SWEET'S ARCHITECTURAL CATALOGUES



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Horn, A. C., Co..... A207
Toch Brothers A272
Bar-X A207
R.I.W. A272

Paint
See Paint, X-Ray Proof

Proofing
(See also specific products)
Bar-Ray Products, Inc.....B2645
Bar-Ray B2645

Z

Zeolite Water Softeners
See Softeners, Water

Zinc
Oxide
New Jersey Zinc Co.....C4113

Shingles
See Shingles, Metal

Sulphide
New Jersey Zinc Co.....C4113

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HAMILTON MANUFACTURING CO.

Manufacturers of Drafting Room Furniture

GENERAL SALES OFFICE AND FACTORY
TWO RIVERS, WIS.

RAHWAY, N. J. CHICAGO, ILL. LOS ANGELES, CALIF.

Products

OAK and STEEL SECTIONAL PLAN FILE CABINETS; ADJUSTABLE DRAWING TABLES; DRAWING BOARDS.

Also manufacturers of Collapsible Drawing Tables and Easels, Parallel Rule Attachments, Artists' Tables, Typewriter Tables, School Tables, etc.

Hamilton-Calumet Plan File Units

Made for sheets from 24x36 to 42x72 in.

Shallow Drawer Units—The shallow drawer units are for active tracings. The semi-mechanical lifter eliminates wear and tear. This feature permits active tracings to be filed rapidly and efficiently.

5-Drawer Unit—The 5-drawer unit is for semiactive tracings in folders; 4 folders of 50 sheets to a drawer.

Shelf-filing Units—The shelf-filing units are for storage of inactive plans; 4 folders of 50 sheets to a shelf.

Hamilton-Calumet Vertical Plan File

A vertical file for the most efficient handling of large records or sets of plans. The sheets are held in binders, 26 binders of 100 tracings each to a cabinet.

Made for plans from 24x70 to 48x70 in.

Made of steel, olive green finish.

Hamilton Oak Plan File Units

These units are thoroughly well made of seasoned oak and well finished.

They are made for drawings 24x36, 30x42 and 36x48 in. Special sizes can be made to order.

Bases are supplied in four different styles; flush to the floor or on legs, sanitary style.

Hamilton Drawing Boards

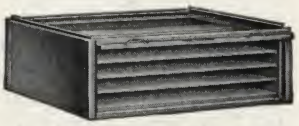
Made in pine or basswood in seven styles and in any size from 10x12 to 48x96 in. Special sizes made on order.



Shallow Drawer Unit

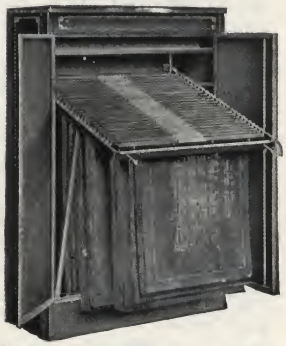


5-Drawer Unit



Shelf-filing Unit

Hamilton-Calumet Plan File Units



Hamilton-Calumet Vertical Plan File



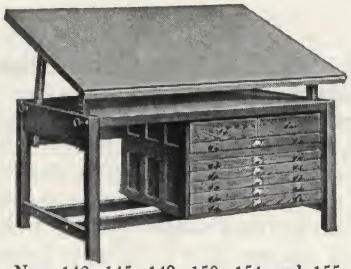
Oak Plan File Cabinet Units, Combination 29



Style A Drawing Board



Hamilton Drawing and Reference Table No. 239-A



Nos. 142, 145, 149, 150, 154 and 155
Hamilton 4-post Drawing Table



No. 214-D
Hamilton Steel Base Drawing Table



Hamilton De Luxe Drawing Table



Hamilton Ideal-Universal Drawing Table

Hamilton Drawing and Reference Table No. 239-A

The top is of pine 36x54 in., which can be tilted to any angle or used vertically. The top also slides forward or back 17 in.

Table No. 239 — no units.

No. 239-A, with 2-drawer unit, with letter file drawer and tool drawer.

Has dust covers on drawing board and reference surface.

Hamilton Adjustable 4-Post Drawing Table

The pine top is adjustable in height and slant. Any drawer combination can be supplied. They are made from 36x60 to 42x84 in.

Hamilton Steel Base Adjustable Drawing Table

This table has an unbreakable steel base, with pine top; in sizes from 36x48 to 48x120 in., and is made with or without the drawers.

The top is easily adjustable in height by a new screw device.

Hamilton De Luxe Adjustable Drawing Table

The base is very rigid and is of cast iron and steel, finished in olive green. The pine top is very easily adjusted in height and slant. Table is adjusted by bevel gears and spiral shaft. Made from 36x48 to 42x84 in.

Hamilton Ideal-Universal Adjustable Drawing Table

The pine top is adjustable in height and slant as well as vertically. Top also slides forward or back 25 in., making the table adaptable to any kind of drafting or art work.

Further Information

For further information on Hamilton Drafting Room Furniture, ask for Catalog No. 7-S.

For further information on the Hamilton-Calumet Plan File System, ask for Catalog No. 9-S.

THE C. F. PEASE COMPANY

Blue Printing Machines and Accessories, Drafting Room and Architects' Supplies

EASTERN SALES OFFICE AND DISPLAY ROOM
12 East 44th Street
NEW YORK, N. Y.

837 North Franklin Street, Chicago Avenue Station
CHICAGO, ILL.

PACIFIC COAST SALES OFFICE
541 South Spring Street
LOS ANGELES, CALIF.

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Products

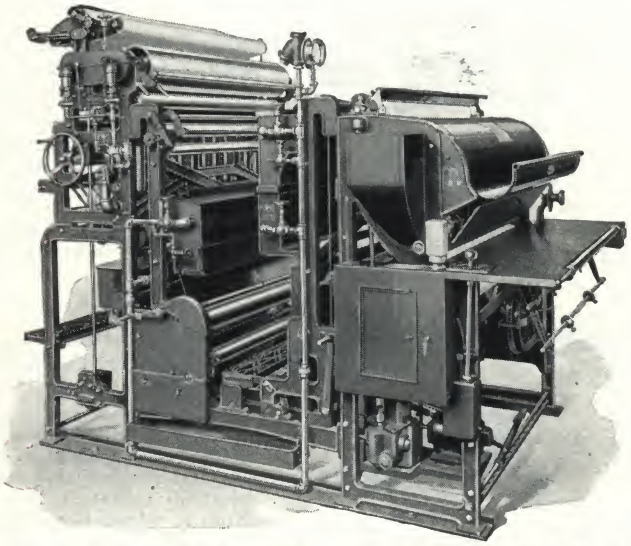
BLUE PRINTING EQUIPMENT and ACCESSORIES, which include: Blue Printing Machines; Washing and Drying Machines, single sheet and continuous types; Blue and Brown Print Paper and Cloth, sensitized and unsensitized; Blue Print Room Supplies.

DRAFTING ROOM FURNITURE and SUPPLIES of all kinds: DRAWING INSTRUMENTS and MATERIALS of every sort; all leading brands of TRACING PAPERS and CLOTHS in rolls and cut and printed sheets.

Also Architects', Engineers' and Surveyors' Instruments and Supplies.

Pease "Peerless" Model "30" Continuous Blue Printing Equipment (Electric)

For Maximum Production—This latest model new Pease Blue Printing Equipment will produce highest quality blue prints, negatives, blue line or brown line prints in continuous operation, with amazing speed, at lowest possible cost. Has speed range from 4 in. to 12 ft. per minute—240 lin. yd. per hour. Blue printing machine can be operated separately from washing and drying machine, for making single prints. Also, blue printing machine can be purchased separately and washing and drying machine added later.



Pease "Peerless" Model "30" Continuous Blue Printing, Washing and Drying Machine

Outstanding Features — Vacuum-like contact. Concentrated light distribution. Dial speed control. High, low and reverse, auto-type gear shift. Synchronized gear drive throughout. Roll driven paper, no strain, no breakage. High pressure atomized back and front water wash. Revolving roll potash bath—no potash loss or dilution. Low chemical consumption. Roll ironing double drum dryer (chromium plated copper cylinder—gas or electrically heated), automatic roll up device. Operator has fewer duties to perform. All operating mechanism at front and left-hand side of machine for power, water and heat control. No extension parts. Easily accessible for cleaning and oiling.

Construction and Assembly—Frame rigidly constructed of best gray iron castings finished in olive green enamel. Shipped in four sections including negative unit—all interlocking—easily assembled without misalignment. Equipped with Pease Type "P" Universal Arc Lamps. Operates on 220 volts d-c. or a-c. Electrical construction approved by Underwriters—all piping and wiring complete.

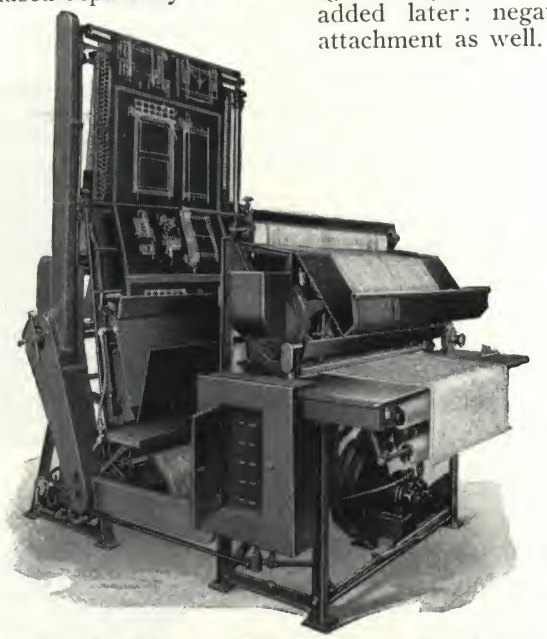
Size and Floor Space—All units furnished in two sizes, 42 and 54 in. wide. Over-all dimensions of 42-in. complete equipment are 5 ft. 8 in. wide by 9 ft. deep, by 7 ft. high. Over-all dimensions of 54-in. complete equipment are 6 ft. 8 in. wide by 9 ft. deep by 7 ft. high.

Special Model "30" Brochure—Contains complete specifications, illustrations, and description.

Ask for Catalog MP-337.

Pease "Peerless" Model "20" Continuous Blue Printing Equipment (Electric)

For Normal Output—This pioneer continuous blue printing equipment will turn out high quality blue prints, negatives, blue line or brown line prints at low cost. Has speed range from 4 in. to 6 ft. per minute—120 lin. yd. per hour. Blue printing machine can be operated separately from washing and drying machine for making single prints. Also, blue printing machine can be purchased separately and washing and drying machine added later: negative attachment as well.



Pease "Peerless" Model "20" Continuous Blue Printing, Washing and Drying Machine

Continued on next page

Special Features—Excellent contact. Concentrated light distribution. Synchronized operation. Electric speed control. Uniform application of potash. Thorough water wash. Smoothly dried prints (gas or electrically heated dryer), automatic roll-up device. No extension parts. Simple to operate.

Construction and Assembly—Frame is rigidly constructed of best gray iron castings finished in olive green enamel. Enclosed operating mechanism. Shipped in two sections—printer and washing and drying machine. Negative attachment furnished separately on special order. Equipped with Pease Type "P" Universal Arc Lamps. Operates on 220 volts d-c. or a-c. Electrical construction approved by Underwriters—all piping and wiring complete.

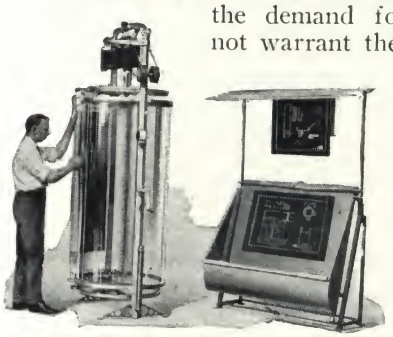
Size and Floor Space—All units furnished in two sizes, 42 and 54 in. wide. Over-all dimensions of 42-in. complete equipment are 5¾ ft. wide by 7¾ ft. deep by 9¼ ft. high. Over-all dimensions of 54-in. complete equipment are 6¾ ft. wide by 7¾ ft. deep by 9¼ ft. high.

Special Model "20" Catalog—Contains complete specifications, illustrations, and description.

Ask for Catalog MP-237.

Pease "Senior" Vertical Blue Printing Machine and Sheet Washer (Electric)

A Fast Vertical Blue Printing Machine—Where the demand for blue printing does not warrant the purchase of a Pease "Peerless" Model "30" or Model "20" Continuous Equipment, the Pease "Senior" Vertical Blue Printing Machine and Sheet Washer meets every blue printing requirement.



Pease "Senior" Vertical Electrical Blue Printing Machine and "Senior" Sheet Washer

Machine is made in six sizes and is equipped with a Pease "UV" Universal High Power Arc Lamp which operates on either 110 or 220 volts d-c. or a-c. The Pease Sheet Washer is made in three sizes and completely eliminates open bath trays, dripping prints and wet floors.

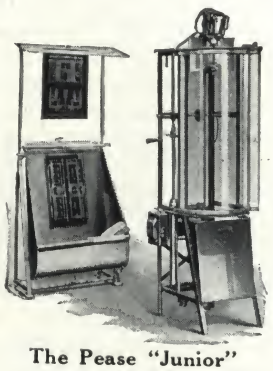
Ask for Catalog MV-37.

Pease "Junior" Vertical Blue Printing Machine and Sheet Washer (Electric)

For Moderate Users of Blue Prints — Completely eliminates old unreliable makeshift or sun frame methods and will furnish clear and distinct blue prints in any size up to 24x36 in. in from one to one and one-half minutes. Similar in design to the Pease "Senior" Vertical Machine, can be stood in a corner of the drafting room, and can be connected directly into the lighting circuit.

Initial investment is small and maintenance expense is reduced to a minimum.

Ask for Catalog MJ-37.



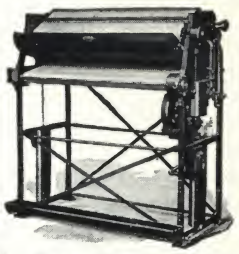
The Pease "Junior"

Machine operates on either 110 or 220 volts a-c. or d-c. and requires a floor space only 25x26 in. The sheet washer requires a floor space of 24x34 in. and is equipped with spray pipe and drain pipe

Pease Sheet Dryer

No Waiting for Prints to Dry—Dries prints perfectly dry at rate of either 4 or 8 lin. ft. per minute. Either gas or electric heating element can be furnished and Pease Dryers are equipped with a revolving copper cylinder to which prints will not adhere. An inclined feeding apron eliminates steam pockets and resultant creased prints while automatic band control regulates traveling of the band. Made in 42 and 54-in. widths.

Ask for Catalog SD-37.

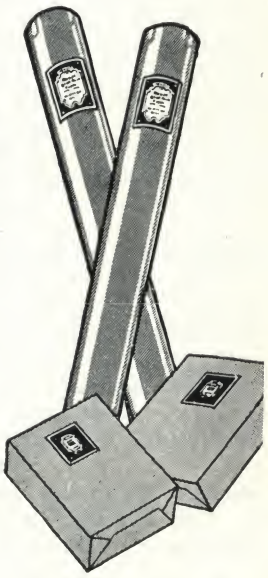


Pease Sheet Dryer

With gas heater, thermostatic heat control and automatic band control. Electric heating element can be furnished if desired

Pease Blue Print Paper

Guaranteed Rag Stock—Pease Blue Print Paper is coated in four printing speeds and all rolls are guaranteed to contain exact rag stock specified and be of full measure and in one piece. Also furnished flat in sheets—cut to sizes specified. Has a high folding test, excellent permanency and is the nearest non-fading blue print paper in existence. Pease Paper is thoroughly tested every hour — every roll — all throughout production. Fresh stock is coated daily and your order is shipped the same day it is received. Special moistureproof, lightproof wrapper prevents deterioration.



Send for complete information on Pease Papers and Cloths for making highest grade blue prints, negatives, blue line and brown line prints.

Ask for Catalog BP-37.

When ordering Pease Paper or Cloth give your machine data, including current and voltage. Also specify width, speed, and weight of paper desired.

Pease Drafting Room Furniture and Drafting Room Supplies

Includes both steel and wooden, sectional horizontal and vertical filing cabinets; drawing tables; drawing boards; draftsmen's stools and drawing materials, briefly — "Everything for the Drafting Room."

We are National distributors of Pease-Hamilton Drafting Room Furniture and a complete stock is carried on hand at all times. Prompt shipment can be made from either Chicago, New York, or Los Angeles.

Ask for Catalog F-37.



Pease Filing Cabinet

General Catalogue G-37

Ask for your copy.

Contains complete illustrations and descriptions of the full line of Pease Blue Printing Machinery, Blue Print Paper, Drafting Room Furniture and Supplies, Architects', Engineers' and Surveyors' Equipment.

GAS SERVICE AND EQUIPMENT RECOMMENDATIONS

of Architects' and Builders' Service Committee

AMERICAN GAS ASSOCIATION

420 Lexington Avenue

NEW YORK, N. Y.

Public Interest in Gas Service

The rapid increase in the number of American communities recently provided with natural gas service and plans for early extension of natural gas service to other communities have awakened a new public interest in the comfort, convenience and economy of modern gas service in the American home. Further impetus has resulted from the development of "bottled gas" and home gas plants for buildings not connected with city gas mains. This spread in availability of gas service has been preceded and accompanied by the adoption of more scientific gas rates on the part of manufactured and natural gas companies which has greatly expanded the use of gas for house heating, water heating, and other domestic purposes.

Services of Gas in the Home and Apartment

Recent scientific developments in the manufacture of gas appliances make gas the ideal agent for cooking and refrigerating food, disposing of household waste, providing ever-ready hot water, heating the household uniformly and permitting clothes to be laundered in the home under conditions of known cleanliness.

New Beauty in the Gas Range

Gas has long been recognized as ideal for cooking because quickest, cleanest, most economical and flexible. New range designs by several manufacturers have given an added degree of beauty to the kitchen. One of these is illustrated in Fig. 1, and many others are available to meet the color scheme and enhance the beauty of the new style kitchen. Modern gas ranges provide automatic oven-heat control and include oven insulation to insure a comfortable kitchen temperature. Automatic lighting devices and other special convenience features minimize the time spent in the kitchen.



Fig. 1. One of the New Design Gas Ranges with Oven Heat Insulation and Automatic Oven Temperature Control

Range models in all types and sizes are available for any apartment or residence kitchen. For further information see Sweet's Catalogue Index, section ranges, and consult the local gas company.

In specifying range sizes, care should be taken that the oven is of sufficient size to meet the family needs. A standard 18-in. oven should be utilized whenever possible. Where space is limited in apartments and small residences, this can be accomplished by specifying one of the several types of ranges, which carry the oven and broiler directly below or above the cooking top burners. Undue restriction of the oven and cooking space seldom justifies the inadequate cooking facilities that result.

Flues and Ventilation for the Gas Range

Adequate ventilation of the kitchen is always desirable. A flue connection arranged to vent a hood installed over the range is the most desirable form thus carrying off all cooking odors and products of combustion. Where this is impossible the range may be directly connected to the flue opening which should be approximately 4 in. in size. A good chimney with ample updraft should be provided and the installation of an approved back-draft converter is recommended.

Gas Refrigeration—The Latest Scientific Development

The gas refrigerator, shown in Fig. 2 on the following page, is the latest development in the field of automatic refrigeration for the home and apartment. With no moving parts to wear, cause noise or vibration, or require oiling, the unit is silent in operation, a feature greatly appreciated in both homes and apartments. Control of the refrigerator temperature is accurately maintained by means of an automatic temperature control device, which regulates the flow of gas to the burner. The gas is automatically shut off, should the flame ever be extinguished. All water used to cool the unit is automatically regulated to maintain the amount just sufficient for complete refrigeration.

Three necessary outlets, all ⅜ in., are required for the gas supply, water supply and water drain. The refrigerator is connected to these by means of ⅜-in. copper tubing, which can be readily bent and concealed. Due to the small gas and water consumption averaging 1500 cu. ft. of gas and 450 cu. ft. of water monthly, the operating cost is unusually low. Absence of moving parts insures long life.

Continued on next page

Automatic Hot Water Service

Efficient and safe gas-fired water heaters for automatic hot water service are available in two main types:

The automatic instantaneous water heater is suitable for water supply under a pressure of 20 lb. or more at the highest faucet. The gas burner operates only while the water flows from the faucet, the burner being ignited by a pilot light and controlled by a valve operated by water pressure. These heaters are both economical and efficient, but their large demand for gas for short periods requires a larger gas supply pipe and meter.

The more usual type shown in Fig. 5 is the automatic storage heater consisting of an insulated water tank, a pilot light, thermostat and gas burner, so connected that the tank is always kept full of hot water. This type can be used on low pressure water supply and requires only a ¾-in. gas pipe and meter of corresponding size.

Where an installation is required at minimum cost, a non-automatic hot water service can be secured through the use of the circulating or tank type of gas water heater, manually controlled. Accessories can be had for this type of heater, whereby the gas can be automatically turned off after a given time. It is also possible to convert this type of heater to the automatic type later, if desired.

Sizes—The local gas company or water heater manufacturer will gladly suggest the proper size and type of heater for any installation.

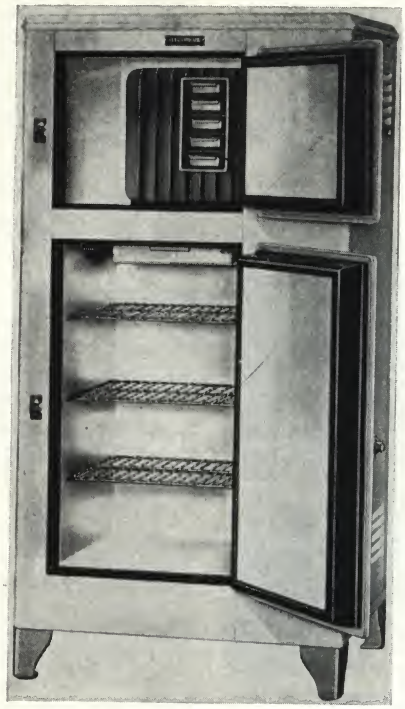


Fig. 2. A Popular Model of the Gas Refrigerator Which Is Available for Any Home or Apartment Kitchen

Location of Water Heater

Water heaters should not be installed in bathrooms or closely confined spaces.

All automatic water heaters should be provided with flue connections, and suitable back-draft diverter.

The presence of a water meter may serve to make the water system a closed system, as water meters permit the flow in only one direction. It is to be recommended that all water heating systems be operated with a pressure relief valve at some point.

Auxiliary Room Heating

Individual gas room heaters perform a welcome service during the autumn and spring in removing chill and dampness from the room without necessitating the operation of the main heating plant, which is not designed for efficient operation at low temperature and for short periods. In addition certain types may be employed to give the beauty and comfort of the open fireplace without the ashes, dirt and inconvenience of old heating methods. Types are available to harmonize with every style of fireplace and interior decoration, as follows:

1. Radiant Heaters, Often Called Fireplace Heaters—This appliance employs the principles of radiant heat. Although the radiant heater is odorless, it is best adapted for use in vented fireplaces. The proper position of the radiant surface is 1-in. behind the front surface of the face of the fireplace. This type also includes those made to resemble coal basket grates, illustrated in Fig. 3.

2. Individual Gas-fired Radiators, Either Steam or Hot Air Type—This appliance may be used in combination with a central heating plant or may be the sole means of heat where a central plant is not necessary or feasible.

3. Flame Type Heaters, Either Portable or for Wall Installation—These are often connected by means of flexible gas tubing, although this is not a recommended practice. Where flexible hose connections are necessary be sure that the tubing utilized has been tested and approved by the American Gas Association Testing Laboratory, and that the shut-off gas cock is located in the gas pipe outlet and not on the heater. Safety hose cocks installed on all gas pipe outlets will prevent accidental opening.

4. Base Burner or "Circulator" Type Heaters—This new gas appliance is designed to replace the coal-fired base burner previously used in homes. These heaters are really miniature pipeless warm-air furnaces, in which the flue gases from the burner pass through ducts leading to the flue connection. The air to be heated enters through openings in the side of the heater, circulates around the outside and through the center of the ducts, leaving the heater through the framework at the top. A large humidifying tank is supplied with these heaters. Floor or wall furnaces are a special type of the appliance.

The heater should be located so as to require not more than 10 ft. of horizontal flue run to a good chimney, and an approved back-draft diverter should be utilized.

Gas Equipment in the Laundry

Gas service plays an important part in the domestic and apartment laundry by providing a convenient method of drying clothes, irrespective of weather conditions; affording ample heat for the operation of automatic ironers capable of handling the heaviest clothing; and by keeping the water in the washer at a right temperature for best results.

Two distinct types of gas heated dryers are available.

In the cabinet dryer, illustrated in Fig. 4, numerous rods are installed for hanging the clothes while drying. Access to the rods is through doors opening outward and requiring approximately 3 ft. of space in front of the cabinet.

Another cabinet type dryer is equipped with a vertical counterbalanced sliding door to save space.

The rack type dryer provides for the hanging



Fig. 3. A New Coal Basket Type Heater to Give Fireside Warmth without the Usual Ashes and Inconvenience

Continued on next page

of clothes on racks, which operate on a control or runners, the rack frame being pulled completely out from one end of the compartment when handling the clothes.

Modern dryers have thermostatic controls which automatically regulate the temperature in the cabinet to suit the needs of the articles being dried.

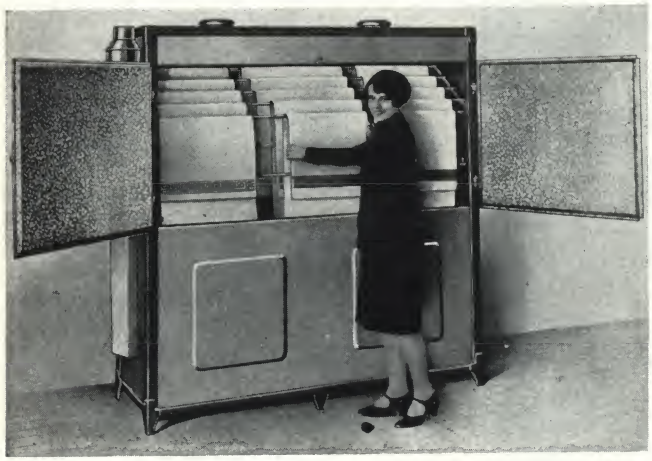


Fig. 4. The Gas Heated Laundry Dryer Is Essential in the Modern Home or Apartment Laundry

Heating the Whole House with Gas

The recent growth in the number of gas companies offering special gas rates for house-heating customers has resulted in a rapid development of this use of gas. The modern home owner desires automatic heat and realizes that gas is the ideal fuel for this purpose. Gas equipment is manufactured to meet all heating requirements—for steam, vapor, hot water or warm air systems. Each of these types has its special advantages and all operate with a very high efficiency. In addition special automatic gas burners are available for utilizing gas fuel in the existing heating plant, where its design is such as to make this an appropriate and efficient method.

Gas heating installations, whether special design or conversion equipment, ordinarily include every form of safety and control device to make their operation completely automatic and reliable, such as room thermostats, safety gas pilots, low water and high temperature controls, gas and steam pressure regulators.

Amount of Gas Required for House Heating

The uniformity of the heating value of gas makes it possible to predict with great accuracy the amount required to heat a home in any territory, once the type of house construction and climatic conditions are taken into account. The local gas company can easily provide an accurate estimate of the cost of heating any house upon request.

All gas-fired heating systems should be thermostatically controlled, inasmuch as the saving in fuel under these conditions and the uniform temperature made possible more than pay for the added cost of the heat control equipment.

The house equipped with gas heating gives positive assurance that the home will always be kept warm and comfortable automatically without any labor and attention on the part of the owner.

The development of gas heating for the first time recovers the space ordinarily required for other fuels and makes it available as a clean and thoroughly useful part of the house. See Fig. 5.

Building Insulation Cuts Fuel Costs

The wall and roof heat losses of most old or new houses can be cut to one-third of their normal value by the use of insulation with corresponding reduction in the necessary radiation and furnace equipment as well as the operating expenses of heating the house. Oftentimes the savings in installation and cost of operation cover the added cost of insulating the house and make it possible to utilize gas for heating the home at little or no extra cost over other fuels.

Incineration

The gas-fired incinerator makes possible the complete disposal of household garbage, safeguards health, and saves labor and eliminates the unpleasant odors and opportunity for the spread of disease resulting from accumulation of garbage between collections by the municipality. In addition to this the use of the incinerator avoids the fire hazard caused by the accumulation of household waste, old boxes and paper.

The installation of an incinerator requires a flue, as shown in Fig. 5, and therefore this appliance should be located as near to the chimney as possible.

Flue Connections and Gas Appliances

With the exception of small hot plates, portable appliances and refrigerators, for maximum convenience, efficiency and safety practically all domestic gas appliances are designed for flue connections. Architects and builders are, therefore, urged to give most careful attention to the necessity of providing sufficient and adequate flues in the building plans in order to facilitate these modern services of gas in the home under advantageous conditions. A flue connection for the range, in addition to providing comfortable kitchen temperatures, will eliminate all cooking odors and vapors, thus paying for itself by avoiding frequent redecoration. Every modern home should provide for flue connection of the gas water heater. Special attention should be given to flues for heating plant, fireplace heaters and incinerators where these are contemplated or may be installed after house is completed. Local rules and regulations enter so largely in the matter of flue connections that no detailed recommendations may be given herein. The local gas company will gladly furnish complete information.

Selection of Gas Appliances

No gas appliances should be installed which are not capable of such adjustment as will bring about the complete combustion of the gas supplied under all reasonable service conditions. Because it is somewhat difficult for those not experienced in the utilization of gas to determine whether a gas appliance will comply with this requirement, the AMERICAN GAS ASSOCIATION, in 1925, established a complete laboratory which tests all types of gas appliances. The Laboratory Approval Seal shown on a gas appliance is a guarantee of its compliance with basic national safety requirements established by experts from the United States and Canadian Gas Industry, the U. S. Bureau of Mines, U. S. Bureau of Standards, U. S. Public Health Service, Heating and Piping Contractors' National Association, the Master Plumbers' Association and the National Board of Fire Underwriters, which every appliance should meet.

To date official approval requirements have been promulgated for ranges, water heaters, space heaters, central plant house heating equipment, incinerators and clothes dryers. Approval requirements for other varieties of appliances are being prepared. Approved appliances which meet or excel these basic requirements are available over a wide range in prices.

Continued on next page

Architects and builders are urged to specify and install only appliances which have been tested and approved by this laboratory. A large variety of each type of appliance appears on the Approval List, which is issued monthly and may be secured free from the local gas company or the AMERICAN GAS ASSOCIATION.

Proper Piping for Domestic Gas Service

No less important than the quality of the appliance itself is the provision of adequate supply piping, in order to insure the safe and satisfactory performance of gas appliances. Piping of the proper size insures constant and sufficient gas pressure and results in uniform operation of the burners, giving complete combustion and insuring reliable performance.

The following table gives the gas consumption of various domestic appliances and indicates the sizes of outlet ordinarily necessary for each appliance:

Appliances	Size of outlet ordinarily necessary, in.	Usual maximum gas consumption, cu. ft. per hour operation*
For the Kitchen:		
Gas range	¾	110
Gas refrigerator	⅜	3
For the Basement:		
Gas water heaters:		
Manual	¾	40 to 80
Instantaneous	1¼ to 1½	60 per gallon water supplied per minute
Automatic storage	¾ to 1	60 to 80
Gas incinerators	¾	40 to 60
Gas boilers	1½ to 2½	300 to 1600
		About 85 per hour per 100 sq. ft. installed cast iron steam radiation
Gas warm air furnaces	1½ to 2½	250 to 1000
		About 35 per hour per 10,000 B.t.u. hourly heat loss from the building
For the Domestic Laundry:		
Gas heated laundry dryers	¾	60 to 90
Gas laundry stove	¾	30
Gas heated ironers	¾	20 to 40
Gas heated washers	¾	20 to 40
For Space Heating:		
Gas radiant heaters (for fireplaces)	¾	30 (or 3 per radiant)
Gas room heaters (flame type)	¾	15 to 30
Gas radiators (warm air)	¾	15 to 30
Gas radiators (steam)	¾	3 per section
Gas floor furnaces	¾ to 1	100
Gas garage heaters	1	50
Gas wall heaters	¾	15

**Note:* For natural gas installation these figures should be divided by two.

Four factors determine the size of pipe needed—length of pipe, maximum gas consumption to be provided for, the allowable loss in pressure from the meter to the appliance, and the specific gravity of the gas. The gas company will be glad to advise the proper pipe sizes to insure good service to your installation of gas appliances.

Piping should not be laid under tile, parquet or mosaic floors, where it is possible to avoid it. Piping should not be run along the bottom of beams that are to be covered with lath and plaster, but should be run along the top of beams or joints, where it is possible, so that it will be accessible by raising the floor boards, which, when covering such piping, should be fastened with brass screws.

All parts of piping should be securely and permanently fastened to or supported from the building itself. If this is not done, sags or undue strains may later develop and the piping may leak or condensation may accumulate in the low points of the sags and interfere with the free flow of gas.

All piping should be graded toward the meter or outlet—condensation can then be removed if necessary. Meters should be set in a clean, dry, safe place, not subject to wide variations in temperature.

The local gas company has complete information on the size, price and instruction for installing all of the equipment mentioned herein, and will be glad to supply this information upon request without obligation or cost to you.

In addition, the Architects' and Builders' Service Committee of the AMERICAN GAS ASSOCIATION will be glad to furnish without charge specific answers to any questions relating to the design, construction and installation of gas service in the home.

General Principles of Installation

As local conditions govern to a great extent the practice and installation of gas piping it is urged that before the contract is let for this important part of the building, the local gas company be consulted. The following general conditions, however, apply in practically every community:

Appliances should be installed so that their continued operation will not in any way create a fire hazard because of adjacent flammable material. Vent pipes should not be run closer than 6 in. to unprotected ceiling and wooden joists.

Any appliance which consumes large quantities of gas, or which is automatically controlled and which depends upon a pilot light for ignition, should be connected to an adequate flue or flue pipe. This rule is particularly significant with regard to the large appliances, such as central heating systems. These burn such large quantities of gas that every precaution should be taken. As further protection, it is advisable to insist on thermostatic or other forms of safety pilots which cut off the main gas supply if the pilot is extinguished.

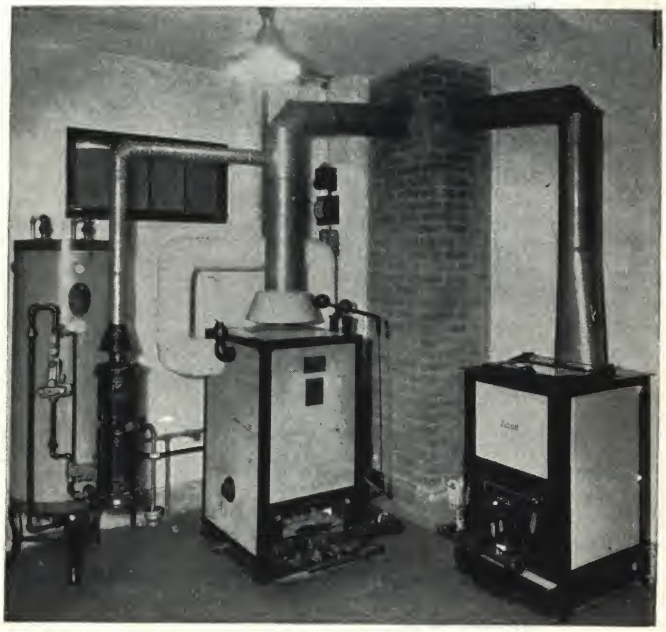


Fig. 5. Corner of a Modern Basement Showing the Automatic Gas Water Heater (left), Gas Boiler for House Heating (center), and Gas Fired Incinerator for Disposal of Household Waste

THE BELL TELEPHONE SYSTEM

AMERICAN TELEPHONE AND TELEGRAPH COMPANY AND ASSOCIATED COMPANIES

A Service for Architects, Builders, Engineers and Owners

Comfort and convenience are basic requirements of modern telephone service. Their complete realization in large buildings or in residences involves the planning, in advance of construction, of suitable facilities for telephones.

To help in the attainment of adequate telephone comfort and convenience our telephone engineers have prepared two illustrated booklets which will be furnished gladly to those interested in building projects.

Write or call the nearest Bell Telephone business office.

Planning for Telephone Comfort and Convenience

With the view of laying out the required facilities to best advantage, the telephone company will be glad to co-operate with architects, engineers, builders and owners relative to desirable service arrangements for proposed projects. This consulting service of the telephone company is available without expense and should be particularly valuable to architects and others who are engaged in the design of plans and specifications for sale to home builders.

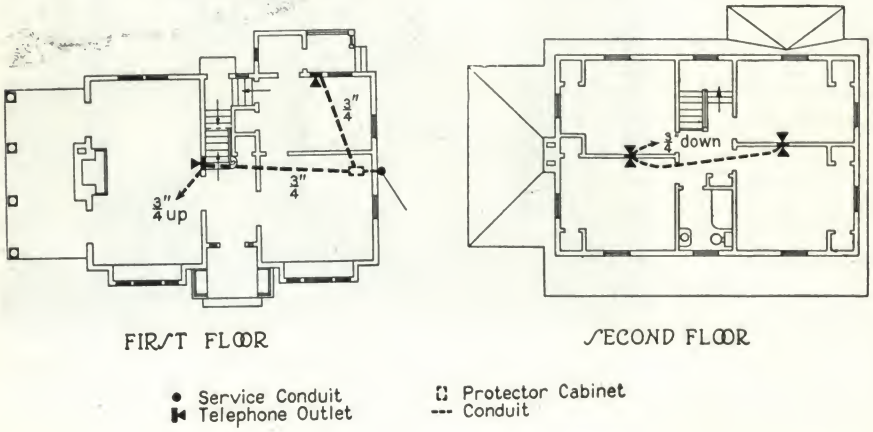
These facilities make for the satisfaction of the owners and tenants in the general improvement in appearance effected, as well as in the betterment of telephone service. *They are not provided by the telephone company since, in common with water, gas and electric light and power conduits, they must necessarily become a permanent part of the structure.*

Any business office of the telephone company will be glad to arrange for conferences between owners, architects, engineers and builders and the telephone company's representatives with reference to any phase of this matter.



House and Two Floor Plans

Diagram below shows service conduit on side of house connecting to protector cabinet in cellar. From this point conduit is run to telephone outlets on first floor. Conduit also connects these telephone outlets with outlets on second floor



Residences

With the growing appreciation on the part of telephone subscribers of the comfort and convenience to be obtained from adequate telephone service, more telephone facilities are being installed in homes to provide sufficient central office lines for family and servant use and for intercommunication within the household. It is important, therefore, that the facilities provided in the home be adequate for all of the telephones that may be desired, initially as well as in the future.

The placing of facilities for telephone wires and apparatus during construction results in general improvement of residences, in that better appearance is secured by concealing the wires and some of the apparatus; additional telephones when desired can readily be placed at convenient locations; protection is afforded to the wires and apparatus, thereby serving to prevent interruptions to the telephone service; and the service arrangements can be rearranged or enlarged without marring the walls and woodwork.

Following are some of the more important considerations in planning facilities for telephone convenience in residences.

Service Entrances—The location of the service entrance should permit as direct a route as possible for the wires from the telephone terminal to the entrance. If there is any doubt as to the point from which the wires will run, the telephone company should be consulted before the service entrance is located.

Service Conduits for Telephone Wires—Conduit should be provided for running the telephone wires from the point of attachment on the house into the building. The telephone company will run its wires through this conduit as required.

Telephone Protector Cabinets—Most residences require a protector in the telephone line. It is desirable, therefore, that arrangements be made in connection with the service conduit for the telephone protector. This is accomplished by providing a metal cabinet of suitable size to which the service conduit and the conduit to the telephones are connected.

Continued on next page

Conduit for Inside Telephone Wires—In order to install the conduits for telephone wires while residences are under construction, it is necessary, of course, that the telephone locations be determined in advance.

If a wall box or telephone cabinet is not installed, the run of conduit from the protector cabinet should terminate in an outlet box.

Separate iron pipe conduit run from the protector cabinets to the telephone locations should be installed in the same manner as required for electric light installations.

Buildings

The provision of facilities for telephones during construction makes possible the concealment of the telephone cables and wires and thereby improves the general appearance of the building and its offices. The mechanical protection afforded the cables and wires serves to prevent interruptions to the telephone service. The flexibility provided by such facilities makes possible rearrangements and changes in the location or number of telephones which are often necessary to meet changing requirements for service, without the drilling of holes through finished walls and floors, the exposure of wires and cables in offices and in halls, and defacement of walls and trim by the wire attaching devices.

Following are some of the more important considerations in planning facilities for telephones in buildings.

Service Entrances—Service entrances may be underground or overhead. When the connection to the telephone company's plant is to be underground the matter of providing the necessary conduit for connecting the telephone plant with the owner's premises should be discussed with the telephone company. When the telephone company's plant outside the building is not underground and the owner of the building desires telephone service through underground conduit, the required conduit connection may be made at the owner's expense by a contractor in accordance with specifications which the telephone company will be glad to furnish.

Facilities for Cables and Wires—Facilities which carry the cables from the telephone company's plant to and through the building consist of main cable terminal cabinet or frame, riser shafts or vertical riser conduits, splicing closets, distributing terminal cabinets, conduit between splicing closets and distributing terminal cabinets.

Facilities which carry the telephone wires from the distributing terminal cabinets under the floors or by means of raceways to the telephone locations, consist of underfloor systems, conduit underfloor and wall system, metal base raceways, wood base raceways, molding raceways.

These facilities for cables and wires for a large building are illustrated diagrammatically in the figure to the right. The arrangement of the facilities will vary with loft buildings, office buildings, hotels, apartment houses, public buildings, hospitals, etc., and the telephone company will be glad to co-operate in determining the best arrangement for specific building projects.

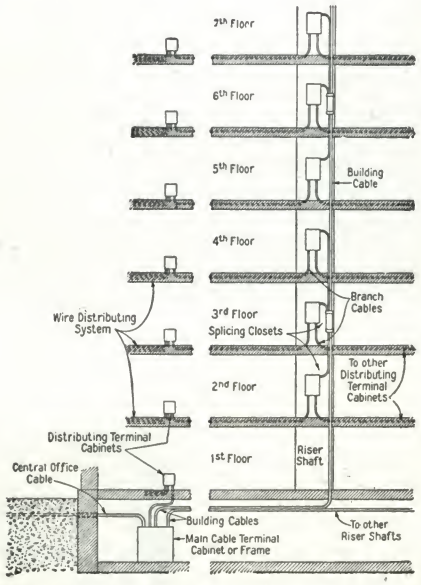
Facilities for Public Telephones—Office buildings, hotels, theatres, clubs, hospitals, etc., require public telephone facilities for the convenience of their occupants and patrons.

These facilities include booths, in which the telephones are placed, and in many of the larger buildings a small switchboard and tables for the telephone directories.

The general appearance and usefulness of these facilities is, of course, enhanced by their inclusion in the design of the buildings so that they harmonize with their surroundings. It is, therefore, recommended that the builders provide the booths as a permanent part of the buildings together with any space that may be required for switchboards and tables for telephone directories. Alcoves or rooms having easy access have been found generally satisfactory for these facilities.

The telephone company provides and installs the switchboard and telephones with the necessary wires and cables and will be glad to furnish data as to space required, booth dimensions, location of electric outlets and fittings to provide suitable illumination in the booths and for directories, etc.

Private Branch Exchange Switchboards and Associated Equipment—In many buildings, especially large office buildings, department stores, and hotels, private branch exchange switchboards are required for handling the intercommunicating telephone service in the building as well as the exchange telephone service. The telephone company should be consulted in all cases where private branch exchange requirements are involved, with the view of determining early in the planning of the building the desirable amount and arrangement of the floor space required for the accommodation of the switchboards and associated equipment and operators' quarters.



Sectional View of Cable Distribution in Office Building

Note how the cables extend up through the building with branch cables terminating in distributing terminal cabinets at suitable points on each floor

ALLEGHENY STEEL COMPANY

GENERAL OFFICES AND WORKS
BRACKENRIDGE, PA.

BRANCH OFFICES

NEW YORK, N. Y., 501 Fifth Avenue
BUFFALO, N. Y., Iroquois Gas Building
CLEVELAND, OHIO, Union Trust Building
CHICAGO, ILL., Peoples Gas Building
DETROIT, MICH., General Motors Building
MILWAUKEE, WIS., Bankers Building
ST. LOUIS, MO., Missouri Pacific Building
LOS ANGELES, CALIF., Roosevelt Building

Products

SHEETS for AUTOMOBILE BODIES, METALLIC FURNITURE, DEEP DRAWS; ALLEGHENY METAL; ASCOLOY; ELECTRICAL SHEETS; STEEL CASTINGS; BOILER TUBES; PIPE.

Allegheny METAL

Building Uses of Allegheny Metal

Allegheny Metal is recommended for building use wherever a bright, silvery surface is needed. It withstands practically every corrosive agent encountered in ordinary use, so its permanence is assured.

Allegheny Metal is used now for interior and exterior trim on buildings; for exterior walls; for kitchen equipment in the home and in commercial institutions; for hospital, dairy, food, laundry and chemical plant equipment.



Allegheny Metal Equipment in a Kitchen
Used because it is unrusting, unstaining, untarnishing

Physical Properties

Allegheny Metal is ductile and malleable, permitting a wide range in design. This alloy may be readily annealed, welded and soldered. It may be drawn, spun, stamped, machined, cast.

Characteristics of annealed sheets of Allegheny Metal are:

Ultimate tensile strength	90,000 lb. per sq. in.
Yield point	45,000 lb. per sq. in.
Proportional limit	30,000 lb. per sq. in.
Elongation in 2 in	61%
Reduction of area	70%
Brinell number	135

Characteristics of Allegheny Metal satisfactory for engineering applications are:

Ultimate tensile strength	120,000 lb. per sq. in.
Yield point	86,000 lb. per sq. in.
Proportional limit	67,900 lb. per sq. in.
Elongation in 2 in	36%
Reduction of area	52%
Brinell number	253

The weight in pounds per cubic inch of Allegheny Metal is .283. This weight is low among corrosion-resisting alloys.

Allegheny Metal is non-magnetic to an extent that has seldom been obtained with a ferrous alloy. It has a permeability of 1.02.

The modulus of elasticity of Allegheny Metal is about 28,600,000 lb. per sq. in. The modulus of shear is 11,900,000 lb. per sq. in.

The specific electrical resistance of Allegheny Metal is .000069 ohms per CM^3 or 416 ohms per circular mil ft.



Soap and Water Shine This Mirror Frame and Vestibule of Allegheny Metal

The thermal conductivity of Allegheny Metal is 48% that of wrought iron. Taking the absolute value of the conductivity of iron as .143, the thermal conductivity of Allegheny Metal is .069 calories per centimeter per second per degree C. over the range from 20 degrees C. to 100 degrees C.







Allegheny Metal Alternates with Black Glass to Trim This Lobby
The metal cleans as easily as the glass

Allegheny Metal is austenitic in structure. Hence, it cannot be heat treated to produce definite physical properties. These properties can be imparted only through hot and cold working processes. This alloy is available in all commercial forms including: blooms; billets; slabs; plates; sheets; rounds; squares; hexagons; flats; castings; wire; rivets; bolts and nuts; screws; cold rolled strips; seamless and welded tubes.

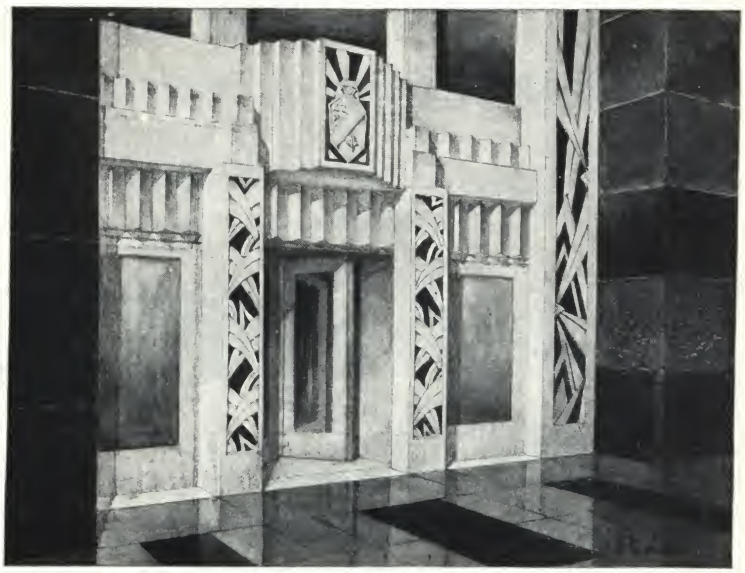
A commercial polished—or scratch brushed—finish is given Allegheny Metal sheets and plates at the mill. It can be buffed and polished to any surface up to the smoothness of a mirror.

Continued on next page

Building Applications of Allegheny Metal

Because it *does* have so many superior qualities, Allegheny Metal has been chosen by architects for three of the world's largest skyscrapers. First was the La Salle-Wacker Building, Chicago. Holabird & Root and A. N. Rebori of Rebori and Wentworth, architects, specified tons of this alloy to trim the interior. Second, the Irving Trust Building on Wall Street, in New York City (architects, Voorhees, Gmelin & Walker) uses Allegheny Metal in the same way. On the third, the Empire State Building in New York City (Shreve, Lamb & Harmon, architects), hundreds of tons of sheets decorate and protect the exterior.

For decorative use, Allegheny Metal affords an interestingly wide range of finishes. Make it mirror smooth for brilliant bands of white. Use it dull for dignity in restrained design. Etch with any pattern to harmonize. Alternate Allegheny Metal, brass and copper for still different effects. But never conceal it or paint it over—better use a baser metal instead.



An Interesting Entrance Design of Allegheny Metal

A new type of design is thrown open by the use of Allegheny Metal because it is so easy to clean. To illustrate, some building managers today instruct their maintenance crews to refrain from polishing escutcheon plates of brass. They do this because the harsh abrasives or powerful cleaning fluids required, would also remove the paint immediately adjacent to the plates, thereby exposing the base metal to corrosion.

No cleaning powders or fluids are needed to keep Allegheny Metal bright. Soap and water are used by most people to keep it shining. And this humble cleaner will not scour off paint.

The type of design hinted by this description employs silvery brilliant strips of Allegheny Metal immediately adjacent to a painted base metal for any kind of flat design, on doors or elsewhere.



This home kitchen unit has shelves and lining of Allegheny Metal to lighten the work of the housewife

Kitchen Applications of Allegheny Metal

Famous large restaurants throughout the United States have found that Allegheny Metal is peculiarly suitable for kitchen equipment.

The reason is that Allegheny Metal is, probably, the nearest approach to an absolutely untarnishable metal. It contains no copper, zinc, tin, aluminum or lead to react with food acids. It will not taint foods with a harsh metallic flavor.

Because of this high resistance to acid reaction, no metal polishes are needed to shine Allegheny Metal. Users generally wipe it bright with a damp cloth. The most they *ever* need use to shine it are soap and water. In the kitchen, Allegheny Metal is economical because it is unplated. The same unrusting, unstaining, untarnishing qualities of its hard surface exist throughout every piece. Recoating is banished forever. Hence, there is no thin surface that can peel or chip and then get into food. Stronger than steel, Allegheny Metal withstands severe denting and scratching.

Through several years of service, every quality of this unusual alloy has been proved time and again. Hotels, restaurants, cafeterias, school kitchens, clubs, dining cars and ocean liners' galleys all testify to its longer life, to its beauty and its pinchpenny economy. Among the prominent restaurant groups using Allegheny Metal equipment are: Childs', William Childs', Thompson's, Horn and Hardart, Waldorf, Stouffer's, and Acker, Merrall & Condit. Scores of hotels have specified kitchen equipment of this alloy.

Other Applications of Allegheny Metal

Hospitals demand absolute sanitation. Allegheny Metal gives it to them easily. Ease of cleaning this ever-bright alloy is a prime factor in its selection for clinical equipment, kitchen and dietary equipment, laundry machines and building trim.

The dairy industry is adopting Allegheny Metal as its standard. This alloy will not taint milk products in any way. This, combined with the ease of cleaning and resistance to corrosion by food acids, makes it a most practical metal for milk handling.

The largest food manufacturers and canners are installing Allegheny Metal wherever their products come in contact with equipment. The same qualities that recommend this alloy in the dairy industry have proved its usefulness here.

In laundries, the delicate fabrics must touch no rough surfaces. They must meet no metal that can stain or spot them. Allegheny Metal is safe, and is being widely accepted.

Chemical plants prepare highly corrosive compounds. Allegheny Metal resists a wide range of corrosive agents, hence, it is being specified widely.

To prove to yourself how Allegheny Metal withstands severe corrosive agents, look at the bright parts of the 1930 Fords. This alloy here has met conditions worse than years of building use. Still it is bright—easy to clean as the windshield.

Warehouse Stocks

Warehouse stocks of Allegheny Metal are carried in the United States by Jos. T. Ryerson & Son, Inc., at Chicago, Cleveland, Milwaukee, St. Louis, Cincinnati, Detroit, Buffalo, Boston, Jersey City, Philadelphia. In Canada, by Samuel & Benjamin, Ltd., Toronto, Ontario.

THE AMERICAN BRASS COMPANY

Sole Manufacturers of Everdur Metal—Sheets, Wire, Rods, Tubes

GENERAL OFFICES
WATERBURY, CONN.

For Mills, Factories, Offices and Agencies, see our page on Sheet Copper

Products

EVERDUR METAL, an Anaconda alloy, is recommended for use wherever service conditions require a metal combining the strength of steel with high resistance to corrosion. Manufactured in the form of Plates, Sheets, Wire, Rods, Tubes, Rivets, Casting Ingots, Forging Blanks and Special Shapes. Arrangements have been made with leading fabricators to supply Everdur in various forms, such as bolts, nuts, screws, nails, castings, forgings, etc.

For pages on Anaconda Sheet Copper, Brass and Copper Pipe, Architectural Bronze, Copper and Nickel Silver, see Manufacturers' Index.

General Properties

Everdur is an alloy of copper (96%), silicon and manganese which is golden bronze in color. It has the strength of medium carbon steel and is immune to season cracking.

Everdur is non-rusting and offers high resistance to a large number of corroding agents (corrosion-resistance data sent on request).

Everdur can be cast, rolled, drawn, spun, forged, pressed and welded, and is worked either hot or cold. It is unique among high-strength, non-ferrous metals in that it is readily welded by all commonly used methods.

Everdur makes unusually sound castings and possesses excellent machining qualities.

Because of this unique combination of properties, Everdur has been successfully adapted to a wide variety of needs. Some of the uses in modern building construction and equipment to which Everdur has been advantageously applied are discussed on this page.

Tanks and Boilers

Everdur, with its high strength and excellent corrosion resisting properties, is the ideal metal to use for water storage tanks.

Everdur tank plates are supplied by The AMERICAN BRASS COMPANY in plates of any size and thickness up to 4200 pounds in weight for the fabrication of large welded or riveted tanks. Domestic water heating units with welded Everdur Tanks can now be obtained from several manufacturers of nationally advertised products. Everdur Tanks used with brass pipe completely eliminate rust from the water supply.

Smoke and Soot Washers, etc.

Because of its high resistance to corrosion, Everdur is used to advantage for smoke and soot washers. It has also been found extremely practicable for ventilating ducts, floor drains, nuts, bolts, screws, etc., subjected to the corrosive conditions encountered in battery rooms, electroplating establishments, railroad terminal sheds, chemical plants, etc. In the last few years Everdur has been used with marked success for skylight frames and supports under conditions so extreme that less durable materials failed in a short time.



Ventilating Duct of Everdur Sheet Metal

Terra Cotta Anchors, etc.

Due to the high strength and high yield point of wrought Everdur, and to the fact that these properties do not diminish even though the metal is constantly subject to the deteriorating influence of water and moisture, Everdur is being used for terra cotta anchors, window cleaners' safety anchors and bolts, ceiling hangers, etc.



Drop-forged Everdur Window Cleaner's Safety Anchor

Roofing Nails

Everdur is being employed on an increasing scale for nailing slate, heavy tile and other materials of considerable weight. Everdur nails possess the strength of steel nails, as well as immunity to rust and high resistance to corrosion. They can be driven into hard woods or other materials without bending in the shank or flattening at the points.

Castings

Leading brass and bronze foundries are prepared to furnish Everdur in all types of castings. The inherent strength and durability of the metal is retained in the cast form, Everdur castings having considerably more strength than the "tin-bronzes" commonly used in foundry work. In addition, the castings produced are finely grained, tough and homogeneous.

ANACONDA
from mine to consumer

Consultation Service

An Anaconda engineer will be pleased to consult with architects desiring further information on the many applications of Everdur in modern buildings.

APOLLO METAL WORKS

LA SALLE, ILL.

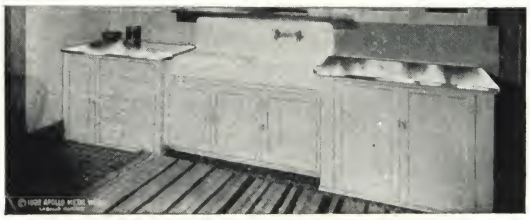
APOLLO CHROM

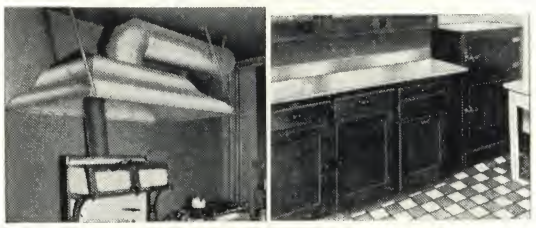
Tarnish Proof Metal—Non-rusting—Corrosion Resistant

Description

Apollo Chrom is manufactured by electrically depositing, on hard rolled zinc, a plate of copper, nickel and chromium. In point of workability Apollo Chrom is handled like sheet zinc. Its treatment qualifies it to be used on all requirements calling for specially finished sheets.

Apollo Chrom is about 33% lighter than copper. In appearance it resembles pure chromium, the platinum-like lustre of chromium matching perfectly the chromium plated plumbing and hardware used in modern kitchens.





Apollo Chrom Is an Ideal Metal for Apartment House Work

For covering shelves, work tables and range hoods it is preferred by metal workers who find it easy to form, inexpensive, and permanently endowed with resistance to tarnish

Qualities

Rust proof, tarnish proof, light and pliable, hard as copper, cleans with neutral soap, resists fruit and food acids, resists alkalis, solders easily and bends both ways of the grain.

Durability

Apollo Chrom is forty-two times more resistant to the salt spray test than a processed nickel sheet. Like all highly polished metals, Apollo Chrom will show the effects of rough usage in a reduced polish, though tests prove that it scratches less readily than nickel silver and in about the same degree as other alloys used for similar work. The surface, after four years' exposure to domestic work, shows no tarnish or appreciable abrasion.

Domestic and Commercial Uses

Table tops, shelf covering, drainboard covering, boat galley covering, kitchen cabinet tops, coffee urn stands, stove hoods, counter covering, sink and sink back covering, trim on showcases, refrigerators and other types of store fixtures.

Basis for Preference

Besides the attractiveness of its unusual surface, Apollo Chrom is preferred on account of its lightness and comparative inexpensiveness when considered in relation to certain alloy sheets. The fact that it does not require constant attention and daily polishing is recommending it to makers of metal trimmed store fixtures. After forming, no buffing is needed to restore the polish, thus reducing the cost of fixtures.

How to Specify Apollo Chrom

For Covering Stove Hoods—Apollo Chrom .024 full finish, high polish two sides.

For Covering Table Tops—Apollo Chrom .024 full satin finish one side is recommended where a high polish may reflect and exaggerate scratches. Otherwise describe sheets to be full finished, highly polished one side.

For Covering Drainboards, Shelves, etc.—Apollo Chrom .024 full finish high polish one side.

For Store Fixtures and Refrigerator Work—Apollo Chrom, LaSalle metal, W. M. selection full finish high polish one side. Gauges between .040 and .055 are generally used for this class of work.

Availability

Apollo Chrom .024 full finish high polish one side is carried in stock by leading metal and hardware jobbers. Satin finished sheets, sheets full finished two sides, and LaSalle metal W. M. selection are obtained on special order only by addressing the manufacturers or through any reliable wholesale hardware or metal house.

File Card and Samples

Write for this material, which is being widely distributed to architects specializing in apartment house work. Ask for S-1.



Attractive Meat Market Showing Practical Utility of Apollo Chrom

ASSOCIATED ALLOY STEEL COMPANY, INC.

SALES DIVISION FOR

Corrosion, Heat, and Wear Resistant Alloy Steels for

LUDLUM STEEL CO., Watervliet, N. Y. SHARON STEEL HOOP CO., Sharon, Pa.
TIMKEN STEEL & TUBE CO., Canton, Ohio

GENERAL OFFICE

1806 Union Trust Building, CLEVELAND, OHIO

BRANCH OFFICES

NEW YORK, N. Y., Chrysler Building
PHILADELPHIA, PA., 1834 Lewis Tower
NEW HAVEN, CONN., 406 Century Building
DETROIT, MICH., 920 Fisher Building
CHICAGO, ILL., 333 No. Michigan Avenue
CINCINNATI, OHIO, 3443 Wellston Place
SAN FRANCISCO, CAL., 90 Tehama Street
LOS ANGELES, CAL., 1417 Santa Fe Avenue









Nirosta KA2 (18% Chromium—8% Nickel)

This steel is of high-chrome, high-nickel alloy *resistant to corrosion* by air, salt water and acids *even at elevated temperatures and high pressures.* It may be welded, drawn, spun and highly polished.

During the past year rapid progress has been made by manufacturers in overcoming production problems, and the principal rolled forms are now available to fabricators for conversion according to the architect's requirements and specifications.

Extensive research has developed that, by slightly varying the analyses, Nirosta KA2 Steel can be given many successful applications which originally it did not serve.

A Mirror Finish, Resisting Tarnish

The rare beauty of this steel will be a major consideration to the architect. It takes, and holds, a mirror finish that is untarnishable under all atmospheric conditions.

When ground or polished, it is proof against water and atmospheric corrosion.

It is not attacked by most acids, whether diluted or concentrated.

Striking Beauty in Architectural Applications

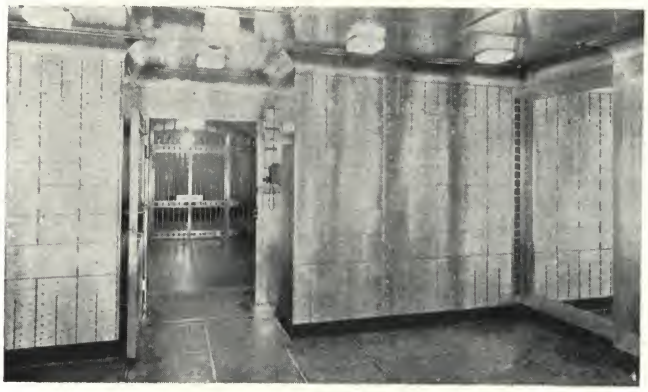
The inherent beauty of Nirosta KA2 Steel is no "outside plating" or surface finish. It is the same all through. Hence when used architecturally, either interior or exterior, its striking appearance will be retained indefinitely.

Nirosta KA2 lends itself ideally to the creative abilities of the architectural designer. A few applications are suggested in the illustrations. These, however, scarcely suggest the variety of uses to which this steel may be applied.

Endurance and Utility

To say that this steel will resist rust and remain untarnished under all adverse air conditions, is only the beginning. Nirosta KA2 retains its original polish under exposure to dust and water; it is resistant to a remarkably wide range of acids and chemicals.

Continued on next page

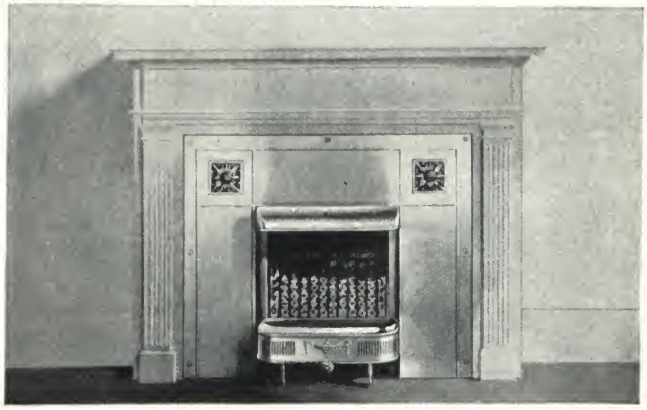




Average Physical Qualities

As heat treated, Nirosta KA2 alloy steel has a tensile strength of 85,000 to 95,000 lbs. per sq. in., and a yield point of 30,000 to 40,000 lbs. per sq. in.

Tabulated data on its physical and chemical properties, losses by exposure to chemicals, dilute solutions, air and water, etc., will be furnished on application.

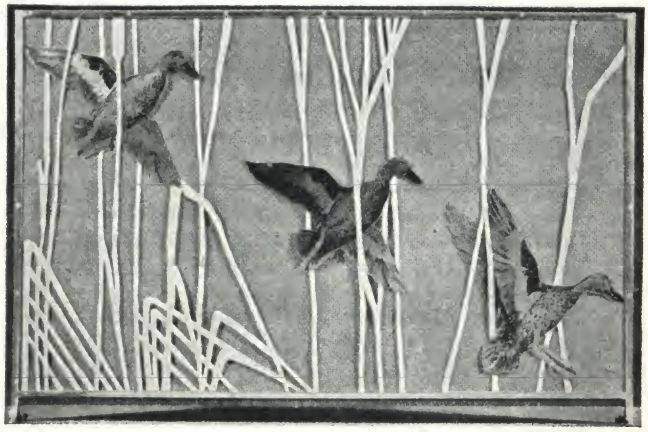


Readily Fabricated for Architectural Requirements

Nirosta KA2 is tough and ductile, and the various operations of expanding, rolling, belling, flanging and bending can be done at room temperature.

Forming and Drawing

Bending, breaking, forming and drawing of Nirosta KA2 can be readily accomplished, owing to its ductility.



Punching

Nirosta KA2 may be readily sheared and punched.

Spinning

Nirosta KA2 can be satisfactorily spun, although not as easily as copper.

Soldering and Brazing

Nirosta KA2 can be soldered without difficulty, firm and strong joints being produced.

Welding

Nirosta KA2 may be welded by either the acetylene torch or electric arc, using specially prepared welding rods. It may also be spot and resistance (line) welded, but cannot be hammer welded. Due to freedom from any air hardening tendency, welds in this metal remain tough and ductile.





Riveting

Nirosta KA2 is an extremely satisfactory material for rivets. It does not harden on rapid cooling, nor develop a coarse crystalline structure on heating.

Architectural Information

Inquiries are solicited from Architects, covering specific or general applications for Nirosta KA2 Steel. The Company will gladly furnish such information in detail, together with the names of manufacturers from whom fabricated products may be obtained.

THE INTERNATIONAL NICKEL COMPANY, INC.

Monel Metal and Nickel and Allied Products

EXECUTIVE OFFICES
67 Wall Street
NEW YORK, N. Y.

MINES AND SMELTER: Copper Cliff, Ont., Canada
ROLLING MILL AND REFINERY: Huntington, W. Va.
REFINERY: Port Colborne, Ont., Canada
FOUNDRY: Bayonne, N. J.

DISTRIBUTORS
(Warehouse Stocks)

ATLANTA, GA., J. M. Tull Rubber & Supply Co., 285 Marietta Street
BOSTON, MASS., Whitehead Metal Products Co. of New York, Inc., 67 Washington Street, No.
BUFFALO, N. Y., Whitehead Metal Products Co. of New York, Inc., 319 Niagara Street
CHICAGO, ILL., Steel Sales Corporation, 129 So. Jefferson Street
CINCINNATI, OHIO, Williams & Company, Inc., 2118 Spring Grove Avenue
CLEVELAND, OHIO, Williams & Company, Inc., 1748-1756 E. 22nd Street
DENVER, COLO., Hendrie & Bolthoff Mfg. & Supply Co., 1621 17th Street
DETROIT, MICH., Steel Sales Corp., 3-218 General Motors Building
ERIE, PA., Williams & Company, Inc., 1121 Erie Trust Building
KANSAS CITY, MO., Steel Sales Corp., 1115 Grand Avenue
LOS ANGELES, CALIF., Pacific Foundry Co., Ltd., 1016 W. 9th Street
MILWAUKEE, WIS., Steel Sales Corp., 490 Broadway
MINNEAPOLIS, MINN., Steel Sales Corp., 535 So. 7th Street
NEWARK, N. J., Whitehead Metal Products Co. of New York, Inc., 215 Frelinghuysen Avenue
NEW ORLEANS, LA., Equitable Equipment Company, Inc., 410 Camp Street
NEW YORK, N. Y., Whitehead Metal Products Co. of New York, Inc., 304 Hudson Street
PHILADELPHIA, PA., Whitehead Metal Products Co. of New York, Inc., 725 Arch Street
PITTSBURGH, PA., Williams & Company, Inc., 901 Pennsylvania Avenue
ST. LOUIS, MO., Steel Sales Corp., 4903 Delmar Boulevard
SAN FRANCISCO, CALIF., Pacific Foundry Company, Ltd., 3100 19th Street
SEATTLE, WASH., Eagle Brass Foundry Company, 21 Spokane Street
TOLEDO, OHIO, Williams & Company, Inc., 734 Nicholas Building
TULSA, OKLA., Harrisburg Supply Company, 303 E. 2nd Street
MONTREAL, CANADA, Robert W. Bartram, Ltd., 277 Duke Street
TORONTO, CANADA, Peckover's Limited, 77 Front Street, E.
VANCOUVER, B. C., Wilkinson Company, Ltd., 190 Second Avenue, W.
EUROPE, Monel-Weir, Limited, Cathcart, Glasglow, Scotland
AUSTRALIA, Ferrier & Dickinson, Ltd., 26 Clarence Street, Sydney, Australia
NEW ZEALAND, Dickinson's Limited, 245 Princes Street, Dunedin, New Zealand

Monel Metal

Monel Metal is a registered trade mark applied to a technically-controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled, and marketed solely by International Nickel.

Uses of Monel Metal in Building Construction and Equipment

The silvery beauty of Monel Metal and its unique combination of physical properties are responsible for its use in a wide variety of architectural applications.

In modern hotels and restaurants Monel Metal is extensively used for such food service equipment as cook tables, steam tables, serving counters, dishwashing machines, etc.

In hospitals it is used for food service equipment, surgical equipment and laundry equipment.

In the home it is principally used for pantry and kitchen sinks, kitchen cabinet working tops and kitchen table tops.

Other architectural uses are: elevator doors, grilles, trim, railings, gates, fireplace screens, store fronts, etc.

Properties of Monel Metal

Monel Metal combines in the one metal properties otherwise available only in several different metals:

(1) Has an attractive, silvery color.
(2) Is easy to clean and keep clean.
(3) Will not rust.
(4) Has the strength of mild steel.
(5) Is highly resistant to abrasion.
(6) Has a hard smooth surface.
(7) Is highly resistant to corrosion.
(8) Harmonizes with any color scheme.
(9) Retains strength at high temperatures.

Available Forms

Monel Metal is available in the following mill forms:

Full Finished Sheets		Cold Drawn Rods	
Cold Rolled Sheets		Hot Rolled Flats	
Cold Rolled Strip		Hot Rolled Plates	
Hot Rolled Rods		Forgings	
Castings	Wire Cloth	Tubing	Billets
Wire	Wire Rope	Shot	Ingots

Special Shapes (Angles, Channels, etc.).
Accessories (Bolts, Nuts, Screws, Nails, Tacks, etc.).

General and Technical Publications

"List B of Monel Metal Literature"—A folder giving all available literature, both technical and non-technical, on Monel Metal.

"Instructions for Working Monel"—Complete working instructions for casting, forging, welding, machining, soldering, spinning, brazing, drawing and punching Monel Metal. They will gladly be sent on request.

Architectural Service

A department is maintained for direct contact with architects and engineers to help in the solving of architectural problems involving the use of metals.

Other International Nickel Catalogues

Besides this page on Monel Metal, The International Nickel Company, Inc., has prepared for the use of the architect, other pages covering the use of Monel Metal in:

Ornamental Metalwork; Hospital Equipment; Kitchen Cabinets; Refrigerators; Food Service Equipment; Laundry Equipment; Kitchen and Pantry Sinks.

For the location of these pages, refer to the Manufacturers' Index.

ROBERT W. HUNT COMPANY

Engineers

Inspection and Tests of Materials for Buildings and Structures

GENERAL OFFICES
22nd Floor, Insurance Exchange
CHICAGO, ILL.

NEW YORK, N. Y. | DENVER, COLO. | KANSAS CITY, MO. | BIRMINGHAM, ALA. | DALLAS, TEX.
SAN FRANCISCO, CAL. | RICHMOND, VA. | CINCINNATI, OHIO | BUFFINGTON, IND. | DETROIT, MICH.
NEW ORLEANS, LA. | MILWAUKEE, WIS. | CLEVELAND, OHIO | PITTSBURGH, PA. | JACKSONVILLE, FLA.
HOUSTON, TEX. | ST. LOUIS, MO. | PHILADELPHIA, PA. | SEATTLE, WASH. | LOS ANGELES, CAL.
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General Engineering Service

CONSULTATION SERVICES in all ENGINEERING FIELDS: MECHANICAL, CIVIL, HYDRAULIC, ELECTRICAL, CHEMICAL and MINING.

The SUPERVISION and DETAIL INSPECTION of CONCRETE CONSTRUCTION, including EXAMINATIONS and REPORTS upon the SUITABILITY of AGGREGATES.

SOIL TESTS, TEST BORINGS and REPORTS upon the SAME in CONNECTION with FOUNDATIONS.

Also, Reports on Permissible Floor Loads and on Existing Conditions of Buildings and other structures.

Testing, Physical, Chemical and Machinery

Strength tests of materials and systems of construction—steel, iron, cement, brick; columns, beams, floor slabs, partitions and other members.

Chemical tests of all building materials, including steel, iron, cement, paint, oils, slags, limestones, marls and clays.

Duty and efficiency tests of entire plants—engines, boilers, pumps, compressors and other machinery.

Structural Steel Inspection

The inspection of structural material at the mills and foundries, including the identification and witnessing of physical tests.

The supervision and inspection of workmanship, checking the sections, dimensions and detail connections during the course of fabrication at the shops, insuring the proper handling of the material, first class workmanship, accurate construction, thorough painting and distinct marking, thus facilitating the erection at the site.

Estimation of weights from detail drawings, and checking shipped weights of finished work.

The supervision and detail inspection of the structure during erection.

Cement Inspection

The testing of cement, including the sampling in car load or bin lots, at the mills or warehouses or when delivered on the work, and the identifying of each lot with serially numbered blue tags.

Complete cement and chemical laboratories in connection with cement testing at Chicago, New York, Pittsburgh, St. Louis, Kansas City, San Francisco, Birmingham, Montreal, Toronto, Vancouver and London.

Soil Tests, Test Borings and Reports

The scientific method of determining areas of foundations, permissible loads per square foot and the probable ultimate settlement under load, based on an analysis of direct soil loading tests and borings, as compared with our records of the results of similar investigations.

Specification Forms

The following is a form for incorporation in specifications for buildings and other structures, covering the necessary arrangements for inspection and relationship between inspector and contractor:

Materials of Construction—Shall be inspected and tested by ROBERT W. HUNT COMPANY, who will act under instructions of the architect or engineer, and report to him the results of inspection and progress of the work, and otherwise facilitate prompt and early delivery of satisfactory materials. The inspectors shall also place marks of identification on accepted materials. Such inspection shall not relieve contractor from responsibility to furnish satisfactory material, but is a measure of precaution against oversights and errors. The cost of this inspection is to be borne by the contractor unless otherwise stipulated.

Structural Steel—Shall be inspected and tested at the rolling mills and also inspected at the shops during fabrication, in proper manner, to determine whether the material conforms with the plans and specifications. Contractor shall furnish inspector necessary facilities for inspecting, testing and labor for handling material.

Reinforcing Steel—Shall be inspected and tested at the mill or warehouse in proper manner, contractor furnishing, free of charge, testing apparatus and facilities for inspection.

Cement—Shall be sampled and tested before delivery to the work, in accordance with American Society for Testing Materials, or the special specifications attached.

Standard Specifications

For complete information write our nearest office and request a copy of our recent publication on "Inspection and Tests of Materials for Buildings and Structures."

Please address our Company on your own letterhead, giving title and position.

ESTABLISHED 1881

PITTSBURGH TESTING LABORATORY

Engineers and Chemists

PITTSBURGH, PA.

BRANCH OFFICES

PITTSBURGH, PA.
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HOUSTON, TEX.
ST. LOUIS, MO.
MILWAUKEE, WIS.
NEW ORLEANS, LA.
NEW YORK, N. Y.
TAMPA, FLA.

ASSOCIATED COMPANIES

SMITH, EMERY & COMPANY, 651 Howard Street, San Francisco, Calif.
SMITH-EMERY COMPANY, 920 Santee Street, Los Angeles, Calif.
NORTHWEST TESTING LABORATORIES, 390 Burnside Street, Portland, Ore.
NORTHWEST TESTING LABORATORIES, 2113 Third Avenue, Seattle, Wash.
CANADIAN INSPECTION & TESTING COMPANY, Shaughnessy Building, Montreal, Que.
CANADIAN INSPECTION & TESTING COMPANY, 100 Jarvis Street, Toronto, Ont.
KANSAS CITY TESTING LABORATORIES, 700 Baltimore Avenue, Kansas City, Mo.

Pittsburgh Testing Laboratory Service

To safeguard the interests of architects, engineers and owners, and to facilitate the work of contractors, this company renders Complete and Reliable Testing, Inspection and Verification Services covering all types of Buildings and Building Materials. Trained field and and laboratory personnel and adequate modern facilities produce thorough and intelligent performance of this work in accordance with established standards. Costs are charged in direct proportion to the required work and necessarily are not subject to competitive price-cutting.

Inspection Service

Steel Buildings—***Mill Inspection***—Inspection and tests in the mills embrace prescribed physical and chemical tests, checks for surface, section and gage. Detailed reports furnished with each shipment.

Shop Inspection—Includes examination of laying-out, punching, riveting, reaming, machining, assembling, checking of field connections and painting. Detailed progress reports are made with shipping weights.

Welding Inspection—Embraces examination of laying-out, edge preparation, spread of joint, clamping, shrinkage, depth of penetration, check of dimensions and check by procedure control on qualification of welders.

Erection Inspection—Made during erection, includes supervision of the placing of steel, alignment of columns, field riveting and painting.

Concrete Buildings—***Cement Testing***—Samples taken by us from bins and cars at the mill. Tests made in our own laboratories located in principal cement producing centers. Standard A.S.T.M. methods, equipment and laboratory control. Bin tested cement available at most mills.

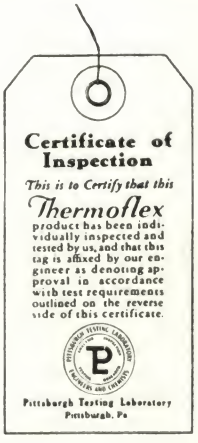
Aggregates—Investigation, test and report as to suitability, in accordance with standard requirements of gravel, stone, slag, sand, etc.

Reinforcement—Inspection and test for section and quality at mill or warehouse.

Supervision—Inspection on the job. Control of mixing and placing, slump tests and water cement ratio. Inspection of forms. Protection against low and high temperatures. Test specimens poured on job and sent to laboratory. Load tests on finished structures.

Examination of Failures—Competent and experienced engineering service to determine cause and suggest remedy, if feasible.

Preserved Lumber—***Inspection Before Treatment***—Examination for kind, dimensions, heart, sap, grain, knots, insect damage, other defects, and finish.



Inspection of Treatment—Preservative is analyzed and checked with specifications. Quantity of preservative required, pressures, temperatures, gages and quantity of oil injected are carefully checked. Borings are made to determine depth of penetration.

Inspection After Treatment—All lumber is examined after removal from the treating tanks for shakes, splits and warp, or other defects due to treating process or which may be aggravated by it.

Verification of Quality

Physical, chemical, or electrical tests are made to determine relative performance and quality of any product or material, or any group of competing products when architects or engineers desire to maintain their specified standards or to establish definite standards to which materials must conform.

Certification of Quality or Performance

Progressive manufacturers may have their products tested and inspected by the PITTSBURGH TESTING LABORATORY to establish impartially their grade or performance characteristics. To products so inspected, the laboratory attaches a certification tag similar to the specimen illustrated.

Inspection Clauses for Architects' Specifications

Since the function of this testing and inspection service is to protect the architect and owner against sub-standard materials or workmanship, the architect should definitely appoint the inspection laboratory or company without option to the contractor or manufacturer. The following clauses should be incorporated in the general conditions of specifications:

"**Inspection and Tests**—All laboratory mill, shop, and field inspections called for in other divisions of this specification shall be made by (Insert Name of Inspecting Laboratory), and all reports thereof shall be delivered to the architect. The contractor shall incorporate in his proposal an allowance of (state amount) to cover the costs of these independent inspections and tests. These sums shall be expended at the architect's discretion; any unexpended balance shall revert to the owner and any additional costs incurred at the architect's order shall be paid by the owner."

THE FOUNDATION COMPANY

120 Liberty Street
NEW YORK, N. Y.

CABLE ADDRESS
"UNDERFOUND"

BRANCH OFFICES
CHICAGO, ILL. ATLANTA, GA. PITTSBURGH, PA.

FOREIGN OFFICES
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LIMA, PERU
LA PAZ, BOLIVIA
TOKYO, JAPAN
SANTIAGO, CHILE
BUENOS AIRES, ARGENTINA
MONTEVIDEO, URUGUAY

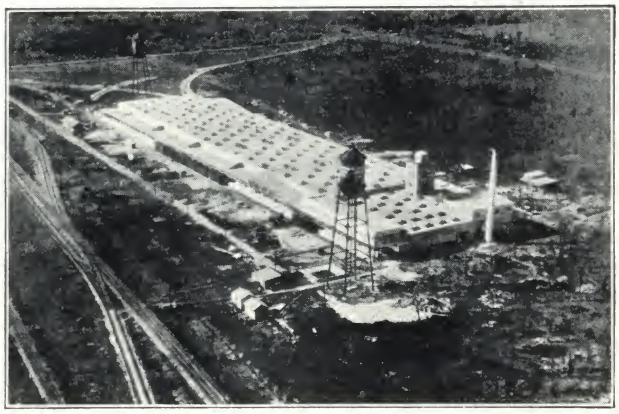
Services

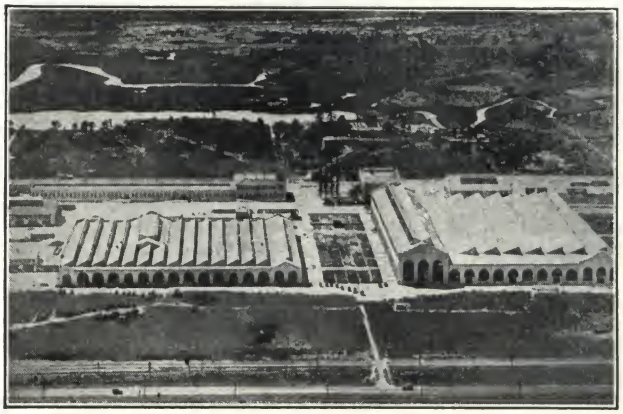
THE FOUNDATION COMPANY is an organization of Construction Engineers widely experienced in BUILDING DIFFICULT SUPERSTRUCTURES and SUBSTRUCTURES in all parts of the world. The enviable reputation gained in its early history for trustworthy underground construction followed it into the field of GENERAL CONTRACTING.

THE FOUNDATION COMPANY has built buildings of nearly every known type, such as offices, banks, stores, hotels, club houses, dwellings, and also the whole range of industrial buildings, power plants, etc. This company is successfully building warehouses, railroad terminals, filtration and sewage plants, hydro-electric developments, highways, bridges and bridge piers, mine shafts and tunnels, river and harbor developments and complete industrial projects.

As its name would indicate, THE FOUNDATION COMPANY also specializes in underpinning and foundations. Most of the skyscrapers in lower New York City rest on foundations built by this Company.









The Foundation Company, General Contractor

NATIONAL GUNITE CONTRACTING COMPANY

OFFICES

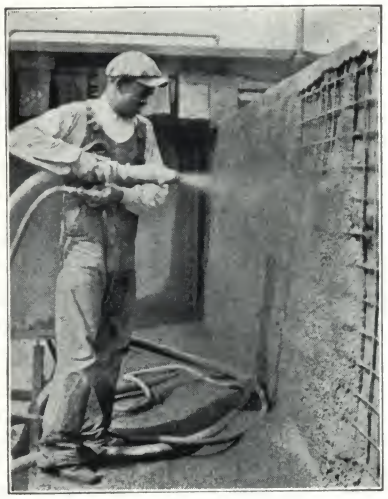
82 West Dedham Street

BOSTON, MASS.

BIRMINGHAM, ALA., 3415-27 Avenue North
BUFFALO, N. Y., 316 Jackson Building
CHICAGO, ILL., 549 West Washington Street
DENVER, COLO., 233 Continental Oil Building
NEW YORK, N. Y., 1849 Grand Central Terminal Building
PITTSBURGH, PA., 6801 Juniata Place
RICHMOND, VA., 504 American National Bank Building
ST. LOUIS, MO., Louderman Building
SAN BENITO, TEX., Aztec Building

Gunite

A composition of sand, cement and water applied by means of the "cement-gun" under pneumatic pressure. The accompanying illustration shows GUNITE being applied to a wall—here the operator and the nozzle only are shown. The "cement-gun" in which the cement and sand are mixed is outside the picture. GUNITE can be applied not only to walls but to the top of floors and the underside of ceilings. In all cases a perfect and permanent bond is secured.



Strength

GUNITE is two to four times as strong as poured or hand-placed mortar composed of sand, cement and water. This strength is derived from the pressure with which it is applied, about 50 lb. per sq. in., and from the water-cement ratio which is maintained at a minimum at all times by the operator at the nozzle. The cement and sand are brought dry through one hose to the nozzle; the water is brought through a second hose to the nozzle. The water and dry materials are here mixed thoroughly and immediately projected upon the structure.

Uses

GUNITE is used for structural steel encasement on bridges and buildings, where it serves for fireproofing and eliminates future painting or maintenance. When masonry—concrete, brick or stone—has disintegrated, GUNITE will restore it to its original strength and contours.

Another large use is the lining of reservoirs and tanks, whether steel or masonry, to prevent leakage. With it we also have lined steel plate structures for protection and preservation, such as coal bunkers, ash hoppers, breechings, smokestacks, gas purifier tanks, etc.

Many other uses, too numerous to specify here, are found for GUNITE.

Use on Buildings

GUNITE is particularly adapted to the construction of thin walls because of reduced load combined with great strength. A 2-in. GUNITE wall may be used as the equivalent of a 6-in. concrete or 8-in. brick wall, thereby making a tremendous saving in dead load. Speed of construction is great and positive connection is obtained with the supporting structural steel frame. Factories particularly employ this type of wall construction and its application to residential construction is ideal.

The accompanying illustration shows a small residence where a 2-in. GUNITE wall forms the main structural support. On larger structures double GUNITE walls with contained air space are used, built integrally with GUNITE studding. Any type of finish for outside walls may be secured; the harmonious and uniform appearance obtained on the GUNITE walls of this residence is apparent.



Specifications

The uses for GUNITE are so varied that any attempt to make a complete specification covering all types of work would be futile. We therefore earnestly solicit your consultation for specifications whenever any work involving GUNITE arises so that we may put at your disposal the experience of many years we have obtained in the GUNITE field.

Installations

Building Walls (Thin Construction)

Ford Motor Company, Detroit, Mich.
Chance-Vought Corp., East Hartford, Conn.
Pratt & Whitney Aircraft Corp., East Hartford, Conn.
Buffalo Foundry & Machine Co., Buffalo, N. Y.
National Aniline & Chemical Co., Buffalo, N. Y.

Fireproofing

St. Joseph's Seminary Cupola, Washington, D. C.
McComas St. Terminal Pier Sheds, Baltimore, Md.

Tank Lining

Oxford Paper Mills, Rumford, Me.

Power Plants

Springfield Gas Light Company, Springfield, Mass.
Commonwealth Power Co., Zilwaukee, Mich.
Milwaukee Electric Railway & Light Co., Milwaukee, Wis.
New Bedford Gas & Edison Light Co., New Bedford, Mass.
Nichols Copper Co., Laurel Hills, L. I., N. Y.

Steel Encasement

Waldorf-Astoria Hotel Substructure, New York, N. Y.
New York Central R. R. Bridge, Rensselaer, N. Y.
Nickel Plate R. R., Cleveland, Ohio (10 Bridges).
Washington Street Bridge, Providence, R. I.
Tompkins Avenue Viaduct, Staten Island, N. Y.

Restoration of Masonry

Cudahy Packing Co., Cudahy, Wis. (Brick Buildings).
Elgin, Joliet & Eastern R. R., Joliet, Ill. (Roundhouse Walls).
Commonwealth of Massachusetts, Point Shirley, Mass. (Seawall).

Roof Construction

City of Niagara Falls, N. Y.

RAMP BUILDINGS CORPORATION

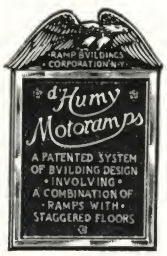
Consulting Garage Engineers

21 East 40th Street, NEW YORK, N. Y.

Service

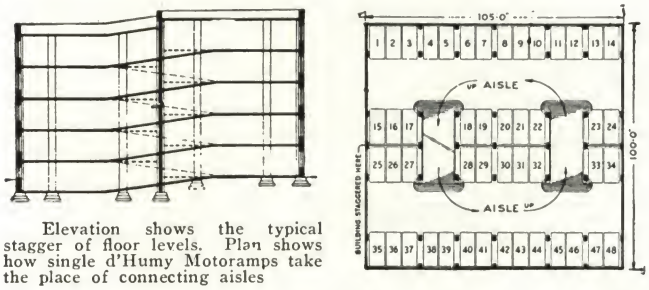
This company works with the architect and places its specialized knowledge at his disposal in the design, laying out and construction of any multi-floor garage.

d'Humy Motoramps are short, easy-grade ramps connecting staggered floors, insuring maximum storage space and minimum operating costs in a garage. They eliminate the heavy investment in elevators and their high operating costs, and at the same time take up less space than ordinary ramps, either straight, curved, or spiral. d'Humy Motoramps make garages efficient and insure maximum revenue.



d'Humy Motoramps

The basis of this system of building design is the arranging of a portion of the structure with floor levels intermediate between the floor levels of the rest of the building. The floors of the two sections are joined by short, inclined ramps, each rising one-half story at an easy grade.



Elevation shows the typical stagger of floor levels. Plan shows how single d'Humy Motoramps take the place of connecting aisles

By making the dividing line between units vertically on one facade, the architect has the opportunity of achieving the unusual by emphasizing the staggered floors; on many plots the stagger may be concealed, if desired, so that it does not show in the elevation.

d'Humy Motoramps are adaptable for plots of any dimension greater than 50x100 ft. and are readily adapted to plots of irregular shape.

d'Humy Motoramps have been used in 2-story buildings and in garages as high as 11 stories—and higher buildings are contemplated. For large capacity structures it is advisable to provide separate ramps for ascending and descending travel.

Advantages of d'Humy Motoramps

Complete visibility for the motorist on short length, open side ramps.

100% convenience in driving to or from any storage space—no congestion.

Eliminate necessity of connecting aisles.

Maximum car storage and maximum net income for the owner.

Increase opportunity for sale of merchandise and service.

Simple construction, no depreciation, no mechanical troubles, no after-expense.

How We Serve Architects

Without cost or obligation, our engineers will prepare sketch plans on any garage project to demonstrate the efficiency of d'Humy Motoramps in achieving maximum storage space and insuring maximum income. Alternate layout where possible, will be submitted.

Our staff is available for preliminary consideration of the possibilities of any garage project backed by an experience of ten years in the design, construction, financing and operation of parking garages.

Consultation with us in the early stages of any such discussion involves no obligation and is not charged for.

Following the arrangement of a contract between the owner and this company for the use of d'Humy Motoramps, our complete engineering service is made available at no cost to the architect which includes consultation with the architect as to:

(a) Floor layout of car spaces.

(b) Establishment of critical dimensions.

(c) Planning of entrance, control and service facilities.

(d) Selection and design of the most efficient means of vehicular interfloor communication for the particular requirements.

(e) Selection of best and most economical equipment as learned in our experience on hundreds of garages.

(f) Method of construction.

(g) Provision for the indispensable mechanical equipment.

(h) Okaying of final plans.

(i) Any other problem that may arise in the designing or construction of the building.

Cost to Building Owner

For the use of the d'Humy Motoramp System and our complete engineering service, a charge (based on the total number of square feet of garage floor area) is made to the owner of the building. There is no charge to the architect.

Installations

Up to June 3, 1930, plans had been made for 286 d'Humy Motoramp Garages, of which 220 were completed and put in operation. Among them:

Bowdoin Square Garage, Boston
Chalfonte-Haddon Hall Garage, Atlantic City
Royal Garage, Montreal
Statler Hotel Garage, Buffalo
Medical Arts Bldg. Garage, Cleveland
Book Tower Garage, Detroit
South Loop Motoramp Garage, Chicago
City Ramp Garage, Spokane
"Four Fifty Sutter" Garage, San Francisco
Clarke's Strand Garage, New Orleans
Cone Street Garage, Atlanta
Ferro Concrete Garage, St. Louis
"1616 Walnut Street" Garage, Philadelphia
Auto Hotel, Denver

Two Booklets Available

The Company will be glad to send to any architect either or both of two booklets:

"The Modern Garage" explains where and why garages are needed, what they will earn, what d'Humy Motoramps are and will do, how we serve architects, and describes the interesting features of some of the 286 garages on which we have consulted.

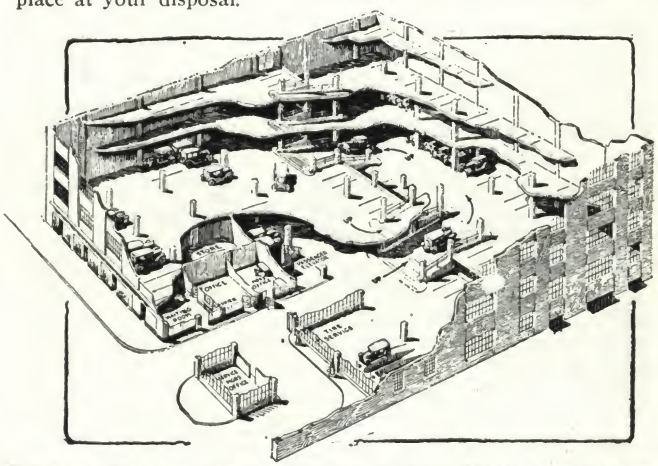
"Garage Design Data"—35 pages of technical data on the design and construction of garages, giving important information obtainable nowhere else under one cover, so far as we know.

The booklets will be sent to any architect on request, under no obligation or cost.

Call on Us Freely

Ramp Buildings Corporation emphasizes its willingness to consult with any architect, at any time, on any problem involving the design, construction, financing, operation or management of any garage. Frequently there is more than one possible layout of a garage for achieving high operating efficiency—we are always glad to have architects submit their garage layouts to us for our suggestions as to possibly improving them.

The engineers of the company have an unsurpassed fund of experience in this kind of work, which they will be glad to place at your disposal.



Cut-away Perspective of a Typical d'Humy Motoramp Garage
Single ramp system—up and down traffic on same ramps

AUTO RAMPS CORPORATION

Builders' Exchange Building
RICHMOND, VA.

Wabeek Building
BIRMINGHAM, MICH.

AUTOMOBILE PARKING PROBLEM SOLVED

Automobile Parking

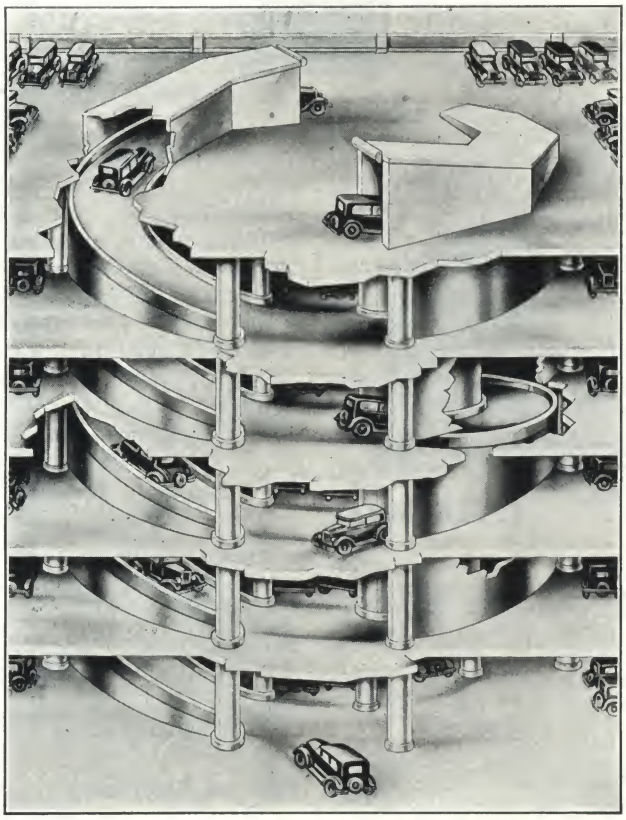
Automobile parking is an ever-increasing problem with which every growing community, large or small, is faced. How can the streets be made passable for moving traffic and how can parking space be provided for those who desire to do business? The problem is not only a question of convenience and safety but one which directly affects the prosperity of many communities. People do not buy where they cannot park.

The AUTO RAMPS CORPORATION Systems of double spiral and semi-spiral ramps solve the problem of parking because they make possible the erection of buildings which provide the maximum of parking space, operating efficiency and safety with a minimum of cost.

These ramp systems are similarly advantageous in buildings devoted to the automobile and other industries and wherever numbers of cars are to be stored for any purpose.

Service to Architects

The AUTO RAMPS CORPORATION works through the architect. The service rendered consists of furnishing architects with complete working drawings of the ramp structure and a license to the owner permitting the use of the ramp, which is protected by many pending patents. For this service a reasonable fee is charged the owner, the amount being based on the number of car spaces.



Phantom View of Double Spiral Auto Ramp

Double Spiral Auto Ramp

The accompanying illustration shows the double spiral system, the operation of which will be apparent on observing the direction in which the cars are shown moving on the ramps. The "Up" and "Down" spirals are entirely separate from each other, with separate entrances to each at opposite sides of the circular form on each floor.

From the illustration it will be observed that a car on the ground floor may enter the "Up" ramp and by proceding a half turn be elevated to the second floor; or may, by completing the circle, rise to the third floor.

A car on any given floor may, if desired, be readily moved to any other floor. The circular space in the center of the spiral is used for parking and will normally store six cars.

The grade of the ramp is less than 14%, permitting one to drive at the rate of about 15 floors per minute, or *more than double that of any other ramp system.* This is accomplished not by an excessive speed of the car, but by an actual reduction of 50% in the travel distance in comparison with any system of straight ramps.

The contour of the ramp floor is so nicely designed that, in spite of the spiral and the grade, the points of wheel contact lie in a plane, which, of course, eliminates any distortion of the car frame or springs. There is, accordingly, no strain on either car or driver in ascending or descending. After the steering wheel is adjusted to the spiral it is necessary only to hold the wheel in this fixed position and to regulate the speed of the car. As there is no distortion to the car frame or springs, it is the equivalent of driving up a straight hill of the same grade.

In descending the ramp, the resistance of second gear is sufficient to retard the progress of the car, without the application of brakes.

Office Building Adaptation

In keeping with the modern trend which demands ever new and progressive ideas, we offer the suggestion of the Double Spiral Auto Ramp for use in connection with office and large commercial buildings. See illustration on following page.

High cost of land plus difficulty of parking are making such combination buildings a present-day need.

It is generally agreed by many leading realtors and building management organizations that office buildings of the future must have garage accommodations for tenants.

In the arrangement shown on the right, the elevators serving the office building pass through the garage in a fireproof shaft, having no openings in the garage. The garage is served by separate elevators.

Semi-Spiral Ramp

The accompany illustration shows the features of the Semi-Spiral Ramp. A similar arrangement would apply for each upper floor. In this case the ramp is used for up and down traffic.

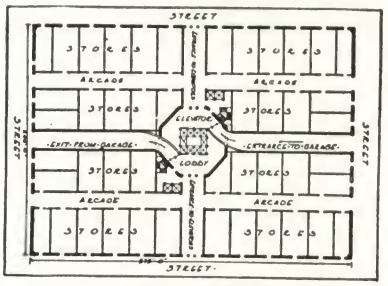
The Semi-Spiral Ramp is used where the number of cars to be handled does not require separate "Up" and "Down" driveways.

General Information

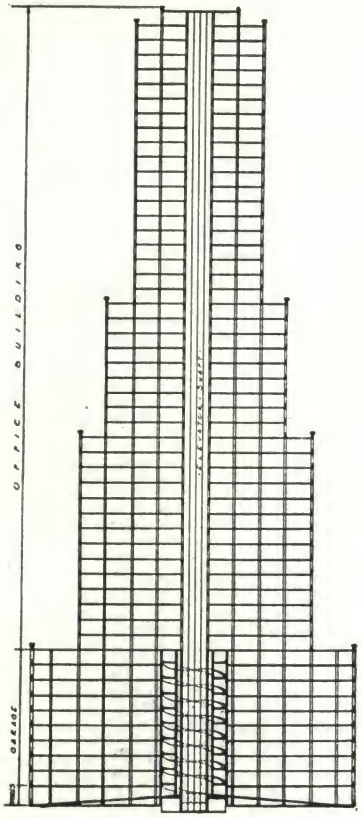
The construction of the auto ramps is of reinforced concrete, requiring only such tools, materials and methods as are common to the building construction industry.

The construction embraces the driveways, the enclos-

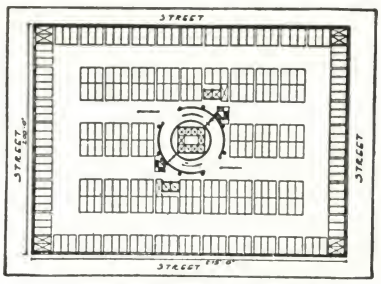
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STREET FLOOR PLAN



SECTIONAL VIEW



TYPICAL GARAGE FLOOR PLAN

ing walls and curbs of the driveways, the parking floor slabs within the inner circle of the double spiral ramp and the columns supporting this construction as shown. All of this construction is tied in with the surrounding floor construction and made an integral part of the whole in the usual manner. The columns form either an eight or ten-sided figure.

We prepare the plans for the work to the extent above described.

Our U.S. patents cover certain phases of the use and construction of the ramps, the details of construction and features of combination with other types of buildings.

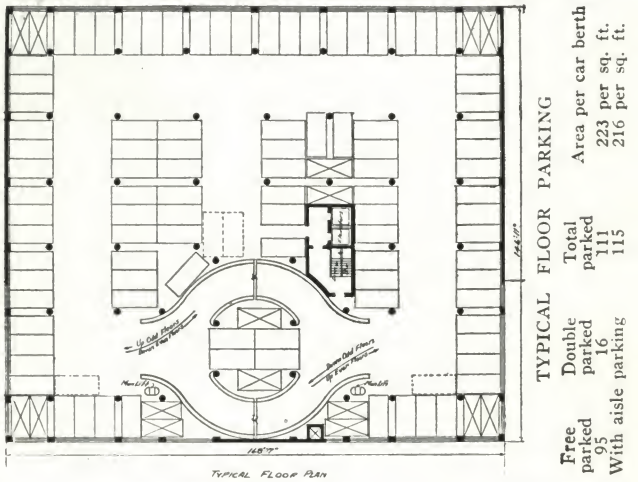
Selection of the double or semi-spiral ramp is ordinarily governed by three factors: the area of the lot, the height of the building and the number of cars to be handled. In order to use the double ramp efficiently it is desirable to have at least 18,000 sq. ft. in the lot. The building should house 350 cars or more, and the height of the building could be made 25 stories.

The semi-spiral ramp will work on lots as small as 8000 sq. ft. with a capacity in the building of 400 cars and a height of up to six stories.

Our ramps may be installed in old buildings as well as new ones. They may also be easily removed when economic conditions require the conversion of the building to another use.

Fire cut-offs may be provided at each opening to ramps where so required.

Place your parking problem with us and be in the vanguard of progress.



Below
Semi-Spiral Ramp

Information Required

Upon receipt of information as noted hereunder, we will furnish without charge a preliminary layout.

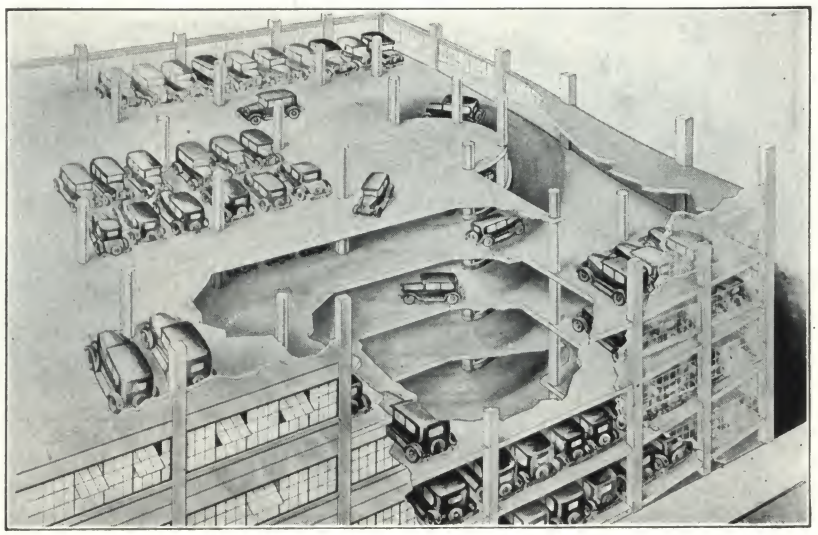
(1) Name and address of architect and owner.

(2) Dimensions and height of building, including any basements.

(3) Ceiling heights. (4) If corner building, state more important street. (5) Number of cars to be accommodated and sizes. (6) Expected patronage, whether hotel, theatre, town parking, etc. (7) Are plans finished, contract let or construction started? (8) When will construction begin? (9) Where do you wish entrance and exit located? (10) Is location good for retail stores? (11) Drive-in filling station? (12) If accessories are carried, state sq. ft. to be devoted to store, also to accessory stock rooms. (13) Will building be operated by owner? (14) State things you wish to have in the building. (13) Things to be particularly avoided, if any.

For sales and service buildings, state in addition to the above, the amount of space to be devoted to show room, number of cars to be accommodated in shop and number of people in the office.

Please also make diagram of plot and proposed building as suggested by illustration herewith. Show all dimensions indicated by arrows on plot diagram. Give name of each street. Show location of car lines and direction of traffic in one-way streets. Give approximate elevations at lot corners. Show dimensions of plot and included angles.



MacARTHUR CONCRETE PILE CORPORATION

19 West 44th Street, NEW YORK, N. Y.

BRANCH OFFICES

CHICAGO, ILL., 228 North La Salle Street
PHILADELPHIA, PA., 4807 Locust Street
BOSTON, MASS., 101 Tremont Street
PITTSBURGH, PA., Union Trust Building
DETROIT, MICH., 431 Howard Street
CLEVELAND, OHIO, 868 Rockefeller Building
SAN FRANCISCO, CAL., 58 Sutter Street
NEW ORLEANS, LA., 325 North Cortez Street

CANADIAN MacARTHUR CONCRETE PILE CO., LTD., New Birks Building, MONTREAL

"A Special Pile for Every Condition—Not One Pile for All Conditions"

The MacArthur Method employs *"A Special Pile for Every Condition—Not One Pile for All Conditions"* but the method of forming each type is such that all can be placed with our standard equipment. Therefore, when unexpected subsoil conditions are encountered and a change in plans becomes suddenly necessary, there is no delay incidental to bringing in equipment for special piles, as the equipment is already on the site and all material used is available locally.

MacArthur Concrete Piles are all cast-in-place piles and are all of the straight shaft type. They include:

Straight Shaft and Pedestal Piles—These are our standard compressed concrete piles. Used for all ordinary soil conditions where piles up to 40 ft. in length are required.

Composite Piles of Concrete and Timber—For use where bottom (timber) section of pile is below permanent water level. More economical than all-concrete. Placed in lengths up to 100 ft.

Composite Piles of Concrete and Pipe—Uncased upper section of compressed concrete and lower section of closed end pipe—any length. For use in very soft soils where piles have to be driven to great depths.

Pipe Piles with Cast Steel Point—Filled with concrete to any length. Economical for driving where headroom is limited, such as for underpinning foundations or making new foundations inside existing buildings.

Concrete Slabs for Gas Holders—We have built hundreds of complete foundations (piling and slabs) for gas holders and oil storage tanks. Our experience in this work is a very valuable asset.

Straight Shaft Uncased Compressed Concrete Piles for All Ordinary Soil Conditions

Maximum Skin Friction—The MacArthur uncased pile calls for a workable dry mix concrete compressed under a weight of 7 tons per pile—after the concrete is poured. This forces a dense, homogeneous concrete into intimate contact with the surrounding soil and gives the maximum skin friction with the earth.

The compressed concrete is so much denser than the surrounding soil that it cannot be disturbed, distorted or forced out of place by the driving of adjacent piles as might be the case with a wet uncompacted concrete even though enclosed by a thin metallic casing.

Perfect piles are formed on 2 ft. 6-in. centers in the toughest and most rubbery of clays by this method. Large numbers of excavated piles have proven the certainty of this method.

Uniform Diameter—The MacArthur Method for uncased compressed concrete piles employs a steel driving shell with walls ½-in. thick and of uniform diameter throughout its entire length. There is no question, when this is driven to penetration, about the shell being intact and absolutely true in diameter throughout while the concrete is being placed. It also makes a pile as strong at the base as it is at the top—a pile with twice the diameter at the base as the ordinary tapered form of pile and with more concrete in each pile.

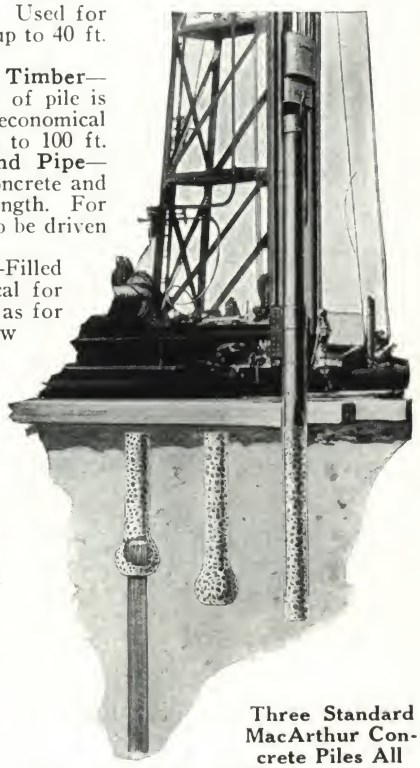
Concrete Easily Rammed or Compressed—It is a known fact that has been demonstrated by years of practice that concrete should be rammed or compressed after being placed in the forms, so as to secure perfect cohesion and to remove voids caused during pouring.

The MacArthur Method calls for a concrete compressed under a weight of 7 tons in each pile, after the concrete is placed.

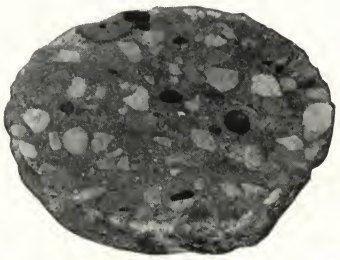
"Dry Mix" Concrete Recommended for Cast-in-place Piles—In a cast-in-place pile it is necessary to dump the concrete down a steel shell a considerable distance. Therefore when a wet sloppy mix is used, the sand, cement, water and stone will undoubtedly separate and the chance of the aggregates again arranging themselves in correct proportion when they arrive at their destination is very remote indeed.

The MacArthur Method calls for a water ratio of 6 gal. of water per bag of cement with sufficient coarse aggregates to make what is termed a "dry mix."

Note: See recommendations of Portland Cement Association in their booklet "Design and Control of Concrete Mixtures."

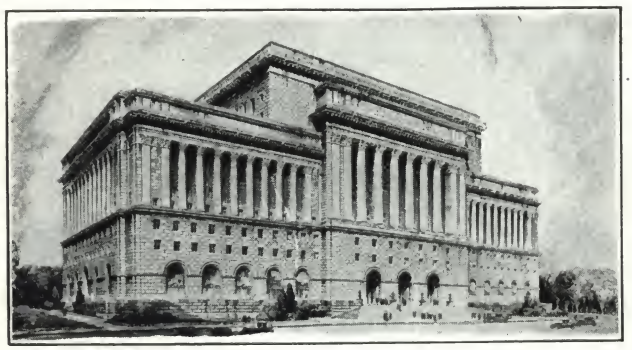


Three Standard MacArthur Concrete Piles All Formed by the Same Standard Driving Apparatus



Section of MacArthur Concrete Pile

This slab sliced from a typical MacArthur Pile shows a perfect dispersion of aggregate. Good solid concrete—no unfilled interstices. The right mix, compressed, assures sturdy concrete piles

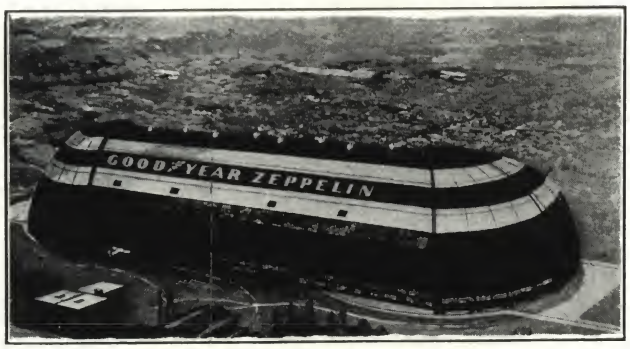


Milwaukee County Courthouse, Milwaukee, Wis.

ALBERT RANDOLPH ROSS, Architect

We Saved Milwaukee County $73,000 on This Courthouse

When our bid was lowest by $73,000, we were asked to drive test piles, with the result that we won this 6,700 pile contract. The job was properly completed on time to the entire satisfaction of the architect



Goodyear Zeppelin Corporation Airship Factory and Dock, Akron, Ohio

WILBUR WATSON & ASSOCIATES, Architects and Engineers

Demonstrated merit won this contract for us

Only time-tried materials and methods could be considered for such a structure. During the past 20 years the dependability of piles produced by the MacArthur Method has been proven to the satisfaction of engineers

Continued on next page

Open Specifications for Cast-in-place Concrete Piles

(For Incorporation in Architect's and Engineer's General Specifications)

Concrete Pile Construction—Concrete piles shall be provided where shown and called for on plans. The price shall be calculated on the basis of .... lineal feet each. Contractors shall state plus and minus price per pile and per lineal foot for actual length driven.

Concrete piles shall be driven to a bearing value as determined by the Engineering-News Formula and if necessary, in the judgment of the architect or engineer, load tests shall be made on (one or more) piles, at the expense of the owner. The total settlement of pile shall not exceed one one-hundredth of an inch per ton of test load applied.

Concrete piles cast-in-place may be straight shaft or tapered. The working load on each pile shall be .... pounds. Piles shall be cast in strong removable steel shells, or light gauge steel reinforced, or corrugated, or plain shells to remain in place.

After the shell has been driven and the driving mandrel withdrawn, the shell shall be tested against collapse or squeezing of the shell out of true shape by again dropping the full sized mandrel to the bottom of the shell. Any shell which is improperly driven, is broken, shows partial collapse, is out of round or otherwise defective shall not be accepted.

Note: In the removable shell type the concrete shall be constantly compressed while the shell is being withdrawn.

Concrete—Concrete shall be mixed in the proportion of 1 part of cement, 3 parts of sand and 5 parts of stone or gravel, all as approved. A water ratio of 6 gal. per bag of cement shall be used as closely as possible so as to obtain a dry enough mix to keep the component parts of the concrete from separating while being poured into the shell. A wet, sloppy mix of concrete shall not be allowed. The concrete shall be tamped as it is being deposited or compressed after it is deposited.

Borings—(State hereafter information on and instructions regarding soil samples and boring diagrams).

Special Notes and Engineering Information on Cast-in-place Concrete Piles

Engineering News Formula—

$$L = \frac{2\,W\,H}{S + 0.1}$$

L = Load in pounds
W = Weight of falling parts in pounds
H = Drop in feet of falling parts
S = Final penetration per blow in inches

A No. 1 steam hammer has a weight of 5000 lb. falling 36 inches.

Pile Length—It is necessary to adopt in the specification a length of pile so as to secure uniformity in the bids. This length can be determined approximately from examination of the borings. (We will be glad to make recommendations covering correct bid length upon receipt of boring data.)

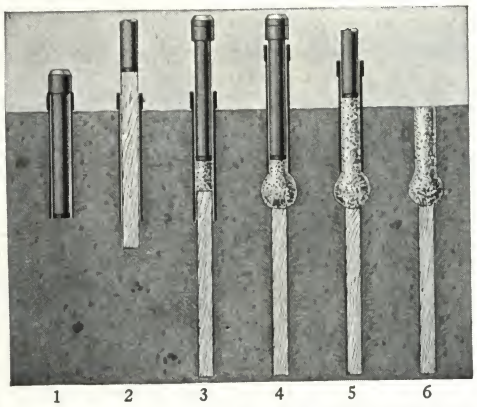
Driving Piles on Standard Centers—A condition is seldom met where the driving of cast-in-place concrete piles on 2 ft. 6-in. centers injures the pile previously driven. If unusual soil conditions are found it should be treated as a special case, rather than needlessly adding to the cost of the operation by arbitrarily specifying piles to be driven in scattered formation, which makes necessary considerable increased cost to the owner. The following is suggested for taking care of this case:

"If it is found that driving adjacent pile disturbs the pile which has just been completed, the engineers [architects] may require the contractor to deviate from the regular driving method, so as to avoid injury to piles already in place."

Pedestal Piles—It is sometimes found that there is a firm strata of soil lying between layers of poor soil which would sustain the superimposed load if it could be properly distributed by a larger base than is possible with standard diameter piles, thereby making a desirable saving in pile length. Also, in some cases the foot of the concrete pile rests on an inclined rock, which tends to cause a side slip of the pile. The addition of a pedestal overcomes this danger by giving a larger end bearing and more intimate bond.

Reinforced Piles—Piles may be reinforced with single central rod or with a hooped cage without delay in driving operations. When so reinforced these piles may be used to withstand uplift (43-ton test load has been withstood without movement). This is valuable to resist overturning movement due to wind, or to reduce cantilever action.

Metal Shoe—In wet or semifluid soils pile forming casing is sealed before driving with a suitable metal shoe.

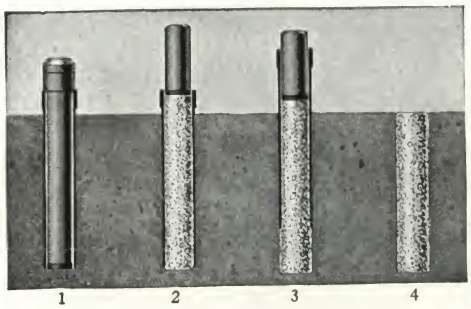


MacArthur Composite Type (Concrete and Wood Pile)

(1) Core and casing driven into ground.
(2) Core withdrawn and square timber placed in casing.
(3) Timber guided by casing, driven down to give necessary bearing. Butt of timber below ground water level. Core withdrawn, batch of concrete deposited in casing on top of timber and core replaced.
(4) Casing raised necessary distance, pedestal joint formed around top of timber insuring perfect juncture between timber and concrete.
(5) Core withdrawn, sufficient concrete deposited to provide for voids and space occupied by casing. Casing then steadily withdrawn with 7-ton pressure remaining constantly on the concrete.
(6) Finished shaft well knitted and bonded to soil

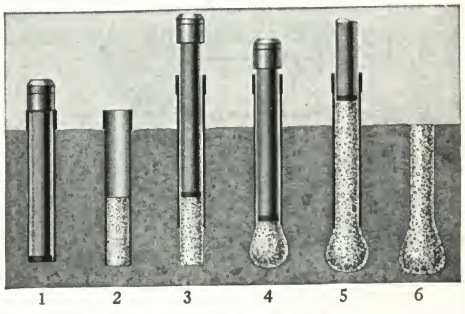
References

Bartlett-Hayward Co., Baltimore, Md.
The H. K. Ferguson Co., Cleveland, Ohio
William Higginson, New York, N. Y.
D. X. Murphy & Bro., Louisville, Ky.
B. H. Davis & Co., New York, N. Y.
Willys-Overland Co., Toledo, Ohio
A. Burton Cohen, New York, N. Y.
Ford, Bacon & Davis, New York, N. Y.
Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio
Brooklyn Union Gas Co., Brooklyn, N. Y.
Stevens & Wood, New York, N. Y.
Electric Management & Engineering Corp., New York, N. Y.
National Tube Co., McKeesport, Pa.



MacArthur Compressed Concrete Straight Shaft Type

(1) Core and casing driven into ground.
(2) Core removed and casing filled with concrete a sufficient amount above grade to take care of compression. The 7-ton weight of the core and hammer is then placed on the concrete.
(3) The casing is steadily withdrawn from the ground—the 7-ton weight of the core and steam hammer remaining constantly on the concrete and forcing it into the space occupied by the casing and any voids in the ground.
(4) The finished cylindrical shaft—a solid homogeneous mass of compressed concrete



MacArthur Compressed Concrete Pedestal Type

(1) Core and casing driven into ground.
(2) Core removed, charge of concrete dropped to bottom of casing.
(3) Casing pulled up 18 in. to 3 ft. with 7-ton pressure of core and steam hammer remaining on concrete.
(4) Charge of concrete rammed out.
(5) Core is removed, casing filled with concrete. Core replaced and casing steadily withdrawn while concrete is under 7-ton pressure.
(6) Finished shaft with enlarged base

RAYMOND CONCRETE PILE COMPANY

Concrete Piles and Special Concrete Work

140 Cedar Street
NEW YORK, N. Y.

111 West Monroe Street
CHICAGO, ILL.

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KANSAS CITY, MO., 114 W. 10th Street
LOS ANGELES, CAL., 311½ So. Spring Street
MIAMI, FLA., 141 N. E. 3rd Avenue
MILWAUKEE, WIS., 217-23 Wisconsin Avenue
NORFOLK, VA., 1007 Royster Building
PHILADELPHIA, PA., N. E. Cor. 15th and Locust Streets
PITTSBURGH, PA., Fourth Avenue and Wood Street
PORTLAND, ORE., 1301 E. 31st Street
ST. LOUIS, MO., 611 Olive Street
ST. PAUL, MINN., 152-60 E. 6th Street
SAN FRANCISCO, CAL., 111 Sutter Street
WASHINGTON, D. C., 912 17th Street

RAYMOND CONCRETE PILE CO., LTD., 10 Cathcart Street, MONTREAL, CANADA

A form for every pile—
A pile for every purpose.

Classification of Concrete Piles

Concrete piles are of two distinct types:

(1) Concrete piles, which are made in place, commonly referred to as "cast-in-place" concrete piles.

(2) Concrete piles which are cast in moulds and then driven like wooden piles and are referred to as "pre-cast" concrete piles.

Cast-in-place piles are divided into two classes:

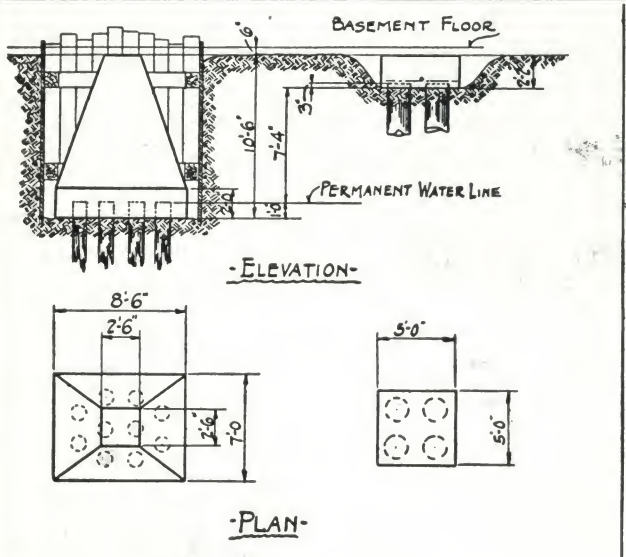
(a) Those in which a form is left in the ground to preserve the integrity of the finished pile.

(b) Those in which the concrete is placed by means of a temporary driving form which is removed before the concrete hardens and leaves the pile confined only by the loose earth. The green concrete is then obviously subject to the admixture of foreign materials, excess of water and distortion due to strains set up by soil pressures and the driving of adjacent piles.

Pre-cast concrete piles are those which are cast in a mould and then driven like a wooden pile and are referred to frequently as "pre-cast concrete piles."

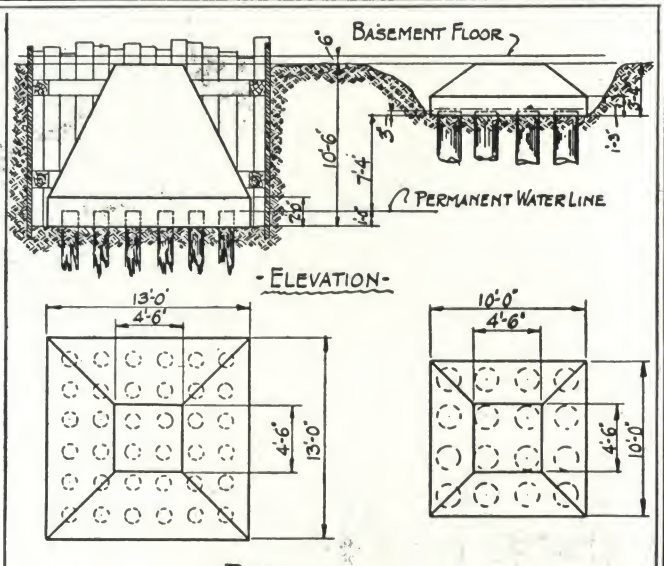
The Raymond Method

A collapsible steel core, usually 8-in. diam. at the point and increasing in diameter at the rate of 0.4 in. per lin. ft. of length, is incased by a spirally reinforced steel metal shell. The core, thus incased, is driven to a proper penetration in accordance with the *Engineering News* formula. It is then collapsed and withdrawn from the shell, the shell remaining in the ground and



-FOR COLUMN LOAD OF 116 TONS-

WOOD PILE LOAD • 15 TONS-		CONCRETE PILE LOAD • 30 TONS-
-QUANTITIES-	WOOD	CONCRETE
NO OF PILES	10.	4.
CONCRETE	15. CU. YDS.	2.01 CU. YDS.
STEEL	0	121. LBS.
FORMS	237. SQ. FT.	44. SQ. FT.
EXCAVATION	36. CU. YDS.	3.94 CU. YDS
SHEETING	39 LIN. FT. 12 FT. DEEP	0



-FOR COLUMN LOAD OF 461 TONS-

WOOD PILE LOAD • 15 TONS.-		CONCRETE PILE LOAD • 30 TONS-
QUANTITIES	WOOD	CONCRETE
NO OF PILES	36.	16
CONCRETE	38.5 CU. YDS	8.9 CU YDS
STEEL	0	1230. LBS.
FORMS	419. SQ FT.	150. SQ. FT.
EXCAVATION	87.5 CU. YDS	22. CU. YDS.
SHEETING	60 LIN. FT. 12 FT DEEP	0.

~ WOOD PILES VS CONCRETE PILES ~

Continued on next page

maintaining the resistance encountered in the driving. The shell is then inspected and if found perfect from tip to top is filled with concrete, making a perfect concrete pile.

Under certain conditions we use a core with a larger diameter at the point.

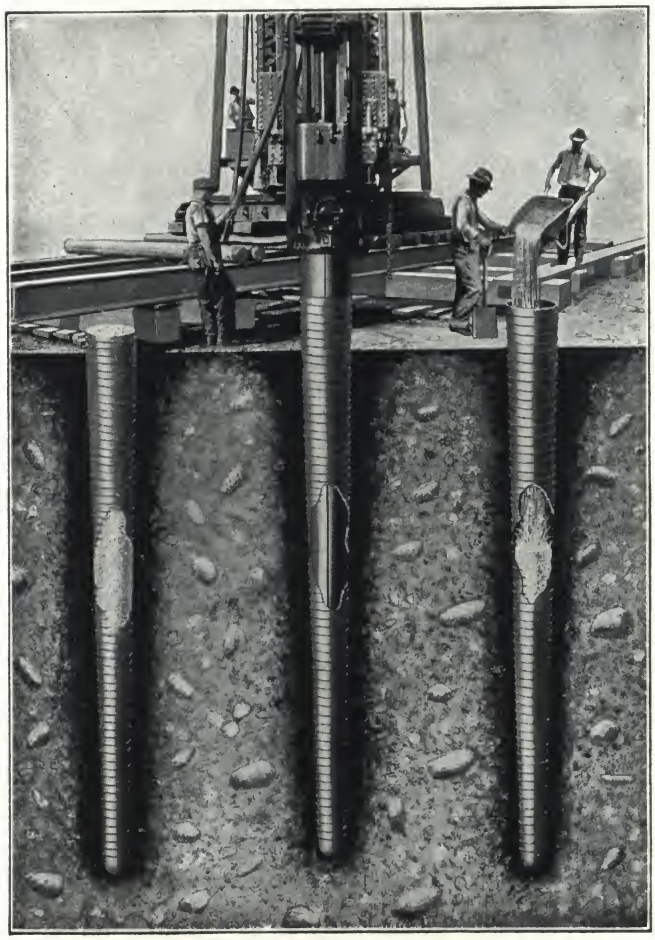
Loads and Spacing—Usually Raymond concrete piles are driven to carry a working load of 30 tons each, but in some cases, loads of from 35 to 40 tons are safely carried.

A working load of 30 tons per pile is accepted by all building departments. The usual spacing of Raymond concrete piles is 2 ft. 6-in. centers for piles less than 30 ft. in length, and for piles in excess of 30 ft. in length, a spacing of 3-ft. centers is more desirable. In view of the very wide variation in soil conditions and other difficulties surrounding a job, it is suggested that the nearest Raymond office be conferred with, so that the site can be investigated and recommendations made.

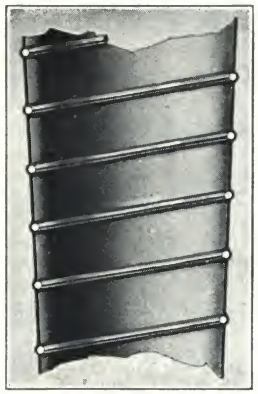
Sizes and Weight of Material—The standard Raymond concrete pile is installed by the use of a pile core 8-in. diam. at the point and increasing in diameter 0.4 in. per lin. ft. of length. For instance, a pile 20 ft. in length would be 16-in. diam. at the top, while one 37 ft. long would have a top diameter of 22.8 in.

The present limit in length of a standard Raymond concrete pile is 37 ft. 6 in.

Where conditions are such as to require piles of greater length, we call attention particularly to the Raymond composite pile, a description of which will be found on the following page.



Essential Steps in the Making of a Raymond Concrete Pile



Section of Spiral Shell



Looking Down Into a Driven Shell—30 ft. Long

Working Loads—In calculating the resistance to penetration, the *Engineering News* formula, based on using a steam hammer, has been found most satisfactory.

This formula follows:

$$L=\frac{2\,W\,H}{S+0.1}$$

L=Load in pounds
W=Weight of falling parts in pounds
H=Drop in feet of falling parts
S=Final penetration per blow in inches

A No. 1 steam hammer has a weight of 5000 lb. falling 36 inches.

A No. 2 steam hammer has a weight of 3000 lb. falling 30 inches

Thus the carrying capacity of the Raymond concrete pile is not a matter of guesswork or speculation, but is susceptible of computation and demonstration.

Advantages of Taper—The Raymond concrete pile possesses an extreme taper and offers a maximum resistance for a given length. This has been proved by a comprehensive record of resistance encountered in driving plus an extensive series of loading tests, during which the real carrying power of the pile has been checked with the driving resistance.

Prices—The Raymond concrete pile is "made-in place" and not sold by the foot, f. o. b. cars, consequently it is impossible to quote prices without knowing the conditions under which the work is to be done. For even approximate prices, it is necessary to have some knowledge of the number of piles, probable length, the approximate spacing, soil conditions, accessibility of the site, etc.

Advantages of Raymond Concrete Piles—

(1) Absolute permanency: immunity from decay or from the attacks of wood borers and destroyers.

(2) Economy, because of greater carrying capacity—meaning a less number of piles for a given load. The greater carrying capacity rests upon several points—to wit:

(a) Greater size, therefore greater displacement and frictional area.

(b) Greater taper, therefore greater frictional value per square foot.

(c) Perfect shape, therefore perfect contact with the ground at every point.

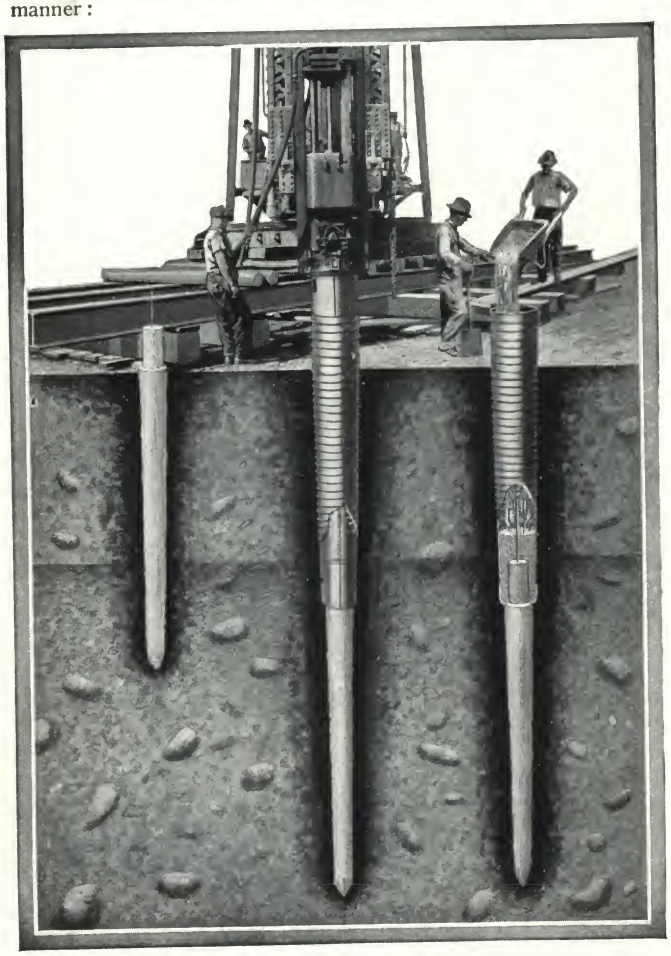
(d) Possibility of inspection after driving, hence the ability to load to full capacity, instead of making a large allowance for inefficiency as in the case of wood piles subject to injury by overdriving, telescoping, departing from the vertical, and like defects, none of which are discernible at the moment when correction is possible.

Continued on next page

(e) Decreased length of pile as a natural consequence of greater size and taper.
(3) Smaller and lighter footings, because of decreased number of piles.
(4) Decrease in total load to be carried, because of decreased weight of footings.
(5) Practical elimination of shoring, underpinning, sheeting, pumping and deep excavation and the reduction of masonry.
(6) Due to decreased number of piles and consequent reduction in width of wall footings, the center line of columns can be brought nearer to the building line.
(7) Important saving in time caused by:
(a) The smaller number of piles required.
(b) The reduction in the amount of excavation, shoring, sheeting and pumping.
(c) The reduction in quantities of footing or masonry.
(d) Manufacture of the pile in place, from materials readily procurable in all localities, and limit of manufacture to the actual number and exact length of piles required. There is no delay for cutting and trimming trees, hauling to shipping point, transporting for great distances by rail or water and delivery to the job, perhaps only to find that the piles are too long or too short.

Specification—If "Raymond concrete piles" are called for, this is of course sufficient. On the other hand, if it is for any reason inadvisable to name them specifically the following specifications will cover:

"Concrete piles shall be of a type specifically approved by the architect or engineer, and shall be placed in the following manner:



Raymond Composite Pile

"A collapsible steel mandrel or pile core 8 in. in diameter at the small end and 20 in. in diameter 30 ft. from that point shall be incased in a spirally reinforced steel shell and driven to a proper penetration. The pile core shall then be collapsed and withdrawn from the shell. Before placing the concrete, each shell shall be inspected and, being found perfect, shall thereupon be filled with concrete placed in accordance with the best practice."

or

"Moulded-in-place piles shall be of a type suitable for the conditions and subject to the approval of the architect or engineer. They shall be formed in casings left in place, which shall be of sufficient strength to prevent distortion or bulging after mandrel has been withdrawn and while the cavity is being filled with concrete or during the driving of adjacent casings."

More About the Raymond "Cast-in-place" Pile

The Raymond pile is the only concrete pile employing the spirally reinforced driven casing as a permanent form to remain in the ground. This feature is essential for perfect dependable results. The province of the form or shell is manifold:
(1) To serve as a form for the piles.
(2) To prevent the admixture of foreign substances.
(3) To retain the original moisture in the mixture until the concrete is thoroughly hardened.
(4) To prevent distortion by external pressure, due to the driving of adjacent piles or accumulated pressures from displacement by the pile itself.
(5) To perfectly retain the displaced earth forming the walls of the cavity, so that there may be no relaxation of the ground and therefore no loss of resistance when the displacing force (the core) is removed.
(6) To act as reinforcement of the pile until the concrete shall have attained its maximum strength.

Raymond Composite Piles

For use where depths greater than 37 ft. 6 in. are encountered, we have developed a composite pile made up by superimposing a Raymond concrete section on a previously driven wooden pile.

The wood pile is ultimately driven so that its top is below the permanent water level and from that point to the bottom of the footing is a standard Raymond concrete pile, as fully illustrated at the left.

Pre-cast Piles

Pre-cast piles have a large and useful field, particularly in marine structures, such as docks, bulkheads, etc.

The Raymond Concrete Pile Company is prepared, through its experience, to give good advice upon the use of "pre-cast piles," and also to design and construct work in which a pre-cast pile can be used economically and advantageously.

Services and Facilities

Our staff of experts is at your service, to assist in the designing and installation of concrete piles for all purposes and to meet all conditions.

Engineering—Our engineering department is available to architects and engineers at all times for investigation work and consultation, and we will gladly submit recommendations, designs and estimates covering any problem within the scope of our business.

Equipment—Every Raymond driver is built of structural steel, scientifically designed for the most rapid and economical construction, and the major portion of our equipment is built in our own machineshops.

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A Few of the Many Architects Who Have Been Satisfied with Raymond Concrete Piles and Raymond Service

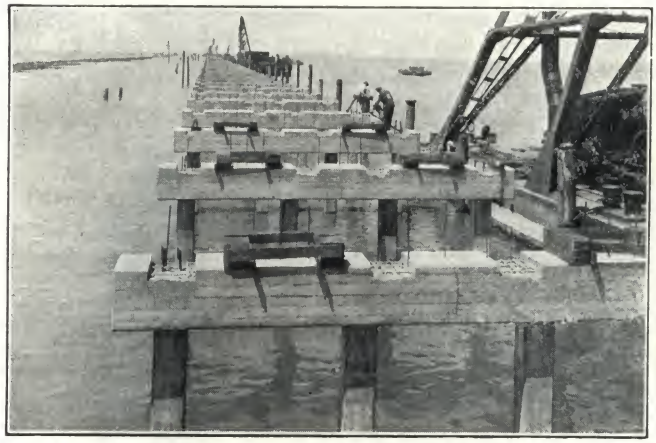
Since 1901 when the first Raymond concrete pile was placed, we have placed up to December, 1929, more than 31,076,824 ft. of Raymond concrete piles throughout the United States, covered by over 3000 separate and individual contracts. We will be only too glad to have you refer to any of the many engineers, architects, owners, and general contractors with whom we have been associated. A partial list of architects follows:

Ernest Flagg, New York, N. Y.
Voorhees, Gmelin & Walker, New York, N. Y.
Dwight P. Robinson & Co., Inc., New York, N. Y.
Trowbridge & Livingston, New York, N. Y.
Warren & Wetmore, New York, N. Y.
Buchman & Kahn, New York, N. Y.
Guilbert & Betelle, Newark, N. J.
Holabird & Root, Chicago, Ill.
Nimmons, Carr & Wright, Chicago, Ill.
Rapp & Rapp, Chicago, Ill.
Graham, Anderson, Probst & White, Chicago, Ill.
H. L. Stevens & Co., Chicago, Ill.
Rankin & Kellogg, Philadelphia, Pa.
Zantzinger, Borie & Medary, Philadelphia, Pa.
Horace Trumbauer, Philadelphia, Pa.
Paul P. Cret, Philadelphia, Pa.
Monks & Johnson, Boston, Mass.
Lockwood, Greene & Co., Boston, Mass.
Stone & Webster, Boston, Mass.
Clyde N. & Nelson Friz, Baltimore, Md.
Wm. H. Emory Jr., Baltimore, Md.
Albert Kahn, Inc., Detroit, Mich.
Smith, Hinchman & Grylls, Detroit, Mich.
Henry Hornbostle, Pittsburgh, Pa.
Joseph F. Kuntz, Pittsburgh, Pa.
Edward Stotz, Pittsburgh, Pa.
Hunting, Davis & Dunnells, Pittsburgh, Pa.
Aegerter & Bailey, St. Louis, Mo.
Mauran, Russell & Crowell, St. Louis, Mo.
William B. Ittner, Inc., St. Louis, Mo.
Supervising Architect, U. S. Treasury, Washington, D. C.
Marye, Alger & Vinour, Atlanta, Ga.
Diboll & Owen, Ltd., New Orleans, La.
Ebbets & Frid, Hartford, Conn.
McClintock & Craig, Springfield, Mass.
J. Latenser & Sons, Omaha, Neb.
A. E. Harvey, Los Angeles, Cal.
Claud W. Beelman, Los Angeles, Cal.
Aleck E. Curlett, Los Angeles, Cal.
Proudfoot, Rawson, Souers & Thomas, Des Moines, Iowa

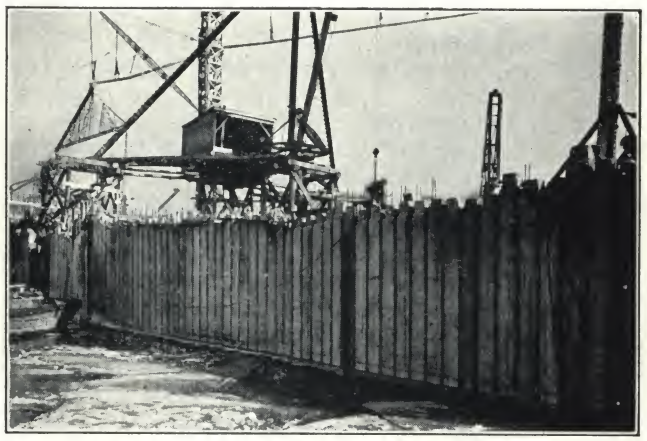
Special Concrete Construction

In addition to the placing of standard Raymond concrete piles for foundation of structures on land, we construct and design permanent docks, piers, bulkheads, trestles, storage bins, retaining walls, bridges, heavy foundation, shipways, drydocks, etc.

Each problem requires special study for solution and our experienced organization is yours to command.



Precast Piles, of Which There Were 4854, for the San Francisco Bay Toll Bridge, San Mateo-Haywood, Cal.



Precast Concrete Piles, of Which There Were 2152, Driven for the Cahokia Power Co., St. Louis, Mo.



Special Construction Work for the Great Lakes Steel Company, Detroit, Mich., Consisting of 76,000 Cubic Yards of Concrete and 30,000 Wood Piles



A Portion of the 7172 Wood Piles Placed Beneath the Grain Elevator for the State of New York at the Gowanus Canal, Brooklyn, N. Y.

SPENCER, WHITE & PRENTIS

Foundations and Underpinning

SPENCER, WHITE & PRENTIS, INC.
10 East 40th Street
NEW YORK, N. Y.

THE SPENCER, WHITE & PRENTIS CO.
Washington Boulevard Bldg. — DETROIT, MICH.
Terminal Tower Bldg. — CLEVELAND, OHIO

Products

FOUNDATIONS of every type.
UNDERPINNING.
MASS CONCRETE CONSTRUCTION.
SOIL TESTS.

Services

SPENCER, WHITE & PRENTIS are prepared to consult with architects, engineers and owners on their foundation and underpinning problems, to submit designs, and to install foundations of all kinds, underpinning, and mass concrete construction.

The personnel of the SPENCER, WHITE & PRENTIS companies have been engaged for many years in engineering operations. They have developed numerous processes for lowering costs and time of installation, among which are Tuba Steel Foundations, the installation of foundations for new buildings under existing buildings on the site, either before or during demolition of the latter, and Pretest Underpinning.

Caisson Foundations

SPENCER, WHITE & PRENTIS have installed many caisson foundations, including the deepest building foundation in the world, and are fully equipped to do both pneumatic and open caisson work.

Improved methods for installing caisson foundations, which reduce both the cost and the time required for installation, have been developed by these companies. Under many conditions these newer methods permit the use of open caissons in place of the more expensive pneumatic type.



One of the World's Deepest Building Foundations—250 Ft. Below Curb, Union Terminal, Cleveland
GRAHAM, ANDERSON, PROBST & WHITE, Architects
CLEVELAND TERMINALS CO., Engineers

Some of the caisson foundations installed:
Central Savings Bank, New York
Manhattan Company Building, New York
21 West St., New York
Fidelity Philadelphia Trust Co., Philadelphia
Cleveland Union Terminal, Cleveland
City Hall, Buffalo

Foundations Under Existing Buildings

To save time in construction, SPENCER, WHITE & PRENTIS, have developed methods for installing new building foundations prior to or during the demolition of existing buildings on the site. The time saved has run from four to six months on big operations, and in one case has made it possible to demolish existing buildings and erect a new 70-story building in eleven months.

Caissons to rock, Tuba Steel Foundations to rock or spread footings, depending upon ground and water conditions, are installed in the basements of the old buildings on the site. When necessary, due to lack of space or time, temporary footings are installed sufficient to carry only a part of the ultimate load, and are increased in size later.

Steel erection is started immediately upon completion of the demolition, sometimes before it is finished. After the steelwork is under way, the general excavation and incidental work are done and the temporary foundations are increased to their permanent size.

Buildings where these methods were used include:
American Surety Co., New York
Manhattan Company Building, New York
Abraham & Straus Department Store, Brooklyn
Hudson Department Store, Detroit

Tuba Steel Foundations

Tuba Steel Foundations are composed of groups of concrete filled steel cylinders. They provide permanent rock-bearing support at great savings in time and expense over open or pneumatic caissons.

The Tuba Steel Cylinders which comprise these foundations are steel tubing, 10¾ to 18 in. outside diameter, $\frac{5}{16}$ to $\frac{9}{16}$ in. thick, driven to rock by steam or pneumatic hammers. Sections of tubing are about 20 ft. long, joined together by internal cast steel sleeves. After being seated on the rock or other firm stratum they are cleaned out, cut off at the required grade, filled with concrete and capped with reinforced concrete.

Safety — Tuba Steel Cylinders derive their support from end bearing and not from skin friction. On this account they are not subject to damaging settlement and are not affected by future adjoining operations. When driven to rock they are the equivalent in every respect of caisson piers.

Speed—For depths of 20 to 30 ft. Tuba Steel Foundations effect a time saving over open caissons

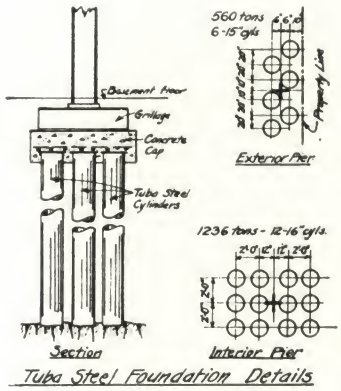


Caisson Foundations Installed During Demolition of Old Building—Manhattan Company Building, New York
H. CRAIG SEVERANCE and YASUO MATSUI, Associated Architects
STARRETT BROS., INC., Builders

Continued on next page



Tuba Steel Foundations Installed in 19 Working Days, Wall and Hanover Building, New York
DELANO & ALDRICH, Architects
STARRETT BROS., INC., Builders



Tuba Steel Foundation Details

of about 50%. For greater depths and bad ground conditions the saving is still greater. They can also be installed more rapidly than concrete or wood pile foundations.

Economy—Generally, Tuba Steel Cylinders can be installed at much lower cost than caisson piers to rock. For great depths, water conditions and where piers are to be installed near adjoining structures, the saving is very great. Tuba Steel Foundations can usually compete in price with any type of pile foundation.

Carrying Capacity—Tuba Steel Cylinders are figured as unsupported columns. The New York Building Code conservatively allows 500 lb. per sq. in. on concrete and 7500 lb. per sq. in. on the steel after deducting the outside $\frac{1}{16}$ in. of steel for possible rusting. The resulting loads for bearing on rock are as follows:

NEW YORK BUILDING CODE
Allowable Load in Tons

Diam., in.	Thickness of shell, in.			
	5/16	3/8	7/16	1/2
10	49.8	57.6	65.5	73.4
12	64.4	73.6	83.0	92.4
14	75.3	84.4	93.5	102.4
15	83.6	93.5	103.2	112.9
16	92.4	103.5	113.4	123.8
18	111.2	123.1	134.9	146.6

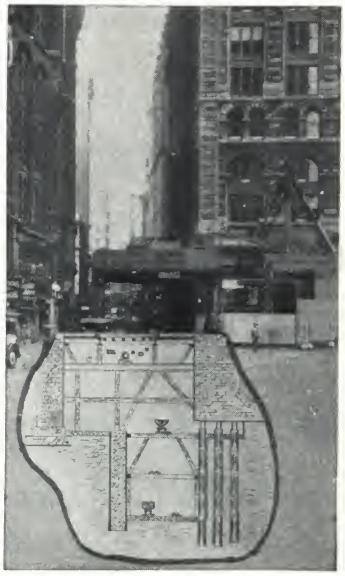
When rock is at a prohibitive depth, Tuba Steel Cylinders are driven to other strata. So driven, they have all of the advantages of Tuba Steel Foundations to rock, except that the loadings are reduced.

A Few of Many Tuba Steel Foundations—
Wall and Hanover Building, New York (38 stories)
American Surety Building, New York (25 stories)
19 Rector St., New York (44 stories)
L. S. Plaut Department Store, Newark
Industrial Trust Co., Providence
First National Bank, Tampa

Pretest Underpinning (Patented)

Pretest Underpinning is employed to provide new and deeper foundations for existing structures when adjacent excavations are to be made to depths greater than the existing foundations. It is also employed to arrest the settlement of structures whose foundations have proved inadequate and to increase the bearing capacity of existing foundations to which loads are to be added.

Advantages—Pretest Underpinning is applicable to every type of structure and to nearly every ground condition. It entails the least interference with the full use of the structure and of adjoining property and streets during installation. Pretest Underpinning eliminates damage through settlement by reducing settlement to the absolute minimum.



Pretest Underpinning in Subway Construction

How the Pretest Method Operates—Details of the Pretest Underpinning method are varied as required to meet individual conditions. Generally sectional steel cylinders are jacked down beneath the foundation of a structure to a satisfactory bearing material and are then cleaned out and filled with concrete. Each cylinder is then tested to overload, usually 50% in excess of permanent load, and the load of the structure is transferred to the cylinder by the patented Pretest wedging method which *maintains the full test load on the cylinder during wedging.* Under any other method the test load is released, resulting in rebound of the cylinder and subsequent settlement when the load of the structure is applied. Pretest Underpinning alone prevents this rebound and eliminates settlement or reduces it to a negligible amount.

Where Used—Pretest Underpinning has been installed under hundreds of structures, including buildings up to 28 stories in height, bridge piers, elevated railroads, retaining walls, chimneys, etc. It has been used for underpinning the buildings along many miles of subways in New York and Philadelphia.

Concentrated loads up to 1200 tons have been underpinned by the Pretest Method. Bearing materials have included sand and clay mixtures, sand, hardpan and rock, and cylinders have penetrated to depths as great as 90 ft.

Concrete Underpinning

For lighter structures on dry materials at reasonable depth, plain concrete underpinning is used. The modern method is to sink pits—so located and constructed that, generally, no needling or shoring is required—build concrete walls or piers in the pits up to the existing foundations and transfer the load to the new footings by dry packing or wedging.

Mass Concrete Construction

SPENCER, WHITE & PRENTIS install heavy concrete structures such as bridge piers, viaducts, dams, retaining walls, etc., especially under difficult conditions.

Pretest Soil Tests

The most accurate means of determining the bearing value of soils at reasonable cost is by the Pretest Method (patented). Reaction is obtained under an existing structure, against the sides of a pit or against a loaded platform. The test is made by hydraulic jacks on any desired area and can be maintained at any loading for as long a period as desired.

WESTERN FOUNDATION COMPANY

Engineers and Contractors

308 West Washington Street

CHICAGO, ILL.

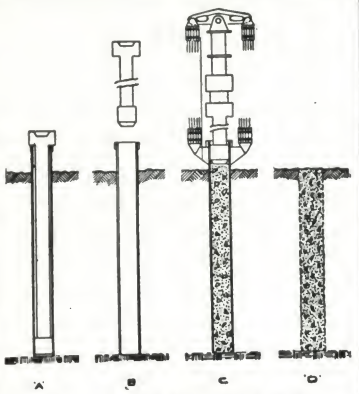
Products

PILES: Cast-in-place Concrete; Composite Concrete and Wood; Steel Pipe, open or closed end; Precast Concrete; Wood.

Also Caissons; Underpinning.

Service Based on Experience

The WESTERN FOUNDATION COMPANY is prepared to install any type of foundation required where it is not practical to use spread footings. Experience shows that no one type of foundation is either economically or engineeringly correct for all soil conditions. For example, on one of our jobs we used six different types of foundation and on another it was necessary to try three before a satisfactory one was found, the method finally adopted being one which had never been used before in any foundation. We give below descriptions of three of the most common methods used by us. We invite correspondence and would be glad to have our engineers confer with any one relative to their problems.



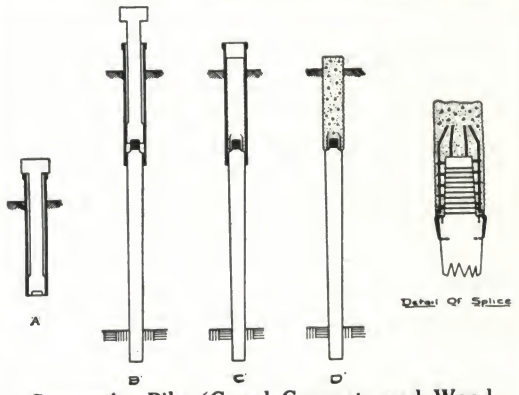
Compressed Concrete Pile

(a) An apparatus consisting of a heavy steel drive casing and solid pointed core driven into ground until required resistance to driving is obtained.

(b) Core removed.

(c) Casing filled with concrete of coarse aggregate and small slump and core replaced in contact with concrete. Note that the force necessary to withdraw casing passes through core and therefore through concrete so that there is no chance of withdrawing casing without a simultaneous deposit of concrete taking place under high pressure.

(d) Finished pile; drive casing removed



Composite Pile (Cased Concrete and Wood with Reinforced Splice)

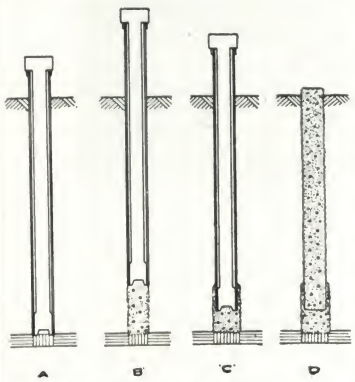
(a) A heavy steel casing and a solid pointed core driven into ground to a point well below permanent ground water level.

(b) Core removed and a wooden pile driven through casing using the core as a follower. Wooden pile is provided with rope grummets to exclude water and mud.

(c) Core removed and corrugated metal shell, carrying reinforcing cage at lower end, inserted in casing and over head of wood pile.

(d) Corrugated shell filled with concrete; heavy casing removed.

Detail of Splice—Wire-wound tenon of pile, splice reinforcement (spiral and verticals), dogs which prevent lifting of shell due to driving of adjacent piles before concrete is set, and spacers and grummet which center wood pile in driving casing, form a seat for corrugated shell, and exclude mud and water



Cased Pedestaled Concrete Pile

(a) A heavy steel casing and a solid pointed core are driven into ground until solid strata is reached.

(b) Core removed and a wet mixed concrete placed in casing. With core in contact with deposited concrete, casing is pulled over core until again fully entered in casing.

(c) Core and casing together are redriven through deposited concrete, spreading it to form a pedestal.

(d) Core removed and a corrugated metal shell placed inside casing. Shell is filled with concrete and casing removed, soft concrete in pedestal flowing around it

Some Architects and Contractors for Whom We Have Done Work

Architects Located in Chicago, Ill.

Alfred S. Alschuler, 28 E. Jackson Blvd.
John Archibald Armstrong, 127 No. Dearborn St.
Battey & Kipp, Inc., 231 So. La Salle St.
Bennett, Parsons & Frost, 80 E. Jackson Blvd.
Condron & Post, 53 W. Jackson Blvd.—2 jobs
Folz & Brand, 510 No. Dearborn St.
Graham, Anderson, Probst & White, 80 E. Jackson Blvd.—3 jobs
Ernest A. Grunsfeld, Jr., 1307 Tribune Tower
Holabird & Root, 333 No. Michigan Ave.
M. J. Morehouse, 343 So. Dearborn St.
Schmidt, Garden & Erikson, 104 So. Michigan Ave.
Thielbar & Fugard, 219 E. Superior St.

Architects Located in Miscellaneous Cities

Harry Hake, 2400 Gilbert Ave., Cincinnati, Ohio—3 jobs
Albert Kahn, Marquette Bldg., Detroit, Mich.—3 jobs
Kirchoff & Rose, 210 Sycamore St., Milwaukee, Wis.
Smith, Hinchman & Grylls, Marquette Bldg., Detroit, Mich.
John T. Windrim, N. W. Cor. 12th and Chestnut Sts., Philadelphia, Pa.

Contractors Located in Chicago, Ill.

Avery Brundage, 110 So. Dearborn St.—3 jobs
Contracting & Materials Co., 42 E. Pearson St.
John Griffiths, Builders Bldg.—2 jobs
Hegeman-Harris Company, Tribune Bldg.
Kelly-Atkinson Construction Co., 189 W. Madison St.—2 jobs
MacDonald Engineering Co., 53 W. Jackson Blvd.—5 jobs
South Parks Board, Linn White, Chief Engineer, 57th and Cottage Grove Ave.—13 jobs
Turner Construction Company, 6 No. Michigan Ave.
R. C. Wieboldt Co., 1412 W. Washington St.—4 jobs

Contractors Located in Miscellaneous Cities

Austin Company, Cleveland, Ohio—2 jobs
Bartlett Hayward Company, Baltimore, Md.—3 jobs
A. Bentley & Sons, Toledo, Ohio—2 jobs
Bryant & Detwiler, 2814 Union Trust Bldg., Detroit, Mich.
Day & Zimmerman, 1600 Walnut St., Philadelphia, Pa.
Ferro Concrete Construction Co., Third and Elm Sts., Cincinnati, Ohio—3 jobs.
T. J. Forschner Contracting Co., 39th St. and 52nd Ave., Cicero, Ill.—2 jobs
M. A. Long Company, 10 W. Chase St., Baltimore, Md.

CONTRACTORS' BUILDING EQUIPMENT

Ackerman-Johnson Co. A138
Ankyra Mfg. Co. A139
Builders Flooring Co. A140
Bull Dog Floor Clip Co. A141
Cowing Pressure Relieving Joint Co. A152–153
Dravo Equipment Co. A137
Floor Accessories Co., Inc. A142–143
Kohler Die & Specialty Co. A144
Ohio Fibrated Asphalt and Rubber Co. A154
Patent Scaffolding Co. A136
Servicised Premoulded Products, Inc. A155–157
Star Expansion Bolt Co. A146–147
"Tie-To" Insert Co. A145
U. S. Expansion Bolt Co. A148
Universal Form Clamp Co. A149
V-W Ventilator Co. A150
W-O-I Products Co. A151

THE PATENT SCAFFOLDING CO.

Manufacturers and Lessors of "Tubelox" Steel Scaffolding, Steel Sidewalk Bridges, Safety Swinging Scaffolds and Scaffolding Machines

MAIN OFFICES

NEW YORK, N. Y., 647 West 50th Street
BOSTON, MASS., 49 Ellery Street
PHILADELPHIA, PA., 2835 Bridge Street
SAN FRANCISCO, CAL., 270 13th Street
LOS ANGELES, CAL., 1148 East 11th Street
CHICAGO, ILL., 1550 Dayton Street
ST. LOUIS, MO., 6168 Bartmer Avenue
ATLANTA, GA., 44 Haynes Street N. W.
PITTSBURGH, PA., 1254 Voskamp Street, N. S.
DETROIT, MICH., 2816 East Canfield Avenue

Representatives and Service Stations throughout the United States and Canada



Patent "Tubelox" Scaffolding Used on a Skyscraper

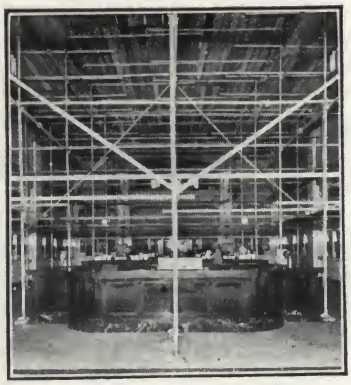
Replacing wooden scaffolding which burned for hours at the 38th floor of this building, causing a large amount of damage

The "Gold Medal" Line

PATENT "TUBELOX" STEEL SCAFFOLDING.
PATENT STEEL SIDEWALK BRIDGES.
PATENT JUNIOR SAFETY SWINGING SCAFFOLDS.
PATENT SAFETY SCAFFOLDING MACHINES.

Patent "Tubelox" Steel Scaffolding

The very latest development in scaffolding—strong, sightly, fireproof, easily and economically erected and dismantled. May be used wherever the built-up form of scaffolding is required, especially for the interior of banks and churches, and for the exterior on skyscrapers, towers, etc. This newly developed steel scaffold is rapidly replacing the old unsightly form of wooden scaffolding. Its fireproof qualities alone, should be of first importance to scaffold users, large losses having been caused by burning wooden scaffolding.



Patent "Tubelox" Scaffolding Used in a Bank

Patent Steel Sidewalk Bridges

Steel sidewalk bridges provide a substantial protection for the public during building operations. They represent a sightly appearance, reduce fire risk, and provide storage space for building materials. The use of this bridge on all kinds of sidewalk conditions is made possible by the adjustable features in the head, which is the key member of this equipment.

This type of bridge has been very quickly adopted by the Contractors in the larger cities, as they realize it is of the utmost importance to give the public the greatest possible protection during building operations.



Bridge Head
(Key Member)



"Gold Medal" Steel Sidewalk Bridge with Plank Decking Laid

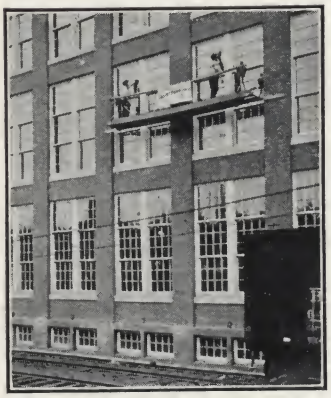
Patent Junior Safety Swinging Scaffolds

Excellent scaffold for general use around industrial plants, for repairs and maintenance. Also used by Contractors for cleaning and pointing masonry, setting stone, cement finishing, etc.

These machines are equipped with galvanized steel cable, which does not deteriorate when subjected to acid or atmospheric conditions. The chief cause of the numerous accidents on the old type block and fall scaffold is due to the rotting of the ropes.

Patent Safety Scaffolding Machines

Provide adjustable, suspended scaffolding for the erection of brickwork, stone, terra cotta, etc., on steel and concrete frame buildings.



Patent Junior Safety Swinging Scaffold

Catalogues

Catalogues on any of the above types of "Gold Medal" Safety Scaffolds and Sidewalk Bridge will be gladly furnished on request.

Service

We should also be very pleased to have our Engineering Department discuss any special or difficult scaffold problems that you might have, and prepare drawings and make recommendations for their proper solution. Each of the above forms of equipment have been worked out in our own plant by our Scaffolding Engineers, after many years of practical tests and experience. Our service stations in forty of the principal cities of the United States and Canada are at all times prepared to give prompt and efficient attention to our customers' requirements.



Patent Safety Scaffolding Machine

DRAVO EQUIPMENT COMPANY

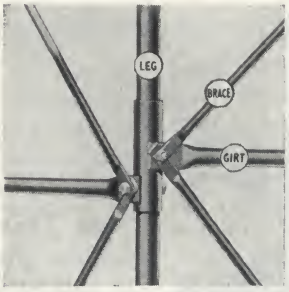
GENERAL DISTRIBUTORS

American Tubular Towers and Accessories

300 Penn Avenue, PITTSBURGH, PA.

American Tubular Towers

American Tubular Towers are designed for handling material and concrete, with or without chuting. They are built in any height and with one or more compartments. Their many advantages both in construction and in performance, their durability and low maintenance, and their remarkable adaptability to various jobs make them ideal as low cost plant equipment for contractors.



There are only 3 main parts to an American Tubular Tower —leg, brace and girt—as shown

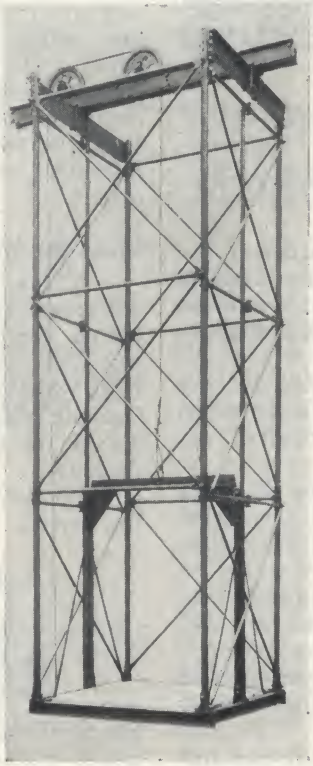
Strength — They are exceptionally strong because the tubular construction of legs, girts, and braces affords the greatest strength for a given weight.

Simplicity—Erection is exceedingly simple. One man can handle easily leg, girt, brace or guide. Elaborate gin poles and tackle are not needed.

Safety — Danger of accident to workmen during erection or dismantling is reduced by simplicity of operations and short time they are in air. Strong, fireproof construction and low wind resistance make an American Tubular Tower safe at any height with minimum guying.

100% Salvage—The same American Tubular Tower can be used on job after job, year after year, with practically no replacement of parts. The entire tower can be compactly stored (a 100-ft. tower needs less storage space than that required for a small touring car).

Service and Adaptability—American Tubular Towers give efficient and economical service on any kind of a job. Because of the interchangeability of parts they can be erected as single towers on one job and as double or triple towers of less height on a subsequent job. A concrete bucket can be installed in a few minutes' time and the concrete distributed through a hopper, high line or boom chute plant.



Typical 3-section American Tubular Tower

American Tubular Towers are being used on a majority of the large buildings in this country and Canada, and on an enormous number of small jobs.

They are available with four different leg sizes to take care of different heights and classes of service. They have been erected in heights from 26 ft. to 762 ft. and with one to four compartments.

American Tubular Towers can be leased or purchased.

Warehouse stocks are maintained in principal centers.

Representative Buildings on Which American Tubular Towers Have Been Used

Palmolive Bldg., Chicago, Ill., Lundoff-Bicknell Co., Contractors

Koppers Bldg., Pittsburgh, Pa., Mellon-Stuart Co., Contractors

Southwestern Bell Telephone Bldg., Kansas City, Mo., Swenson Construction Co., Contractors

Smith-Young Tower, San Antonio, Tex., McKenzie Construction Co., Contractors

Penobscot Bldg., Detroit, Mich., Albert A. Albrecht Co., General Contractors

Chrysler Bldg., New York, N. Y., Fred T. Ley & Co., Inc., General Contractors

Bank of Manhattan Bldg., New York, N. Y., Starrett Brothers, Builders

Sir Francis Drake Hotel, San Francisco, Calif., Lengren & Swinerton, Inc., Contractors

Waldorf Astoria Hotel, New York, N. Y., Thompson, Starrett, Inc., Contractors

Columbia Broadcasting Bldg., New York, N. Y., Dwight P. Robinson, General Contractor

United Shoe Machinery Bldg., Boston, Mass., Geo. A. Fuller Co., General Contractors

Realty Building, Youngstown, Ohio, Mellon-Stuart Co., Contractors

Jackson-Franklin Bldg., Chicago, Ill., McLennan Construction Co., Contractors

Canada Permanent Mortgage & Loan Bldg., Toronto, Canada, Anglin-Norcross, Ltd., General Contractors

Bell Telephone Bldg., Toronto, Canada, Robertson & Jan of Ont., Ltd., Contractors

ACKERMAN-JOHNSON CO.

Expansive Screw Anchors, Expansion Bolts, Concrete Inserts

625 West Jackson Boulevard
CHICAGO, ILL.

Products

ACKERMAN-JOHNSON EXPANSIVE SCREW ANCHOR; EXPANSION BOLTS; CONCRETE INSERTS. U. S. Patents: April 27, 1915, December 21, 1915, April 4, 1916, May 14, 1918; others pending. Patented in Canada, Great Britain, France, Belgium; others pending.

Ackerman-Johnson Expansive Screw Anchor

Adaptability—For attaching objects to hard materials, as concrete, brick, stone, tile, marble, etc.

Description and Operation—Consists of a doubly tapered internally threaded cone made of brass, iron or steel (Fig. 1), within a lead composition ductile sleeve (Fig. 2). These are assembled at the factory, the sleeve being forced on the cone to a normal position as at Fig. 3.

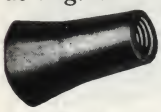


Fig. 1



Fig. 2



Fig. 3

Ackerman-Johnson Expansive Screw Anchor

When installed as illustrated, the sleeve is driven farther toward base of the cone and is expanded generally to any degree required to swedge tightly against the sides of hole, effecting perfect holding contact throughout the length and circumference of the anchor. Thus consolidated with the wall material, the anchor provides a machine threaded hole the same as an ordinary tapped hole in a machine part. Any object may then be attached with a standard screw or bolt of suitable diameter.

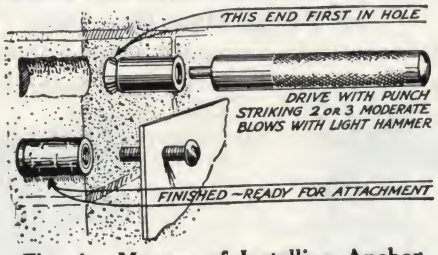


Fig. 4. Manner of Installing Anchor
The piloted setting punch supplied without charge with all anchors

The heavier the load attached, the more forcible becomes the expansion, causing the anchor to resist effort to pull it out far beyond the tensile strength of any screw or bolt.

Distinctive Advantages—Time saving through the use of Ackerman-Johnson anchors compared with old methods more than compensates their total cost.

They save much of drilling cost, requiring least depth for any stated load. They are installed instantly, without the aid of the screw, and before the fixture is lifted into position to be fastened. Their margin of safety is equal to that of steel bolts of correlating size.

They necessitate the least displacement of wall material and consequently less injury to buildings. They effect the neatest possible workmanship.

Sizes—The size of anchor is designated as the size of the bolt or screw to be used. Example: For No. 10-24 screw, use No. 10-24 anchor; for ⅜-in. bolts use ⅜-in. anchor.

SIZES, EXPANSIVE SCREW ANCHORS

Screw or bolt sizes	Threads per in.	Minimum dimension of holes required, inches		Specify anchor Size No.
		Diam.	Depth	
No. 6	32	¼	⅜	6-32
" 8	32	5/16	½	8-32
" 10	24	⅜	⅝	10-24
" 12	24	7/16	¾	12-24
¼"	20	½	⅞	¼-20
5/16"	18	⅝	1	5/16-18
⅜"	16	¾	1¼	⅜-16
7/16"	14	⅞	1½	7/16-14
½"	13	⅞	1½	½-13
⅝"	11	1⅛	2	⅝-11

Packed 50 or 100 in box.

Stud Type Expansion Bolts

So great is the holding power of this anchorage, that when set in strong stone or concrete with only its one primary sleeve expanded, the bolt shank can be pulled in two, without the anchorage yielding.

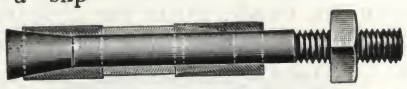


Bolt with Primary Expansive Sleeve Only



Bolt with Primary and One Secondary Expansive Unit

Secondary Expansive Units—Made up of an expansive sleeve and a slip steel cone, giving additional anchorage equal to the primary unit. Calculate the minimum depth of holes for setting at twice the diameter of hole drilled.



Sectional View Showing Bolt with Primary Expansion Sleeve, One Iron Spacing Sleeve, and One Secondary Expansive Unit

Fig. 5. Stud Type Expansion Bolt

Diam. of bolt, at thread .....in.	¼	⅜	½	⅝	¾
Diam. for hole ...in.	⅜	9/16	¾	1	1⅛
Lengths of bolts in inches	1¼	1¾	2½	3½	5
	1½	2	3	4	6
	1¾	2½	3½	5	7½
	2	3	4	6	9
	2½	3½	4½	7½	10
	3	4	5	9	12
	3½	4½	6	10½	15
	4	....	7	12	18
	....	....	8	15	....

Concrete Inserts

Ackerman-Johnson concrete inserts for moulding into the concrete when poured, afford minimum displacement of the concrete and maximum speed in setting. Can be furnished for all sizes of screws and bolts up to ⅝-in. diameter.

We invite requests for full information concerning inserts.

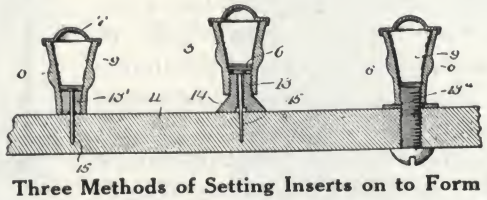


Fig. 6. Three Methods of Setting Inserts on to Form Lumber

Users of Ackerman-Johnson Products

Extensively adopted by leading contractors, manufacturers, railroads, shipyards, government departments and public utility companies.

ANKYRA MANUFACTURING CO.

Manufacturers of Expansion Bolts

149 Berkley Street, Wayne Junction
PHILADELPHIA, PA.

Product

ANKYRA ANKOR (Expansion) BOLTS.

TRADE-MARK
(Reg. U. S. Pat. Off.)

Purpose

To provide a means of holding fixtures to *any* wall, whether hollow or solid, and so holding them that they shall never come loose.

Uses

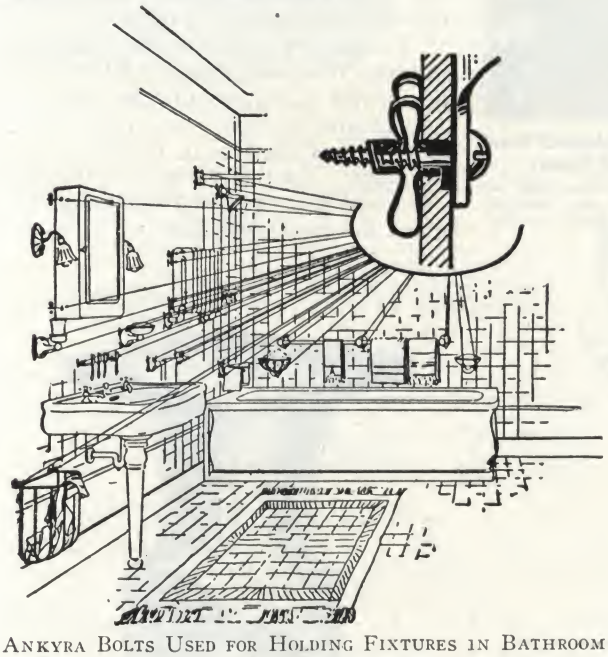
The uses for Ankyra Ankor Bolts are too many to permit of more than a description of typical cases.

Ankyra Ankor Bolts will fasten fixtures to lath and plaster, hollow tile, glazed tile, expanded metal lath, compoboard, sheet metal, brick or concrete walls—in fact they may be used in any sort of wall with assurance that the fixture will "stay put," and yet that it may be removed and replaced at will, if alterations or renewals are necessary.

The illustrations show some uses; but a booklet giving detailed information will be mailed on request.

Other Advantages

Unlike wooden or lead plugs which are prone to loosen quickly because they dry out or are so soft that the threads wear out rapidly, Ankyra Ankor Bolts remain in the wall—rivet themselves in it—and, being made of steel, last indefinitely.



ANKYRA BOLTS USED FOR HOLDING FIXTURES IN BATHROOM

Tests show that Ankyra Ankor Bolts will support a greater load than can be carried on any hollow wall regularly used on standard construction.

(1) The Ankyra sleeve is a self-riveting wing nut.

(2) Ankyras can be installed so quickly that the labor and time saved is an exceedingly important factor. Contractors and plumbers have reported that they saved as much as 90% over ordinary methods.

(3) Ankyras obviate the necessity of sounding for studding or making previous provision during construction for the location of fixtures.

(4) The fixture may be removed by taking out screw, but Ankyra nut will not drop down inside of wall as it is an integral part of sleeve or bolt.



ANKYRA BOLT EXPANDED
Note wood screw
Self-riveting; self-adjusting



ANKYRA BOLT WITH
WOOD SCREW
BEFORE EXPANSION

(5) Ordinary standard wood screws are used with Ankyra and may be selected to match other hardware.

(6) Ankyras will hold until the wall itself gives way.

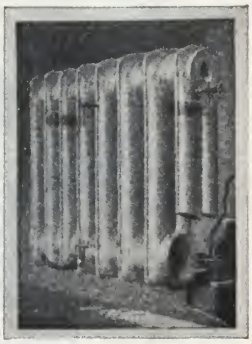
(7) The alignment of grounds can be controlled regardless of irregularities in the face of the wall.

(8) Ankyras are easily and quickly installed.

(9) The solution to many especially vexing problems.

Fastening wall radiators to nearly any kind of wall, but more particularly to tile walls, is usually a ticklish proposition. Ankyras hold the radiator hooks firmly to any kind of wall and are easy to install, as well as permanent.

Bathroom fixtures—especially in public places—break loose with annoying and expensive frequency. The remedy lies in Ankyras which not only hold permanently, but can be used without fear of cracking or breaking the tile.



WALL RADIATOR
PLACED ON TILE
WALL

References

Hundreds of thousands Ankyra Ankor Bolts have been used in many of the largest and best known buildings in this country and Canada. Among them are:

The Woolworth, Metropolitan, Equitable and Widener Buildings; Massachusetts Institute of Technology; the Ritz-Carlton, Bellevue-Stratford and Marlborough-Blenheim Hotels; Detroit Free Library.

BUILDERS FLOORING COMPANY

CONCRETE INSERT DIVISION

501 Fifth Avenue, NEW YORK, N. Y.

The Universal Adjustable Concrete Insert

Because of its simplicity of design, strong construction and special unique feature of radial adjustment, this Universal Insert is recommended for heavy duty work. It is used for securing hangers, for the support of heavy machinery, shafting, etc., and can be used in either horizontal or vertical plane.

The illustration below indicates clearly the radial adjustable feature and its adjustability in all directions.

The insert consists of a hollow one-piece casting, cleanly cored. The interior of the cup socket is provided with a lug or fin, which prevents the socket nut from revolving when turning the rod.

The solid top of the insert prevents concrete from entering the interior. The bottom is open to receive nut and rod. Notched flanges are provided for securing the insert to the forms while pouring the concrete.

The insert is so designed that its exterior surface presents exceptionally large contact with the concrete, making the insert so strongly embedded that the bolt threads will fail before the insert could possibly pull loose.

Hanger Rods and Socket Nuts—The insert takes any size from ¼ to ¾ in. The special nuts are furnished separately as may be required. Steel bolts or threaded rods, after being engaged in the socket nut, can be allowed to hang loose and sway in any direction desired, and then drawn up in place, absolutely tight and rigid.



4500-lb. Press Suspended from Single Universal Insert

Illustration also shows use of Universal Inserts for line shafting. Plant of American Can Company, Jersey City, N. J.

Should the inserts, through error or carelessness, be out of line with each other, the radial adjustment feature allows for such inserts to be still usable, as the rods can be swung to right or left and set to line up with adjoining hangers.

The Right Angle Adjustable Concrete Insert

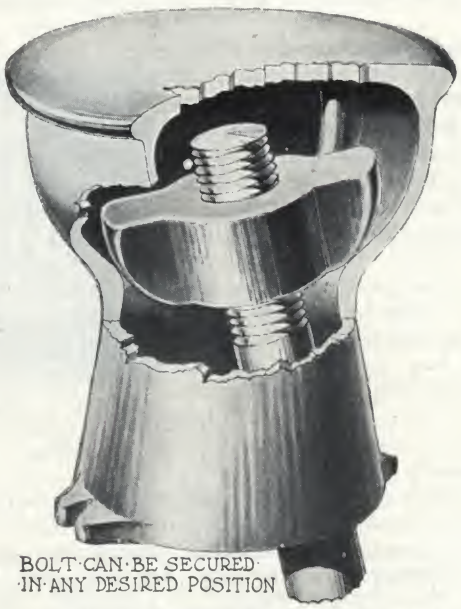
Especially designed for light work, this "one way" insert offers several worthwhile advantages: its one-piece construction makes the first cost low; it is installed quickly and easily with standard size nuts and bolts from ¼ to ½ in.; and it gives a wide transverse adjustment.

This Right Angle Insert is used for a wide range of hangers, such as sprinkler equipment and metal lath ceiling; anchoring tile and terra cotta to walls or ceilings; supporting under ceiling conduits, wiring and plumbing fixtures; etc.

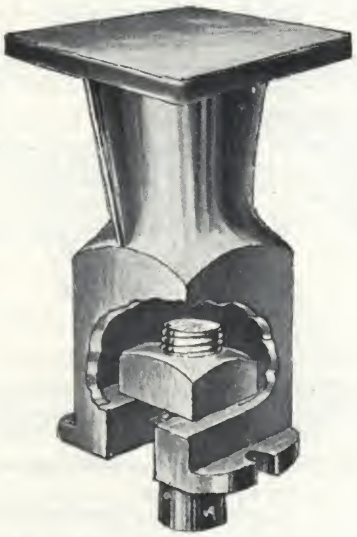
This insert is a one-piece casting with a large supporting head, cast fins on the body and heavy cast shoulders to support the hanger nut and bolt. Notched flanges are provided to secure the insert to forms.

The illustration below shows the right angle adjustable slot which permits accurate alignment of hangers.

Because of its design, this insert possesses unusual strength and simplicity and insures a low installation cost. The hangers are so rapidly inserted that the labor of installation is reduced to the minimum. Yet the strength of the insert is so great that the bolt threads will strip before the insert loosens.



Universal Adjustable Concrete Insert
Cut view. Two-thirds actual size



Right Angle Adjustable Concrete Insert
Cut view. Two-thirds actual size

THE BULL DOG FLOOR CLIP CO.

Floor Clips, Buck Anchors, Wall Anchors, Furring Anchors

108 North First Avenue
WINTERSET, IOWA
135 BRANCH REPRESENTATIVES AND 20 CONVENIENT DISTRIBUTING PLANTS

Product

BULL DOG FLOOR CLIP for anchoring Wood Floors to Concrete, with or without a fill.

Advantages of Bull Dog Floor Clips

(1) That the Bull Dog Method is practical is evidenced by the fact that more than 26,000,000 units are in use, in more than 8000 buildings.

(2) A one-piece clip, made of heavy 18 and 20 gauge galvanized iron. Shows no weakness, no joints or hinges to break or corrode. Easily placed by straightedge method.

(3) Affords adequate anchorage by engineer's test.

(4) *Dry rot* elimination is greatly enhanced because of dead air space rather than rot from moisture, and floor and sleeper deterioration from acid reaction.

(5) Proper size nails are furnished *free*. Friction-tight nail fitting guarantees rigid sleeper anchorage.

(6) Provide a perfectly firm, *level* floor. Abundant anchorage defeats all possibility of floor buckle, dome, or squeak.

(7) Save 5¢ per sq. ft. by avoiding the cost of material and labor for a concrete fill. Also saves labor cost of beveling and shimming of sleepers.

(8) Can be placed for ½¢ or less each, and sleepers can be laid 50% faster than if anchored by a fill material. Standard clips spaced 16 in. on center require 576 anchors per 1000 sq. ft. of floor slab.

(9) Reduce dead load 18,000 lb. per 1000 sq. ft. of floor area, which provides also a saving in a proportionate amount of reinforcing steel.

(10) 135 representatives, also stocks are maintained at 20 points, making possible emergency delivery service, as required. Both junior and standard sizes for 2x2, 2x3, and 2x4 sleepers.

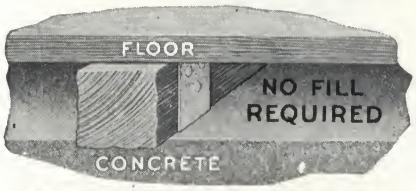


The New Bull Dog Buck Anchor
Literature provided

For floors where ordinances require a fill, or where a light clip is desired, the Bull Dog Junior effects a still greater saving in anchoring wood floors to concrete.

It is one-half the width of the regular Bull Dog Clip and is also made in three sizes, 2x2, 2x3 and 2x4.

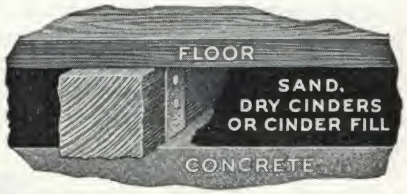
With a fill, we suggest spacing 16 in. and 2½ ft. which requires about 300 clips per 1000 sq. ft. of slab at a cost, including installation, of $9.00. This cost is more than offset in the time and expense of bracing the strips, beveling, etc., and a large saving in expense of fill, material and labor.



Bull Dog Standard without a Fill

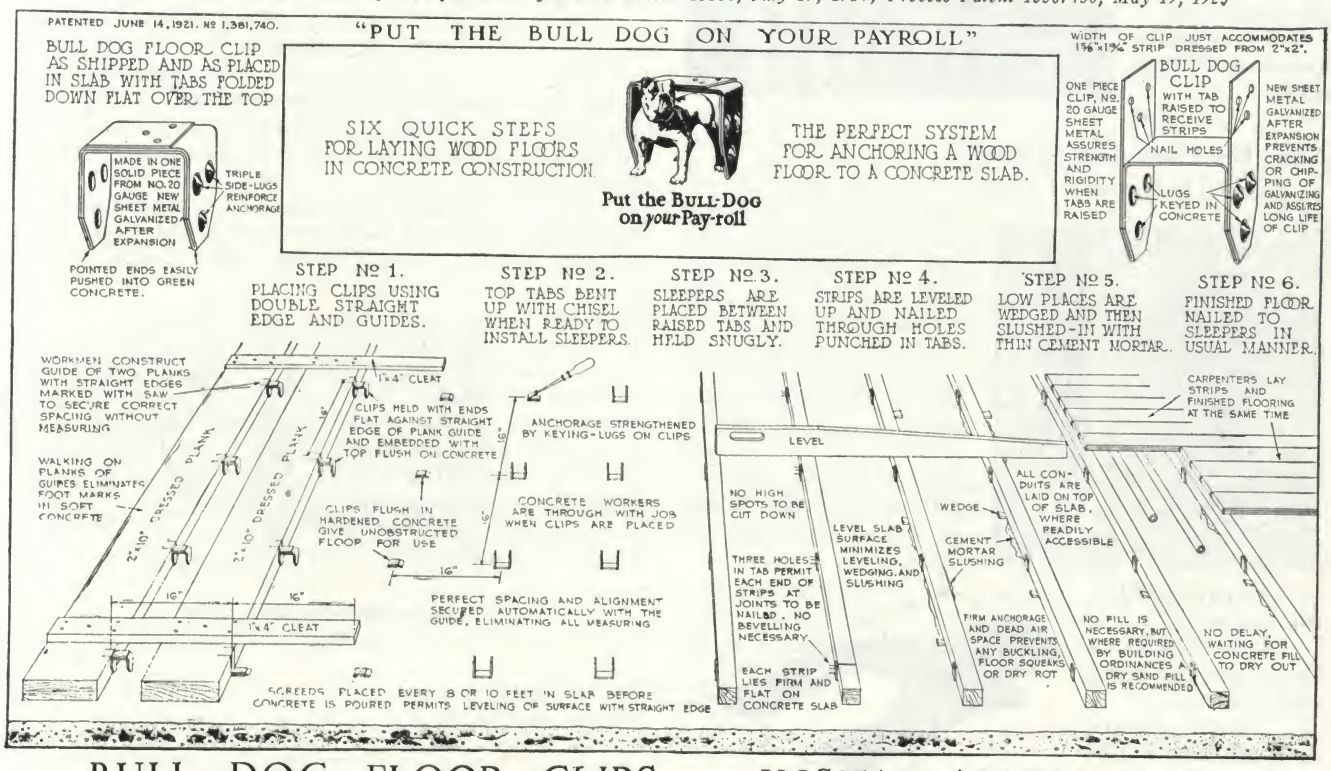
Nails Now Furnished without Charge

A sufficient quantity of friction tight nails are included in each shipping case (gratis) which insures solid anchorage of sleepers to floor clips.



Bull Dog Junior Where Fill Is Required

Users of Bull Dog Floor Clips are protected by reissue Patent 15881, July 29, 1924; Process Patent 15387430, May 19, 1925



BULL-DOG FLOOR CLIPS — INSTALLATION DATA.

FLOOR ACCESSORIES CO., INC.

Ankortite Buck Anchors and Ankortite Floor Clips

GENERAL OFFICE

KANSAS CITY, MO.

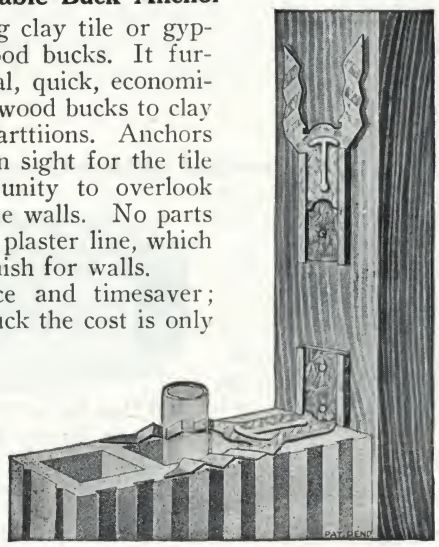
AGENTS IN PRINCIPAL CITIES

Products

ANKORTITE BUCK ANCHORS.
ANKORTITE FLOOR CLIPS.
ANKORTITE SHELF ANGLE FIXTURES.
ANKORTITE HANGER FIXTURES.

For our pages on Recessed Floor Bars, Ankortite Floor Joiners, Standard Brass Thresholds and Tackless Carpet Strips, see Manufacturers' Index.

Ankortite Adjustable Buck Anchor



For anchoring clay tile or gypsum blocks to wood bucks. It furnishes a substantial, quick, economical anchorage for wood bucks to clay or gypsum tile parttiions. Anchors are always in plain sight for the tile setter; no opportunity to overlook placing them in the walls. No parts project outside of plaster line, which permits smooth finish for walls.

A convenience and timesaver; using 3 to each buck the cost is only 18¢ per door.

Packed 250 per carton.

Price, $30.00 per thousand.

Freight allowed on 1000 or more.

Ankortite Floor Buck Anchor

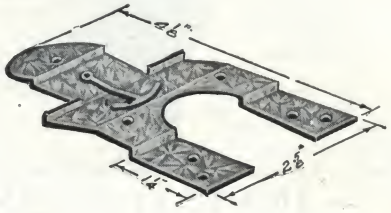
Nailed to bottom of buck and directly into concrete floor with special concrete nails, these anchors eliminate drilling and plugging of floors or providing low places in the slab for grouting in fresh mortar to give bucks anchorage. They provide a substantial anchorage for holding door bucks to the floor slab at a great saving in cost—only 4½¢ per door.



Packed 250 to the carton.

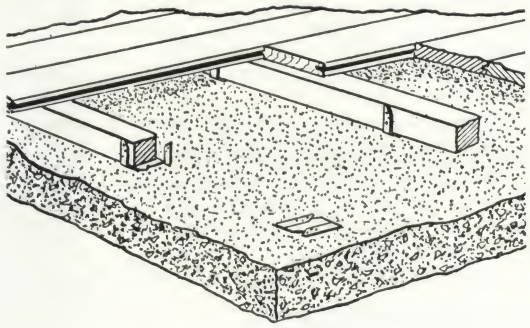
Price, $22.50 per thousand, including concrete nails.

Freight allowed on quantities of 1000 or more.



Ankortite Floor Clips

The use of Ankortite Floor Clips for anchoring wood sleepers to concrete slabs eliminates the cost, material and weight of a fill between sleepers; speeds construction as there is no waiting for a fill to dry and



sleepers can be laid approximately twice as fast as with a fill.

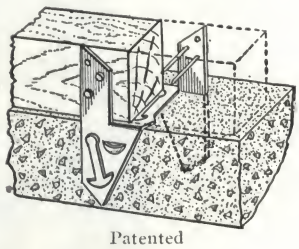
They give an absolutely firm, solid anchoroge to the floor, eliminating squeaks.

The clips lie perfectly flat, leaving slab clear for stacking, trucking, etc., flanges being raised when sleepers are to be attached.

The Ankortite Floor Clip embodies every practical feature of floor clip construction.

Ease and speed in placing, maximum anchorage, unsurpassed strength, and exceptionally low cost, combine to make it an efficient, economical and satisfactory method of floor anchorage. Their extensive use proves their excellence.

Ankortite Floor Clips are made of heavier metal than is generally used in floor clips, giving them greater strength. Their generous width allows sleeper ends to be jointed within the clips; the flanges that receive the sleepers are unusually long, permitting nailing over roughest floor slabs. These flanges have a direct pull against the anchored member of the clip and are offset so the nails do not register opposite each other to weaken the sleeper.



Patented

PRICES FOR FLOOR CLIPS

	Per 1000
2-in. size for 2x2-in. sleepers	$22.50
3-in. size for 3x2-in. sleepers	23.75
4-in. size for 4x2-in. sleepers	25.00

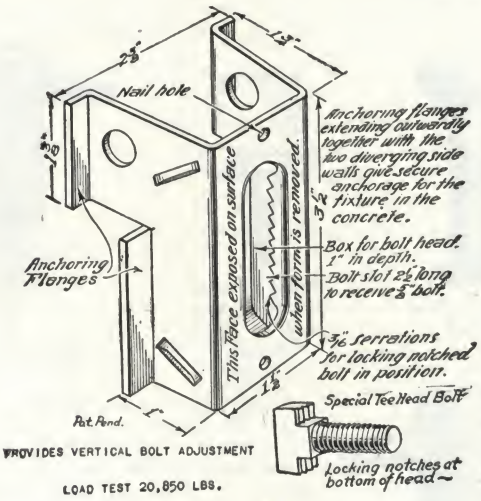
Prices include freight and friction-tight nails for attaching sleepers.

Continued on next page

Ankortite Shelf Angle Fixtures

Provide bolt adjustment for attaching shelf angles, lintels, overhead doors, etc.

The bolt adjustment provided by this method of attaching shelf angles eliminates the necessity of enlarging the holes in the angles to receive bolts that are out of alignment. They further eliminate cutting the



masonry to fit fixed angles, the angles being attached as the story heights are built up and the vertical adjustment permitting the shelf angle to be laid on the top of the masonry course. No holes in form lumber are required, which reduces labor and increases the salvage value.

The time, labor, money and annoyance saved by the use of these fixtures is obvious, while the cost of the fixtures themselves is less per lineal foot of angle than ordinary bolts cast in the concrete on 18-in. centers.

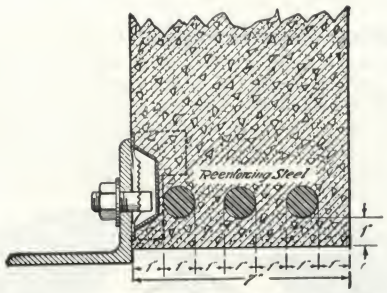
The fixtures are usually spaced on 4-ft. centers.

Price complete, including bolt, nut and washer, 20 cents each.

Cadmium treatment 5 cents extra.

Freight allowed on 100 or more.

Typical Specification—*Shelf Angle Fixtures*— For anchoring shelf angles and lintels, place and nail in an upright position in the concrete forms Ankortite Shelf Angle Fixtures as manufactured by the Floor Accessories Co., Inc., Kansas City, Mo. These fixtures to be spaced to correspond with the slotted holes to be punched in the angles.

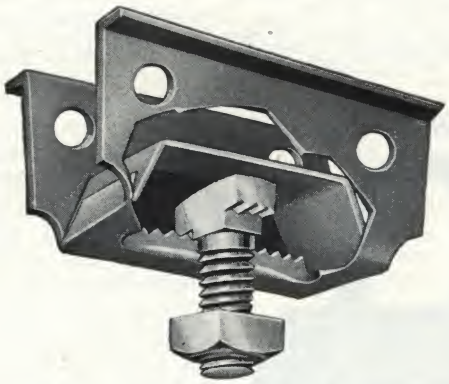


Fixture does not interfere with reenforcing rods, permitting them to be placed within 1 in. of face of concrete

Ankortite Hanger Fixtures

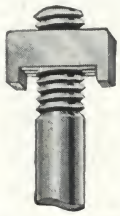
Provide adjustment for suspending line shafts, motors, machinery, overhead tramrails, pipes, etc., from concrete slab or beams.

These fixtures are used with either slab concrete ceilings or with beam and girder concrete ceilings. They are nailed into wood forms, while with steel forms they



are held in place with small pads of concrete until the remaining concrete is poured.

Adjustment sideways to enable perfect alignment of the suspended line is provided by the fixtures. Inside the box are serrations which mesh with the notches in the special bolt heads, preventing any shifting from vibration or other causes. For suspending pipes, etc., where the distance may be varied or not predetermined,

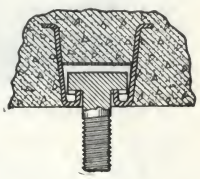


special nuts with notches and drop ends are furnished with the fixtures instead of bolts so that rods of any length can be threaded into them and hung from the fixtures.

These fixtures have a wide range of other varied uses, such as fastening gymnasium and manual training equipment, machinery, etc., to floors, seats in stadiums, and similar attachments where adjustment to position and solid anchorage is desired.

The unsurpassed strength, adjustability and economy of Ankortite Hanger Fixtures makes them extremely satisfactory. Their low cost makes it possible to include them in the ceilings of warehouses, etc., which may later be converted into manufacturing establishments or for other uses where heavy objects may be fastened or suspended. They are usually spaced on 3 or 4-ft. centers in both directions.

Ankortite Hanger Fixtures are made of 12 gage steel and are so constructed as to displace a minimum amount of concrete as will be seen from the accompanying illustration. Their diverging sidewalls with extended flanges give a maximum anchorage in the concrete and provide unusual strength for supporting heavy objects. Laboratory tests show that they carry a load in excess of 20,000 lb. per fixture.



The price of the Ankortite Hanger Fixture, including the bolt, nut and washer, is 20 cents each.

Cadmium treatment 5 cents extra.

Freight allowed on 100 or more.

Special nut for rods instead of bolts furnished at same price. These nuts have standard threads and are made to take rods from ¼ to ⅝ in. in diameter.

KOHLER DIE & SPECIALTY CO.

Concrete Inserts, Steel Bridging, and Metal Specialties

DEKALB, ILL.

CHICAGO: W. L. HARRISON, 1148 Builders Building — NEW YORK: SARGENT BUILDING SPECIALTIES CO., 16 Warren Street

Products

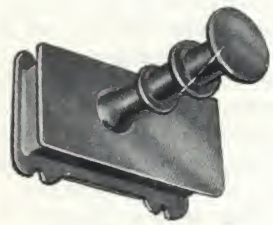
ADJUSTABLE or SLOTTED CONCRETE INSERTS, Loop Type, Stem Type and Angle Type; THREADED CONCRETE INSERTS, Cast Type and Pressed Steel Type; CONTINUOUS STEEL BRIDGING.

Adjustable or Slotted Inserts



Loop Type

Loop Type—The loop type adjustable insert, intended for use in thin slab construction, is proving more popular now than the stem type and is meeting every requirement. It is one of the best designed and most practical inserts on the market. This insert is so formed that the concrete flows freely around it. There are no sharp corners and in the finished work less surface is exposed in the ceiling after the forms are removed than with any other type which is a very desirable feature. The size of the chamber in both the loop type and stem type permits of the use of either the nut or the head of the bolt.



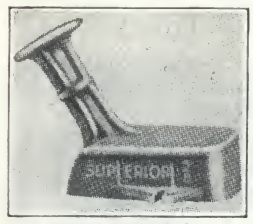
Collings Insert
Note corrugated stem and tapering base with flange at top
Patented Mar. 26, 1918

Stem Type—Made with a corrugated stem that extends up into the compression area of the concrete, the correct place to hang the load. The tapering ribbed base is so shaped that it gives the greatest possible supporting strength to the concrete member. The greater the load on the Collings insert the tighter the concrete grips and holds.

ADJUSTABLE INSERTS—SIZES, WEIGHTS AND LIST PRICES

	Size bolt	Height	Weight per 100	List price
Stem type	½ in.	3⅝ in.	76 lbs.	16c each
	⅝ in.	3¾ in.	90 lbs.	19c each
	¾ in.	4 in.	115 lbs.	23c each
Loop type	½ in.	2 7/16 in.	45 lbs.	13c each
	⅝ in.	2 13/16 in.	63 lbs.	16c each
	¾ in.	3 1/16 in.	81 lbs.	20c each

Discounts will be quoted on application.



Patent applied for

Superior "Angle" Type—The angle type insert is very similar to the stem type with the exception that the stem is placed on an angle at the end for the purpose of securing the greatest possible anchorage in the concrete wall.

This type was designed by our engineers for anchoring shelf angles and is proving entirely satisfactory, offering advantages that are not found in any other type of insert.

Code No.	Size Bolt	Height	Weight per 100	List price
A458	⅝ in.	2⅞ in.	72 lb.	16c each



Superior Pressed Steel Insert
(Patent applied for)

Superior Pressed Steel—This insert is 13 gauge steel, non-breakable, with great strength. It is used by plumbing, heating, and electrical trades. It has an adjustment sidewise of 1⅛ in., also through the nut into the chamber, as shown in sketch. The nut is always in place and provides full supporting strength. Made in one size only.

Code No.	Size bolt	Height	Weight per 100	List price
S938	⅜ in.	1¼ in.	32 lb.	13c each

Superior Threaded Concrete Inserts

Advantages—The Kohler Threaded Concrete Inserts are now supplied either with the screw point or with nailing lugs at the base for use in place of the screw points, as illustrated.



Pressed Steel Insert
Construction of ⅜ and ½-in. sizes



Exact Size of Screw Point Used in ⅝-in. Insert
(Patented)



Cast Insert with Screw Point



Cast Insert with Nailing Lugs

This screw point makes it possible to set the insert in the form accurately and quickly. A blow with a hammer and a couple of turns with the hand sets this screw down so that the insert is held secure in a vertical position ready for the concrete to be poured. After the work is finished the forms are easily pulled away from the screws, which are then quickly removed, leaving the insert free for the threaded bolt.

The cast threaded inserts with the nailing lugs at the base are preferred in many places instead of the screw points. They are quickly set and the cost is less.

THREADED INSERTS—SIZES, WEIGHTS, AND LIST PRICES

Size bolt	Height	Weight per 100	List price
Pressed Steel Threaded Inserts			
⅜ in.	2½ in.	8 lbs.	10c each
½ in.	3 in.	13½ lbs.	13c each
⅝ in.	3¼ in.	42 lbs.	17c each
Cast Threaded Inserts with Screw Points			
⅜ in.	2⅜ in.	23 lbs.	13c each
½ in.	3¼ in.	45 lbs.	15c each
⅝ in.	3½ in.	75 lbs.	19c each
¾ in.	3⅝ in.	85 lbs.	22c each
⅞ in.	3¾ in.	110 lbs.	28c each
Cast Threaded Inserts with Nailing Lugs without Screw Points			
½ in.	3¼ in.	45 lbs.	13c each
⅝ in.	3 7/16 in.	66 lbs.	17c each
¾ in.	3⅝ in.	72 lbs.	20c each

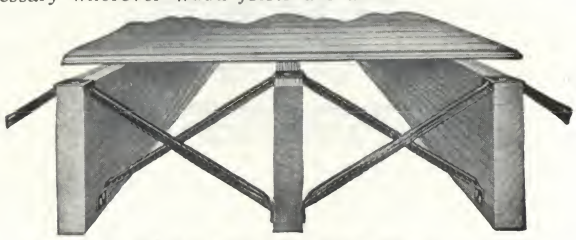
List prices are subject to discount which will be quoted on application.

Economy—These inserts, regularly spaced in the ceilings, floors or walls of reinforced concrete buildings mean a saving of time and heavy expense in attaching or rearranging shafting, piping or other interior equipment. A necessity in concrete construction.

JH Continuous Steel Bridging

A new type of steel bridging that offers a simple yet scientific system for producing a safe, rigid, and permanent floor bridging with real economy. Its construction is such as to make it both a tension as well as a compression bridging.

Write for circular and full information of this bridging system that meets every modern building requirement and is necessary wherever wood joists are used.



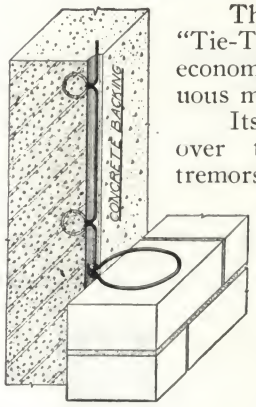
JH Continuous Steel Bridging

"TIE-TO" INSERT CO.

2140 South Layton Boulevard

MILWAUKEE, WIS.

Masonry Anchor for Concrete Construction

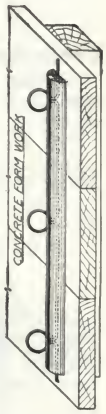


The No. 3 "Tie-To" Insert and "Tie-To" Anchor Ring constitutes a most economical, simple and foolproof continuous masonry anchor.

Its safety factor exceeds many times over the requirements for resisting tremors of earthquake proportion, and the bonding value of the Anchor Ring is many times greater than that of the mortar.

It is equally efficient when used as a brick, tile, stone, or terra cotta anchor. Difficult cutting and possibility of concrete clogging are eliminated, which reflects a 30% to 60% anchor installation saving.

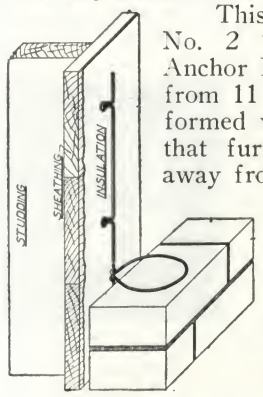
The No. 3 Insert is made from 11 gage heavily galvanized hard steel wire equipped with a wood Core Strip. The continuous wire is formed with 1¼-in. anchor loops 6 in. on centers. The Core Strip is made of two symmetrical pieces stapled together. The "Tie-To" Anchor Ring is made from 11 gage heavily galvanized hard steel wire, is 3½ in. in diameter, the open ends being formed with U-hooks to engage the continuous anchored Insert. The No. 3 Insert is also furnished in 9 gage galvanized, and 11 gage and 9 gage hard copper material.



Installation—The No. 3 Insert is furnished in 5-ft. lengths. It is nailed to the forms with the resin coated nails furnished with the Inserts. When the forms are stripped (Core Strip comes out with formwork) there remains in the concrete, a clear semicircular indentation in the center of which is the continuous wire support which permits the Anchor Rings to be snapped on at any point as the wall is built up. For anchoring stone, the ¼-in. cadmium plated "Tie-To" Stone Anchor Arm is hooked onto the continuous support, the other end engaging the hole prepared in the stone.

Specifications—No. 3 "Tie-To" Inserts, manufactured by the "Tie-To" Insert Company, Milwaukee, Wisconsin, shall be installed vertically in all concrete surfaces which are to be faced with brick, tile, stone or terra cotta. Spacing shall be not more than 16 in. apart. "Tie-To" Anchor Rings shall be installed at every sixth course of brickwork and the "Tie-To" Stone Anchor Arm at every course for stone or terra cotta.

Masonry Anchor for Frame

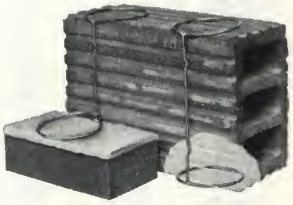


This anchor is a combination of the No. 2 "Tie-To" Insert and "Tie-To" Anchor Ring. The No. 2 Insert is made from 11 gage heavily galvanized wire, is formed with nail loops 6 in. on centers, that furs the supporting portion ⅜ in. away from the sheathing. The carpenter nails the 5-ft. lengths of Insert to to the sheathing at the studding points to form a continuous support the entire height of the wall, which permits the mason to snap on the Anchor Ring at any point when the veneer is being laid up. The anchoring value resulting is not approached with any other type of anchor. The saving in mason labor is considerable.

Note: This insert is also very desirable as a furring for metal lath application for semifireproofed plastering and outside stucco on frame. This construction eliminates 90% of the expansion cracks.

Back-up Tile Anchor and Metal Lath Hanger

The "Tie-To" Back-up Tile Anchor is furnished in all standard tile and block sizes, is made from 9 gage heavily galvanized hard steel wire, the Anchor ends being loops 3½ in. in diameter. The two crimps in the vertical section of the Anchor furs it away ⅜ in. away from the tile. A "Tie-To" Anchor Ring is snapped on to the vertical support and is dropped down to the mortar joint of the veneer facing. Advantages are: positive anchorage, continuous two-way air space and a dampproof wall.

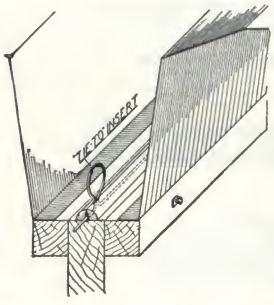


Note: When used as a metal lath hanger for tile or block walls, it furs the metal lath ⅜ in. away from the wall, thus eliminating mortar joint streaks in the plaster and a damp inner wall. Spacing specifications will be sent on request.

Metal Lath Hanger for Concrete Construction

When used as a metal lath hanger, the No. 3 Insert eliminates hanger wires, clinch nails, channels, pencil rods, etc. It is adaptable to any type of formwork and requires no mutilation of form lumber. Foolproof, it assures a perfect installation, thereby avoiding further preparation after the forms are removed.





Installation—The No. 3 Insert is nailed to soffit with ordinary resin coated nails which are furnished with the Inserts. Wood Core Strip comes out with formwork leaving a semicircular indentation in concrete, in center of which is a continuous support even with bottom of joist. To this support, metal rib lath is tied easily and swiftly always at the rib point.

Note: Information on "Tie-to" suspended ceiling hangers will be sent on request.

Note: All "Tie-to" Products patented Aug. 16, 1927, other patents pending. "Tie-to" Registered in United States Patent Office.

STAR EXPANSION BOLT CO.

141 Cedar Street, NEW YORK, N. Y.

BRANCH OFFICES CARRYING COMPLETE STOCK

ATLANTA, GA., 238 Trinity Avenue, S. W.
BOSTON, MASS., 120 High Street
CHICAGO, ILL., 40 So. Clinton Street
CLEVELAND, OHIO, 1200 W. Ninth Street
DETROIT, MICH., 429 Wayne Street
LOS ANGELES, CALIF., 168 So. Central Avenue
SEATTLE, WASH., 522 First Avenue, South
PHILADELPHIA, PA., 410 Commerce Street
ST. LOUIS, MO., 820 No. First Street
SAN FRANCISCO, CALIF., 121 Second Street

FACTORY: BAYONNE, N. J.

Products

Manufacturers of EXPANSION BOLTS and other Anchorage Devices, of all kinds, together with the necessary drills and tools for placing or replacing.

Dryvin Expansion Shields

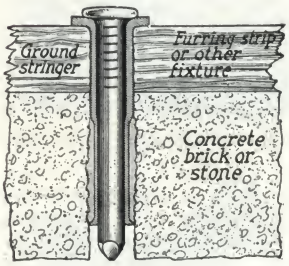
Meets the requirements of the Underwriters' Laboratories, Inc.

The Dryvin offers an improved method of anchoring to masonry and concrete. It differs from other shields in that it employs a nail as an expansion pin during installation, and the nail becomes a locking pin when installed.

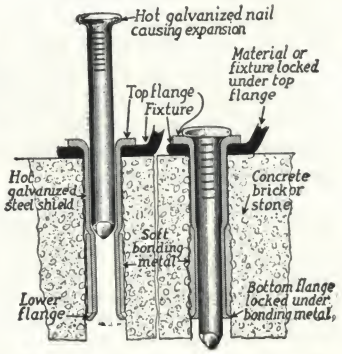
We illustrate by diagram the principle of the Dryvin, showing that it is the shield that holds the load and not the nail. The latter therefore is not subjected to strains or vibrations.

Stresses are conveyed to the bottom flange which is locked under lead at the bottom of the hole.

The fixture may vary from thin sheet metal to a thickness of 2 in.



For Furring Strip
It is the shield that holds the load, not the nail



Before and After Driving Nail



DRYVIN DATA

Size, in.	*Working load, lb.
3/16 x 7/8	130
3/16 x 1 1/4	150
1/4 x 1	200
1/4 x 1 1/4	300
1/4 x 1 1/2	350
5/16 x 1 1/4	400
5/16 x 1 3/4	450
5/16 x 2 1/4	500
5/16 x 2 3/4	500
3/8 x 2	700
3/8 x 3 1/4	700
1/2 x 2 1/4	1200
1/2 x 3 1/2	1200

*Figured with factor of safety in accordance with modern engineering practice.
Always furnished complete with nails.

Tampin Expansion Shields—For Machine Screws and Bolts

Suitable where shallow hole for installation is necessary and where work has to be dismantled from time to time.

This shield has three component parts, assembled into a single unit.

The split ring—an exclusive feature—throws tamping pressure to bottom of the hole, where holding power should be.

Prevents tamping tool from jamming or sticking.

Wedge nut, threaded National Standard threads from No. 5 to 5/8 in.

All sizes have two fins on the conical nut which prevents the nut from turning in the lead when tightening the screw.

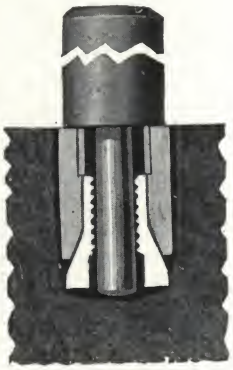
The special Tampin alloy lead sleeve will enter all irregularities of the masonry hole and will not yield under a heavy load.

Spring Pilot Tampin Tool—The pilot passes clear through the shield and is held there by the spring during the expansion.

Prevents all dust from entering the threads and gives clear passage for the bolt to the bottom of the hole.

Packed one in each box of Tampins at no extra charge.

In emergency, any flat end round rod of same diameter as shield can be used for a Tampin tool.

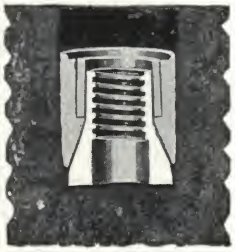


Spring Pilot Tampin Tool Ready to Expand Tampin Shield

TAMPIN EXPANSION SHIELDS

Size of bolt or screw	Minimum hole req'd., in.		*Working load, lb.	†Ship. wt., lb. per 100
	Diam.	Depth		
6-32	5/16	1/2	75	1 1/2
8-32	5/16	1/2	100	1 1/2
10-24	3/8	5/8	200	2
12-24	3/8	7/8	300	5
1/4	1/2	7/8	400	5
5/16	5/8	1	500	7 1/2
3/8	3/4	1 1/4	800	14
7/16	7/8	1 1/2	1000	19
1/2	7/8	1 1/2	1200	19
5/8	1	2	1500	24

*Working loads figured with a factor of safety in accordance with modern engineering practice.
†Includes one setting tool.



Tampin Shield in Position After Expansion

Loxin Expansion Shields—For Machine Bolts



Hot galvanized, single machine bolt type. Designed to hold in loose as well as tight holes.

Loxin shields carry a great load and are easy to install.

LOXIN EXPANSION SHIELDS

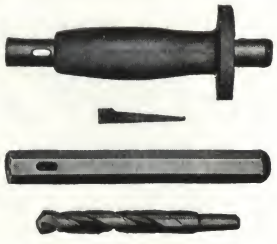
Bolt diam., in.	Shield length, in.	Outside diam. and drill req'd., in.	Ship. wt., lb. per 100
1/4	1 1/4	1/2	3 1/2
5/16	1 1/2	5/8	6 1/4
5/16	2	5/8	8
3/8	1 1/2	5/8	6
3/8	2	5/8	8
7/16	2 1/2	7/8	18
1/2	2	7/8	14
1/2	2 1/2	7/8	18
5/8	2 1/2	1	24
5/8	3	1	26
3/4	3 1/2	1 1/8	37

Hamrtwist Drill Points for Concrete, Stone or Masonry, Hand Chuck and Holder

These drills are made of special steel alloy to stand hard use. Fast and easy cutting, automatically clean dust from holes, long life, easily re-sharpened, hold original diameter, will not jamb. Hand chuck to fit all drills regularly furnished. An improved type of drill holder is made with a protecting shield and rubber grip that prevents hitting and stinging the hand. Knockout pin furnished with each holder. Used with hand hammer or electric hammer.

HAMRTWIST DRILL POINTS

Diameter, in.	Ship. wt. per doz., lb.
3/16	1/2
7/32	1/2
1/4	3/4
9/32	1
5/16	1
11/32	1 1/2
3/8	2
7/16	2
1/2	2 1/4
9/16	2 1/2
5/8	3 1/2



Continued on next page

Star Double Expansion Shields

Malleable iron, machine bolt type.



STAR DOUBLE EXPANSION SHIELDS

Diam. of bolt with which shield is used, in.	Length of shield, in.	Outside diam. and drill req'd., in.
1/4	1 1/2	9/16
5/16	1 7/8	5/8
3/8	2 3/8	3/4
7/16	2 1/2	7/8
1/2	2 1/2	1
5/8	3	1 1/8
3/4	4	1 1/4
7/8	4 1/2	1 1/2
1	4 7/8	1 5/8

Scruin Lead Screw Anchors—For Wood Screws

New design, give greater holding power and require a smaller installation hole for the corresponding size screw. Holding power in average conditions of masonry is higher in the short length for Nos. 8 and 14 sizes, but in case of plaster wall or other soft surfaced masonry, the use of the long length is recommended.

SCRUIN LEAD SCREW ANCHORS

*Screw size and length of anchor	Fractional screw size, in.	Outside diam. and drill req'd., in.	Ship. wt., lb. per 100
6– 8x 3/4	1/8–3/16	1/4	1 3/4
6– 8x1 1/2	1/8–3/16	1/4	2 1/4
10–12–14x1	3/16–1/4	5/16	2 1/2
10–12–14x1 1/2	3/16–1/4	5/16	3 1/2
16–18x1	5/16	3/8	4
16–18x1 1/2	5/16	3/8	5
20–22–24x1 3/4	3/8	7/16	8

*Order by screw number and length of anchor.



Sebco Toggle Bolts

Ideal fastenings for lath, plaster, hollow tile, pressed boards, hollow metal or sheet steel. Channel construction permits toggle head to fold closely over bolt and pass through small hole. The toggle head is set off-center to fall quickly into position. Sebco toggles bear on extreme ends, which avoids breaking edges of brittle material.

Made in four types: Nos. 1, 3, 5R and 5F. No. 1 is a pinched head toggle in which the head of the bolt is fastened to the toggle head and a nut is used to make the fastening. No. 3 is commonly known as "plumber's toggle." It has a No. 5 head with threaded rod and capnut. No. 5R has a channel shaped head set off-center, and a round headed bolt. No. 5F is the same as No. 5R except that the bolt is flat headed. All Sebco toggles have National Standard threads, not stove bolt threads.

SEBCO TOGGLE BOLTS

Diam. and length of screw, in.	Drill size req'd., in.	Ship. wt., lb. per 100
No. 5R or 5F		
1/8x2	5/16	1 3/4
1/8x3	5/16	2 1/2
1/8x4	5/16	2 3/4
No. 1		
5/32x3	1/2	4
5/32x4	1/2	4 1/2
No. 1—*3—5R or 5F		
*3/16x3	1/2	5
*3/16x4	1/2	6
3/16x5	1/2	6 1/2
3/16x6	1/2	7 1/2
1/4x3	5/8	8
*1/4x4	5/8	9
1/4x5	5/8	10
1/4x6	5/8	11
No. 1 or 5R		
5/16x3	7/8	13 1/2
5/16x4	7/8	15 1/2
5/16x6	7/8	20
3/8x3	7/8	19
3/8x4	7/8	22 1/2
3/8x6	7/8	27
No. 1		
1/2x3	7/8	25 1/2
1/2x4	7/8	34 1/2
1/2x6	7/8	43 1/2
No. 5 Toggle Heads Only		
1/8	5/16	1 1/2
3/16	1/2	2 1/2
1/4	5/8	3
5/16	7/8	9
3/8	7/8	9

*No. 3 toggles made in three sizes only.



No. 1



No. 5R

Springin Toggle Bolts

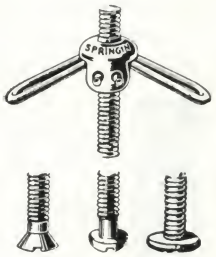
The resilient wings—the distinctive feature of Springin—are made of tempered spring steel with a cam action against the saddle which throws them to open position. The wings are the springs and are very powerful so that the toggle will carry a much greater load than is ever required of a fastening of this type. This is a marked improvement over the trunnion or tumble design toggles, in which the material used for the nuts is necessarily so thin, to permit stamping, that the number of threads in contact with the bolt and the strength of the trunnions are insufficient to carry the heavy loads which are sometimes imposed on them by the leverage of the wings.

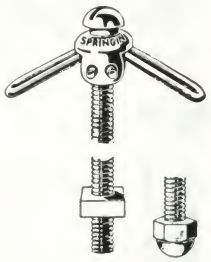
Made in four types: Types R, F, Nut and Plumber's Toggle. Type R is furnished with round head screw, also mushroom head screw of 1/8-in. diameter only; Type F is furnished with flat head screw; Nut Type is made by reversing R or F screw and adding nut on any size up to 4-in. length; Plumber's Toggle is made by reversing R or F screw and adding capnut on any size up to 4-in. length. Capnuts extra.

SPRINGIN TOGGLE BOLTS

Diam. and length of screw, in.	Drill size req'd., in.	Ship. wt., lb. per 100
With R or F Head Screws		
1/8x2	3/8	1 3/4
1/8x3	3/8	2 1/2
1/8x4	3/8	2 3/4
3/16x3	1/2	5
3/16x4	1/2	6
3/16x5	1/2	6 1/2
3/16x6	1/2	7 1/2
1/4x3	5/8	8
1/4x4	5/8	9
1/4x5	5/8	10
1/4x6	5/8	11
With R Head Screws		
5/16x3	3/4	13 1/2
5/16x4	3/4	15 1/2
5/16x6	3/4	20
3/8x3	7/8	19
3/8x4	7/8	22 1/2
3/8x6	7/8	27
1/2x4	1 1/8	34 1/2
1/2x6	1 1/8	43 1/2
Toggle Heads Only		
1/8	3/8	1 1/2
5/16	1/2	2 1/2
1/4	5/8	3
5/16	3/4	9
3/8	7/8	9
1/2	1 1/8	11

All toggle threads are National Standard, not stove bolt threads.



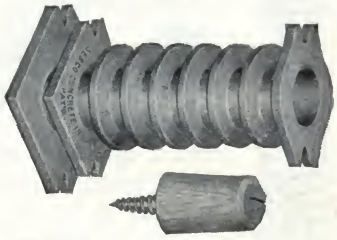


Sebco Concrete Inserts—For Machine Bolts

A practical means of providing threaded holes in concrete walls, ceiling and floors for possible future use. Sebco Concrete Inserts are fastened to the form before concrete is poured. When forms are removed, the inserts remain as permanent sockets to receive standard machine bolts whenever desired.

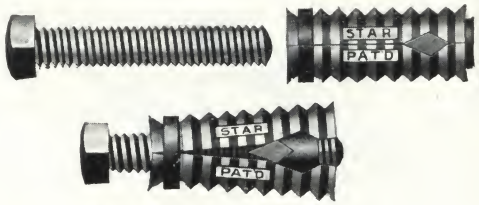
SEBCO CONCRETE INSERTS

Bolt diam., in.	Length of insert, in.	Ship. wt., lb. per 100
1/4	1 1/2	10
3/8	2	17
1/2	2 1/2	25
5/8	2 1/2	36
3/4	3	55



Star Malleable Iron Chair Shields

Simple in operation. The two shield units are held firmly together at one end by a ring, forming virtually one piece of metal. Will withstand almost unlimited rough treatment without parting. Should concrete around shield crush, fastening can be made secure again by tightening expansion with screwdriver or wrench.



Made in 1/4-in. Size Only

U. S. EXPANSION BOLT CO.

Manufacturers of Expansion Bolts and Anchoring Devices

Holland Plaza Building, 75 Varick Street
NEW YORK, N. Y.

BRANCH OFFICES
CHICAGO, ILL., 160 No. Wells Street
LOS ANGELES, CAL., 320 E. 3rd Street
TORONTO, ONT., 67 Yonge Street

PLANT, COLUMBIA, PA.

Products

EXPANSION SHIELDS, LEAD SCREW ANCHORS, TOGGLE BOLTS.

Also Star Drills, Pipe and Cable Clamps, Wire Rope Clips and Thimbles.

Trade names: "Forway," "Rytway," "Nutlok," "Ledlok" Expansion Shields; "Arrow" Toggle Bolts.

USE
TRADE MARK REG. U.S. PAT OFF.



Fig. 118

U. S. E. "Forway" Expansion Shield

Malleable iron—a nationally known type adaptable to any type of anchorage.

Bolt sizes ¼ to 1 in.



Fig. 121

U. S. E. "Lag Screw" Expansion Shield

Malleable iron—a standard type but with our own patented features, including inseparable parts. Made in three lengths and ten diameters.

Bolt sizes $\frac{3}{16}$ to 1 in.


Fig. 117

U. S. E. "Closed Back" Expansion Shield

Malleable iron—particularly adaptable to sprinkler work and all pipe line suspensions. Used as standard equipment by many of the world's largest users of expansion shields.

Sizes ¼ to 1 in.



Fig. 142

U. S. E. "Ziffer" Spring Toggle Bolt

For fastenings to all hollow walls and ceilings. The spring head insures positive toggle action.

Screw sizes ⅛ to ¼ in.; lengths 3 to 6 in.

Plain toggle bolts without spring, diameters ⅛ to ½ in., lengths 3 to 6 in.

Strength Tests of U. S. E. Malleable Iron Expansion Shields

Made by the Underwriters' Laboratories, Inc., Chicago, Ill., in concrete blocks.

Inches	Pounds	Inches	Pounds
⅜	4200	⅝	6000
½	4700	¾	9000


Fig. 152

U. S. E. "Nutlok"

A masterpiece of expansion shields and one that no amount of vibration or shock will ever jar loose. Its tensile strength is greater than the bolt with which it is used. Saves drilling cost.

Bolt sizes ¼ to ¾ in.



Fig. 134

U. S. E. "Korker" Expansive Screw Anchor

Comprising a threaded cone shaped nut and a lead alloy sleeve. Expansion is obtained by tamping the lead sleeve over the cone.

Screw sizes No. 10 to ½ in.



Fig. 120

U. S. E. "Double" Expansion Shields

Malleable iron—designed to accomplish a parallel expansion, the U. S. E. Hexagon Nut and Sleeve provides greater surface bearing and insures greater anchorage.

Bolt sizes ¼ to 1 in.

U. S. E. MALLEABLE IRON EXPANSION SHIELDS

Screw or bolt size, in.	Dimensions of holes required								
	Diameter, in.				Depth, in.				
	Figure numbers				Figure numbers				
	117	118	120	121	117	118	120	121L	121S
3/16		7/16		7/16		7/8		1	
¼	9/16	½	9/16	½	1½	1¼	1¼	1½	1
5/16	5/8	9/16	5/8	9/16	1¾	1½	1⅝	1¾	1
⅜	¾	5/8	1 1/16	5/8	2⅛	1¾	1⅞	2½	2
½	1	⅞	⅞	¾	2¾	2½	2¼	3	2
5/8	1⅛	1	1	⅞	3¼	2¾	2¾	3½	2
¾	1⅜	1¼	1¼	1⅛	3¾	3¼	3½	3½	2
⅞	1½	1½	1½	1⅜	4¼	4½	4½	4½	
1	1⅝	1⅝	1¾	1⅝	4¾	5	5½	5	

UNIVERSAL FORM CLAMP COMPANY

Manufacturers of Masonry Anchors and Slots, Continuous Sleeper Anchors and Other Concrete Accessories

977 Montana Street, CHICAGO, ILL.

Products

MASONRY ANCHOR SLOTS; BAR BOLSTERS; BAR SPACERS.

Also Continuous Sleeper Anchors, Form Clamps, Cone Nuts and other Concrete Accessories.

Masonry Anchors and Slots

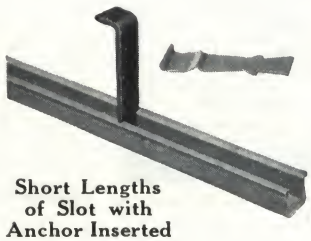
Use—Universal Anchor and Slot provides the modern method of tying brick, terra cotta, stone or tile to concrete. It provides a most substantial bond giving the highest possible degree of strength and safety and affords substantial economies in time and labor.

Advantages—Since the slot remains in the concrete it forms an integral part of the structure which can never work loose. Anchors may be inserted at any height and it is not necessary to bend or distort anchors to make them fit. Measuring course heights, boring and drilling of forms is eliminated, and a substantial time saving is made when forms are stripped. In addition, form costs are substantially reduced since forms are left unmarred by holes.

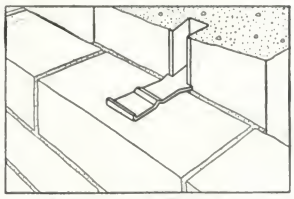
The Universal Anchor Slot has an extra wide flange which gives it complete freedom from distortion and prevents concrete from filling the slot. It is furnished in 10-ft. lengths.

Installation — The length of slot is cut the required length and nailed to the form with the open side down. When forms are stripped the slot remains in the concrete permitting the anchors to be inserted at any point as the masonry is built up.

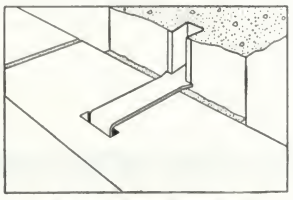
Specifications — Universal Anchor Slot as manufactured by the UNIVERSAL FORM CLAMP COMPANY, shall be installed vertically in all concrete columns, beams or walls which are to be faced with brick, terra cotta, or stone.



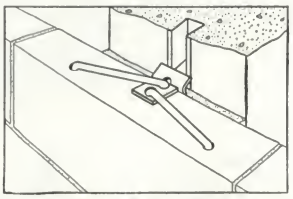
Short Lengths of Slot with Anchor Inserted



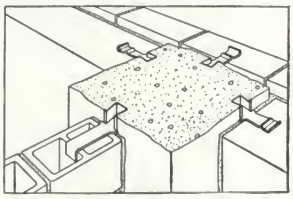
Anchoring Brick to Concrete
The anchor can be inserted at any height desired



Anchoring Stone to Concrete
A twist of the wrist puts the anchor in the slot at any course height



Anchoring Terra Cotta and Tile to Concrete
Two rods placed in holes in the anchor which may be inserted at any height hold the terra cotta or tile tightly to the concrete



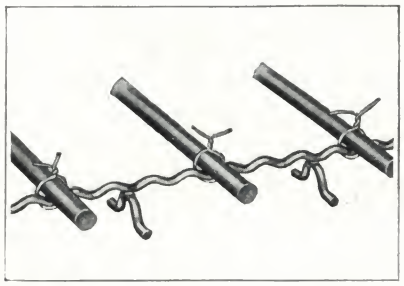
On Columns with Brick Facing
Anchors in columns with brick facing and tile partition showing the versatility of Universal Mortise Anchor and Slot

The contractor for concrete work shall furnish and install one slot in all columns up to 16 in. wide, and in wider columns, two or more slots shall be installed. Slots shall be installed in all beam faces and walls as required by the mason contractor.

The mason contractor shall furnish and install sufficient Universal Anchors to properly anchor masonry as approved by architects.

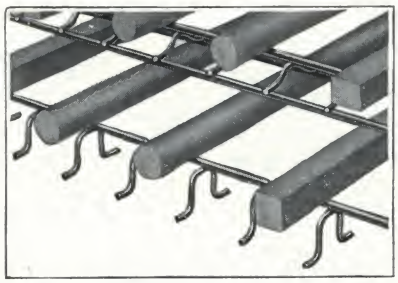
Slab Bar Bolster

This bolster is designed to avoid the inconvenience of prespaced devices. The corrugations 1 in. apart with welded legs 5 in. on center act as a guide to the steel setter and prevent the bars from slipping after wiring. This one type supports all slab steel regardless of spacing.



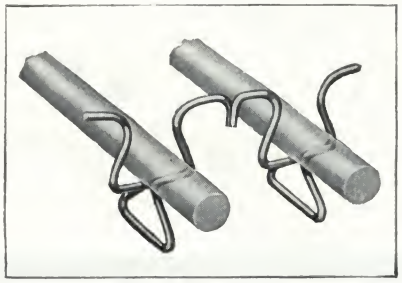
Beam Bar Bolster

This extremely strong beam bar bolster is cut to length on the job to fit individual beams. It is stocked in 5-ft. lengths. The welds are never in shear and carry no load. It properly supports the bars in any beam, regardless of spacing. Interference with flow of concrete is reduced to a minimum.



Spring Joist Bar Spacer

The joist spacer here illustrated meets every condition demanded in a self-locking device. Bars up to 1⅛ in. are locked in place after being pushed into the seat. The spring acts from the top to the very bottom of the spacer. Wide supporting legs are directly under the bars.



THE V-W VENTILATOR COMPANY

Tiger Floor Clips and Tiger Ceiling Clips

2879 A. I. U. Building, COLUMBUS, OHIO

Products

TIGER FLOOR CLIPS.
Also Tiger Ceiling Clips.

Tiger Floor Clips Offer These Features

Lower Cost—The low initial cost of Tiger Floor Clips is a decided saving over that of other types of clips.

Easily and Inexpensively Placed—Tiger Clips are easily and speedily placed in fresh concrete. Just shove in place and that is all until they are bent up for use.

Set Flush—"Tigers" set flush with the surface of the concrete slab without obstruction during other phases of construction.

Cannot Loosen or Pull Out—Tiger Clips are guaranteed not to loosen or pull out. Examination of their construction will prove that they are built so as to become firmly embedded in the concrete. Tests have proved that they last as long as concrete.



Other V-W Products

V-W Built-in Ventilators, Window Ventilators and Roof Ventilators. See Manufacturers' Index.

TRADE V-W MARK VENTILATOR THE V-W VENTILATOR CO. COLUMBUS, O.

Placing Tiger Floor Clips

A simple guide can be made by using two planks, spaced 12 in. apart from left edge to left edge, and held by strips that extend 12 in. past the left edge of plank; 16 in. marks for placing are staggered on the two planks so that two rows can be laid simultaneously.

For 16 in. center to center spacing of nailing strips, space boards 16 in. from left edge to left edge and extend strip 16 in. past left edge. For 24 in. placing, mark the guide boards accordingly. See diagram below.

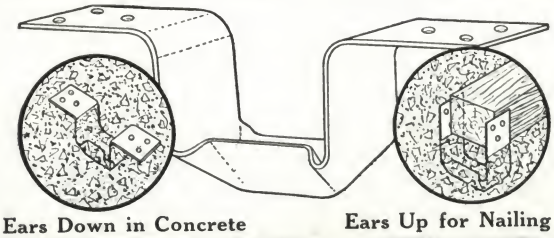
Quickly Placed with Paddle

Notice in diagram below how small paddle pushes "Tigers" easily into concrete. This is speedier than by hand.

HOW TO CALCULATE THE NUMBER OF CLIPS REQUIRED

Nailing strip c.c. distance, in.	Clip spacing c.c. distance, in.	Number of clips per 1000 sq. ft.
12	16	800
16	24	550
12	16	600

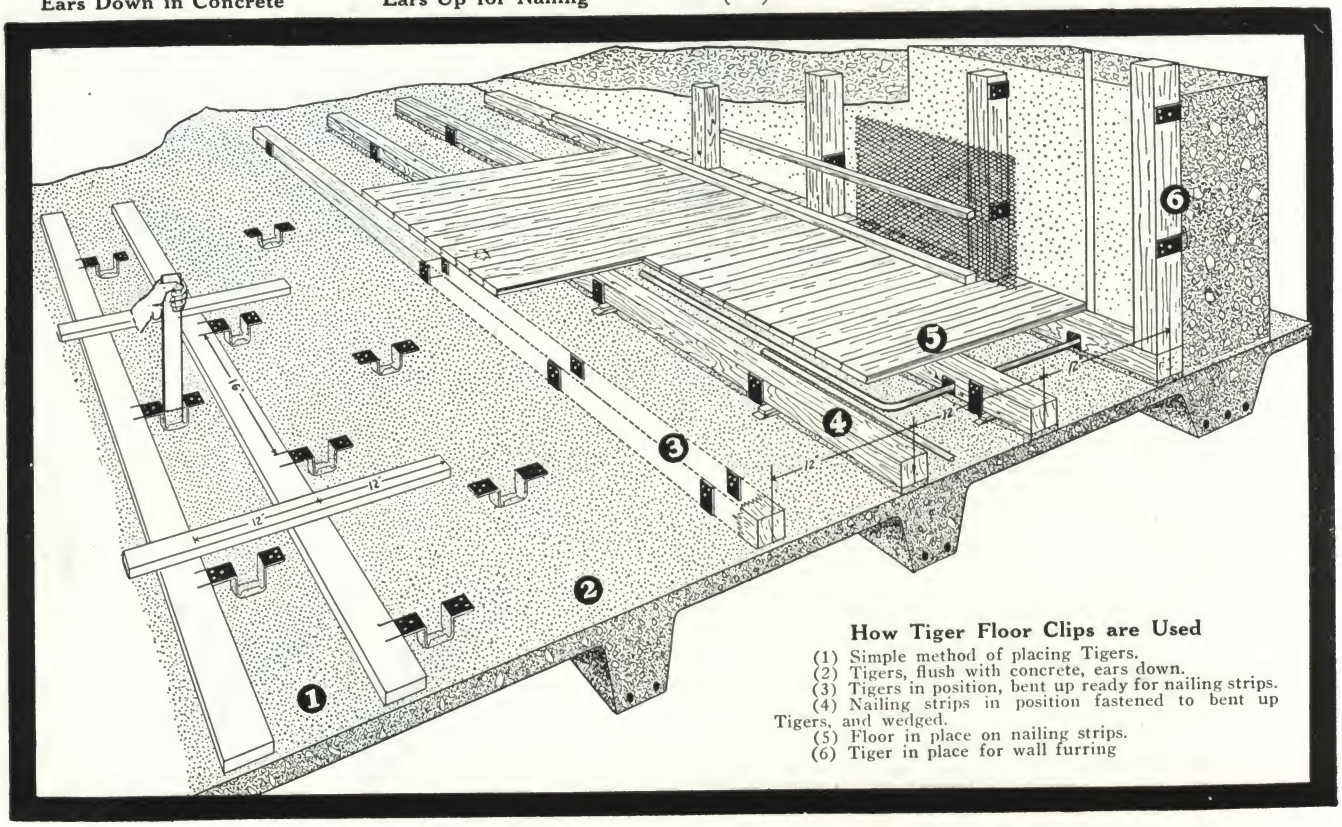
Price per thousand 2-in. Tiger Floor Clips, 20-gauge galvanized iron, $30.00. Tiger Clips can also be furnished for 3 and 4-in. nailing strips.



Ears Down in Concrete — Ears Up for Nailing

Suggested Specifications

In concrete upon which wood flooring is to be built, insert 2-in. (3-in.) Tiger Floor Clips while concrete is being poured; clips to be spaced 12 (16, 24) in. center to center along nailing strips, nailing strips to be spaced 12 (16) in. center to center.



How Tiger Floor Clips are Used

(1) Simple method of placing Tigers.
(2) Tigers, flush with concrete, ears down.
(3) Tigers in position, bent up ready for nailing strips.
(4) Nailing strips in position fastened to bent up Tigers, and wedged.
(5) Floor in place on nailing strips.
(6) Tiger in place for wall furring

W-O-I PRODUCTS COMPANY

Manufacturers of Building Specialties

3345 North Lincoln Street, CHICAGO, ILL.

Products

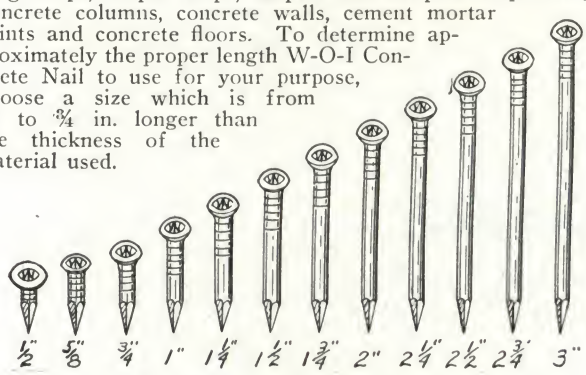
CONCRETE NAILS, CONCRETE FLOOR DOOR BUCK ANCHORS, V-TYPE BUCK TILE ANCHORS, SPLIT TAIL BUCK TILE ANCHORS, CONCRETE FORM SPACERS, GYPSUM SCREED ANCHORS.

Also Door Buck Ceiling Supports, Metal Furring Strip Hook Nails, Concrete Corner Bead Clips, Shoring Jacks, Fireproof Studs, Carpet Strip Ties and Magnetized Punches.

TRADE-MARK
(Reg. U. S. Pat. Off.)

W-O-I Concrete Nails

W-O-I Concrete Nails drive directly into hard concrete of a density ordinarily used in the average construction project. They are especially designed for nailing corner beads, wood screeds, furring strips, carpet strips, carpets and sleepers respectively to concrete columns, concrete walls, cement mortar joints and concrete floors. To determine approximately the proper length W-O-I Concrete Nail to use for your purpose, choose a size which is from ½ to ¾ in. longer than the thickness of the material used.



W-O-I Concrete Floor Buck Anchors

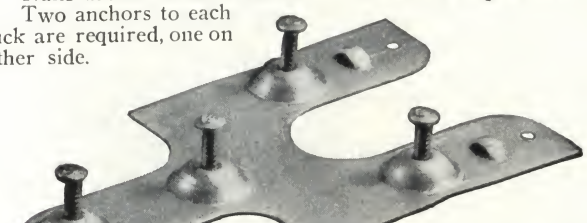
Relieve carpenters of the tedious job of drilling and wood plugging holes in concrete floors. All that is necessary is to nail W-O-I Anchors to the bottom of the buck, set the buck in place and drive the W-O-I Nails, which are attached to the anchor, into the concrete floor.

W-O-I Door Buck Floor Anchors are made of 22 gauge cold rolled full pickled sheet steel.

No. 1 for 3 to 6-in. bucks. No. 2 for 2-in. bucks only.

Nails are attached to anchors or detached as preferred.

Two anchors to each buck are required, one on either side.



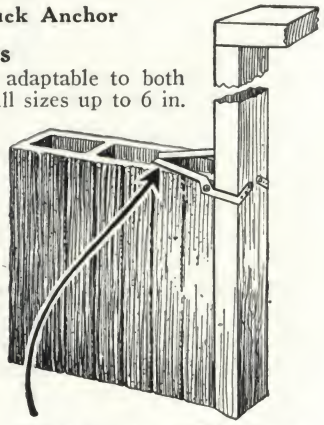
Floor Buck Anchor

V-type Buck Tile Anchors

These anchors are readily adaptable to both gypsum and clay tile walls of all sizes up to 6 in.

For all-around purposes, this type anchor is very satisfactory, except perhaps in cases where plowed or fluted bucks are used in connection with exceptionally narrow finishing trim.

To install, spread arms of anchor apart and place between tiles with hook in contact with the rib. Bend anchor straps around door buck and nail with 6d nails. Cover anchor with mortar. On gypsum tile, drive hook into block with butt of trowel handle. Made of 22 gauge steel, galvanized.



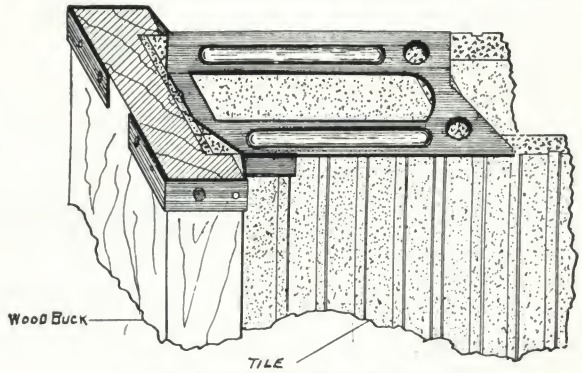
W-O-I V-type Tile Buck Anchors Attached to Clay Tile

Split Tail Buck Tile Anchors

Made in two sizes, 3 and 4 in. of 24 gauge galvanized steel.

The anchor has two sturdy hooks to engage the tile besides being reinforced with an anchor plate having beaded grooves and openings to receive the mortar and act as a bond between the anchor and tile. The hooks may be placed to straddle the front rib of clay tile, or, if preferred, with the foremost hook in a position directly behind and in contact with the front rib, to suit conditions. When gypsum or Macalite tile are used the hooks are driven into the block.

This type anchor is considered better than the V-type for fluted bucks when extra narrow trim is to be used, for the reason that the buck straps fit closer to the inside edge of the buck, thus permitting a deeper plaster covering at the edge of the buck.

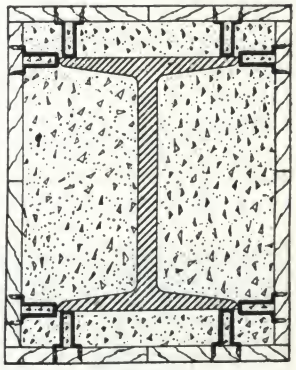


Split Tail Buck Tile Anchor

W-O-I Form Spacers

These spacers are constructed to offer the least possible obstruction to an even pour of concrete, but at the same time have well braced resistance from all directions against possible side thrusts in the course of construction.

W-O-I Spacers are made of 9 gauge basic wire in standard sizes ranging from 1½ to 4 in. Standard sizes carried in stock 1½, 2, 2½, 3, 3½ and 4 in.

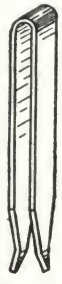


Form Spacers

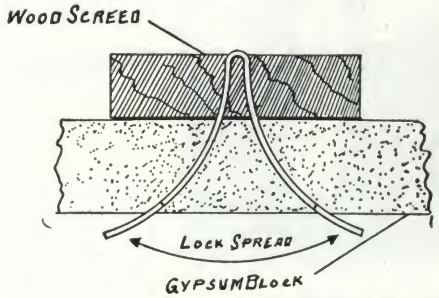
Note: Any fractional size within the above mentioned lengths may be had by special order at a slight additional cost.

W-O-I Gypsum Screed Anchors

To make gypsum or Macalite tile walls serve as a suitable nailing base for wood screeds and furring strips is no longer a problem. W-O-I Gypsum Screed Anchor is the answer. One anchor is required to 2 lin. ft. of screed.



Normal Shape of Anchor



Manner in Which Anchor Spreads When Driven Through Wood Screed into Gypsum Block

COWING PRESSURE RELIEVING JOINT CO.

Manufacturers of Pressure Relieving Joints

TELEPHONE
SUPERIOR 0346

226 West Superior Street
CHICAGO, ILL.

Product

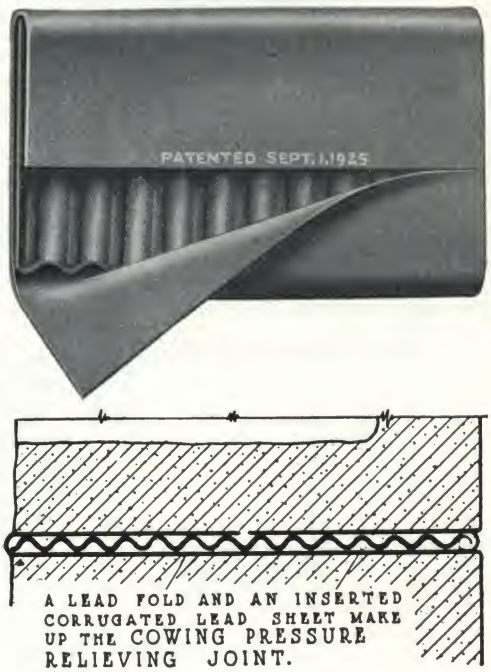
COWING PRESSURE RELIEVING JOINT.

Purpose

This joint gives positive protection against cracks and spalls in buildings of stone, terra cotta, marble or granite.

Description

The Cowing Pressure Relieving Joint is a corrugated sheet lead filler enclosed in a sheet lead envelope the thickness of the bed joint, and used in the place of one mortar joint in each story height. The Cowing Joint is made to the templet of the piers and is placed in the wall some place within the window opening, 3 to 7 ft. below the shelf angle. It carries, at all times, the dead load from the joist to the shelf angle above, which is 3 to 7 lbs. to the sq. in.



A LEAD FOLD AND AN INSERTED CORRUGATED LEAD SHEET MAKE UP THE COWING PRESSURE RELIEVING JOINT.

Structural Feature

This joint zones a building into story heights and prevents the breaking or spalling of stone, terra cotta, marble or granite facing blocks. It delivers exact and automatic compensation for all destructive stresses thrown on the facing material due to shortening of steel caused by temperature changes, compression of steel vibration, wind stress and imposed loads.

It permits the shelf angles to function, which they cannot do in a building where mortar only has been used. It allows the building to find its level and adjust its load without injury to the facing material.

The Cowing Joint will carry the normal load of the facing material until superimposed pressure accumulates. Under such pressure the joint compresses and relieves the stress from the facing material. The load imposed by such stress is kept on the steel as intended and the facing material and mortar are preserved.

Permanency

Once installed in a building, the Cowing Joint remains permanent. It will not squeeze out. Being lead, time and weather have no effect on it. It preserves the mortar joints and practically eliminates future tuck pointing. It is practically unnoticeable in the facade.

Causes of Cracks and Breaks

In tall structures, regardless of the rigidity of the structural steel or reinforced concrete frame, there are movements which occur that will create an overstressing of the facing material at various points. These movements may be caused by compression of the steel, wind action or unequalized expansion or contraction between the frame and the facing material due to temperature changes.

Where these movements occur—if there is not some elasticity in the face of the building—there is sure to be some cracking due to overstress.

The facing under such conditions is obviously called upon to support not only a large measure of its own weight for the total height of the building, but loads of backing masonry, and also some weight of the structure itself, that are transmitted to it by any shortening of the columns or other destructive stresses.

While it is true there is a compensating factor in the fact that extremes of temperature must strike and act upon the facing material first, and must naturally be more intense in the facing material than in the column section protected by its envelope of masonry, it is nevertheless a fact that the difference in the co-efficient of expansion of steel and stone is such that in a building 260 ft. high a change of 60° temperature in the exterior walls would cause the columns to shorten about ½ in. more than the face of the building.

The action described, which in a structure has the effect of a vise, is the only logical way of accounting for the cracking of perfectly sound facing blocks. Tests of facing blocks, after they had been so cracked, have been found to have a crushing strength equal to the average product of their particular grade, which is always many times more than sufficient to carry any possible load that could come upon them from the evident manner in which they were designed to be used. It is clear, therefore, that the cracking is not due to defective material, but to an overstrain or stress it was not intended to bear.



Penobscot Building, Detroit, Mich.
SMITH, HINCHMAN & GRYLLS, Architects



One Wall Street, New York, N. Y.
VOORHEES, GMELIN & WALKER, Architects

Continued on next page

Specifications

Buildings Faced with Stone, Terra Cotta, Marble or Granite—In all steel skeleton buildings entirely faced with the aforementioned materials, use one course of Cowing Joint to each story height. Install the joint across the columns and weight-carrying mullions to the full depth of the regular facing block at the sill course level or at some point within the window opening. (See chart below.)

Buildings with Ashlar on Lower Floors Only—On tall buildings with 2, 3 or 4 stories of stone, terra cotta, marble or granite, use Cowing Joints the full depth of the regular facing block across the column and weight-carrying mullions at the sill course or some point within the window opening at the second and at the top floor of the ashlar.

For Solid Masonry Walls—Install one course of Cowing Joint 4 in. deep placed on bed, at intervals of 12 or 15 ft. in height, to provide for surface expansion. Explanatory chart sent on request.

Strike Joints As Set—All joints may be struck as set, eliminating the initial tuck pointing. Where the Cowing Joint is installed, bed mortar joints will also be protected against the destructive stresses and their life increased, resulting in a saving of future tuck pointing.

Specify—Cowing Joint, 226 West Superior Street, Chicago.

Instructions for Setting Cowing Joint

Level up with mortar any unevenness or holes that may be in the stone or terra cotta. Always pick up the lead joint edgewise with both hands to prevent buckling or bending. This will insure a smooth even bed to receive the stone. Butt ends together in mortar. Joint will be fitted to profile of column and shipped ready to install.



Merchandise Mart, Chicago, Ill.
GRAHAM, ANDERSON, PROBST & WHITE, Architects

Compression Test

The following report was made by Robert W. Hunt Co., Laboratory No. 12176, after testing a sample lead joint:

Dimension under compression, 4x2¾.
Area under compression, 11 sq. in.
Original thickness, 0.179 in.
Thickness after test, 0.101 in.
Total permanent set, 0.078 in.

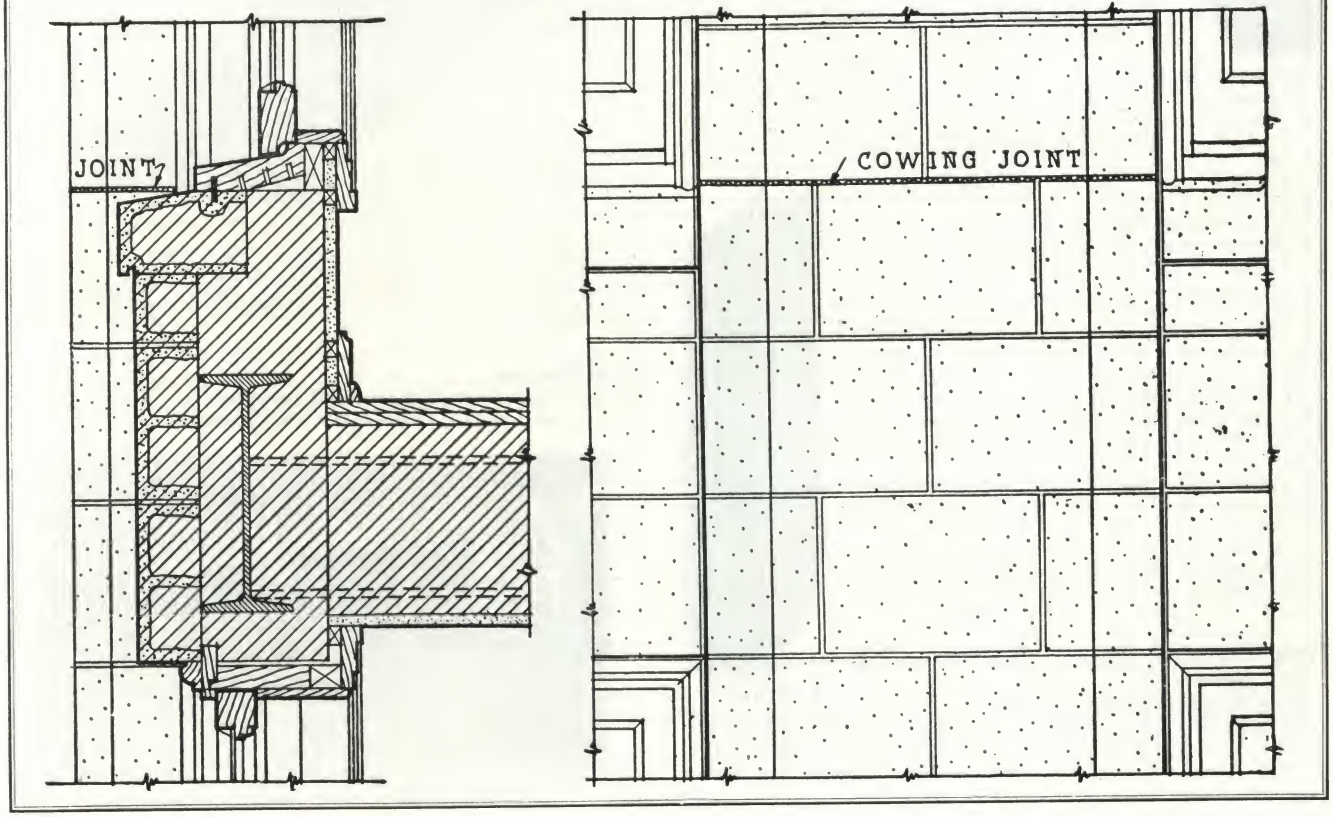
Actual load, lb.	Load, lb.	Total compression, in.
1. 100	100	0.025
1. 650	150	0.035
2. 200	200	0.050
2. 750	250	0.068
3. 300	300	0.075
6. 600	600	0.094

Partial List of Installations

BUILDING	ARCHITECT
First National Bank Bldg., Detroit (2 units)	Albert Kahn, Inc.
Jackson Michigan Union Bank, Jackson	Albert Kahn, Inc.
Union Trust Bldg., Detroit	Smith, Hinchman & Grylls
Union Depot Tower, Cleveland (4 units)	Graham, Anderson, Probst & White
Foreman Bank, Chicago	Graham, Anderson, Probst & White
N. W. Bank and Office Bldg., Minneapolis	Graham, Anderson, Probst & White
First National Bank, St. Paul	Graham, Anderson, Probst & White
Pennsylvania R. R. Terminal, Philadelphia	Graham, Anderson, Probst & White
Mather Tower, Chicago	Herbert Hugh Riddle
Carbide and Carbon Building, Chicago	Burnham Brothers, Inc.
One North La Salle Bldg., Chicago	K. M. Vitzthum & Co.
Foshay Tower, Minneapolis	Magney and Tusler
Yeates Medical Arts Bldg., Minneapolis	Long & Thorshov
Rand Bldg., Minneapolis	Holabird & Root
Nebraska State Capitol, Lincoln	Mayers, Murray & Phillip
McGraw-Hill Bldg., Chicago	Thielbar & Fugard
Santa Fe Office Bldg., Amarillo, Tex.	E. A. Harrison
New York Trust Bldg.	Cross & Cross
City Bank Farmers' Trust, New York	Cross & Cross
Waldorf Astoria Hotel, New York	Schultze & Weaver
Empire State Building, New York	Shreve, Lamb and Harmon
Omaha Union Depot	Gilbert, Stanley & Underwood
New William Oliver Bldg.	Pringle and Smith
State Office Bldg., Buffalo	Hopkins and Haugaard

ONE INCH SCALE DETAIL OF TERRA COTTA FRONT

Detail for Stone Similar



OHIO FIBRATED ASPHALT AND RUBBER CO.

Manufacturers of Expansion Joints, Flooring, and Waterproofing Sheets

FACTORY AND GENERAL OFFICES
SANDUSKY, OHIO

WESTERN OFFICE: 53 West Jackson Boulevard, CHICAGO, ILL.

Ohio Products

PREMOULDED EXPANSION JOINT for highways, sidewalks, walls, buildings. FIBRATED ASPHALT PLANK for bridges; INDUSTRIAL FLOORING; WATERPROOFING SHEETS; ROOFINGS.

Ohio Expansion Joints

Ohio Expansion Joints protect all forms of monolithic construction by absorbing the overstrains due to expansion and contraction. They meet any expansion joint specifications, and, enduring as long as the concrete they protect, prevent uncontrolled cracking, which in turn reduces maintenance.

Center Core Expansion Joint—The advantage of this design of expansion joint lies in the fact that the resilient core of heavily saturated felt readily takes up any expansion and contraction force before the movement of concrete slabs can cause any flow of the bituminous material. Thus the center core acts to take up the initial compression or expansion, giving time for the outside asphaltic layers to readjust themselves.



Center Core Expansion Joint

The outside layers of the joint have an unusually large asphaltic content, the composition being composed of bituminous material, mineral matter and shoddy textile fiber, so balanced that the composition contains 75% asphalt, approximately 15% to 17% fiber and from 8% to 10% mineral matter.

All-asphalt Expansion Joint—The use of joint installers reduces the relative importance of stiff reinforcement means within the joint structure and has brought about an increasing demand for an expansion joint possessing the greatest possible plasticity and waterproofing quality.

Ohio All-asphalt Expansion Joint is uniform throughout its structure, composed of selected textile fiber in combination with special asphalts refined by the Ohio processes. In service, the plastic asphaltic structure coheres to the abutting concrete, closely following all irregularities, forming a most watertight joint and one which in the highest degree follows the movements of the adjacent slabs.

Rubber Expansion Joint—This is an exceedingly valuable extra elastic expansion joint designed to be used in floors, roofs and walls of modern buildings, and on bridges, viaducts, or wherever a fine structure must be preserved and protected against uncontrolled cracking. This form of expansion joint possesses the property of reacting promptly to full volume even after unusual compression. Any monolithic structure, high in architectural quality, well merits the extra protection against damage from temperature and moisture stresses afforded by Ohio Rubber Expansion Joint.

Sizes—Standard dimensions of Expansion Joints range from ¼ to 1 in. thick, 1 to 12 in. wide and lengths up to 10 ft.; other thicknesses and widths may be specified.



Rubber Expansion Joint

Ohio Fibrated Asphalt Waterproofing Sheets

In varying dimensions from ½ to 2 in. thick, 6 to 28 in. wide and lengths up to 10 ft. They afford efficient waterproofing protection on roofs, decks, viaducts, etc., which is not penetrated or damaged by ballast paving blocks.

Ohio Industrial Flooring

Slabs—An extraordinary flooring for all industrial uses. It is a fiber-asphalt composition preformed into slabs, varying from ½ to 2½ in. in thickness, 6 to 12 in. in width and in lengths of 3 to 6 ft.

It is furnished in several shapes, known as straight side, Angle-lap edge as illustrated, and with V-type edge.

Ohio Industrial Flooring is waterproof and does not crack, splinter or corrugate. It is practically noiseless and possesses the ability to heal itself of traffic injuries. For garages, warehouses, platforms, mills and factories, its quiet, dustless, warm and long-wearing features stamp Ohio Industrial Flooring as an improved material for the service.

Planking—A hard, tough composition of asphalt, fiber and mineral, denser than industrial flooring, formed under heavy pressure into slabs or planks of convenient sizes. The slabs contain several times the proportion of asphalt found in paving mixtures, yet they retain resiliency at all temperatures because of the even, uniform incorporation of tough fiber. Hard usage serves to roll and compress into greater smoothness a pavement deck or floor of Ohio Asphalt Planking, and it is noiseless and dustless to a great degree. On account of its toughness, resistance to abrasion, waterproofing and shock-absorbing qualities, fibrated asphalt planking makes fine flooring for decks, viaducts, bridges, platforms and runways.



Section from Ohio Industrial Flooring

Application—Ohio Industrial Flooring and Fibrated Asphalt Planking can be easily applied over any suitable wood or concrete surface to which the slabs can be secured and which furnish the required support.

Ohio Fibrated Asphalt Flooring or Planking can be laid at right angles or at an angle of 45° to flow of traffic, with all joints staggered. All crevices and nailholes should be sealed with asphalt.

Specifications

Complete specifications and methods of using fibrated asphalt sheets, slabs and planks gladly sent on request.



Typical Installation of Industrial Flooring

SERVICISED PREMOULDED PRODUCTS, INC.

GENERAL DISTRIBUTORS FOR PRODUCTS MANUFACTURED BY

SERVICISED PRODUCTS CORPORATION

53 West Jackson Boulevard, CHICAGO, ILL.

FACTORY: 6051 W. 65th Street, CHICAGO, ILL.

DISTRIBUTORS AND DEALERS IN PRINCIPAL TRADING CENTERS

Products

SERVICISED INDUSTRIAL FLOORING; FIBRATED ASPHALT PLANKS; WATERPROOFING PROTECTION COURSE.

OHIO RUBBER TILE; MULTICOLOR FLOORING; SHEET FLOORING; COVE BASES; STAIR TREADS; NOSING and RISERS; MATS and MATTING; WALL PROTECTION; WAINSCOTING; PAVING and FLOORING BLOCKS.

Expansion Joints for walls, roofs, floors, buildings in general, sidewalks, streets.

Also Insulation: Asphalts, Saturated Felt.

Company and Facilities

The object of the organization of the Servicised Products Corporation and Servicised Laboratories, Inc., is to supply the architect and the engineer with fibrated asphalt construction materials which will function as nearly 100% as possible when used with any form of concrete or rigid structure for the purpose of taking up expansion and contraction, imparting flexibility, waterproofing, maintaining watertight joints and as a check upon destructive influences.

Complete facilities for refining asphalts under processes which have originated in Servicised Laboratories, experience in the manufacture of compositions of fibers, asphalts and minerals into predetermined shapes under pressure, are placed at the service of architects and engineers.

SERVICISED INDUSTRIAL FLOORING AND PLANKING

Industrial Flooring

This is a fiber-asphalt product formed under extreme pressure, consisting of a uniform mixture of high melting point asphalt, into which is incorporated asphalt-saturated, finely divided, first grade rag felt fiber, asbestos fiber and a selected mineral filler. It is laid like any plank and makes long-life, silent, dry and resilient floors for factories and industrial use generally.



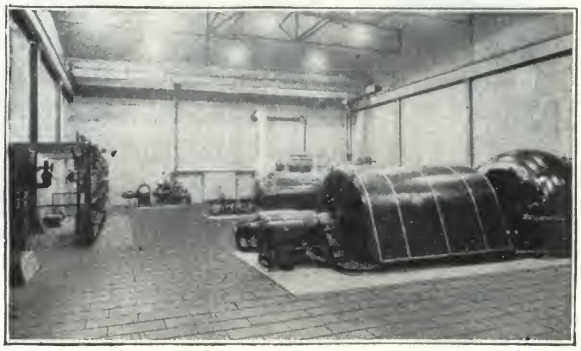
Section of Straight Edge Industrial Flooring or Asphalt Planking

The flooring is made in several shapes—straight edge, overlap, angle edge with "V" edge.

Thicknesses range from ½ to 2 in. by ¼-in. gradations. Standard widths range from 6 to 12 in. by inch strips. Standard lengths are 5 ft. Other dimensions will be supplied on order.

Weight of Servicised Industrial Flooring should be computed on a basis of 8 lb. per sq. ft. of 1-in. material.

Flooring No. 1 is designed to sustain heavy standing loads and absorb the impact of heavy trucking.



Installation of Industrial Flooring

Flooring No. 2 will sustain intermittent loads and ordinary traffic.

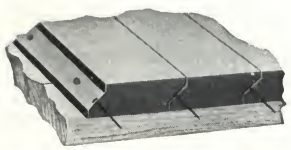
Qualities—Durability, strength, ruggedness, resiliency, shock-absorbent, easy on the feet, quiet and non-slippery are some of the qualities. The flooring is also waterproof, easily cleaned by flushing, does not originate or hold dust. It is acid resisting, fire retarding and requires little, if any, maintenance.

Servicised Fibrated Asphalt Planking

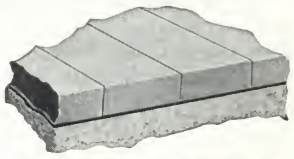
This is a product similar to Industrial Flooring, but with a denser and harder composition, enabling it to resist the excessive wear and impact of traffic. As a sidewalk material and as non-slip paving for airport runways; as material for walks and driveways around hospitals, schools, etc., the shock-absorbing and silencing qualities of Servicised Fibrated-Asphalt Planking make it invaluable. This planking in use on a number of important bridges and viaducts for some years shows no apparent wear—rather an improved appearance, consolidating and self-healing under traffic; with no fracturing or splintering, a noticeable reduction in vibration and traffic noise and better control of vehicles due to resiliency of the planking and its non-skid surface. Standard dimensions are the same as for Industrial Flooring.

Methods of Application

Servicised Industrial Flooring and Asphalt Planking may be laid, as shown by illustrations, on either wood or concrete base. *On concrete base,* clean and dry surface and mop with hot Servicised Asphalt. Plank or flooring should be laid immediately, driven up tight, weighted down, and allowed to set until cool. Seal all joints with hot asphalt. *Over wood deck or floor,* surface must be clean and free from nails or projections. Asphalt saturated felt should first be laid and mopped with hot asphalt. Planks are then laid in preferred pattern, each one nailed securely with large headed spikes countersunk ¼ in. Fill all holes and cracks with hot asphalt. Emulsified asphalt may be used. In cold weather, warm the plank slightly.



Plank Laid on Wood Base



Plank Laid on Concrete Base

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SERVICISED WATERPROOFING PROTECTION COURSE

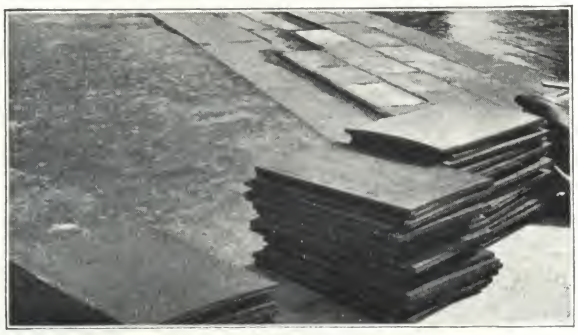
Description

This material consists of preformed sheets, made up of specially blended asphalt combined with asphalt saturated felt and reinforced substantially with strong, tough, long fiber. The process by which these materials are combined, develops a tough, resilient, waterproof sheet, which, laid over the waterproofing fabric, maintains its integrity under the most severe conditions. On roofs, decks, viaducts, bridges and approaches; as a waterproof lining for walls, tunnels, swimming pools, etc., the toughness, elasticity and generally protective qualities of Servicised Waterproofing Course will act to prolong the life, lessen the maintenance and increase the service from the structures.



Section of Angle Edge Industrial Flooring or Protection Course

Standard slabs are 1 in. thick, 8 in. wide and 5 ft. long, but Protection Course is also furnished in other thicknesses between ½ and 2 in., inclusive; in widths, 6, 7, 8, 10, 12, 14, 17, 21, 24 and 28 in., and in any length up to 10 ft.



Laying Waterproofing Protection Course

Method of Application

This is laid on roofs or decks over the waterproofing fabric while the top mopping of asphalt is fluid. Seal all joints with waterproofing asphalt. Waterproofing course ½ in. thick can be applied in two layers by broken joint method as a combination waterproofing and protection course.

SERVICISED EXPANSION JOINTS

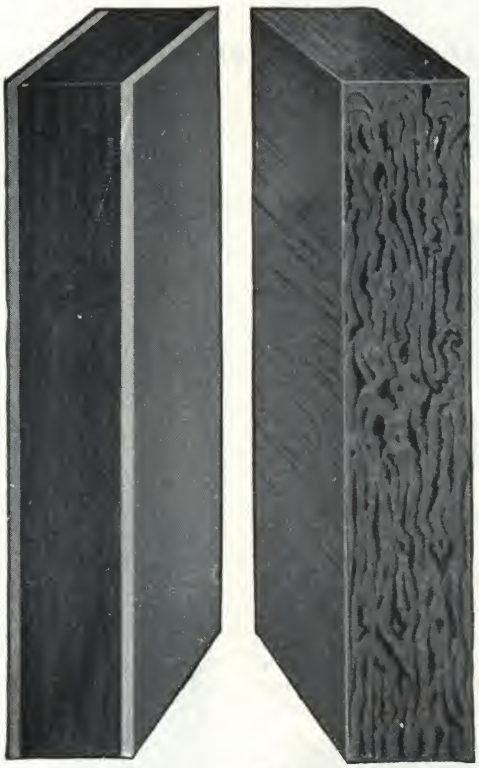
Description

Servicised Expansion Joints consist of refined asphalt, selected fibrous materials and a slight mineral content mixed to predetermined formulæ and formed under pressure into sheets of varying thickness and widths, with or without reinforcement according to design. They are highly useful in all forms of concrete or other rigid construction, as by their resiliency they protect the structure against stresses due to variations and movements which invariably occur, and are made harmless only by interposing these elastic buffers.

Servicised Expansion Joints not only prevent the random cracking and self-destruction of walls, roofs, floors, walks, etc., but by sandwiching in at intervals and at points of acute stress these elastic courses, the tightness, alignment, permanency and original form of any and every portion of a building or other tructure is preserved indefinitely.

As an insurance against premature aging and damage they are invaluable, while the small cost of Servicised Expansion Joints adds little to the original outlay and is quickly made up, many times over, out of the saving in maintenance.

Sizes—Standard dimensions of Expansion Joints range from ¼ to 1 in. thick, 1 to 12 in. wide and lengths up to 10 ft.; other thicknesses and widths may be specified.



Felt Reinforced—Type "B" Expansion Joints

Felt Reinforced Expansion Joint

This is suitable for general construction work, and consists of an asphaltic fiber core reinforced by strips of saturated felt cemented to either side. Extra rigidity is thus produced, a desirable quality where ¼ or ⅜-in. fillers are to be installed.

Servicised Gray Filler

This is a flowable mixture for filling and waterproofing cracks in cement floors, sidewalks, etc. The cement color of the Gray Filler gives the repair a neat appearance. For vertical crevices specify Gray Filler Plastic which is troweled into place.

Type "B" Expansion Joints

These are suitable for general use in concrete construction, wherever premoulded filler and expansion materials are permitted, advantageous or specified. They are formed under pressure from an homogeneous mixture of high quality asphalt and specially selected saturated fiber rolled into parallel mats that impart great resistance, flexibility and toughness to the joint. Thus an unusual conformity to expansion and contraction movements is secured together with long elastic life and maximum control of oozing. Type "B" is an all around expansion and waterproofing joint material and is in general use for all types of building and pavement work. Bridges, viaducts, sewage disposal stations, swimming pools and reservoirs present important fields of application for both Type "B" and Type "D" material.

Servicised Rubber Expansion Joint

The Rubber Expansion Joint is a most remarkable development in the direction of providing the most perfect protection to concrete slab construction against stresses set up by water and temperature.



Rubber Expansion Joint

Engineers have long wanted a dry, non-oozing super-elastic joint material. Here it is in rubber—elastic, durable, weather and waterproof. It is an absolute necessity in the base portion of two-layer streets like those with asphalt and brick surfaces; as it does not flow under any conditions. The same superb qualities make it an ideal joint to use in hot country pavements, and in floors, walls and roofs of modern monolithic buildings. It is recommended that Servicised Rubber Expansion Joint be given a coat of liquid asphalt at the time of installation in order to seal it in place.

Continued on next page

DUO-TYPE RUBBER ASPHALT FLOORING

The qualities in a wearing surface for bridges, viaducts and warehouses which are stressed by engineers and other experienced men are briefly: ruggedness, resiliency, non-skid qualities, appearance and low cost.

It is known and has been known that a rubber composition block can be made which will combine qualities of resilience and very long wear. The modern automobile tire is an illustration of the amount of wear which a rubber pavement can withstand.

The difficulty seems to be in the direction of finding a suitable base for the rubber paving block that will be at once a firm foundation, a watertight base, and one which enables the rubber blocks to be attached to it permanently.

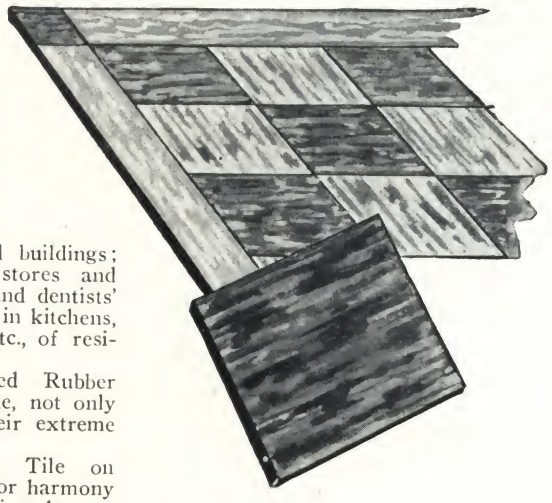


Industrial Paving Block for Bridges, Warehouses, etc.

A newly designed combination of fibrated asphalt and rubber paving block is shown in the illustration. The fibrated asphalt plank base is a counterpart of the rubber paving block, which, after the fibrated asphalt base is nailed or cemented to the bridge deck, is then simply slid into place and knocked up tight. In laying, the paving blocks are staggered both laterally and vertically.

SERVICISED RUBBER TILE AND FLOORING

Description



General Uses—As a sanitary, tough and durable, quiet and resilient, comfortable and safe to the foot, colorful and inviting covering for floors, stairs and walls, for all areas subjected to a great deal of foot traffic, as well as for those where floor beauty and charm is the deciding factor.

Specifically, such areas are included in office buildings; industrial buildings; banks; churches; clubs; schools; stores and shops; theaters; hospitals; doctors' and dentists' offices; barber and beauty shops; also in kitchens, sleeping apartments, halls, porches, etc., of residences.

Special Advantages — Servicised Rubber Products have a wide application due, not only to this decorative appeal, but to their extreme usefulness and wearing qualities.

Appearance—Servicised Rubber Tile on floors and walls lend an agreeable color harmony and give the finishing touch to interior decoration. The beauty of Servicised Tile is a permanent quality, built into the product. The broad range of colors and the wide range of sizes and shapes, give to the architect and decorator an unlimited field in which to create color combination in complete decorative harmony with any interior.

Permanency—Servicised Rubber Tile are waterproof, non-absorbent, unaffected by alkali, most acids, resist abrasion and are non-combustible to a high degree; dense in structure; and, properly installed, will remain perfectly flat and superior in appearance for years.

Comfort—Servicised Tile floors are restful and quiet, easy on the feet, and cut down noise due to shock-absorbing and elastic qualities of the composition.

Maintenance—No special treatment is required other than washing when necessary. The usual materials carelessly thrown on floors do not affect Servicised Rubber Tiling, and it is not damaged by furniture.

Composition—Servicised Rubber Products are carefully and scientifically prepared compositions of pure para rubber, selected non-fading mineral colors, and other materials of established and proven merit used for the purpose of introducing density, resistance to abrasion, and high finish.

Types—*Servicised Rubber Tile* are of uniform first quality structure, colors and marking extending through the tile thickness. *Block-Back Tile* has colors and markings similar to regular rubber tile, but only in the upper half of tile, with base or backing of tough, durable black material. Block-Back Tile is installed at a slightly lower cost than Servicised Rubber Tile.

Colors — Complete range of beautifully marbled and plain color tones. Full color chart showing every tile will be sent on request.

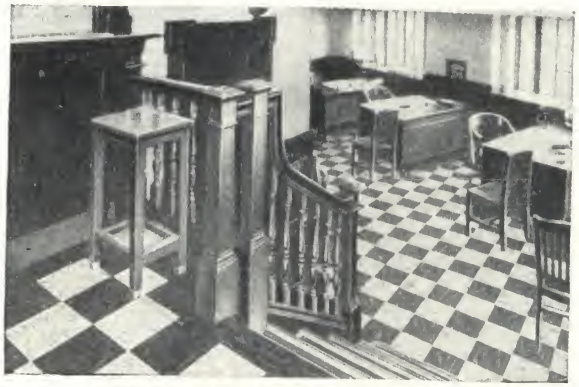
Sizes—Tile sizes: 4x4; 6x6; 8x8; 9x9; 12x12; 18x18; 9x18; 16x24; 18x36 in.

Bases, mouldings, wainscot caps, thresholds, etc., are 42 in. in length.

Stair treads, with built-in nosing, are 42 in. in length.

Border sheets are 18x36 in.

Thickness—Servicised Rubber Tile and Tile Accessories are made in $\frac{3}{16}$ and ¼-in. thicknesses. ¼ in. is always recommended over concrete.



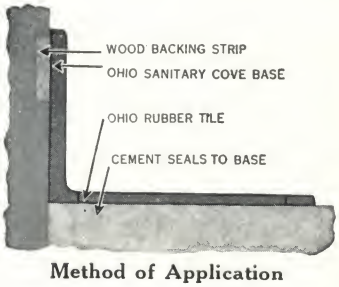
An Installation of Rubber Tile

Application of Servicised Rubber Tile

Generally, Servicised Rubber Tile can be successfully laid over any subfloor which is smooth, up-to-grade, dry, and provides firm support. The life and satisfactory service from any flooring material depends largely upon the firmness, dryness and general excellence of the sub or under flooring construction. Servicised Rubber Tile provides no exception to this, and laid properly, it furnishes a comfortable and agreeable floor with most astonishing durability.

Preparation of Concrete Subfloors—Concrete subfloors should be prepared and constructed as provided in specifications of the Portland Cement Association. It should be brought to proper grade, troweled smooth, be free from waves, irregularities, dust, dirt or roughness, and be absolutely dry. Concrete subfloors are the responsibility of the cement contractor.

Preparation of Wood Subfloors — Wood floors, like the concrete, should be brought to the required floor level. Underfloor should be 3x¾-in. tongue and groove, kiln dried hardwood, driven up tight and securely nailed. Ends of boards should be thoroughly fastened and all irregularities and cracks eliminated. Wood subfloors are the responsibility of the carpenter contractor.



Method of Application

CEMENT AND LIME
MORTAR COLORS
WATERPROOFING

Adensite Co., Inc.....A179
American Tripoli Co.....A180
Antihydrine Co.....A181
Anti-Hydro Waterproofing Co.....A182–183
Aquabar Waterproofing Products.....A186–188
Asphalt Products Co., Inc.....A184–185
Billings-Chapin Co.....A189
Building Chemicals Corp.....A190
Caffall-Cornman Corp.....A191
Carey, Philip, Co.....A192
Carney Co.....A166
Central Ironite Waterproofing Co.....A193
Century Cement Corp.....A167
Ceresit Waterproofing Corp.....A194–195
Clinton Metallic Paint Co.....A175–176
Colorless Dampproofing, Inc.....A196
Concrete Materials Corp.....A197
Concrete Surface Corp.....A292–297
Elaterite Paint & Mfg. Co.....A198
Euclid Chemical Co.....A199
Everseal Mfg. Co., Inc.....A200
Flintkote Co.....A202–203
Headley Emulsified Products Co.....A204–205
Horn, A. C., Co.....A207–236
Hydrolithic Waterproofing Co., Inc.....A201
Hydroseal Waterproofing Co.....A206
Hy-Test Cement Co.....A168
Johns-Manville.....A237
Kosmos Portland Cement Co.....A169
Kuhls, H. B. Fred.....A238–239
Lewis Asphalt Engineering Corp.....A240
Louisville Cement Co.....A170
Mann, O. H., & Co., Inc.....A241
Master Builders Co.....A242–253
Medusa Portland Cement Co.—
Portland Cement.....A162–163
Waterproofing.....A264
Minwax Co., Inc.....A254–261
Mitchell-Rand Dampproofing Corp.....A262–263
National Waterproofing Co.....A265
Obelisk Waterproofing Co.....A266
Pecora Paint Co.....A172–174
Portland Cement Assn.....A160–161
Solvay Sales Corp.....A267
Sommers & Co., Ltd.....A270
Sonneborn, L., Sons, Inc.....A268–269
Southwestern Portland Cement Co.—
Cement Mortar.....A171
Portland Cement.....A164
Sullivan Co.....A271
Superior Cleaning Co.....A291
Toch Brothers.....A272–283
Truscon Laboratories.....A284–285
Vortex Mfg. Co.....A286–287
Waterproofing Co.....A290
West Penn Cement Co.....A165
Western Waterproofing Co.....A288–289
Williams, C. K., & Co.....A177–178

PORTLAND CEMENT ASSOCIATION

A National Organization to Improve and Extend the Uses of Concrete

33 West Grand Avenue
CHICAGO, ILL.

DISTRICT OFFICES

ATLANTA, GA.	DES MOINES, IOWA	LINCOLN, NEB.	NEW YORK, N. Y.	ST. LOUIS, MO.
BIRMINGHAM, ALA.	DETROIT, MICH.	LOS ANGELES, CAL.	OKLAHOMA CITY, OKLA.	SALT LAKE CITY, UTAH
BOSTON, MASS.	HELENA, MONT.	MILWAUKEE, WIS.	PARKERSBURG, W. VA.	SAN FRANCISCO, CAL.
CHICAGO, ILL.	INDIANAPOLIS, IND.	MINNEAPOLIS, MINN.	PHILADELPHIA, PA.	SEATTLE, WASH.
COLUMBUS, OHIO	JACKSONVILLE, FLA.	NASHVILLE, TENN.	PORTLAND, ORE.	VANCOUVER, B. C.
DALLAS, TEX.	KANSAS CITY, MO.	NEW ORLEANS, LA.	RICHMOND, VA.	WASHINGTON, D. C.

CONCRETE BUILDS THE COMPLETE STRUCTURE

Concrete is a building material which *extends* the possibilities of architectural treatment for many types of buildings. It may be finished to meet the most modern requirements of color and texture.

These statements are based upon definite experience and actual use. Many notable buildings, in all parts of the United States, have reinforced concrete frames, and exteriors which are, wholly or in part, some form of concrete. As a consequence, there is an interest in concrete construction which is having marked influence upon the design and decoration of buildings.

Concrete has long been used for various purely structural purposes. Now, however, it is being used as a complete building material. These applications take various forms: cast stone, concrete masonry (available in both light weight and standard weight units); roofing tile; and monolithic, or cast-in-place concrete.

The successful use of concrete in any form is governed by certain basic principles which are simple, but exacting. Scrupulously observed, they permit the architect to design and build with concrete in complete confidence that the structure will endure and will fulfill his ideals.

The PORTLAND CEMENT ASSOCIATION, in thirty years of existence, has conducted extensive research to develop clear understanding of the laws which control the strength of concrete, as well as its other important characteristics.

The result of this research, and of nationwide study of construction problems and procedure, has been embodied in a series of practical bulletins and suggested specifications covering almost every use of concrete. These bulletins, specifications, and the personal services of the Association's staff are freely available to architects and structural engineers.

Some of these bulletins are listed and briefly described on this and the following page.

PORTLAND CEMENT ASSOCIATION BULLETINS AND SPECIFICATIONS OF INTEREST TO ARCHITECTS

All titles listed are in A.I.A. file size except where otherwise noted.

Architectural Specification for Cast Stone
(12 pp.)

A complete specification covering all labor, materials and services incidental to and including the furnishing and erecting of cast stone.

Attractive Small Homes of Concrete Masonry
(20 pp.)

Series of twenty designs and home studies in a standard A.I.A. file folder.

Beautiful Homes of Concrete Masonry
(32 pp.)

Photographs and floor plans of forty-one concrete masonry homes in all parts of the country. Names of designing architects given.

Concrete Floor Finishes
(24 pp.)

Recommendations, details and specifications for durable concrete floor finishes to meet all requirements.

Concrete Farm Buildings
(72 pp., 7½x9¾ in.)

Design and construction methods for all types of farm buildings and improvements.

Concrete Floors for Residences
(20 pp.)

A manual of residence floor construction describing and showing designs for the three common types: solid slab, ribbed floor and tile and joist. Discusses surface treatment.

Concrete in Architecture
(64 pp.)

Color plates showing the decoration of both interior and exterior surfaces of concrete. Theatres, churches, libraries, clubs.

Concrete in Parks and Playgrounds
(24 pp., 7½x9¾ in.)

Rotogravure illustrations of uses of concrete in parks and playgrounds.

Continued on next page

Concrete Masonry Construction
(48 pp.)

Specifications, construction details and estimating data, especially with regard to concrete block, building tile and brick. Includes a recommended building ordinance for concrete block and building tile.

Concrete Masonry in Outstanding Buildings
(16 pp.)

Illustrates and describes use of concrete masonry for fireproofing, partitions, exteriors, back-up and floors in large buildings recently erected.

Concrete Sidewalks
(12 pp., 6x9 in.)

Recommended practices to improve sidewalk construction. Specifications.

Concrete Swimming Pools
(32 pp.)

Public and private, large and small pools illustrated. Design, construction, sanitation and operation. Specifications for construction.

Design and Construction of Concrete Pavements
(48 pp.)

A technical manual on concrete street and highway pavements prepared primarily for use of the designing engineer.

Design and Control of Concrete Mixtures
(3rd Edition, 72 pp., 6x9 in.)

Methods of producing concrete of predetermined strength and durability. Design of mixtures and field control. A.S.T.M. standards for field tests. Specifications.

Modern Garages
(24 pp.)

Illustrates layout and design of commercial multi-story garages to reduce parking problem in cities.

Monolithic Concrete Buildings
(48 pp.)

36 full page halftones of monolithic concrete buildings. Decoration cast in place and precast. Methods of construction.

Plasterer's Manual
(48 pp., 6x9 in.)

An illustrated booklet giving latest information on use of portland cement in plaster and stucco. Includes construction details and material specifications.

Portland Cement Stucco
(64 pp.)

Shows various stucco finishes with eleven color plates. Methods of application and completed houses illustrated. Gives specifications and recommendations on design and construction.

Schools
(A.I.A. File Folder and Inserts, 30 pp.)

Sketch elevations, photographic illustrations, sketch plans and details of monolithic concrete and concrete masonry schools.

Specifications for Making, Placing and Curing Concrete in Cold Weather
(2 pp.)

Special provisions for cold weather construction.

Specifications for Plain and Reinforced Concrete
(4 pp.)

Water-cement ratio specification based on proposed standard building regulations of the American Concrete Institute.

Standard Specifications for Portland Cement
(36 pp., 6x9 in.)

A.S.T.M. standards and manual of cement testing.

Store Fronts
(A.I.A. File Folder and Inserts, 22 pp.)

Sketch elevations, photographic illustrations, sketch plans and details of monolithic concrete and concrete masonry store fronts.

Tennis Courts for All Year Sport
(20 pp., 6x9 in.)

Construction details and instructions for building tennis courts. Illustrations of private and public courts.

The New Architectural Medium—Concrete
(20 pp.)

Reprint from "The Architect and Engineer," describing the development in monolithic concrete construction on the Pacific Coast. Illustrated.

Two Family Houses of Concrete Masonry
(24 pp.)

Prize winning designs submitted in an architectural competition. Plans for two family houses of both duplex and semi-detached type.

Vaulted Concrete Sidewalks
(12 pp.)

Requirements for sidewalks over excavated areas. Specifications and line drawings.

MEDUSA PORTLAND CEMENT COMPANY

Manufacturer of Medusa Waterproofed Cements

1002 Engineers Building, CLEVELAND, OHIO

BRANCH OFFICES

CHICAGO, ILL., 1704 The Builders Building
CINCINNATI, OHIO, Building Industries Building
GRAND RAPIDS, MICH., 602 Grand Rapids Trust Building
MANITOWOC, WIS.
MILWAUKEE, WIS., 1135 Empire Building
NEW YORK, N. Y., 1521 New York Central Building
PITTSBURGH, PA., 1829 Oliver Building
TOLEDO, OHIO, Second National Bank Building
WASHINGTON, D. C., Chandler Building
YORK, PA., 25 No. George Street

PLANTS

SANDUSKY, OHIO TOLEDO, OHIO MANITOWOC, WIS. DIXON, ILL. YORK, PA. WAMPUM, PA. NEWAYGO, MICH.

Products

MEDUSA GRAY PORTLAND CEMENT—Waterproofed.

MEDUSA WHITE PORTLAND CEMENT—Waterproofed.

MEDUSA MIX, the Masonry Cement.

For Medusa Integral Waterproofing, Medusa Portland Cement Paint, see Manufacturers' Index.

Literature

Our book on "How to Make Good Waterproofed Concrete," A.I.A. File No. 4, size 8½x11 in., will be gladly sent upon request.

Literature on any or all Medusa products sent on request.

MEDUSA WHITE PORTLAND CEMENT—WATERPROOFED

Medusa White Portland Cement—Waterproofed is manufactured by the Medusa Process which consists of grinding Medusa Waterproofing with Medusa White Portland Cement during the process of manufacture. This insures proper and uniform distribution of the waterproofing. It eliminates one material on the job, and costly supervision by the architect and contractor.

Where to Use

Medusa White Portland Cement—Waterproofed, is used where non-staining, impervious mortar is required for the pargeting, setting, backing and pointing of limestone, marble, granite, etc.; in the facing for cast stone and for the finish coat of portland cement stucco. It is also used in terrazzo and when portland cement is specified and white or tinted effects are desired.

How to Use

Medusa White Portland Cement—Waterproofed, is used the same as regular gray or white cements except that precaution should be taken where hand mixing is employed to dampen the aggregates before mixing with cement.

Quality

Medusa White Portland Cement—Waterproofed, is guaranteed to pass all standard and U. S. Government specifications. It attains high strength and has the same setting time and ultimate strength as regular portland cement. It is uniform in color and passes all the requirements of the American Society for Testing Materials.

Medusa Portland Cement Company is the exclusive manufacturer of white Portland cement—waterproofed, which has been successfully used for more than 20 years.

Partial List of Leading Applications for Medusa White Portland Cement—Waterproofed

- Cast stone (plain or ornamental)
- Cut cast stone (plain or ornamental)
- Cement brick
- Cement floor tile
- Cement mantels
- Concrete burial vaults
- Concrete fence posts
- Concrete roofing tile
- Concrete stave silos
- Hollow concrete tile
- Lawn furniture
- Lamp standards
- Monuments
- Mortar (non-staining)
- Shower baths
- Stucco
- Swimming pools
- Table tops and counters
- Terrazzo tile
- Traffic markers



Federal Forestry Building, Missoula, Mont.
W. B. LOVELL CO., Minneapolis, Contractors
PERRY FUEL & CEMENT CO., Missoula, Mont., Dealer
Medusa White used in mortar for laying brick and stone in front



Home of Wyatt C. Hedrick, Architect, Fort Worth, Tex.
Showing the splendid effects obtainable with Medusa Waterproofed White Stucco

Continued on next page

MEDUSA GRAY PORTLAND CEMENT—WATERPROOFED

Medusa Gray Portland Cement—Waterproofed is manufactured by the Medusa Process which consists of grinding Medusa Waterproofing with Medusa Gray Portland Cement during the process of manufacture. This insures proper and uniform distribution of the waterproofing. It eliminates one material on the job and costly supervision by the architect and contractor.

Where to Use

Medusa Gray Portland Cement—Waterproofed, should be specified and used in all concrete and mortar placed below grade, and above grade where it is exposed to the elements.

Mixing

Medusa Gray Portland Cement—Waterproofed, is mixed the same as regular gray portland cement. The only precaution is that when hand mixing is employed, the sand should be dampened before mixing with the cement. In machine mixing, use the same mixing operation as in making good concrete with regular gray portland cement.

Mortar

The use of Medusa Gray Portland Cement—Waterproofed, in mortar for laying up brick, tile, stone, etc., will produce an impervious joint and prevent the absorption of moisture.

Quality

Medusa Gray Portland Cement—Waterproofed, is guaranteed to pass all standard and U. S. Government specifications. It attains high strength and has the same setting time and ultimate strength as regular gray portland cement. It is uniform in color and passes all the requirements of the American Society for Testing Materials.

Advantages

Medusa Gray Portland Cement—Waterproofed, has been used all over the United States for the past 20 years, under severe water conditions. Its use will prevent the absorption of moisture by breaking down capillary attraction and the resulting concrete will be dry.

In waterproofing by the Medusa process, the voids are not filled and the concrete is permitted to breathe. It has been proven that concrete allowed to breathe and still impervious to moisture, gives many added years of service.

MEDUSA-MIX—THE MASONRY CEMENT

Description

Medusa-Mix is a portland cement base masonry cement with aquagel added to produce plasticity.

Packages

Medusa-Mix is put up in paper sacks, 65 lb. net each, four sacks to the barrel.

Mixing

When mixed in proportions of 1:3, 1 bbl. of Medusa-Mix will produce a full ½ yd. of mortar.

Color

The color of Medusa-Mix is an advantage, natural, or when used with mortar colors.

Quality

Medusa-Mix is the same quality as other well known Medusa products and was manufactured to meet the insistent demand of architects and builders for a portland cement base masonry mortar.

Where to Use

Medusa-Mix is recommended for use in laying up brick, concrete block, tile, etc.



Federal Reserve Bank Building, San Antonio, Tex.
Atlee B. Ayres and Rob't M. Ayres, Architects J. Depuy, Constructor
Southern Cement Products Co., Cast Stone
Medusa Waterproofed White Portland Cement used. The first Federal building to be made of precast stone



Vista Del Lago Club, Sheridan Road, No Man's Land (between Wilmette and Kenilworth), Ill.
Thieblar & Fugard, Architects Geo. A. Nordgren, Contractor
Peddie & Carney, Plastering Contractors
Waterproofed White used for exterior and interior

SOUTHWESTERN PORTLAND CEMENT COMPANY

42 North Main Street
DAYTON, OHIO

PLANTS
OSBORN, OHIO — VICTORVILLE, CALIF. — EL PASO, TEX.

Products

MIAMI HYDRO-PLASTIC CEMENT: a waterproofed, high early strength special portland cement for producing more workable, waterproof concrete ready for use in 24 to 72 hours.

MIAMI Hydro-Plastic CEMENT

Also Miami Portland Cement: a high quality standard portland cement, surpassing in three days the twenty-eight day specification for portland cement of the American Society for Testing Materials.

For page on Miami Richmortar: a Mason's Cement with a portland cement base, for setting masonry of all kinds and which combines, in a high degree, both strength and plasticity, see List of Manufacturers.

Hydro-Plastic Cement for Better Concrete

Hydro-Plastic Cement is Miami High Early Strength Portland Cement to which a patented compound has been added and thoroughly incorporated during the manufacturing process. The finished product has greater strength-developing properties, greater plasticity and increased waterproofness.

Field of Use—

(1) Where "quick use" concrete is essential.
(2) Where watertight concrete is vital.
(3) Where a dense and durable concrete is required.
(4) For exterior stucco and plaster work.
(5) Wherever it is desired to produce at a reasonable cost, stronger and more durable concrete than is ordinarily produced with regular portland cement.

High Early Strength—Concrete made with Hydro-Plastic is ready to use in 24 to 72 hours depending on the temperature. This high early strength is obtained by using the ordinary proportions and the accepted methods for producing good concrete. No change of concreting methods is necessary in any respect.

CONCRETE TESTS

Mix 1-2-3 (sand and gravel) Water Ratio 0.80
Slump 4 in. 6.0 gal. per sack cement
Moist cured at 70° F.
Tested damp

Cement	Fineness through No. 200	Compressive strength lb. per sq. in.				
		1 day	2 days	3 days	7 days	28 days
Hydro-Plastic	95.0	1750	2350	2750	3500	4900

Strength data for all mixes, curing conditions, etc., will be supplied on application.

Watertightness—Concrete made with Hydro-Plastic Cement is free from honeycombing, both internal and external. Hence the concrete has the maximum density possible with the materials used, which assures minimum porosity and maximum watertightness. Also, the added compound closes all voids with a water-repellant film which prevents corrosion of the concrete and reinforcing steel.

Workability or Plasticity—Concrete made with Hydro-Plastic is easy flowing and non-segregating. The prime requisite of durable, high quality concrete is assured—a plastic, homogeneous mixture during and after placing in the forms. The mix flows easily into all the corners of the forms and around reinforcing steel. The concrete is uniform throughout the structure and hence has a higher effective strength than ordinary concrete. Hydro-Plastic cement provides the ideal combination for obtaining maximum durability in concrete—adequate strength with a high degree of workability.

Mortar for stucco or masonry made with Hydro-Plastic is fat, smooth, easy spreading. The workman can apply more square feet of stucco surface in less time with less effort. No lime is needed to produce this plastic mortar.

Physical Properties of Miami Hydro-Plastic

Fineness: 95% through 200-mesh
Initial setting time: 2 hours
Final setting time: 4 hours

STRENGTH IN POUNDS PER SQUARE INCH

Standard Mortar Mix
1 Cement—3 Ottawa Sand

	1 day	3 days	7 days	28 days
Tension	300	360	425	485
Compression	1850	3230	4250	4860

Specifications for Concrete

Hydro-Plastic Cement is guaranteed to conform with all the chemical and physical requirements of the standard specifications for portland cement of the American Society for Testing Materials.

Since no change of construction methods is necessary, the usual specifications for concrete work as given by the Portland Cement Association or American Concrete Institute should be used, with the substitution of the following clause:

"Water-Cement Ratio—Concrete shall be proportioned to give the necessary workability without exceeding the quantities of mixing water given in the following table:

Class of concrete	Compressive strength		Maximum quantity of mixing water
	1 day	28 days	U. S. gal. per sack cement
1	2000	5500	5.0
2	1500	4500	6.0
3	1000	4000	7.0



Central Police Station, Columbus, Ohio
ALLIED ARCHITECTS ASSOCIATION, Architects, Columbus, Ohio
BOYAJOHN & BARR, General Contractors, Columbus, Ohio

"These water ratios must not be exceeded. Moisture held in the aggregates must be included. Use that combination of aggregates that has the maximum weight per unit volume.

"Where a watertight structure is required, placing must be done with extreme care. Concrete must be of a consistency that will flow sluggishly when tamped or spaded. It must be deposited as rapidly as possible in shallow, even layers, working up to the full height of the forms as the placing progresses."

Complete specifications for mass concrete, stucco, swimming pools, dustless floors, etc., will be gladly supplied on application.

WEST PENN CEMENT COMPANY

Manufacturers of West Penn Cement, West Penn Waterproofed Cement and Overnight Cement

BUTLER, PA.

BRANCH OFFICE, 2215 Oliver Building, PITTSBURGH, PA.

PLANT: WEST WINFIELD, PA.

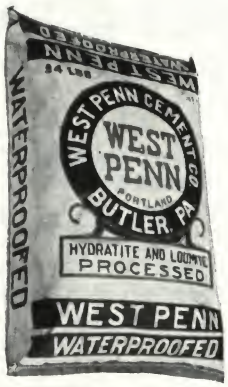
Products

WEST PENN WATERPROOFED CEMENT for use in all work where integral waterproofing or waterproofed cement is required.

West Penn Portland Cement.

Overnight Portland Cement.

Distributors of Flamingo Mortar Cement.



Description

West Penn Waterproofed Cement is West Penn Portland Cement made waterproof by the Hydratite and Loomite Process.

Hydratite is made by the A. C. Horn Co. and has been recognized as a standard of integral waterproofing for twenty-two years. The integral method is a designation first adopted by the A. C. Horn Co. Calcium and aluminum stearates are the bases of Hydratite Powder.

In U. S. Bureau of Standards Technological Paper 370 on a study of wet walls and the prevention of efflorescence on face brick walls it states on page 594 that "calcium and aluminum stearates were effective in all cases."

Loomite is finely pulverized Rensselaerite which has been extensively used to increase the plasticity and density of concrete.

Advantageous Features

(1) Comprehensive tests for both high and low pressure permeability have demonstrated the superiority of West Penn Waterproofed Cement over similar products. Upon request, we shall be pleased to furnish the architect with authoritative test data on West Penn Waterproofed Cement compiled from testing laboratory results.

(2) The concrete is extremely plastic and easy to place avoiding segregation.

(3) The required degree of workability can be secured with a lower water ratio.

(4) Concrete of very high early and ultimate strength is produced.

(5) Since the waterproofing elements are ground into the cement at the mill, there is no necessity for special supervision.

Uses

West Penn Waterproofed Cement will give positive waterproof and dampproof results in the construction of

Concrete reservoirs	Basement walls and floors
Cisterns	Elevator pits
Swimming pools	Stucco
Pumping stations	Cement blocks
Tunnels	Cast stone
Disposal plants	Roofing, tile, etc.

Integral Method of Waterproofing

The necessity of preventing the absorption of water by concrete has been recognized for many years.

Concrete contains many microscopic pores or capillary tubes constituting a considerable part of its total volume. Water enters concrete because of the physical law of capillary attraction.

In the process of manufacturing West Penn Waterproofed Cement, the Hydratite and Loomite are ground into the cement producing a complete and uniform distribution of these materials which become an inseparable part of the concrete itself. These materials lubricate the particles of cement and aggregate producing a denser concrete and at the same time tightly seal the minute pores or capillary tubes.

West Penn Waterproofed Cement will positively and permanently dampproof and waterproof concrete.

Advantages of the Integral Method

The integral method of waterproofing is economical because it does not require additional excavation on the exterior of foundation walls, nor additional brick or concrete protecting walls.

No difficulty is experienced in making joints around pipes or where horizontal or vertical joints occur. Blind leaks are not possible in integral waterproofing and leaks due to settlement cracks can be easily repaired.

Specification and Application

West Penn Waterproofed Cement should be specified, mixed, poured and cured in the same way as ordinary portland cement.

The only precaution is that each batch should be mixed one and one-half minutes minimum.

Shipments

West Penn Waterproofed Cement is furnished in 94-lb. paper bags and can be shipped in mixed cars with West Penn Cement, Overnight Cement and Flamingo Mortar Cement.

Service

We will be glad to have our field men furnish further information and visit construction work while West Penn Waterproofed Cement is being used.

Literature

Literature, in standard size, 8½x11 in., describing many uses for West Penn Waterproofed Cement will be sent on request.

THE CARNEY COMPANY

MANKATO, MINN.

DISTRICT SALES OFFICES

CHICAGO, ILL., Builders' Building — CINCINNATI, OHIO, 2554 Ingleside Avenue — DETROIT, MICH., Book Tower
MINNEAPOLIS, MINN., Builders' Exchange — ST. LOUIS, MO., Louderman Building

MILLS: MANKATO and CARNEY, MINN. — QUARRIES: CARNEY, MINN.

Product

CARNEY CEMENT.

CARNEY CEMENT
for Brick and Tile Mortar

Description

THE CARNEY COMPANY has manufactured cement since 1883.

Carney Cement is unlike others used in brick and tile construction. It is made from a peculiar deposit of stone found only at Mankato, Minn. This stone contains the correct proportion of lime combined chemically, so that, when the stone is burned and ground, it needs nothing but sand and water to form a smooth working mortar.

Advantages

Carney Cement is lighter in weight and more easily handled. It is packed in cloth or paper sacks, each containing 1 cu. ft. and weighing 50 lb. Users of Carney Cement are not required to buy lime, hence labor of slaking and mixing is eliminated. Carney Cement requires nothing but sand and water in mixing.

The simple mixing formula saves time and labor and eliminates the danger of carelessness. Addition of too much sand or adulteration at the mortar box interferes with the plastic, smooth-working properties of the cement and is immediately noticed by the masons.

Because of the plastic and smoother working properties masons can lay more brick per man per day. Carney Cement lays the maximum number of brick per barrel.

Carney mortar has no waste. Mortar left over at the end of a day or when a job is delayed can be used the next day by re-tempering with water.

Carney Cement can be used winter and summer. Frost does not affect the strength of Carney mortar in the wall. Printed directions on tags attached to the cement bags provide for its proper use in cold weather.

In the wall, Carney mortar returns to its native hardness, becoming harder than the brick it joins and as the mortar is absorbed into the brick it exerts a tremendous gripping power. It makes one solid wall of masonry.

Specifications for Brick, Tile and Terra Cotta Mortar

Plain Mortar—For all brick, tile and terra cotta mortar above grade, use 1 part Carney Cement to 3 parts sand, in accordance with the manufacturer's directions attached to the cement bags. Carney Cement mortar can be used for brick walls faced with Bedford stone without danger of staining the stone.

Colored Mortar—Use a good, double strength mortar color, and mix according to manufacturer's instructions.

Descriptive Literature

Literature covering every point on Carney Cement will be sent on request.

A list of buildings near you that have been laid up in Carney Cement, together with the names and addresses of the architects and contractors, will also be sent, if requested.

Carney Cement Test

Made by G. F. Gebhardt, Mechanical Engineer, Armour Institute of Technology, Chicago

A mortar of 1 part Carney Cement to 3 parts sand was used to make 14 piers, three bricks high, with ½-in. mortar joints—size of brick 3¾x8⅛x2¼ in.; area, 31 sq. in.

A pier was tested nearly every day for 16 days, on a Standard Olsen machine. The table shows the tremendous crushing strength reached on the 16th day.

While this test is more than sufficient for all practical purposes, it by no means represents the peak strength of a Carney joint—Carney Cement never stops hardening. In older specimens, the bricks themselves have given way without a sign of fracture in the joints.

CARNEY BREAKING LOAD

Designated age, days	Actual	Sq. in.	Designated age, days	Actual	Sq. in.
1	9,000	290	9	42,000	1,355
2	10,000	322	10	45,000	1,450
3	14,000	452	11	51,000	1,645
4	15,800	510	12	55,000	1,775
5	25,000	807	14	53,000	1,710
7	29,000	935	15	55,000	1,775
8	31,000	1,000	16	56,000	1,808

A Few Buildings Laid Up in Carney Cement

American Furniture Mart, Chicago, Ill.
Book Tower, Detroit, Mich.
Brotherhood of Locomotive Engineers Building, Cleveland, Ohio
Cleveland Union Terminal, Cleveland, Ohio
Diversey Theatre, Chicago, Ill.
Federal Reserve Bank Building, Kansas City, Mo.
Harper Hospital, Detroit, Mich.
Hibbard-Spencer-Bartlett & Co., Chicago, Ill.
Louderman Building, St. Louis, Mo.
Minneapolis Municipal Auditorium, Minneapolis, Minn.
Passenger Station, New York Central R. R., Buffalo, N. Y.
Sears, Roebuck & Co., Branch Store Building, Atlanta, Ga.

CENTURY CEMENT CORPORATION

Manufacturers of Century Waterproofed Masonry Cement

GENERAL OFFICES AND MILLS

ROSENDALE, N. Y.

SALES OFFICES

NEW YORK, N. Y., 103 Park Avenue — BOSTON, MASS., Park Square Building — PHILADELPHIA, PA., Finance Building
CLEVELAND, OHIO, Builders Exchange Building — BUFFALO, N. Y., 505 Delaware Avenue

Product

CENTURY WATERPROOFED CEMENT, the modern Masonry Cement for brick, tile, terra cotta, partition tile, cinder and concrete blocks, etc.

Physical Qualities

Century Waterproofed Cement is a very finely ground, highly plastic cement, that requires only the addition of sand and water to produce a perfect mortar for masonry of all kinds, above and below grade. It is a true hydraulic cement, manufactured from special cement rock deposits at Rosendale, N. Y., carefully proportioned with the same exactness that characterizes present-day manufacture of the finest portland cements.

Strength and Durability

The strength of Century Waterproofed Cement is greater than that required by the building codes of the various cities. It increases with age until its final hardness exceeds that of the brick it joins.

The high flour content of Century Waterproofed Cement imparts excellent plasticity with a low water ratio, which latter insures greater early strength, no shrinkage in mortar joint and a resulting strong bond. It also adds greatly to the stability of the new wall when subjected to freezing conditions.

Century Waterproofed Cement is particularly outstanding in its toughness, adhesiveness and durability. It passes all soundness tests and has ample strength for all classes of masonry work, large and small.

Color

The natural color of Century Waterproofed Cement is a pleasing gray, which, being neutral, harmonizes excellently with all types and shades of brick. It will satisfactorily carry any good grade of mineral mortar color.

Waterproofed and Non-Efflorescent

A stearate is ground in Century Cement at the mill, assuring an effectively waterproofed mortar. This stearate is of the class recommended for the purpose by the U. S. Bureau of Standards—Technologic Paper No. 370, page 579; the American Face Brick Association and other important authorities.



We illustrate a test made on April 1, 1930, by the James H. Herron Co., Chemists and Engineers of Cleveland, Ohio, on one pier of common clay brick and one of face brick. The bottom brick in each pier stands in a solution of sodium sulphate. *No absorption of the solution beyond the first mortar joint of Century Waterproofed Cement.* Ample proof of Century Cement's impermeability.

Century Waterproofed Cement prevents seepage of crystallizing salts from one brick to another, and is free from such salts or other injurious chemicals which can cause efflorescence and fading of mortar color.

Uniformity

Century Waterproofed Cement is manufactured in one of the most modern cement plants, equipped with production machinery and scientific control methods which mark the highest achievement in the industry.

Absolute uniformity of strength and color is assured through hourly tests, made under the direct supervision of highly skilled chemists having every necessary facility at their disposal in a most modern and complete chemical and physical laboratory.

Ernest E. Berger, Chief Chemist, who developed and perfected Century Waterproofed Cement, was for many years identified with the U. S. Bureau of Standards at Washington, D. C., and the U. S. Bureau of Mines at New Brunswick, N. J., in chemical research and scientific investigation of ceramics and rock products.



The Mill at Rosendale, New York, N. Y.

Specifications

Mortar—For all brick, tile, terra cotta, partition tile, cinder and concrete blocks—1 part Century Waterproofed Cement to 3 parts clean, sharp sand—mixed and measured by volume. The Century Waterproofed Cement shall be mixed thoroughly while dry with the sand, either by hand or machine, thereupon adding clean water in sufficient amount to produce a mortar of the desired consistency. In warm weather, low burned brick shall be wetted thoroughly; in cold weather, sand and water shall be heated and brick and tile kept dry before placing them in the wall.

Colored Mortar—Where better color is required, a good double strength mineral mortar color shall be used, in accordance with the directions of the manufacturer of the particular mortar color used.

Cost

Although a straight cement Mortar, Century Waterproofed Cement costs less than other mortars of comparable strength and quality, because it is economically prepared and used, and requires the admixture of only one additional material—sand. It is unusually plastic under the trowel, enabling the mason to work with a maximum of speed and accuracy. If specified originally and figured upon competitively, masonry bids should be lower.

It requires approximately 5 sacks of Century Waterproofed Cement to lay 1000 bricks, ½-in. joint, 13-in. wall. It also requires less mortar color per 1000 brick than with any other cement or lime.

Stucco

Because of its plasticity, adhesion, strength, waterproofed property and ease of application, Century Waterproofed Cement is an ideal material for stucco.

References

American Museum of Natural History, (2 bldgs.) New York.
Trowbridge & Livingston, Archts., New York, N. Y.
Melrose Office Building (N. Y. C. R. R.), New York.
New York Central R. R. Co. Archts., New York, N. Y.
Mayflower Hotel, Akron, Ohio.
Graham, Anderson, Probst & White, Archts., Chicago, Ill.
County Jail, Albany, N. Y.
Howard Rogers, Archt., Albany, N. Y.
Flynn Building, Burlington, Vt.
Mowll & Rand, Archts., Boston, Mass.
Polsky Dept. Store, Akron, Ohio.
Starrett & Van Vleck, Archts., New York, N. Y.
Central Savings & Trust Co's. Tower, Akron, Ohio.
Walker & Weeks, Archts., Cleveland, Ohio.
Osborn Manufacturing Co. Factory, Cleveland, Ohio
Austin Company, Engrs.

HY-TEST CEMENT CO.

Integrally Waterproofed Bricklayer's Cement—Waterproofed at the Mill

MAIN OFFICE
PHILADELPHIA, PA.

SALES OFFICES
NEW YORK, N. Y. WASHINGTON, D. C. BOSTON, MASS. RICHMOND, VA. PITTSBURGH, PA.

Product

HY-TEST MASONS' CEMENT, a finely ground, plastic, smooth-working cement made especially for mortar for laying brick, tile, stone and other masonry construction.



MARK ON EVERY BAG

Advantages

The advantages of using a mason's cement for brick mortar instead of mixtures of portland cement and lime is so well established, that it now resolves itself around the quality and merit of the mason's cement to be considered.

Hy-Test Waterproofed Masons' Cement differs from other mason's cements in that it is "all cement," as absolutely no lime is added to it during process of manufacture.

It is not necessary to add lime to it at the mortar box. When mixed with 3 parts sand it will produce a mortar as fat as butter and of the same ultimate strength as portland cement.

Because it contains no lime, Hy-Test Waterproofed Masons' Cement Mortar is practically non-shrinkable—and shrinkage of mortar is a potent cause of leaky walls. We refer you to no less an authority than the U. S. Bureau of Standards Technical Paper No. 308 on "Cement-Lime Mortars," pages 254 and 256.

"The addition of lime to cement mortars increases the shrinkage in proportion to the amount of lime added.

"This shrinkage tends to result in cracks in the plaster or in the separation of the mortar from the brick or stone."

It is upon this fundamental theory, based upon over 200 tests conducted by the Bureau of Standards, that the HY-TEST CEMENT CO. is producing the only "100% pure cement" mason's cement on the market.

Waterproofing Qualities

Because of the high strength of Hy-Test Cement we are grinding into it at our mill during process of manufacture a high grade paraffin oil. Here again we are following the successful results secured by another Government department, the Bureau of Roads, U. S. Department of Agriculture, with this waterproofing compound. We refer you to Bulletin No. 230, U. S. Department of Agriculture, pages 2 and 3.

"Concrete and mortar containing oil admixtures are almost perfectly non-absorbent of water and are therefore excellent materials to use in damp-proof construction.

"The addition of some water-repellent compound appears absolutely necessary to insure this result, and for this purpose laboratory tests have shown these oils to be at least equal to any other substance that has been used."

Strength and Hardening

Hy-Test Cement is guaranteed to meet the building code requirements of any first class city for strength and hardening. It will produce five times greater strength than called for by the U. S. Master Specifications No. 443 for masonry. In brick walls it will harden as quickly as portland cement with 15% lime.

Color

The ultimate color of Hy-Test mortar is the same as a mixture of portland cement with 15% lime. Coloring matter can be used with Hy-Test cement the same as with portland cement.

Estimating Data

It takes from 4 to 5 bags of Hy-Test cement to lay 1000 brick depending upon the thickness of the joint.

Specifications

Mortar—Hy-Test Waterproofed Masons' Cement or an approved equal shall be used for the mortar for all exterior and interior brickwork, rubble stone partitions, cinder and concrete blocks, and brickwork below grade, in the proportion of 1 bag of cement with 3 cu. ft. of clean graded sand (15 No. 2 shovels of sand to each bag of cement). A fine loamy sand will not be permitted.

The waterproofing must be mineral free of all vegetable and organic matter *and must be ground into the cement at the mill* during process of manufacture. Waterproofing content must be no less than 1½%.

The mason's cement shall contain no admixture of lime at point of manufacture nor shall any lime be added to it on the job. It is important to wet all brick or blocks in warm weather and to protect green work in cold weather.

Where a mechanical mixer is used contractor may add 3½ cu. ft. of sand (17 No. 2 shovels) to each bag of cement.

Some Important Installations for Your Inspection

New York Central R. R. Office Building, New York, N. Y.
Pennsylvania R. R. Office Building, Philadelphia, Pa.
Chanin Building, New York, N. Y.
U. S. Department of Commerce Building, Washington, D. C.
Grant Building, Pittsburgh, Pa.
U. S. Cadet Barracks, West Point, N. Y.
U. S. Army Barracks, Camp Devens, Mass.
22 Buildings U. S. Veterans Hospital
U. S. Regimental Barracks, Governors Island, N. Y.
44 Buildings for State of New Jersey
12 Buildings for State of West Virginia
16 Buildings at Harvard University
10 Buildings Andover Academy, Andover, Mass.
10 Buildings University of Pennsylvania
Yale Bowl, Yale University
Roosevelt Hotel, New York, N. Y.
Lexington Hotel, New York, N. Y.
Ritz-Carlton Hotel, Boston, Mass.
Keystone Athletic Club, Pittsburgh, Pa.
Waldorf-Astoria, New York, N. Y.
20 Buildings Public Service Corp., New Jersey
6 Buildings du Pont Company
Press Club, Washington, D. C.
10 Buildings General Electric Co.

KOSMOS PORTLAND CEMENT COMPANY

INCORPORATED

Manufacturers of

Kosmos Portland Cement Since 1905
Kosmortar (a Mason's Cement) Since 1922

SALES OFFICE
LOUISVILLE, KY.

MILLS
KOSMOSDALE, KY.

Kosmortar

"High Strength Long Life" — TRADE MARKS — "For Modern Masonry"

A very smooth working cement for masonry of all kinds. Mixed with sand and water only, by hand or machine, it is ready for immediate use. No slaking, no additions. Minimum labor.

The Use of Kosmortar Insures Distinction in the Color of the Joint. Its natural color, a soft-toned, light gray, blends well with stone and terra cotta, and offers pleasing contrast to the colors in brick and tile.

Kosmortar is economical to use and possesses qualities that satisfy the most stringent mortar requirements. Comparison with portland cement, lime mortars and other cements used for masonry purposes will reveal the economy in specifying Kosmortar.

Kosmortar Has Ample Strength for All Masonry. Its ultimate strength is greater than that of the brick. As there are no ingredients in Kosmortar that can form a film between the brick and mortar, tending to cause shrinkage cracks and leaky joints, its full strength is effective in the bond.

ANALYSIS

SiO_2	16.00	Soundness: O. K.	
Al_2O_3	1.60	Setting time:	
Fe_2O_3	3.20	I. 3 hrs. 40 min.	
CaO	48.97	F. 6 hrs. 55 min.	
SO_3	4.20	Fineness:	
Loss on ignition	1.30	Passing 200-mesh sieve	89.58
Undetermined	**1.41**		

The Robert W. Hunt Company, Engineers, Chicago, report results completed February 1928-May 1929:

Tensile Strengths per square inch (1-3 Standard Sand Briquettes) 3 days....78 lbs. 7 days....178 lbs. 28 days....258 lbs.

Strengths in Compression per square inch (1-3 Sand Mortar Cylinders) 3 days....528 lbs. 7 days....884 lbs. 28 days....1576 lbs.

Uniformity is assured because the manufacture of Kosmortar is a completely controllable process. Kosmortar is portland cement compounded with other materials to give plasticity and body. It is not a natural cement product with the attendant possibilities of variation. No lime is added to Kosmortar during or after its manufacture. Kosmortar has the reliability and durability of portland cement.

Colored mortar is readily obtained with Kosmortar by the addition of mortar colors. Lighter shades than the natural color of Kosmortar may be obtained by the addition of mason's hydrated lime not to exceed 25% by volume.

Setting time is regulated to give complete satisfaction for winter and summer use. There is a minimum of waste mortar and cleaning costs. Kosmortar sets hard under water (it is hydraulic) and is well suited to work below grade.

Estimate of Quantity—Four to six sacks of Kosmortar (five sacks on the average) mixed with three parts good mason's sand, will lay 1000 bricks. The actual quantity depends on the quality of the sand, width of the joint, etc.

Package—Multiwall paper sacks are used exclusively. Each sack weighs 67 lbs. gross; 4 sacks make a barrel of 268 lbs., which is the unit of sale. 187 barrels is a minimum carload.

Watertightness—An agent is used in Kosmortar to produce a dense, watertight mortar of exceptional plasticity.

Leaky walls are extremely rare when Kosmortar is used and when they do occur the trouble is usually caused by careless mechanical work, kind of brick and type of construction.

Kosmortar produces a very watertight mortar and one that bonds exceptionally well with brick.

No oils or similar ingredients are used that may cause a film to form between the mortar joint and the brick, resulting in a lack of bond and shrinkage cracks through which water may easily pass.

Directions for Use—Thoroughly mix as needed 1 sack Kosmortar with 3 cu. ft. good mason's sand, add clean water to proper consistency and use. Do not slake or soak.

Sand for all mortar should be well graded and with sharp angular particles, free from vegetable matter, loam (not over 5%) and large pebbles.

***Note:** Slaking and soaking are not only not required, but are detrimental.*

Model Specifications for the Architect's Use

(1) Mortar for all masonry shall consist of Kosmortar (Kosmos Portland Cement Company, Kosmosdale, Kentucky) with clean, sharp mason's sand alone, mixed in the proportion of 1 sack of Kosmortar to 3 cu. ft. of sand.

(2) Mixing is to be done by machine wherever practicable. If mixing is done by hand, the Kosmortar and sand shall be mixed dry until the whole is of a uniform color; then the water is to be thoroughly incorporated.

(3) Only enough clean water shall be added to give workable consistency.

(4) Kosmortar shall be delivered in the original containers.

(5) In cold weather the sand and water shall be heated to at least 70° F., and the work protected, if necessary, to assure setting of the mortar before the water in it freezes. Building units and sand containing any frost shall not be used.

(6) In hot weather, porous brick and tile shall be wetted before laying to prevent withdrawing from the cement the water necessary for hydration.



Cook County Criminal Court and Jail Buildings, Chicago

Hall, Lawrence & Ratcliffe, Inc., Architects
Great Lakes Construction Co., Contractors
Kosmortar used throughout and as a non-staining cement
(From an original drawing by Hugh Ferriss)

Typical Kosmortar Jobs

Art Institute, Dayton, Ohio—Edward B. Green & Sons and Albert Hart Hopkins, Architects; Hillsmith & Co., Engineers and Builders

Barracks Building, Fort Harrison, Ind.—U. S. War Department Plans and Specifications; Mead Construction Co., Contractors

Hayswood Hospital, Maysville, Ky.—Samuel Hannaford & Sons, Architects; J. C. Simons, Contractor

U. S. Veteran's Bureau Hospital Buildings, Oteen, N. C.—W. P. Rose Co., Contractors

Lunkenheimer Co., Carthage, Ohio—Harry Hake, Architect; Fisher-De Vore, Contractors

Owens Bottle Co., Kanawha, W. Va.—DeVore & Co., Engineers; Rust Engineering Co., Contractors

Consumers Power Co., Jackson, Mich.—Albert Kahn, Architect; Henry Vanderhorst, Contractor

New Toledo Hospital—Schmidt, Garden & Erikson, Architects; A. Bentley & Sons Co., Contractors

Eli Lilly Co., Indianapolis, Ind.—Robert Frost Daggett, Architect; Leslie Colvin, Contractor

LOUISVILLE CEMENT COMPANY

INCORPORATED

GENERAL OFFICES

Speed Building, LOUISVILLE, KY.

DISTRICT SALES OFFICES

CHICAGO, ILL., 1610 Builders Building — DETROIT, MICH., 602 Murphy Building — NEW YORK, N. Y., 101 Park Avenue

Mills: Brixment, N. Y., and Speed, Ind.

BRIXMENT for Masonry

Product

BRIXMENT, a mason's cement for brick, tile and stone masonry and for stuccoing buildings. For our page on Stucco, see Manufacturers' Index.

Brixment for Masonry

Brixment is a mason's cement that combines the characteristics of portland cement and lime, having both strength and plasticity.

When mixed with sand and water, it makes perfect mortar for any type of brick, tile or stone masonry.

How Used

The proper mix is 1 part Brixment and 3 parts sand, measured by volume, with water added for proper consistency.

Neither portland cement nor lime is necessary. The simple Brixment mix makes strong, smooth-working mortar.

Brixment can be mixed in any quantity either by hand or machine. It is ready to mix and use at once.

How to Estimate

Brixment is packed in cloth or paper sacks. Each sack contains 1 cu. ft.. There are 4 sacks to a barrel.

When mixed with 3 parts of sand, a barrel of Brixment will lay between 800 and 1000 bricks, depending on the width of the joint. Therefore, 1000 bricks require 4 to 5 bags.

Uniformity

The use of Brixment is the architect's assurance that all mortar will be uniform in strength and color and that his specifications will be accurately followed. When oversanded, Brixment mortar works short and, since there is no lime in the mix, the necessary plasticity can be secured only by using the proper amount of Brixment.

Strength

Mortar made of 1 part Brixment, 3 parts sand (no lime, no portland) has greater strength than that required by the building code of any city for the heaviest load-bearing walls.

Its strength increases with age, becoming greater than that of the brick itself. When tested in piers, it approaches that of straight 3-to-1 portland cement mortar. This makes it suitable for foundation, load-bearing, or parapet walls and even for tall, free-standing stacks.

Brixment makes a stronger, tighter bond between the brick and the mortar; it is ground finer and hardens more slowly than portland, thus permitting deeper penetration and a more thorough keying into the pores of the brick.

Resists Moisture

When Brixment is used for mortar, no waterproofing admixtures are necessary. Brixment mortar alone is permanently water-repellent because a small amount of unsaponifiable mineral oil is intimately mixed with Brixment during manufacture. This mineral oil adds plasticity and prevents Brixment from air-setting and caking in storage.

Being a true hydraulic cement, water-repellent and used without lime, Brixment mortar is ideal for exterior masonry and walls below grade.

No Efflorescence

Efflorescence is due to the presence of salts in the masonry materials which work their way, in solution, to the surface of the wall and there crystallize. Brixment itself never causes efflorescence because it contains less than one-half of 1% of soluble salts.

Recent experiments at the U. S. Bureau of Standards show that the best way to prevent soluble salts which may be in the mortar materials from coming to the surface is to incorporate in the mortar a water-repellent admixture to resist the passage of such salts in solution. The wax distillate, a mineral oil mixed with Brixment during manufacture, *does just that.*

Mortar Colors

The permanence of the mortar color in the joint depends not only upon the pigment selected but upon the mortar with which it is mixed.

Brixment does not fade mortar colors. It contains none of the strong acids, alkalis or salts so frequently the cause of fading and of efflorescence in other mortars.

The small amount of mineral oil combined with Brixment when manufactured is a further protection to the color because it prevents water from penetrating the mortar and leaching out the pigments.

Specifications

(1) All mortar shall be composed of Brixment, manufactured by the LOUISVILLE CEMENT COMPANY, and sand. (2) The mortar shall be mixed by measure in the proportions of 1 part Brixment to 3 parts clean, sharp sand. (3) The Brixment and sand shall be mixed dry until the color of the mass is uniform. Clean water shall then be added to make mortar of the proper consistency for the work to be done. All mortar shall be mixed by machine (or by hand for small operations where machine mixing would not be practicable). (4) If mortar colors are used, they shall be mixed with the mortar in the proportion and manner specified by the manufacturer of the particular color used. (5) In freezing weather the sand and water shall be heated.

Some Brixment Buildings

Biltmore Hotel, Miami; Schultz & Weaver, Architects

Apartment, 5th Ave. at 70th St., New York City; R. Candela, Architect

Fisher Body Co. Plant, Cleveland; Albert Kahn, Architect

U. S. Railway Terminal Post Office, Chicago; Graham, Anderson, Probst & White, Architects

Children's Hospital, Pittsburgh; York & Sawyer and E. T. Mellon, Architects

SOUTHWESTERN PORTLAND CEMENT COMPANY

42 North Main Street
DAYTON, OHIO

PLANTS
OSBORN, OHIO — VICTORVILLE, CALIF. — EL PASO, TEX.

MIAMI
RICHMORTAR
A MASONRY CEMENT

Products

RICHMORTAR: a Cement for setting brick, tile, stone and masonry of all kinds.

Also Miami Portland Cement: a high quality standard portland cement, attaining in three days a strength surpassing the twenty-eight day specification for portland cement of the American Society for Testing Materials.

For page on Miami Hydro-Plastic Cement, a waterproofed, high early strength special portland cement; for use where highly durable, watertight concrete is essential and where the early use of concrete work is necessary, see List of Manufacturers.

Characteristics of Richmortar

Strength—RICHMORTAR is a mason's cement with a Miami Portland Cement base—therefore it has the high early strength characteristic of Miami Cements. Other materials have been ingeniously and scientifically combined to provide a remarkable plasticity and sand-carrying capacity.

Durability—Because of its portland cement base, RICHMORTAR passes the same soundness test as portland cement. Exceptional strength, coupled with an integral, water-repellant waterproofing, provides a mortar that is of the highest possible durability. RICHMORTAR is always of uniform strength, color and plasticity because it is manufactured by a fixed formula under strict laboratory control.

Plasticity—RICHMORTAR spreads easily and works smoothly under the trowel. Joints can be struck clean and accurate, enabling masons to do faster work and lay more brick to the sack of cement used.

Watertightness—RICHMORTAR insures a permanent waterproof joint in any type of masonry construction. Porous, permeable mortar joints are the cause of unsightly efflorescence, of wet damaged interiors and of spalling from frost action. The high bonding strength and low absorption of RICHMORTAR are positive assurance against these evils.

Economy—RICHMORTAR, sand and water—only these three ingredients—are required to make this fast-spreading, adherent mortar. It is ready for use as soon as mixed and one man can mix as much as two using other materials. Not only does RICHMORTAR stay easy-working and smooth on the board, but the mortar left over from a prepared batch can be retempered, within a reasonable time, without serious loss in strength.

Simplicity—RICHMORTAR is so simply mixed that the architect or superintendent need not worry about any serious errors occurring at the mixing box. Strength will always be ample, for if the mix is overloaded with sand, the plasticity of the mortar is reduced in proportion; and all masons realize it is poor economy to use a harsh working mix.

Color—RICHMORTAR in its natural color is a soft, creamy white, which blends well with any color of brick. If desired, mortar colors may be added. Efflorescence or color fading is prevented by the water-repellant nature of RICHMORTAR and because it contains no free lime or strong alkalis.

Mixing—RICHMORTAR is mixed either by hand or by machine. One part RICHMORTAR, three parts sand, add water and mix thoroughly to desired consistency.

Packing—RICHMORTAR is packed in four-ply paper bags—each bag containing 75 pounds of cement, four bags to the barrel. With the average sand, five bags are required to lay 1000 brick.

Physical Properties

Fineness through 200-mesh sieve—90.0%.
Soundness, 5 hours over steam—O.K.
Initial setting time—3 hours.
Final setting time—6 hours.

REPORT OF STRENGTH TESTS

Pounds per Square Inch
Standard Mortar Specimens
1 Cement—3 Ottawa Sand

Age—days	Tension Forest City Testing Lab., Cleveland, Ohio	Compression H. C. Nutting Lab., Cincinnati, Ohio
3	130	1223
7	167	1504
28	220	1913

RICHMORTAR is guaranteed to meet Federal Specification No. 443, United States Government Master Specification for Masonry Cement.



Pythian Castle, Springfield, Ohio
LLOYD J. ZELLER, INC., Architects and Engineers, Springfield, Ohio
KNOWLTON & WORTMAN CO., General Contractors, Springfield, Ohio

Specifications

(1) All masonry mortar shall be composed of Miami Richmortar (SOUTHWESTERN PORTLAND CEMENT COMPANY, Dayton, Ohio) and sand mixed in the proportion of one sack RICHMORTAR to not more than three cubic feet of clean sand. Add sufficient clean water to make mortar of desired consistency and mix thoroughly.

(2) In freezing weather, water and sand shall be heated and other protective measures taken, if necessary, to prevent freezing of the mortar before it has set.

(3) When mortar color is used, it shall be mixed with the mortar in the manner and proportions specified by the manufacturer of the color used.

(4) In hot weather, wet all masonry units (brick, tile, concrete block, etc.) before laying in the wall.

PECORA PAINT COMPANY, INC.

Mortar Stains and Sash Putty

TELEPHONE
REGENT 6130

Fourth Street and Erie Avenue
PHILADELPHIA, PA.

ESTABLISHED 1862
BY SMITH BOWEN

Products

PECORA MORTAR STAINS.
PECORA METAL SASH PUTTY.
PECORA CALKING and GLAZING COMPOUND.
PECORA COLORLESS WATERPROOF COMPOUND.

Also Mill White, Enamels, Lacquers, Furnace Cement, Stove Putty, Paints, and Varnishes (which are not described in this catalogue) for which we will gladly furnish detailed information on request.



TRADE-MARK
Registered

Pecora Mortar Stains

Uses—A pulp or paste, *not a powder,* made in 11 standard colors. These stains are made to be mixed with lime or cement mortar or with the two combined. The stained mortars are universally appropriate and pleasing, whether used for facing exterior or interior walls and regardless of the type of structure. Stained mortar is also used for mantel facings, fireplaces and hearths, whether of brick, tile, marble, slate, or other material, and for pointing or joining stonework where a color effect is desired. Pleasing color tones may be introduced into exterior "white-wash" through use of these stains.

Advantages—Pecora Mortar Stains are offered only in the form of a pulp or paste because this company has found, after much experimental work, that only in the pulp form can the stains be made to combine certain advantages.

They are absolutely fadeproof. Pecora Stains retain their original tones and the appearance of buildings is preserved as originally planned. These stains are exceptionally strong, which reduces the amount necessary for a given job and so cuts down handling. This strength also is responsible for the economy of its use and for the deep richness of tone that is obtained with Pecora Stains. The advantage of permeability in adding a pulp stain instead of hoeing dry materials into a wet mass of mortar is obvious. The general acceptance of Pecora Mortar Stains as the standard of mortar colors is evidence that the pulp form is superior.

Properties—Pecora Mortar Stains are manufactured from carefully selected, finely ground, rich ores in combination with extenders and fixatives. These materials are dissolved in chemicals to produce a non-acid pulp. This pulp forms a chemical union with the mortar, and serves to strengthen rather than to weaken it. As the mortar sets, the colors become permanent, making rich, clean tones, free from streaks and spots. Pecora Mortar Stains do not cause or increase efflorescence on the face of brick walls.

Colors—Shades below are always in stock. Special shades made to order.

Black	Windsor	Colonial drab
Brown	Red	Amber
Dark brown	Buff	Terra cotta
(chocolate)	Fern green	French gray

Specifications—The spotting and fading that results from the use of inferior materials, and the necessity for expensive tuck pointing as a result, may be avoided by the use of the following outline form:

All mortar to be colored or stained with Pecora Mortar Stain, manufactured by PECORA PAINT COMPANY, INC., Philadelphia, Pa., using by measure 1 bucket of paste or pulp to 7 buckets of face wall mortar.

Mortar must be cold before mixing in stain. To secure a uniform and smooth shade, "hoe in" stain thoroughly. Keep soft in package by covering with water. Pour this off before using. Do not allow stain to freeze before being mixed with mortar.

Note: Depending upon depth of shade desired, the following proportions per 1000 brick, ordinary stretches, will be found to approximate quantity desired:

Red, Buff, Terra Cotta and Amber—For ⅛-in. joint use 45 to 55 lb.

Brown, Windsor, Colonial Drab, Fern Green, French Gray and Dark Brown—For ⅛-in. joint use 35 to 45 lb.

Black—For ⅛-in. joint use 20 to 30 lb.

Mortar varies and takes more or less stain according to richness of lime and quality of sand. Before laying brick it is suggested that a small portion of the stained mortar should be taken from the mortar bed and dried out thoroughly to determine whether the proper quantity of stain is being used to produce the shade desired.

Literature—Booklet, sent on request, showing actual colors and giving full details and photographs of important buildings, with testimonials from architects and owners.

Pecora Metal Sash Putty

Uses—A specially prepared putty for use in metal sash only.

Advantages—Pecora Metal Sash Putty is the modern plastic product developed by this company to replace white lead, litharge and ordinary putties used in connection with metal.

It is a "special duty" putty, compounded to retain its elasticity and adhesiveness and so to take up the difference in coefficient of expansion between glass and steel.

Properties—It remains soft in the package and is immediately ready for use when removed. It is "long" and therefore does not require manipulation by the workmen. This and its ease of application reduce installation costs.

Colors and Samples—The standard shade is dark gray. Other shades are made to order. Sample on request.

Specifications—The one safe way to specify is by name: Pecora Metal Sash Putty.

References—A few of the large buildings where this material has been used by David Lupton's Sons Co., of Philadelphia, Pa., are:

Bethlehem Steel Co., South Bethlehem, Pa.
General Electric Co., Schenectady, N. Y., and West Lynn, Mass.
Fore River Ship & Engine Building Co., Fore River, Mass.
Dayton Electric Company, Dayton, Ohio
S. L. Allen & Co., Philadelphia, Pa.
Central Railroad of N. J., Elizabethport, N. J.
Keokuk Electro Metals Company, Keokuk, Iowa

Continued on next page



Pecora Red Mortar Stain



Pecora Black Mortar Stain



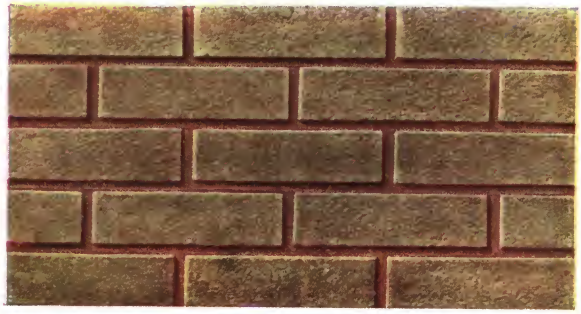
Pecora Black Mortar Stain



Pecora Dark Brown Mortar Stain



Pecora Dark Brown Mortar Stain



Pecora Red Mortar Stain

Continued on Next Page

PECORA CALKING AND GLAZING COMPOUND; COLORLESS WATERPROOF COMPOUND

TRADE-MARK

Pecora Calking and Glazing Compound

A plastic material, impervious to heat, cold and moisture, or acid fumes. When set it forms a tough skin on the surface but remains permanently pliable and elastic underneath, never cracking or drying out. It adheres tenaciously to wood, stone, concrete, iron, glass, or any other building material, while its permanent elasticity adjusts itself, under all ordinary conditions, to contraction, expansion, or warping of the surfaces it joins. Its consistency is about that of putty and it is as easily applied. Stock color is light gray. Other shades furnished if ordered in not less than ½ barrel lots (400 to 500 lb.).

Air Leakage Prevention:—The prevention of air leakage is a vital prerequisite to fuel saving and satisfactory heating, and to the subsequent comfort of the occupants of a building. Approximately 90% of the air leakage in all buildings occurs between window and door frames and surrounding masonry. Unless these spaces are calked with a permanently flexible material in place of the usual mortar joint and cement pointing, air leakage is bound to continue.

Method of Calking Around Window and Door Frames:—This necessarily varies with the conditions to be found in old buildings. In some cases it is advisable to remove staff beads and calk space between the frame proper and the wall, while in other cases the calking can be done satisfactorily without removing staff beads. For this class of work a reliable calking contractor should be consulted; a list of these will be furnished on request. For calking frames in new buildings the following set of specifications, if rigidly enforced, will insure thoroughly weatherproof, windproof, and dustproof joints between frames and the surrounding masonry.

Specifications:—In the last paragraph of the general conditions to the specifications insert under the following heading:

Substitution of Materials, etc.—For material, apparatus, and appliances specified, other articles of equal capacity, material, designs, workmanship, and space occupied may be substituted, providing that the written approval of the architect shall be given before the general contract is signed. After contract is signed, no substitutions will be allowed. Samples of such substitutions shall be submitted before signing the general contract.

In specifications for stone, hollow tile, or brick masonry, insert this paragraph:

This contractor shall rake out the mortar before it is set ½ in. deep from outside face of door and window frames, on jambs top and under wood sills.

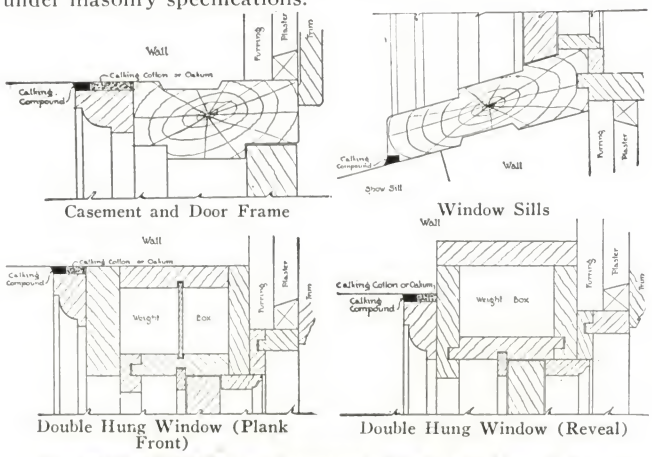
In specifications for carpenter and millwork insert this paragraph:

All staff beads on door frames and reveal window frames and back band moulding on plank front frames shall be loose and shall be put in place by the carpenter immediately after the calking is done.

In carpenter specifications after exterior door and window frames are specified add these paragraphs:

Calking—All exterior window and door frames shall be sealed with Pecora Calking Compound manufactured by the Pecora Paint Company of Philadelphia, Pa. This shall be executed so that the joint between masonry and frames (heads, jambs, and sills) will be rendered weatherproof, windproof, and dustproof, and guaranteed so to remain under all ordinary conditions for a period of 5 years from date of installation. When spaces between the frames and the surrounding masonry are wider or deeper than ½ in., these spaces shall be packed within ½ in. of frame surface with oakum and the remaining space filled solid with the calking compound.

The above work shall be done when all frames are set in place and primed and masonry joints raked out, as called for under masonry specifications.



Suggestive Details for Applying Moulds to New Frames and Undercut Sills to Accommodate Calking

Method of Pointing Stonework:—It is difficult, if not impossible, to get a cement mortar that will stand up in exposed joints in stone, terra cotta, or tile cornices. The cement cracks and becomes loose, causing leaks. To overcome this, set the masonry in portland cement in the usual way, but rake the joints back ½ in. before the cement hardens and fill in with Pecora Calking Compound.

In old work, clean the joints of all loose dirt or cement and grout with Pecora Calking Compound. This makes a positive seal against action of the weather on the cement, insuring permanently tight, waterproof joints.

Other Uses: Glazing—For any construction subject to severe conditions, such as excessive vibration, gas, acid fumes, extreme variations in temperature, etc., Pecora Calking and Glazing Compound should be used for bedding and glazing the skylights. Its permanent elasticity prevents the glass from cracking. It will go twice as far as white lead putty.

Consistencies:—Pecora Calking Compound is supplied in both knife and gun consistencies. The knife consistency is packed in 12½, 25, 50 and 100-lb. kegs; also in ½ barrels (400 to 500 lb.) and barrels (800 to 900 lb.). The gun consistency is supplied in 1-gal. can, 5 and 10-gal. kits, 30 and 50-gal. drums.

Pecora Colorless Waterproof Compound

Pecora Colorless Waterproof Compound is made of a combination of the best water-resisting and water-proofing materials that are known to science.

It dries rapidly to a flat, non-lustrous coating, which preserves, waterproofs and beautifies the surface. Does not stain or discolor.

Further information on request.

CLINTON METALLIC PAINT COMPANY

Mortar Colors, Cement Colors, Protective Paints and Roofing Cement

100 Clinton Road
CLINTON, N. Y.

NEW YORK OFFICE: 19 Liberty Street—Telephone, John 3369

Products

Manufacturers of CLINTON MORTAR COLORS and CLINTON CEMENT COLORS. Also manufacturers of the following Clinton Specialties:

Clinton Silk Fibre Elastic Slaters Roof Cement
Clinton Asbestos Furnace and Retort Cement
Metallic and Venetian Roof and Barn Paints
Clinton Hermetic-Seal Liquid Roof Cement
Clinton High Temperature Fire Brick Cement

Send for descriptive literature and prices

Clinton Mortar Colors

Nature's Permanent Colors—Made Since 1887—at Clinton, N. Y.

Experience

Ever since 1887, the CLINTON METALLIC PAINT COMPANY has served the architectural profession and the building trade. Over 40 years of scientific research and generations of manufacturing experience are reflected in the uniform excellence of Clinton products.

Permanent and Uniform

Clinton Mortar Colors are mineral colors, as permanent as the colors in natural rock. Rigid laboratory tests keep them absolutely uniform from shipment to shipment and from year to year.

Directions for Estimating and Using Clinton Mortar Colors

To get a mortar joint of intense color it is advisable to use approximately 100 lbs. of dry mortar color per



Mortar Colored with Clinton Pompeiian Buff No. 600



Mortar Colored with Clinton Double Strength Olive Green No. 1503



Mortar Colored with Clinton Special Chocolate No. 404



Mortar Colored with Clinton Colonial Buff No. 700

Continued on next page

1000 brick laid in running or common bond, with half-inch mortar joints. If mortar joints are wider or narrower, or if a bond requiring more or less mortar per 1000 brick is used, the amount of mortar color required per 1000 brick should be increased or decreased proportionately.

Following are two formulas for mortar of deep intense color:

Cement Mortar

Clinton Mortar Color (dry)	25 lbs.
Portland cement	1 bag (1 cu. ft.)
Sand	3 cu. ft.
Hydrated lime	1/10 sack

The above is sufficient to lay approximately 250 brick in running or common bond with half-inch mortar joints.

Cement Lime Mortar

Clinton Mortar Color (dry)	30 lbs.
Portland cement	1 bucket (16 qts.)
Hydrated lime	1 bucket (16 qts.)
Sand	6 buckets (96 quarts)

The second formula is sufficient to lay approximately 300 brick in running or common bond with half-inch mortar joints.

As it is not always convenient to weigh the color on the job, we tabulate below the various shades of Clinton Mortar Color, showing in separate columns the number of quarts of dry Clinton Mortar Color (*struck measure*) which are equivalent to 25 lbs. and 30 lbs.

Caution: *This table applies only to genuine Clinton Mortar Colors*

	Number of quarts	
	Equivalent to 25 lbs.	Equivalent to 30 lbs.
Clinton Hematite Red No. 10	10	12
Clinton Mortar Brown No. 400	8½	10½
Clinton D. S. Chocolate No. 402	9	11
Clinton Special Chocolate No. 404	9	11
Clinton Colonial Buff No. 700	19	23
Clinton Pompeiian Buff No. 600	19	23
Clinton Dark Buff No. 717	16½	20
Clinton Mortar Black No. 900	18½	22½
Clinton D. S. Black No. 800	19	23
Clinton D. S. Olive Green No. 1503	17½	21

Pearl Gray Mortar may be produced by using one-eighth as much Clinton Double Strength Black No. 800 as is recommended above to produce intense black mortar.

Clinton Mortar Black No. 900 or Single Strength Black, as it is sometimes called, will not give a jet black mortar. For best work use Clinton Double Strength Black No. 800.

For Cream Colored Mortar a cement lime mortar or a cement mortar made with white cement and sand should be used, adding about half as much Clinton Colonial Buff No. 700 or Dark Buff No. 717 as recommended above.

Many contractors get good results with smaller proportions of Clinton Mortar Colors than those above recommended. This is possible if coarse sand is used and all ingredients are mixed, remixed, then mixed again. Experience, however, proves that the amounts of color recommended will give good results under all conditions and we cannot assure satisfaction if less color is used. Money spent for a little extra color more than pays for itself, in power and wages saved at the mixer and in the owner's satisfaction with the finished job.

Clinton Pulp Colors

Many users of Mortar Colors desire the colors in Pulp form. Clinton Pulp Colors are of the same high quality as Clinton Dry Colors. Further detailed information with prices will be furnished upon request.

Specification

All coloring material to be manufactured by CLINTON METALLIC PAINT COMPANY, Clinton, N. Y., to be delivered on the job in original packages bearing their labels, and to be used according to directions which they will furnish.

Important Notes on the Preparation and Application of Colored Stucco

1. The Portland Cement Association, 33 West Grand Avenue, Chicago, will furnish any builder, without charge, detailed practical information concerning the preparation and application of colored stucco. Their instructions have been followed in the preparation of stucco panels reproduced below. The stucco was made in accordance with the following formula:

White Portland Cement	5 bags (470 lbs.)
Hydrated Lime	1 bag (50 lbs.)
Marble Dust	16 cu. ft.
Color	A weight equal to percentage of weight of cement indicated in table and under panels.

Any suitable white sand may be used in place of marble dust.

Shade	Clinton Color to be Used	Percentage of Color
Pink	Clinton Hematite Red No. 10	5 %
Pink	Clinton Red No. 82	1 %
Orange Pink	Clinton Red No. 61	1 %
Brown	Clinton Brown No. 1150	1.5 %
Deep Cream	Clinton Dark Buff No. 717	5 %
Cream	Clinton Colonial Buff No. 700	5 %
Light Yellow	Clinton Yellow No. 714	.75%
Light Green	Clinton Green No. 1502	1 %
Light Blue	Clinton Blue No. 1601	1 %

2. Any careful mechanic who will follow directions can prepare and apply colored stucco in a satisfactory manner.

3. Colored stucco appears much deeper in shade when wet than when dry. The change in color due to drying out of the stucco surface during the first few days after application must not be mistaken for fading. If Clinton Colors are used as suggested in our folder the final result should be closely similar to panels shown. Variations of fineness or color of the sand will account for such slight differences in color tone as may be noted. It is well to make up a small experimental batch, apply it, and let it dry out before proceeding with the work, thus proving that the color effect is satisfactory.

4. Write for our folder, "Color in Stucco," showing samples and giving more detailed information.



Background—No. 1502 Green 3%
Foreground —No. 61 Red 1%



No. 1601 Blue 2%

MORTAR COLORS

Manufactured by

C. K. WILLIAMS & CO.
Established 1878
Easton, Pa. Emeryville, Cal.

GEO. S. MEPHAM & CO.
Established 1887
East St. Louis, Ill.

RAW MATERIAL DEPOSITS AND SUPPLY PLANTS

CALIFORNIA OHIO ILLINOIS (3) PENNSYLVANIA (7) LOUISIANA WISCONSIN (2) MISSOURI (3) SPAIN (5) NEW YORK (2)

The C. K. Williams Company and the Geo. S. Mepham Company are an organization of world-wide magnitude and one of the world's largest producers of mineral pigments.

Anchor Brand MORTAR COLORS Star Brand

The growing popularity of Mortar Colors during the past decade is largely due to the following reasons:

(1) Mortar to Match Brick—Where particular color effects are desired, such as in brick panels of contrasting or harmonizing color or for interior work, especially hearths, mantels, etc., the effects are greatly increased by coloring the mortar to match the brick.

The American Face Brick Association standard specifications provide:

"The hearth shall be of (name) brick laid as per drawings in a 1:3 cement mortar to match the brick."

(2) For Mortar Contrasting with Brick—By laying the brick in mortar of a color and shade which will bring out the full value of brick texture and tone gradation, a beautiful effect is secured. Some combinations which have become very popular are as follows: rough texture variegated red brick with buff or chocolate mortar; red brick with black mortar; and smooth-surface light buff or yellow brick with red mortar.



Mortar Colored with Anchor Brand No. 1174 Double Strength Chocolate or Star Brand Double Strength Chocolate, Dk.



Mortar Colored with Star Brand Double Strength Buff or Anchor Brand No. 19 Buff

(3) For "Mellowing" the Mortar—One of the principal charms of old brick buildings is the warm and mellow tone of the mortar. To reproduce the charm of half-century-old mortar, a judicious use of mortar colors will prove most satisfactory.

(4) For Color Control—The color value of sand and cement varies greatly with the source of material. Our standard specifications provide architects with an exact method of color control.

(5) One-fifth of the Brick Wall Surface Is Mortar—Proportions vary, but in the ordinary wall with ½-in. mortar joints, approximately one-fifth of the wall surface is mortar. For this reason architects realize the necessity of selecting the mortar color with the same discriminating care that is used in the choice of the brick.

Non-Fading Mortar Colors

Brilliant colors can be used daringly if combined harmoniously, and if there is no danger of fading. Our mortar colors have a forty-year record for quality and reliability. They are not only fadeless but they are more finely ground and better mixers with mortar. They are of the highest quality at no higher price. When using our mortar colors you can be sure of artistic brick work.



Mortar Colored with Star Brand Double Strength Black or Anchor Brand No. 222 Double Strength Black



Mortar Colored with Anchor Brand No. 1151 Red or Star Brand Double Strength Red

Continued on Next Page

Specifications for Star Brand and Anchor Brand Mortar Colors

The following paragraphs are to be inserted in the Brick Masonry specifications:

Mortar Color—Mortar color shall be Anchor Brand Mortar Color, manufactured by C. K. Williams & Co., Easton, Pa., or Star Brand Mortar Color, manufactured by Geo. S. Mepham & Co., East St. Louis, Ill., and delivered to the site in the original packages.

The exact quantity of color to be used will be decided by the architect after the construction of test panels.

Test Panel—Test or sample panels as required by the architect shall be constructed in the same manner and of the same thickness as the finished wall. Face brick for test panel shall be laid in mortar mixed according to the formula and directions given below. After test panels are thoroughly dry, the architect will decide whether the color of the mortar is satisfactory, or whether the amount of mortar color in the formula should be increased or reduced. *See Note (1).*

Mixing—Dry color, sand, hydrated lime and cement shall be thoroughly mixed before water is added. After the water is added, mixing shall continue until the mass is absolutely free from spots or streaks of color. Mortar shall be mixed as stiff as is practicable, and batches shall be kept as nearly as possible at the same consistency throughout the job. The same proportions of ingredients shall be accurately maintained in all the batches. The kinds of lime, sand, cement and color shall not be changed after the work has begun. *See Notes (2) and (3).*

Cleaning and Pointing—When plasterer has left building, all surface brick and mortar shall be thoroughly cleaned down by applying a solution containing not more than 1 part of muriatic acid to 20 parts of water, using a stiff wire brush. Surface shall then be rinsed with clean water. All defective joints shall be pointed up at this time. *See Notes (4) and (5).*

Notes to Specifications

(1) Omission of Test Panel—For smaller jobs where cost is an important consideration, the test panel may be omitted. In this case, a little of the mixed mortar may be taken from the first batch and pressed into a small cake. When this cake is dry, it can be determined whether the color of the mortar will be satisfactory.

(2) Lump Lime—If lump lime is used in place of hydrated lime, it must be thoroughly slaked and allowed to cool at least 24 hours before being brought in contact with mortar colors. *Hot lime bleaches color.*

(3) Accurate Mixing Necessary—Lime is a strong pigment; sand and cement also have an important effect on color. It is important to measure accurately and maintain same proportions throughout the work.

(4) Raking Joints—Defer raking till mortar has begun to set.

(5) Prevention of Efflorescence—If mortar is mixed stiff and raking of joints deferred till mortar has begun to set, efflorescence will rarely be found. Efflorescence is in no way caused by Star Brand or Anchor Brand Mortar Color. It is due to the occurrence of soluble salts in cement, sand, lime, water or the brick, and is just as common in plain mortar as in colored mortar, though not so easily visible.

To Secure Good Results

We recommend use of 100 lbs. of dry Mortar Color per one thousand brick laid in running or common bond with half-inch joints. We cannot assure satisfaction if less Color is used.

Anchor Brand CEMENT COLORS Star Brand



Blue Brown Green Red Yellow Black

Star Brand and Anchor Brand Cement Colors

Are very finely ground and produce clear, bright tones with a minimum of coloring material. They are used in floors, sidewalks, cast-stone work, roofing and floor tile, stucco, etc., and should not be confused with mortar colors.

For Cement Floors—Although colored cement floors are comparatively inexpensive, they should never receive the treatment of a cheap floor. Colored cement, if carefully laid, finished and protected, will be found to possess all the decorative qualities of more expensive materials, along with the strength and economy of concrete. Specifications are shown below.

For Stucco—The popularity of colored or tinted stucco surfaces is increasing rapidly. Directions for the use of our stucco colors will be furnished on request.

Specifications for Coloring Cement Floors

Subfloors under colored cement topping should be specified as usual. It is well to use a fairly dry mix and tamp thoroughly. Allow 1 in. for top dressing, which should be laid immediately. The following paragraphs should be incorporated in the specifications:

Cement Floor—Cement color, wherever specified, shall be Anchor Brand Cement Color, manufactured by C. K. Williams & Co., Easton, Pa., or Star Brand Cement Color, manufactured by Geo. S. Mepham & Co., East St. Louis, Ill., and delivered to site in original packages.

Top Finish—A top finish not less than 1 in. thick shall be applied to floors in (state part of work), topping to be composed of 1 part cement and 2 parts of sharp clean sand, free from loam, and from 5 to 20 per cent of color, according to results desired.

Mixing—Cement, sand and color shall be thoroughly mixed before water is added. Only enough water shall be added to make a heavy paste. Mixing shall continue till the mass is absolutely free from spots or streaks of color.

Application—While base is still moist, top dressing shall be applied as follows: Trowel down about ½ in. of colored cement at a time, so as to work the air out of the mass. Build to the surface in this manner. Use the stroke board to chop the surface, as the mass will be too tough to stroke in the usual way. Take off any surplus with the trowel. Level the surface and let it lie till it becomes dull. Do not trowel until all water on the surface disappears.

Tile Effect (Optional)—48 hours after application of top finish, floors shall be cut ⅛ in. deep with a three-cornered file sharpened to a diamond point, so as to produce a tile effect in the pattern directed by the architect.

Note—Cutting floors while green will produce a ragged edge.

Protection—As soon as topping is sufficiently set, floors shall be covered with a 2-in. thickness of sawdust, which shall be kept wet for at least 2 weeks.

Cleaning and Waxing (Optional)—When protective coating is removed, the surface shall be washed with linseed oil soap, using a wire brush, if necessary, to remove dirt and stains. When clean and dry, the surface shall again be covered with a 2-in. thickness of sawdust.

Just before the floor is to be put into use, it shall be polished with a floor wax approved by the architect and applied in accordance with the manufacturer's directions.

ADENSITE CO., INC.

Manufacturers of Concrete Waterproofings and Hardeners

152 West 42nd Street
NEW YORK, N. Y.

LABORATORY: 36-17 34th Street, LONG ISLAND CITY, N. Y.

Products

ADENSITE, a Liquid Integral which is used in the gauging water for Hardening and Waterproofing portland cement concrete and mortar.

PURTONE COLORS, mineral color in powder form for portland cement floor finish.

ADAFLINT, a flush-on floor hardener in crystal form.

CLERSEAL, a colorless waterproofer.

A LIQUID INTEGRAL ADENSITE ITS FUNCTION GUARANTEED

TRADE-MARK

Adensite

Uses—Waterproofing concrete walls below grade, either in mass concrete or in plaster coat.

Hardening and dustproofing cement floor finish.

Waterproofing portland cement stucco.

For brick masonry, Adensite gauged mortar is smooth working, does not drag and prevents "riding."

Authoritative Tests—Upon request, we shall be pleased to furnish the architect with authoritative test data on Adensite, compiled from testing laboratory results and research work carried out at the U. S. Bureau of Standards for the A. S. T. M.

Guarantee—Adensite is unconditionally guaranteed to produce positive and permanent results by the manufacturers, the ADENSITE CO., INC. Surety maintenance bonds furnished on waterproofing jobs.

Service—Our field men visit construction operations while Adensite is in use.



Independence Hall, Philadelphia
Waterproofed with Adensite gauged plaster coat

Colored Floors

PurTone colors are specially prepared for use with portland cement in floor finish and are used integrally throughout entire top finish, assuring permanent and positive results. Specifications on request.

Applied Hardener

Adaflint, dissolved in water, 2 lb. to the gallon and slushed over an old or new floor, will render a cement finish hard and dustless. Furnished in natural gray, oak and green.

Colorless Waterproofing for Masonry above Grade

Clerseal can be applied with brush or spray. One gallon is sufficient for two applications for 80 to 100 sq. ft. of surface.

Shipments

Adensite is shipped in 5, 30 and 50-gal. containers.
PurTone Color is shipped in 550-lb. barrels.
Adaflint is shipped in 2-lb. boxes, 25 to a case.
Clerseal is shipped in 1-gal. jugs; 5, 30 and 50-gal. barrels.

Adensite Specifications

Waterproofing Mass Concrete—The gauging liquid for concrete shall be prepared by placing from 3 to 4 gal. of Adensite in a 52-gal. barrel and adding water. For every 1-bag batch, use between 3 and 4 gal. of the prepared liquid (amount of liquid varies with fineness of aggregate and temperature).

Joints Between Pourings—Shall be thoroughly grouted with Adensite grout.

Waterproof Plaster Coatings—Shall be ⅝ in. in thickness, applied in 2 coats and properly coved and bonded to the floor.

Bonding New to Old Concrete—All surfaces before application of new work shall be thoroughly roughed, cleaned and dampened with Adensite grout to insure perfect bond.

Adensite Grout—Add 1 part Adensite to 3 parts water and enough cement to give mixture a creamy consistency.

Protection of Green Work—To protect green work against action of water, the pump shall be kept in operation 24 hours after pouring or troweling of work.

Floor Hardening—Upon the plain concrete floor slab shall be laid a 1-in. topping of 1 part cement and 2 parts clean sand.

This dry mix shall be tempered with a liquid composed of 3 gal. of water to 1 qt. of Adensite for every 1-bag batch. No dryer shall be used.

Gauging Liquid for Floor Finish—Gauging liquid may be prepared by putting 4 gal. of Adensite into a 52-gal. barrel and adding water (no stirring required).

Bond—When slab is over 48 hours old, before topping is stretched, it shall be given a coating of Adensite grout.

When slab is over 7 days old, before topping is stretched, it shall be roughed with a pick or chisel, cleaned and given a coat of Adensite grout.

Brick Masonry—The mortar shall be composed of 1 part portland cement, and 3 parts clean sand, tempered with a liquid composed of 1 part Adensite to 12 parts water.

Some Users of Adensite

Grosvenor Atterbury, New York, N. Y.
Alfred C. Bossom, New York, N. Y.
Harold B. Brady, Elizabeth, N. J.
Bureau of Yards & Docks, Washington, D. C.
Clinton & Russell, New York, N. Y.
George W. Conable, New York, N. Y.
Day & Klauder, Philadelphia, Pa.
Delano & Aldrich, New York, N. Y.
Dennison & Hirons, New York, N. Y.
I. E. Ditmars, New York, N. Y.
C. E. C. Dyson, Toronto, Ont., Canada
J. H. & W. C. Ely, Newark, N. J.
J. W. Ferguson Co., Paterson, N. J.
Fletcher-Thompson Co., Inc., Bridgeport, Conn.
D. R. Franklin, Toronto, Ont., Canada
John F. Jackson, New York, N. Y.
Mack & Sahm, Wilkes-Barre, Pa.
John Molitor, City Architect, Philadelphia, Pa.
New York Central Railroad Co., New York, N. Y.
John T. Rowland, Jr., Jersey City, N. J.
F. B. & A. Ware, New York, N. Y.
Warren & Wetmore, New York, N. Y.
F. W. Wentworth, Paterson, N. J.

INCORPORATED 1892

AMERICAN TRIPOLI COMPANY

SUBSIDIARY OF BARNSDALL CORPORATION

Barnsdall Admix for Concrete

1636 Arcade Building, ST. LOUIS, MO.

PLANT: SENECA, MO., U. S. A.
DEALERS AND STOCKS IN PRINCIPAL CITIES

Facilities

Electrified plant. Electric railroad to our mines. Large stock carried for immediate shipment. Capacity to serve the largest job promptly. Centrally located plant on main line of railroad. We have shipped internationally for thirty-eight years. Shipment made in 100-lb. bags, or in bulk.

Barnsdall Admix is extensively used throughout the United States and foreign countries by utilities, railroads, outstanding engineers, architects, and contractors, Federal, State, county, and municipal departments.

"BE SQUARE" PRODUCTS (Reg. U. S. Pat. Off.)

Technical Description

Barnsdall Admix is pure, finely ground, meta-colloidal tripoli silica (active silicon dioxide, 97½% SiO_2) to be mixed integrally with concrete. It is a low water-factor admixture. Microscopic examinations show the particles to be more or less rounded and each particle, however small, is porous, the pores being of submiscroscopic size. When used in concrete it mixes instantly, insures uniform mixing, clean discharge from mixer, and thoroughly lubricated concrete. It does not "ball up" in the mixer and requires no special mixing process—merely add it to other ingredients in hopper or mixer. When the cement or concrete sets, Barnsdall Admix enters into the chemical and physical reactions and becomes an integral part of the cement and concrete. It is insoluble and cannot be carried away by water or corrosive elements. Barnsdall Admix does not affect the time of setting.

Barnsdall Admix is a distinctive mineral, similar to hardened silica gel, and occurs only at Seneca, Missouri. It is mined, dried, ball-milled finer than cement, screened, air separated, and sacked. No chemicals or adulterants are added.

Advantages of Barnsdall Admix

Concentrated—Barnsdall Admix is one of the most concentrated admixture and waterproofing known. It contains no water, clay or other adulterants or impurities, which means a large saving in freight and increased efficiency on the job as less material is required, as proved by certified analysis appearing on this page.

Flowability—Flow tests in the laboratory and field show that Barnsdall Admix doubles the flowability of plain concrete and gives more flowability per pound of material than any other admixture. Barnsdall Admix is the only admixture which increases the flowability of concrete without the use of additional or excess water.

Uniformity—No Segregation—Explained above.

Watertightness, Durability, Permanence—Barnsdall Admix insures watertightness, durability and resistance to disintegration in two ways: (a) by making concrete physically resistant through increasing the density and watertightness, and reducing shrinkage cracks, and (b) by making concrete chemically resistant through enabling the use of less cement, and through adsorbing the free hydrated lime which is liberated by hydrolysis of the calcium silicates during the setting of cement.

Other Advantages

Barnsdall Admix prevents leakage of cement, reduces shrinkage and prevents disintegration, thereby insuring "constant volume" concrete. Efflorescence is decreased, and with proper workmanship, a smoother surface is obtained through the elimination of honeycombing and hair-checking. It causes better curing and greater strength. (List of several thousand strength tests sent on request.) Workmen prefer Barnsdall Admix because it contains no injurious chemicals or alkalis. Being pure silicon dioxide, it has no effect on other materials which may be used in or on cement and concrete. In storage, moisture has no effect on it, nor does its volume change when wet although it is easier to handle when dry. One ton occupies 34 cu. ft. (1¼ cu. yd.).

Service

Consult with us regarding your concrete problems. Send us the number of bags of cement in your job and we will send quotation with recommendation for your particular type of work.

References

Barnsdall Admix has been approved by the U. S. Bureau of Standards for use as a concrete admixture, by the U. S. Veterans' Bureau and other Government departments and has been successfully used on many Government jobs. Certified tests by all the well known laboratories sent upon request, along with list of users.

Barnsdall Admix insures permanently stronger concrete buildings of better appearance with lower maintenance costs.

PHYSICAL PROPERTIES OF BARNSDALL ADMIX	
Weight of powder..55 lb. per cu. ft.	
Neutral light buff color (has no effect on the color of concrete).	
True specific gravity..... 2.2	
Water absorption by weight. 50%	
(Neither shrinks nor swells when wet).	
Fusing point ..... 3300° F.	

AVERAGE SCREEN ANALYSIS (Cumulative)		
On	35-mesh.....	.01%
On	48-mesh.....	.12%
On	65-mesh.....	1.38%
On	100-mesh.....	4.37%
On	150-mesh.....	7.18%
On	200-mesh.....	9.67%
On	325-mesh.....	18.68%
Through	200-mesh.....	90.33%
Through	325-mesh.....	81.32%
*Through	500-mesh.....	80.75%
*Through	750-mesh.....	42.50%

*Last two percentages calculated from microscopical examination by the Pittsburgh Testing Laboratories on material passing through a 200-mesh screen.

General Specification

In all concrete there shall be used .... pounds of Barnsdall Admix per bag of cement (according to table shown below) in strict accordance with directions of the manufacturer, the AMERICAN TRIPOLI COMPANY, 1636 Arcade Building, St. Louis, Missouri, as follows: Empty the bags of Barnsdall Admix into a box adjacent to the mixer. Provide a measure holding correct amount for each mixer batch. For mixers larger than one bag capacity weigh the correct amount of Barnsdall Admix for one batch into a pail; punch a hole in side of pail at material line and thereafter use as a measure.

Stucco, mortar, plaster (finishing, topping, walls, floors, curbs and cement products); 3 lb. of Barnsdall Admix shall be used per bag of cement, mixing same as above.

Siliceous Admixture Specification

In all concrete there shall be used .... pounds, per bag of cement (according to table), of a siliceous admixture conforming to the following specifications:

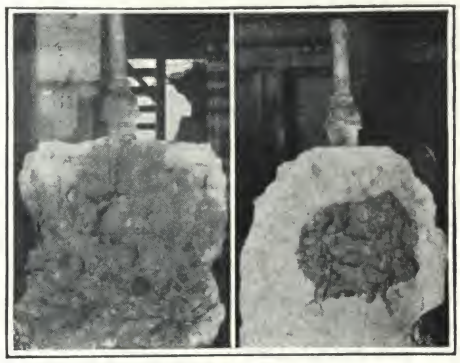
Pure active tripoli; not less than 95% silica (air dry basis), passing not less than 85% through a 200-mesh screen; weight not less than 40 lb. nor more than 70 lb. per cu. ft.; water absorption not less than 45% nor more than 55% by weight. It must pass the tolerances for impurities in portland cement (except insoluble residue) and sand as set forth in A. S. T. M. Serial Designation C9-26 under chemical properties and C40-27.

Portland cement intimately mixed with 3% by weight of the siliceous admixture shall pass all the chemical and physical requirements for portland cement (except insoluble residue) listed under chemical and physical properties in A. S. T. M. C9-26.

Efficiency of Barnsdall Admix has been increased by a new heat-treating process in our new plant.

CHEMICAL ANALYSIS
By Robert W. Hunt Co.
(Air Dry Basis)

Silica	97.40%
Alumina	.15%
Iron oxide	.35%
Lime	.15%
Magnesium	Trace
Ignition loss	1.00%



PERMEABILITY TEST

Plain concrete completely penetrated at 100 lbs. per sq. inch water pressure within 48 hours.

Concrete integrally waterproofed with Barnsdall Admix withstood 250 lb. per sq. in. water pressure for five days.

Both cylinders 1:2:4 mix. Water-cement ratio .8.
Pierce Testing Laboratories, Inc.

RECOMMENDED AVERAGE PROPORTIONS OF BARNSDALL ADMIX FOR VARIOUS MIXES

Mix	Barnsdall Admix per bag cement
1–1 –2	1 lb.
1–1½–3	2 lb.
1–2 –3	2 lb.
1–2½–3½	3 lb.
1–2 –4	3 lb.
1–2½–5	4 lb.
1–3 –5	4 lb.
1–3 –6	5 lb.

ESTABLISHED 1895

THE ANTIHYDRINE COMPANY

294 Kimberly Avenue

NEW HAVEN, CONN.

Product

Manufacturers of ANTIHYDRINE, a Coating for Dampproofing and Stainproofing.

Description

Antihydrine is a material made of a high grade of asphalt carefully prepared in combination with several chemicals, which combination gives it the peculiar property of *forming (without heating) a continuous glossy and impervious coating upon porous surfaces, without penetration.*

Antihydrine is the pioneer dampproof paint, having been first made in 1895. *There has been no subsequent change in formula.*

Advantageous Features

(1) Antihydrine eliminates the necessity of using lath and wood furring for interior plastering of outside walls, plastering being applied over the Antihydrine within 24 hours.

(2) Renders walls dampproof.

(3) Prevents staining of plastering on walls and on fireproof work; also, the following:

Applied to Inside of Outside Walls—(4) No furring needed—cost of and space occupied by furring are saved.

(5) Dangerous places to harbor vermin and encourage fires (when wood furring is used) are eliminated.

(6) Outside walls are made absolutely dampproof.

(7) Building is made warmer and more easily heated.

(8) All staining of and efflorescences on plastering are avoided.

Applied to Fireproof Blocks in Ceilings and Partitions—(9) All staining and efflorescence prevented.

(10) Plastering on blocks dries quickly, saving much time.

(11) All plastered surfaces permit diversified decoration without danger of damages from dampness.

(12) Discoloration of plastering from smoky brick is prevented.

Applied to Built-in Surfaces of Iron, Limestone, Marble, Face Brick, etc.—(13) All ironwork built in wall is preserved.

(14) Staining and efflorescence on exterior of limestone, marble and brick are prevented.

(15) Use of *ordinary* cement mortar in the backing is allowed, thus saving time and money otherwise spent in preparation of expensive cement mortar.

Application

After being well stirred, the Antihydrine contents are poured into a pail and any laborer can apply same *cold* with a brush. Material is fully prepared, ready for use, and is applied as easily as whitewash; *the coating, however, must be kept absolutely continuous, covering every part.* A second coat can be applied, if desirable, within a few hours after the first application.

Covering Capacity

Extensive, by reason of its lack of penetration. 1 gal. covers about 100 sq. ft. of brickwork or fireproofing, 1 coat; or, 60 sq. ft., 2 coats; 1 coat, properly applied, is sufficient for the prevention of dampness and stains.

Shipment

Antihydrine is delivered in casks of 10 and 50 gals.

Cost

The cost of Antihydrine is $1.25 per gal.

Specification Data

The brush shall be the kind used for oiling brick fronts; contents of barrel to be thoroughly stirred before application; every part to be covered, leaving no small holes, etc.; coating to be thin where it is to be plastered over, with sufficient body to leave a glossy surface; and the Antihydrine to be soft or "tacky" when plastering is applied.

First coat of plastering, as thin as will allow of proper scratching, will dry quickly; second coat is applied immediately thereafter; after drying, third and last coat of plastering is applied when, after a few days, surface will be ready for painting and decorating.

References

A few buildings in which Antihydrine was used:

New York, N. Y.

American Museum of Natural History
Delmonico Building
St. James Building
Manhattan Hotel
Skin and Cancer Hospital
Home for Aged Men and Married Couples
Journeay Building
Public School Buildings
New York Hospital
New Hall of Board of Education
Commercial Academy of Marest Bros.
Clara Hirsch Home for Working Girls

Other Cities

Lincoln Memorial, Washington, D. C.
St. John's Home for Boys, Brooklyn, N. Y.
Brazer Building, Boston, Mass., Cass Gilbert, Architect
Masonic Temple, Boston, Mass., Loring & Phipps, Architects
Residence, Beacon St., Boston, Mass., R. Clipston Sturgis, Architect
Hotel Dartmouth, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
St. Joseph's Novitiate, Boston, Mass., Maginnis, Walsh & Sullivan, Architects
Hotel Cambridge, Boston, Mass., W. T. Sears, Architect
Hall of Missions Church, Boston, Mass., T. J. Untersee, Architect

ANTI-HYDRO WATERPROOFING CO.

TELEPHONE
TERRACE 3-5440

295 Badger Avenue
NEWARK, N. J.

ESTABLISHED 1904

REPRESENTATIVES, SERVICE AND STOCK IN ALL LARGE CITIES

Products and Services

"ANTI-HYDRO PERMANENT," a Liquid Integral Compound for waterproofing, dampproofing, accelerating without weakening, and for hardening all portland cement mixtures.

ARMORTOP, a liquid applied Hardener and Dust Preventer for cement floor surfaces.

AMURSEAL, a black liquid dampproofing applied to exterior foundation walls and footings.

ARIDTITE, a black liquid dampproofing and bond coat for walls above grade.

ACCELLO, a water solution of commercially pure calcium chloride for refrigeration and for accelerating the set of concrete in cold weather, without freezing.

CONSULTING WATERPROOFING ENGINEERS, for consultation and design for all waterproof constructions. Correspondence invited.

25-Year Guarantee

On many important installations we have furnished a written guarantee for 25 years on the maintenance of waterproof concrete. A Surety Bond will be furnished on all waterproofing installations supervised by our Engineering Department. Written guarantee for 5 years furnished on dustproofing and hardening of concrete floors.

"Anti-Hydro" Concrete Integral Waterproofer and Hardener

Description — "Anti-Hydro" is a liquid compound, with an affinity for cement. When added, in certain percentage to the water used in gauging portland cement mixtures in the usual way, it has the effect, without retarding setting, of rendering cement in all kinds of masonry impervious to water, moisture, frost, gas, oils, odors, sugar solutions, alkalis and most acids. It excites and brings into service all the cohesive or colloidal possibilities of portland cements, which in themselves are most efficient waterproofing mediums. There are no alums, hydrate of lime, greases, oils, stearic acid or decomposable ingredients used; neither are there any iron admixtures—all of which disintegrate concrete in time.

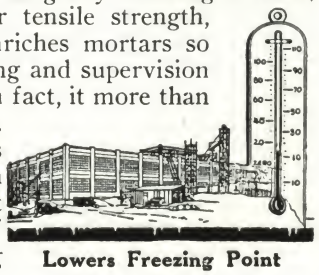
"ANTI-HYDRO" FOR PERMANENT CONCRETE HARDENS WATERPROOFS

TRADE-MARK



Hardens and Dustproofs Concrete Floors

"Anti-Hydro's" function may be expressed as waterproofing cement with cement; that is, filling the voids with a cement solution, which crystallizes at the same time as the cement, integrally forming a hard, insoluble silicate of greater tensile strength, density and activity. It enriches mortars so that cost of troweling, mixing and supervision is reduced to a minimum. In fact, it more than pays its cost in labor saving. It hardens wearing surfaces to a degree that makes them dustless and adamant. It lowers the freezing point of the gauging water, permitting concreting when the temperature is as low as 15° F.



Lowers Freezing Point

When mixed with portland cement "Anti-Hydro" forms a plastic mass which sets up very quickly and is used for calking metal passing through concrete, and for stopping leaks under pressure. Mixed with water and cement, it forms a dampproof paint which can be applied to the inside of masonry walls or to the back of limestone to prevent discoloration.

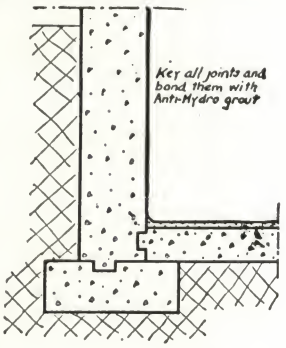


Dampproofs Brick Mortar and Prevent Efflorescence

"Anti-Hydro" is used for hardening cement floors, waterproofing concrete in mass and in surface coating, and bonding topping to underlying slab; dampproofing and waterproofing brick mortar and for preventing efflorescence; waterproofing, hardening and bonding concrete roads.

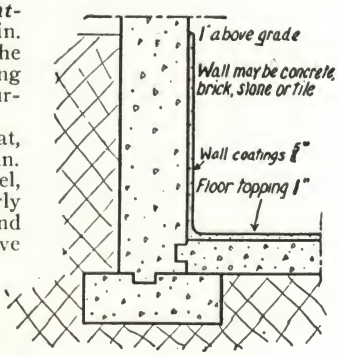
Approval—The superiority of "Anti-Hydro" for waterproofing and concrete hardening is demonstrated by the permanency of work completed since 1904, and by the comparative tests of the United States Bureau of Standards. Their Technologic Paper No. 3 designates "Anti-Hydro" as Compound No. 40, and states "It is the most impermeable of any of the mortars."

Specifications—***Waterproofing in Mass***—To the 1:2:4 mix, for gauging, add 1½ gal. of "Anti-Hydro" for every cubic yard of concrete. Proper consistency will be obtained if, for each bag of cement, 1 qt. of "Anti-Hydro" be added immediately after the water, and not over 5½ gal. of water be used per bag of cement. If forms are below water level, concrete should be poured stiff. Unless walls and floor are poured at one time, key all joints and bond them with "Anti-Hydro" grout. (See bonding directions below.)



Floor Hardener—The 1-in. floor topping of 1:2 mix shall be gauged by addition of "Anti-Hydro" to all water used in tempering dry mixture, using 1 gal. of "Anti-Hydro" to each barrel (4 bags) of cement. Proper consistency will be obtained if, for each bag of cement, 1 qt. of "Anti-Hydro" be added immediately after the water, and not over 3½ gal. of water be used per bag of cement. (See bonding directions below.)

Waterproofing in Coatings—Floor work shall be 1 in. in thickness, and shall serve the double purpose of waterproofing agent and dustless wearing surface.



Wall coatings (2-coat, scratch and finish) shall be ⅝ in. in thickness from floor level, where they shall be properly coved and bonded to floor, and carried up to at least 1 ft. above grade.

The 1:2 mortar shall be gauged by addition of "Anti-Hydro" to all water in proportion of 1 gal. "Anti-Hydro" to each barrel (4 bags) cement.

Perfect Bond—To assure perfect bond to underlying masonry, all surfaces, before application of waterproofing, shall be thoroughly roughened, cleaned, dampened and grouted.

Continued on next page

A slush or grout of neat cement, using 1 part "Anti-Hydro" to 3 parts of water, is first applied. Coatings shall be applied not later than 24 hours after surfaces have been prepared and while slush coat is still wet.

Note: Specifications for waterproofing *Brickwork, Cast Stone, Stucco on Solid Masonry* and *Stucco on Metal Lath and Dampproofing* furnished on request.

Acid Resisting—Write for special specifications.

Road Work—"Anti-Hydro" is especially suited for concrete pavements and roads. It makes concrete as hard in 24 hours as it would ordinarily be in 8 days and actually increases the strength of concrete 22%. Due to its quick hardening qualities, roads are made ready for use in 24 hours after they are laid by mixing 1 gal. of "Anti-Hydro" to 10 gal. of water.

"Anti-Hydro" can be used with any portland cement at a minimum cost.

For maintenance work, "Anti-Hydro" will bond new concrete securely to old.

"ANTI-HYDRO" QUANTITIES

Kind of work	Quantity Anti-Hydro per bbl. cement	Covering capacity
Waterproofing in mass 1:2:4 concrete	1 gal.	⅔ cu. yd. concrete
Waterproofing ½-in. plaster coat	1 gal.	100 to 125 sq. ft.
Waterproofing 1-in. floor topping	1 gal.	100 to 80 sq. ft.
Waterproofing stucco ⅞ in.	1 gal.	100 sq. ft.
Waterproofing brickwork ⅜-in. joint	1 gal.	700 brick or 35 cu. ft.
Dampproofing brickwork ⅜-in. joint	1 gal.	1000 brick or 50 cu. ft.
Dampproofing in cement wash	8 gal.	2400 sq. ft.—2 coats
Hardening cement floor 1-in. topping	1 gal.	100 to 80 sq. ft.

Armortop Concrete Applied Dustproofer and Hardener

ARMORTOP
THE APPLIED HARDENER FOR CONCRETE
TRADE-MARK

Description—Armortop is a liquid compound which, when applied to any concrete surface, old or new, changes the soft granular topping of the concrete into a granitelike mass that resists the most severe wear and abrasion without dusting up. The application of Armortop insures added years of wear and use for any cement floor whether it has just been laid or whether it has been in service for several years. It saves tearing up and relaying old floors which are beginning to rut.



So easily, quickly and surely does Armortop transform soft, crumbling, dusting floors into new, hard, dustproof ones, that the whole job can be performed in the evening after closing hours by any ordinary laborer. Next morning floors are ready for use without loss of time, costly shutdowns and delays to manufacturing.

No skill is required to apply Armortop. Simply mix it with water and brush it with a stiff brush or broom over the surface to be treated.

Armortop reacts chemically with cement and combines with it, forming a new compound which binds the loose, disintegrating particles of the concrete mix into a dense hard mass. Because of this reaction, Armortop results are permanent and should not be confused with temporary paint coatings.

The covering capacity of Armortop varies with the density of the floor. One gallon will cover from 70 to 150 sq. ft. of floor surface.

A concrete test slab treated with Armortop will be sent to any one desiring to make the comparative test.

Specifications—Upon the clean, dry floor apply a solution of 1 part Armortop and 1 part water in 2 or more coats, depending upon the density of the floor. Allow 4 hours to elapse between coats.

Amurseal Dampproofing

AMURSEAL
THE FOUNDATION DAMPPROOFING
TRADE-MARK

Amurseal, a black liquid dampproofing, may be applied cold with spray or brush to the exterior of foundation walls. Two coats give a solid elastic film, impenetrable to dampness, and unaffected by expansion or contraction of the walls.

Aridtite Dampproofing and Plaster Bond

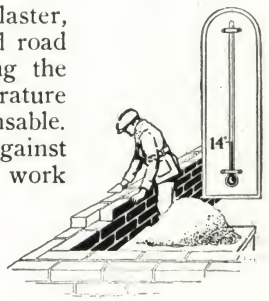
ARIDTITE
THE DAMPPROOF PLASTERBOND
TRADE-MARK

A black liquid dampproofing and plaster bond applied cold to the inside surface of exterior walls in a single coat. Aridtite provides a perfect bond for plaster and assures a lasting job. It prevents moisture passing through the walls and thus eliminates plaster stains and discolorations. Also used for coating unexposed sides of cut stone.

Accello Concrete Accelerator and Anti-Freeze

ACCELLO
For Accelerating the Set of Cement
TRADE-MARK

Description — Accello, a liquid solution, is used to accelerate the set of cement mortars and floor finish in very cold weather, and to make possible the hydration of portland cement mixtures at temperatures as low as 14° F.



In plain concrete, cement plaster, floor toppings, brick mortar, and road work, the use of Accello during the winter months, when the temperature falls as low as 14° F., is indispensable. It insures masonry work against frost and freezing, and permits work to continue during the cold weather.

Accello makes bricklaying and road work possible until the temperature drops below the point at which it pays to keep the men at work.

Accello is a standardized solution of calcium chloride, uniform in quality and strength. It is easy to use. Any unskilled workman can add it to the gauging water. The proportions necessary are shown below:

Proportions of Accello and Water at Outside Air Temperatures—

35° F., use 1 part Accello with 20 parts water
32° F., use 1 part Accello with 15 parts water
28° F., use 1 part Accello with 12 parts water
25° F. (or less), use 1 part Accello with 10 parts water
14° F. (or less), mechanical heat is necessary

Detailed Information

Write for complete data and specifications for any work within the scope of "Anti-Hydro" products. The services of our Engineers are available at all times.

Dealers Everywhere Carry Stock

A complete stock of "Anti-Hydro" products is carried by dealers throughout the country.

Shipment

"Anti-Hydro" is shipped in standard containers of 5, 10, 20 and 30 gal.

Armortop, in containers of 5, 30 and 50 gal.
Amurseal in drums of 5, 30 and 55 gal.
Aridtite in drums of 5, 30 and 55 gal.
Accello, in barrels of 50 gal. and 5 gal. drums.

THE ASPHALT PRODUCTS CO., INC.

Manufacturers of Bituminous Products

SYRACUSE, N. Y.

DISTRIBUTORS IN MANY CITIES OF THE UNITED STATES, REPRESENTATIVES IN ALL

Products

123 "Hydro Proof"—a permanent Waterproofing and Dampproofing Agent.

"Hydro Proof" Plaster Bond.

"Hydro Proof" Plastic—a Calking Compound.

No. 115 Plastic Cement.

"Silver-Seal"—an Aluminum Paint for interior and exterior use.

Hydro-Proof

123 "Hydro Proof"—A Permanent Waterproofing and Dampproofing Agent

For walls, floors, cisterns, pits, etc.

123 "Hydro Proof" is pure Mexican base asphalt atomized and held in suspension in a water vehicle without the use of oils, solvents or adulterants. Having the physical characteristics of water, it is carried by capillary attraction into every pore and void of the surface on which it is applied. It is odorless and tasteless, and expands and contracts without checking or cracking.

Superficial Method—Engineers and architects agree on the success of this method. It embraces the use of 123 "Hydro Proof" applied to the surface by brushing, mopping, or spraying. Its application on the outside of walls below ground level is desirable, and it will be found fully efficient for inside use except where high hydrostatic pressures exist.

Specification for Superficial Method—*For use on new or old walls where high hydrostatic pressure does not exist.*

The outside [inside] face of all foundation walls below grade level shall be treated with 123 "Hydro Proof" Waterproofing as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

Application—All surfaces shall be dry, free from dust, oil and grease to assure proper penetration. Thoroughly stir contents of container and reduce part for the bonding or priming coat with not more than 20% clean water by volume. "Hydro Proof" shall be applied at a temperature not lower than 50° F. with a clean brush or mop (free from oil and grease) or spray, covering approximately 80 sq. ft. per gal. After priming coat has set, apply a full strength coat (material as received thoroughly stirred).

Protection—The final coat shall be protected with a ½-in coating of cement mortar.

Note: Where this waterproofing has been applied on exposed masonry surfaces and black color is objectionable, use the following clause:

Finishing Coat—The final coat on all exposed walls shall be covered with a thin wash of portland cement and sand brushed on. After the finishing coat has set apply with a brush a coat of ..... stucco color.

Membrane Method—Here again, the superiority of 123 "Hydro Proof" is apparent, as it bonds perfectly without decreasing the crushing or tensile strength of the construction, and in addition to its water, acid and alkali resisting qualities has the necessary characteristics of strength and flexibility to bridge over hair cracks in the concrete due to defective workmanship or other causes.

The membrane is built as an inset in the concrete wall, floor, etc., and forms an indestructible waterproof skin, excluding all moisture. It is protected from abrasion by the concrete on both sides.

It has been found by experience that about ½ in. from the finished thickness on the water pressure side is the proper place to introduce the 123 "Hydro Proof" membrane. It does not allow penetration of sufficient moisture in the remaining concrete applied over the membrane to cause trouble from freezing, or the penetration of acids, alkalis, etc.

Specification for Membrane Method—*For use on new walls and floors where hydrastatic pressure exists.*

The outside face of all foundation walls, top of footings, and the surface of all concrete floors at least 4 in. below finished floor level shall be treated with 123 "Hydro Proof" Waterproofing as manufactured by The Asphalt Products Co., Inc., of Syracuse, N. Y.

Application—All surfaces shall be dry, free from dust, oil and grease, to assure proper penetration. Thoroughly stir contents of container and reduce part for the first coat with not more than 20% of clean water by volume. "Hydro Proof" shall be applied at a temperature not lower than 50° F., brushing it thoroughly on the unfinished concrete (the brush shall be free from oil and grease). When set, flow on a heavy second coat (full strength), using 2½ to 3 gal. per 100 sq. ft.

Protection—The final coat on all vertical surfaces shall be protected with at least ½-in. coating of cement mortar [.... in. of concrete].

The final coat on all floors shall be protected with .... in. of concrete including a 1-in. finished surface.

Note: Not less than 4 in. of concrete should ever be used where hydrostatic pressure exists. Mass concrete should be sufficient in weight to withstand the pressure, or where less concrete is desired, the concrete slab between waterproofing membrane and finished floor must be reinforced.

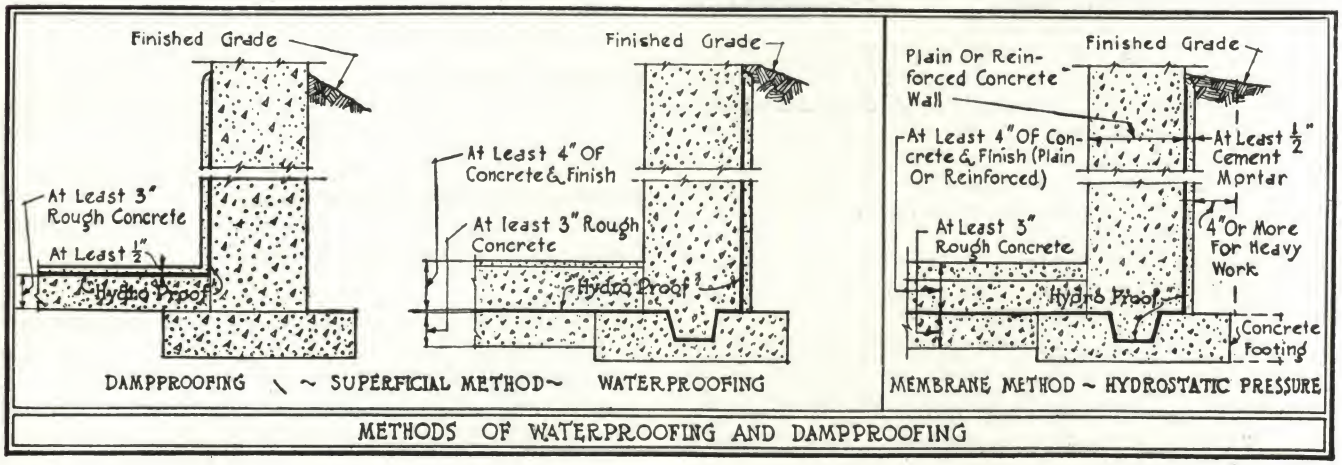
"Hydro Proof" Plaster Bond

For bonding plaster or stucco to concrete, brick, tile, gypsum, etc.

This permanent waterproofing agent being atomized pure Mexican base asphalt, suspended in a water vehicle without the use of solvents, oils or adulterants, has the physical characteristic of being absorbed by capillary attraction into any porous wall construction over which it is applied, permanently sealing same against dampness and moisture which would otherwise penetrate and stain the interior finish.

"Hydro Proof" Plaster Bond eliminates the necessity of furring or lathing except on ceilings.

Used on woodwork to be set against new masonry or construction subject to moisture, it will prevent rotting, cracking



METHODS OF WATERPROOFING AND DAMPPROOFING

Continued on next page

or warping. Remains elastic—expanding or contracting under all atmospheric variations.

Specification for Plaster Bond—*For use on old or new interior or exterior masonry walls and ceilings.*

General—All interior and exterior surfaces (specify surface) shall be given 2 coats of "Hydro Proof" Plaster Bond as manufactured by THE ASPHALT PRODUCTS CO., INC., of Syracuse, N. Y.

Preparation of Surface—Surfaces shall be dry, and free from all loose and foreign materials. Where paint, oil, grease, etc. are present, a suitable cleaner shall be used, the surface flushed with clean water and permitted to dry.

Application—"Hydro Proof" Plaster Bond shall be applied in 2 coats with a new, clean, wide brush or suitable spray.

If brush is used, the first coat shall be diluted with 20% clean water, by volume; the second and final coat undiluted and as received in container.

If sprayer is used, "Hydro Proof" Plaster Bond shall be diluted to the consistency required by spray nozzle. Only sprayer suitable for heavy paints or asphalts shall be used.

"Hydro Proof" shall be brushed or sprayed in a continuous coat over all surfaces of walls, working it well into all corners and joints; also on walls where partitions and floor slabs will abut the exterior walls. When this is not feasible, it shall be carried out from the exterior walls for a distance not less than 12 in. on such intersecting partitions and floor slabs.

Note: *The following provision shall be included by the Architect in his specification for Plastering Work.*

Plaster or stucco shall be applied directly over "Hydro Proof" Plaster Bond after the latter has thoroughly set, which will be indicated by its being slightly tacky to the touch, but which will not adhere to the fingers.

"Hydro Proof" Plastic—A Glazing and Calking Compound

For glazing, calking, airproofing, soundproofing, waterproofing, dampproofing, etc.

A compound of pure Mexican base asphalt suspended in water and processed without the use of oils, solvents or saponifying agents. *It is not a coal tar product.* When applied, it contracts and expands under all climatic conditions without checking, cracking or peeling. It is fire-safe, odorless and tasteless.

To this asphalt base is added pure Canadian asbestos. It is automatically machine mixed, guaranteeing a uniform product.

Glazing—"Hydro Proof" Plastic is a permanent and economical glazing compound. Used the same as putty, it may be spread with a putty knife or our automatic gun. Does not check, crack or peel and is unaffected by the elements as it contains no oils or solvents to oxidize.

"Hydro Proof" Plastic seals the glass to the frame, making it impervious to moisture, snow, rain, air, acids, alkalis, chemical or noxious gases. For greenhouses it is the most satisfactory glazing compound as it stays in place, never cracks or peels off from the vibration of the greenhouses during heavy winds, and it keeps the building watertight.

Calking—"Hydro Proof" Plastic, applied with our automatic gun or with a putty knife will permanently fill and seal all cracks and crevices around windows and doors, as well as seams in metal roofing or siding, cracks in masonry, etc.

Specifications for "Hydro Proof" Plastic as a Glazing Compound—All wood [metal] sash throughout the building shall be glazed with "Hydro Proof" Plastic as manufactured by THE ASPHALT PRODUCTS CO., INC., of Syracuse, N. Y.

Application—"Hydro Proof" Plastic shall be applied with a putty knife or an automatic gun and smoothed the same as putty.

Specifications for "Hydro Proof" Plastic As a Calking Compound—All wood window and door frames shall be calked with "Hydro Proof" Plastic as manufactured by THE ASPHALT PRODUCTS CO., INC., of Syracuse, N. Y.

Application—All exterior staff beads or exterior moulds shall be removed and space between wood frames and masonry [metal] jambs, heads and sills shall be raked out and cleaned, then calked tightly with oakum leaving a recess at least ½ in. deep; this recess shall be filled and calked with "Hydro Proof" Plastic applied with a putty knife or an automatic gun. Smooth with putty knife.

No. 115 Plastic Cement

An adhesive cement for attaching acoustical board, ceramic and other wall and floor tile, blackboard, etc., to any base.

No. 115 Plastic Cement is a combination of blended natural asphalt with an indestructible filler. It contains nothing to create disintegration through age and has maximum adhesive and cohesive characteristics. Will hold tile to walls or ceilings without permitting any sag. Has a comparatively short setting period and will withstand all temperature changes without cracking or peeling.

Specifications—All surfaces on which No. 115 Plastic Cement is to be used must be free from all loose dust, foreign material, grease, etc.

Application—While tile-setters usually have their own method of applying cement, we recommend the "Spot" or "Strip" method, the former for an acoustical board and light weight tile, and the latter for heavy tile or blackboard installations.

"Spot" Method—Spot small gob of cement ½ or ¾ in. from each corner of tile, press firmly in place which will cause cement to spread and to adhere firmly.

"Strip" Method—Apply a strip of cement approximately 1 x 1½ in. around edge of board or tile and press firmly in place.

Note: *Where wall or ceiling surface is irregular, No. 115 Plastic Cement can be used for leveling.*

Apply with trowel and permit to stand 24 hours before placing tile.

"Silver-Seal" Aluminum Paint for Exterior and Interior Work

"Silver-Seal" vehicle is a specially processed bituminous base liquid resistant to moisture and corrosion, with maximum penetration into all porous bases. When dry it is practically insoluble and infusible, withstanding acid and other corrosive fumes and temperatures as high as 800° to 1000° F. without discoloration or breaking down. Further, when thoroughly set, solvents, which in contact with other paints usually disintegrate them, have no effect whatever on "Silver-Seal."

The U. S. Forest Products Laboratory gives a rating of 98% plus moisture resistant efficiency to pitch paint plus aluminum powder, this being the highest rate obtainable. "Silver-Seal" having the same bituminous base takes the highest rank as a preservative paint.

Some Classes of Work on Which "Silver-Seal" Has Been Successfully Used—For protection of structural steel of buildings, bridges and tanks. For masonry work, as on concrete cinder and brick walls. For sheet metal work, such as on metal leaders, gutters and decorative cornices.

As a Priming Coat—"Silver-Seal" insures lasting beauty of the finish coat, regardless of its decorative color, because it seals the pores against moisture.

Exceptinally Opaque—"Silver-Seal" is opaque and prevents the bleeding through of stains. One coat accomplishes the same degree of hiding that would require several coats of white lead paint.

Protection Against Fumes—Applied over decorative work, such as cornices, etc., or metal leaders and gutters on buildings adjacent to chemical plants, it is the highest protection obtainable against acid fumes.

High Light and Heat Reflectivity—As an interior coating it brightens the darkest corners, is restful to the eye, reduces eyestrain, thus increasing plant efficiency.

On cold storage plants, refrigerator units, dairies, creameries, etc., it materially assists in maintaining the normal or interior operating temperature desired.

For Exterior Work—"Silver-Seal" applied over bridges, tanks, structural steel, etc., effectively prevents rust from forming under ordinary conditions, because of its resistance to light and moisture.

Non-poisonous—"Silver-Seal" can be used with perfect safety for painting rooms where food is prepared and handled.

Sanitary and Washable—Can be washed repeatedly. Ideal for the interior surfaces of hospitals for infectious diseases. It does not encourage nor form bacteria breeding places.

Easily Applied with Brush or Spray Gun—"Silver-Seal" operates and works well under brush and may be brushed out into a thin coat. Easily applied with a spray gun and this is usually the best method for use on rough surfaces, such as concrete, cinder block and brick walls.

Specifications for "Silver-Seal"—*Application*—All surfaces shall be clean and dry and free from loose and foreign material. Each coat of paint shall be allowed to dry for 24 hours before a second coat is applied. In applying, "Silver-Seal" with a brush care shall be taken that all of the final strokes are made in the same direction in order that the particles of powder may "leaf" uniformly in the paint film.

Number of Coats—For priming new wood exterior exposure, 1 coat. Used alone on exterior surface, 2 coats. Interior application, 1 coat. To secure greatest brilliancy "Silver-Seal" shall be mixed on the job and only enough for one day's work shall be mixed at one time.

Shipments—"Silver-Seal" is shipped in dual steel containers holding sufficient aluminum powder and vehicle for 5 gal.

Samples of Products

Samples of products manufactured by the ASPHALT PRODUCTS COMPANY, INC., sent free to architects and contractors.

AQUABAR WATERPROOFING PRODUCTS

Waterproofings, Dampproofings, Floor Hardeners, Technical Paints and Steel Coatings—"Known the World Over"

GENERAL OFFICES
Perry Building
PHILADELPHIA, PA.
Representatives in all Principal Cities—Nearest Distributer's name furnished on request

Products

- Aquabar Integral Compound No. 1, Waterproofing Paste.
- Aquabar Aquatite Integral Liquid Waterproofing.
- Aquabar Concentrated Integral Waterproofing 1A.
- Aquabar Concentrated Integral Waterproofing Powder.
- Aquabar Clear-Coat No. 2, Colorless Waterproofing Liquid.
- Aquabar Statite Plaster Bond No. 3 Dampproofing Paint.
- Aquabar Marine Cement No. 3A.
- Aquabar Stone Backing No. 3B.
- Aquabar Mastic Insulite Cement No. 4.
- Aquabar Iron-Clad Crystals No. 7B Floor Hardener.
- Aquabar Duro-Mix Integral Liquid Floor Hardener.
- Aquabar Crysteel Metallic Floor Hardener No. 7.
- Aquabar Quick Set Cement Accelerator and Anti-Freeze Compound.
- Aquabar Wood Floor Preservative.
- Aquabar Conco Cement Floor Paint.
- Aquabar Elasticote No. 6 Waterproof Paint.
- Aquabar Marine Waterproof Paint.
- Aquabar Roof Coating No. 5.
- Aquabar Sterilite Flat Wal-Finish.
- Aquabar Wal-Wite Enamel (Mill White).
- Aquabar Fabricators Red Oxide and Carbonite Steel Coating (Structural Steel Coatings).
- Aquabar Aquatex Caulking Compound.

Twenty-nine Years of Quality and Service—1901-1930

For the past 29 years we have specialized in the manufacture of waterproofing and damproofing materials, floor hardeners and protective coatings of all kinds.

As pioneers in solving the most difficult waterproofing problems, Aquabar has proven to be a most economical and efficient waterproofing compound. It is used extensively in the construction of swimming pools, reservoirs, vaults, foundations, tunnels and all other kinds of masonry construction.

Detailed architects' specifications and information on any of our products will be furnished upon request, without any obligation on your part.

Integral Waterproofing

No. 1 Integral Compound—A soft semipaste which is easily dissolved in water for waterproofing mass concrete, cement plaster, cement mortar for brick and stone work, stucco, etc. It does not affect the strength of concrete, but increases its effectiveness with age.

Specifications for Waterproofing Mass Concrete—A dry mixture of cement, sand and stone—1:2:4 mix, shall be tempered to a medium wet consistency with water, to which 1 part of Aquabar Integral Compound No. 1 has been added to every 50 parts of water, in strict accordance with manufacturer's directions.

Machine Mix—Figuring on ½-gal. basis add ⅔ pt. to each bag of cement for mass concrete 1:2:4 mix.

Covering Capacity—From ½ to ⅔ gal. will waterproof 1 cu. yd. of mass concrete 1:2:4 mix.

Specifications for Waterproofing Cement Mortar and Stucco—The waterproofed cement mortar, consisting of 1 part cement, 2 parts sand with water, shall be prepared by tempering to required consistency, to which 1 part of Aquabar Integral Compound No. 1 has been added to every 25 parts water, in strict accordance with manufacturer's directions.

Covering Capacity—1 gal. will waterproof approximately 150 to 175 sq. ft. 1-in. top coat 1:2 mixture cement mortar, or, approximately, 200 to 250 sq. ft. of cement stucco 1 in. thick.

Aquatite Integral Liquid Waterproofing—A liquid compound for waterproofing and accelerating mass concrete and cement mortars.

Specifications for Waterproofing Mass Concrete—To the 1:2:4 mixture for gauging add 1 gal. of Aquatite for every cubic yard of concrete. Proper consistency will be obtained if for each barrel of cement 1 gal. of Aquatite and from 10 to 15 gal. of water be used. If forms are below water level, an extremely stiff mixture should be poured.

Machine Mix—Figuring on 1-gal. basis add ⅔ qt. to each bag of cement for mass concrete 1:2:4 mix.

Covering Capacity—Use 1 gal. to every cu. yd. mass concrete 1:2:4 mix for ordinary moisture conditions. Where water pressure exists, use 1½ gal. per cu. yd.



Hotel Breakers, Palm Beach, Fla.

After exhaustive tests Aquabar Clear-Coat No. 2 Colorless Waterproofing Liquid was selected to waterproof exterior walls of entire structure against hurricane, driving rains, high winds, etc.

Applied by Metal Products Co. of Miami, Fla., Inc.

Continued on next page

Specifications for Waterproofing Cement Mortars—The 1:2 mortar shall be gauged by the addition of Aquatite to all water used in the proportion of 1 gal. of Aquatite to each barrel (4 bags) of cement.

Covering Capacity—1 gal. will waterproof 100 sq. ft. 1-in. top coat 1:2 mix cement mortar.

Aquabar Concentrated Integral Waterproofing

Concentrated Integral Waterproofing 1A—A paste form of waterproofing for use in concrete and cement mixtures of all kinds. Especially adapted for use in colored stucco, mortar, etc.

Covering Capacity—Use 7 lb. per cubic yard of concrete 1:2:4 mix, or 8 lb. to every 100 sq. ft. 1 in. top coat 1:2 mix.

Aquabar Concentrated Integral Waterproofing Powder—A powder form waterproofing for use in mass concrete, cement mortar, stucco, etc.

Covering Capacity—Use 12 lbs. per cu. yd. mass concrete 1:2:4 mix, or 2 lbs. to each bag of cement for mortar, stucco, etc.

Colorless Waterproofing—Clear-Coat No. 2

A colorless, transparent liquid for waterproofing and dampproofing outside walls (above grade) of brick, stone, concrete cement, terra cotta, stucco, etc. Clear-Coat No. 2 does not discolor surfaces to which it is applied. Penetrates readily, filling all pores, rendering the surface impervious to moisture and driving rains.

If required, we will submit estimates for furnishing and applying by spray.

Covering Capacity—Approximately, 125 sq. ft., 1 coat; 80 sq. ft. per gal., 2 coats, depending upon porosity.

Dampproofing

Statite Plaster Bond No. 3—A black compound for application to masonry surfaces of all kinds, so as to form a dampproofing and bond for plaster. It eliminates furring and lathing.

Covering Capacity—Approximately, 75 sq. ft. per gal., 1 coat; 50 sq. ft. per gal., 2 coats.

Marine Cement No. 3A—A black compound of heavy consistency for dampproofing exterior foundation walls below grade, also for application to floor slabs of ground floors. Applied cold.

Covering Capacity—Approximately, 60 sq. ft. per gal., 1 coat; 40 sq. ft., 2 coats.

Stone Backing No. 3B—A black compound for dampproofing unexposed surfaces of cut stone and for rustproofing metal surfaces. It is applied just as it comes from the container.

Covering Capacity—Approximately, 125 sq. ft. per gal., 1 coat; 75 sq. ft., 2 coats.

Mastic Insulite Cement No. 4—A black mastic for waterproofing foundation walls, tunnels, etc., against heavy water pressure; for overcoating, calking and patching old roofs; sealing cracks, open joints, etc. Applied cold (with trowel) 1/8 to 3/16 in. thick according to the smoothness of the surface. When set, it has the consistency of hard rubber, never gets brittle and is unaffected by changes in temperature. Very elastic and adhesive; works freely.

Covering Capacity—Approximately, 25 to 30 sq. ft. per gal., 1 trowel coat.

Emulsified Asphalt

Aquabar Emulsified Asphalt and Binder, to be used without heating when mixed with aggregates for repairing cement floors, roads, bonding cement top coat to floor slabs, etc.

Floor Hardeners

Iron-Clad Crystals No. 7B (Surface Treatment)—These crystals are dissolved in water, and applied to the concrete surface with a stiff brush or broom in 2 coats of equal strength for wearproofing, waterproofing and dustproofing of same.

Covering Capacity—Approximately, 2½ lb. will treat 100 sq. ft. of surface with 2 coats.

Duro-Mix Liquid Floor Hardener (Integral Method)—This liquid is added to the water used in mixing the cement top coat for wearproofing, waterproofing and dustproofing cement floors.

Covering Capacity—1 gal. will harden, approximately, 100 sq. ft. of 1-in. top coat, 1:2 mixture cement mortar.

Crysteel Metallic Hardener No. 7—Metallic particles that are mixed with the cement used for top coating. It forms a metallic crust that will withstand most severe traffic. Designed for factories, warehouses, etc.

Covering Capacity—Approximately, 30 lb. mixed with 30 lb. portland cement will treat 100 sq. ft. of surface dust coat.

Quick Set Anti-freeze and Accelerator

This liquid is added to the water used in mixing mass concrete, cement mortar, etc., for accelerating the set so as to prevent freezing. Causes a rapid evaporation of the water and speeds the final set permitting work to continue in temperatures as low as 20° F.

Floor Coatings

Wood Floor Preservative—A translucent liquid for preserving and dustproofing maple and yellow pine floors, without changing the appearance of the surface. It prevents rotting and decay, and adds to the wood those essential elements of preserving its life and appearance.

Covering Capacity—Approximately, 250 sq. ft. per gal. for 1 coat; 350 sq. ft. per gal. for 2 coats, depending upon the porosity.



Hotel Whitehall, Palm Beach, Fla.

Entire exterior stucco walls of building colored and waterproofed with Aquabar Clear Coat No. 2 Colorless Waterproofing Liquid.

Applied by Metal Products Co. of Miami, Fla., Inc.

Conco Cement Floor Paint—For coating cement floors above or below grade. It prevents dusting and disintegration of floors; is extremely durable, and resists wear to a remarkable degree.

Covering Capacity—Approximately, 250 sq. ft. per gal. for 1 coat; 150 sq. ft. per gal. for 2 coats.

Aquabar Cement Floor Finish—A penetrating liquid which, binding together the aggregate, produces a smooth, hard and dustproof amberlike surface. Excellent primer for paint.

Continued on next page

Paints

Elasticote No. 6 Waterproof Paint—A highly specialized liquid cement coating for waterproofing and dampproofing exterior and interior concrete, brick, cement, stucco, plaster and masonry walls. Gives a handsome appearance and offers excellent wearing qualities. Made in various colors. Applied with brush or spray.

Covering Capacity—Approximately, 150 sq. ft. per gal. for 1 coat; 100 sq. ft. for 2 coats.

Marine Waterproof Paint—A decorative and protective coating for application to interior surfaces, swimming pools and surfaces immersed in water. It covers well and adheres firmly. Made in various colors.

Covering Capacity—Approximately, 150 sq. ft. per gal. for 1 coat; 100 sq. ft. per gal. for 2 coats.

Roof Coating No. 5—A pure Trinidad asphaltum product having remarkable adhesive and saturating properties for overcoating and waterproofing roofs of every description. Restores life and waterproofing properties to any roof which has been exhausted by exposure to the sun. It is applied cold with a brush.

Covering Capacity — Approximately, 100 sq. ft. per gal. for 1 coat.

Sterilite Flat Wal-Finish—A high grade washable paint for finishing interior plastered surfaces.

Wal-Wite Enamel and Undercoating (Mill White)—A high grade mill white possessing high light reflecting qualities.

Particularly useful for application to walls, ceilings and columns for daylighting interiors. It retains its whiteness and can be repeatedly washed without injuring it. Will not turn yellow.

Aquabar Sanitary Enamel—For interiors of hospitals, sanitariums and similar institutions where a washable durable coating is required. Will not turn yellow.

Fabricators Red Oxide, Carbonite Steel Coating (Structural Steel Coating)—A paint made of the best rust inhibitors or moisture excluders known. For the protection of structural steel. Resists electrolysis to the maximum degree.

Aquabar Acidproof Paint—A quick drying asphalt which leaves a hard glossy finish. Can be applied to metal, wood or concrete. Protects woodwork and metal against corrosive gases and acid fumes.

Aquabar Ready Mixed House Paint—A high grade product that will give a durable and lasting finish. Made in all colors.

Aquabar Everbright Cement Colors—These colors are of high grade and are unaffected by chemical reactions. Will permanently color cement for floors and mortar coloring. Made in all colors.

Aquabar Barn Paint—High grade, especially prepared for rough or smooth surfaces on wood or metal. Made in all colors.

Aquabar Hot Surface Paint—Black elastic paint for interior use on stacks, boiler fronts, pipes, etc. Will not peel or blister.



Pennsylvania R. R. Office Building, Philadelphia, Pa.
GRAHAM, ANDERSON, PROBST & WHITE, Architects
JAS. STEWART CO., Contractors
Over one-half million square feet floors integrally hardened and dustproofed with Duro-Mix

Shingle Stains

Aquabar Shingle Stain, a durable stain for wood surfaces. Prevents dry rot and keeps away all insects. Penetrates deeply. Made in all colors.

Varnishes

Also varnishes for all purposes.



Market Street National Bank Building, Philadelphia, Pa.
RITTER & SHAY, Architects
WM. STEEL & SONS, Contractors
Entire foundations waterproofed with Aquatite Integral Liquid Waterproofing

Aquabar Boiler Compound

A high grade product that will give desired results by preventing and correcting rust and scale formations in boilers.

Hot Self-sealing Foundation Asphalt

A specially prepared asphalt compound in solid form which must be heated and then applied with a mop.

Used for membrane or subgrade waterproofing.

Specialties

We furnish and apply dampproof coatings and colorless waterproofing, furnishing guarantee with same.

Aquabar Aquatex Calking Compound

A plastic material that is composed of weatherproof, waterproof and elastic bonding oils and gums, for the calking of window and door frames, pointing masonry and terra cotta joints and flashings of all kinds.

Made in green, gray, red, maroon, black and natural.

ESTABLISHED 1879

THE BILLINGS-CHAPIN CO.

Manufacturers of Paints, Varnishes, Stains, Enamels, Lacquers, Damp-proof and Rust Preventive Coatings and Technical Products

MAIN OFFICE AND FACTORIES
East 40th Street and N. Y. C. R. R.
CLEVELAND, OHIO

NEW YORK BRANCH, 438 Pearl Street

BOSTON BRANCH, 146 High Street

Products

For over half a century, this company has manufactured paints and varnishes of the better kind, selling to discriminating users who are more interested in lowest per annum upkeep cost than initial outlay on a cost per gallon basis.

DRIWAL—CLEAR, WHITE and COLORS.
U. S. DECK PAINT.
U. S. MARINE WHITE and TINTS.
U. S. MARINE GREENS.
ARTONE FLAT WALL FINISH.
DECOLAC—VARNISHES, STAINS, ENAMELS.
DECOLITE—MILL WHITE.
FOUR-HOUR ENAMELS, STAINS, VARNISHES.
BILCHACO CEMENT FLOOR COATING.
RUSTNAUGHT—ANTI-RUST PAINT.

Driwal TRADE-MARK

Driwal — Damp-proofing, Stainproofing

A damp-proofing and decorative coating for concrete, stone, plaster, stucco, brick, etc., supplied in black, white, colors and clear. Applied by brush or spray it not only penetrates and lines the pores with an insoluble material but the colored Driwal provides the soft rich tones which bring out rather than obscure the artistic texture of the surfaces to which it is applied.

Driwal is recommended only where a clean, reasonably porous surface affords good penetration, and best results are secured where the Driwal is so applied as to secure this penetration.

It is such surfaces that are most likely to absorb moisture and dirt.



The illustrations show a stainproofing test made by The Sargent Cut Stone Co., Topeka, Kan.

Portland cement was used to set the Indiana limestone and brick back-up in these two sections of wall. Both were drenched daily with water to secure maximum conditions favorable to stone staining.

Two months later, these photographs were taken. Upper section, badly stained, had not been treated with Driwal. Lower section, treated with Driwal on all six sides of the blocks, spotless as when first set up

Driwal Clear

A colorless liquid which has a very important use, not only for excluding moisture, but especially for preventing stains and discoloration which from various causes mar the beauty of many otherwise imposing structures. Driwal Clear is a safe material to use on the lightest colored, finest texture quarry products. It does not contain any wax or other material that would darken or discolor the stone. Keeps stone in its natural condition.

Specification Suggestions for Driwal Clear—For any application, surface should be dry, clean and free from all loose particles.

Two good saturating applications should be given, allowing the first to dry overnight before the second is applied.

Where stainproofing of cut stone is provided for before erection, all surfaces except the outside face should be given one saturating coat of Driwal Clear, preferably applied with a flat brush. The exposed surfaces should not be treated until after erection and the building has been cleaned and tuck pointed and allowed to dry. The face of the building should then be given one or two coats (optional) of Driwal Clear, the second not to be applied until at least one day after the first coat.

Where old surfaces are to be stainproofed, additional provision must be made for cleaning prior to the Driwal application — scrubbing with sharp sand, clear water and a fibre brush, or sandblasting or steam cleaning. In such cases special stress should be laid on the necessity that surfaces be allowed to dry out thoroughly before Driwal is applied. On old work, one application is frequently sufficient.

Driwal White and Colors

For damp-proofing and tinting exterior or interior walls and decorating any ornamental work, stone or concrete, where reasonable penetration of the natural surface can be had.

Driwal Black

Supplied in three consistencies for below grade waterproofing.

Further Information

Color cards and complete specifications covering any of our products will gladly be furnished on request. We point with particular pride both to the character of many of the institutions we are serving and to the long, continuous use of our materials over periods of many years by an ever increasing number of large and discriminating buyers.

BUILDING CHEMICALS CORPORATION

"Chemicals for Building Construction"

51 East 42nd Street, NEW YORK, N. Y.

REPRESENTATIVES AND DEALERS IN PRINCIPAL CITIES

Products

WATERPROOFINGS and DAMPPROOFINGS for concrete and masonry (Integral and Surface Treatments); CONCRETE FLOOR HARDENERS and SPECIAL FLOOR TREATMENTS.

Service—Advisory, Research and Contract

(1) Sales engineers and dealers located at important points.

(2) A laboratory equipped to analyze unusual problems of concrete and masonry construction.

(3) A service organization trained to supervise or contract for the application of B.C.C. Products.

(4) We service all jobs where our materials are used.

Quality of Materials

All our materials are made to conform with the Specifications and Recommendations of the Department of Commerce, Bureau of Standards, Washington, D. C., in-so-far as the data is available.

Specifications and Catalogue

For complete information and detailed specifications write for our publication "Chemicals for Building Construction."

References

Architects

Cross & Cross
Hirons & Mellor
McKim, Mead & White
John Russell Pope
James Gamble Rogers
Shreve & Lamb
Warren & Wetmore

Contractors

The Austin Company
James Baird Company
Marc Eidlitz & Son, Inc.
Walter Kidde Constructors, Inc.
Sperry & Treat Company
Starrett Brothers, Incorporated
Turner Construction Company

Jobs

Sterling Memorial Library—Yale University
Columbia Presbyterian Hospital, New York, N. Y.
Empire State Building, New York, N. Y.
Chanin Building, New York, N. Y.
Adelphi College, Garden City, N. Y.
Municipal Building, Hastings, N. Y.
New York Central, Erie, and Lehigh Valley Railroads

MATERIALS AND DIRECTIONS FOR USE

Oil Waterproofing

A specially prepared oil compound guaranteed to waterproof mortar and prevent efflorescence. It is made up in accordance with the best practice as set down by the U. S. Bureau of Standards and the Department of Agriculture.

Directions—Mix dry mortar ingredients with water to the desired consistency. Then add 2 qts. of B.C.C. Oil Waterproofing for each bag of portland cement and allow the mixer to turn over until the oil is completely assimilated and the color of the mix is uniform.

BriXope Concentrated

A combination of stainless oils, prepared to remove efflorescence when used as a cleaning down agent on brickwork. It prevents further leeching out of efflorescence and acts as a dampproofing and brick preservative. *All work is performed in one hanging of the scaffold.*



Directions—Prepare a solution of 1 part BriXope Concentrated to 4 parts water, stirring until thoroughly mixed. Rub down the brickwork with a dry fibre brush. Then scrub over each spot twice with the BriXope solution.

Note: Muriatic acid may be used sparingly to remove refractory mortar stains, but should be washed off immediately with a 1:3 BriXope solution.

Crystal Hardener

A cement floor after-treatment—a double crystalline fluosilicate compound which, when dissolved in water, forms a solution that reacts on the free calcium in the cement topping to form calcium fluoride, thus providing a hard, flintlike surface which wears smooth and glossy under foot.

Directions—This material is usually applied by our own service organization under a standard specification. It is also sold for application with clear directions for use on each container.

Hard-n-tyte Surface Hardener

This cement floor hardener, manufactured by the General Chemical Company, can be supplied from our stock.

Color Coatings

Where a decorative finish is required, specify B.C.C. Color Coatings in the desired color. These coatings seal the pores and eliminate concrete dusting, guard the floor surface against traffic and wear, and give a high gloss finish, easily maintained.

Liquid Integral Waterproofing

A chemical solution for use in waterproofing concrete and masonry—to be incorporated in concrete below grade, cement finish and brick mortar. It is the most simple and economical method. B.C.C. Liquid Integral Waterproofing is an all-season waterproofing—indispensable for winter work. It pays for itself in increased plasticity and labor saving.

Directions—For waterproofing concrete, cement finish or mortar, add to the gauging water, or directly to the mixer, 1 qt. of B.C.C. Liquid Integral Waterproofing for each bag of portland cement used in the mix.

Integral Hardener

A compound added to the mixing water to more quickly develop the full hardness and strength of cement finish. It densifies the mass and makes the entire surface more resistant to abrasion.

Directions—For hardening and densifying cement finish, gauge with the mixing water 1 qt. of B.C.C. Integral Hardener for each bag of portland cement used in the mix.

Colorless Dampproofing Liquid

A clear, colorless dampproofing compound for exterior concrete, stone trim, light-faced brick, terra cotta, etc. It is of decided advantage on new masonry surfaces and on old masonry surfaces where preliminary steps were not employed to prevent moisture from entering the wall.

Directions—Spray or brush on the surface as much B.C.C. Colorless Dampproofing Liquid as it will absorb. When the solution fails to penetrate, further application is unnecessary.

Metallic Floor Dressing

A 20-40 mesh iron, oil-free—prepared for troweling into the surface of concrete or cement floors during construction.

CAFFALL-CORNMAN CORPORATION

Waterproofing and Dampproofing Engineers and Contractors
"Caffall's Scientific Process"

TELEPHONE
BARclay 4543

9-15 Park Place
NEW YORK, N. Y.

Services

WATERPROOFING and DAMPPROOFING ENGINEERS and CONTRACTORS, specializing in "CAFFALL'S SCIENTIFIC PROCESS" of PRESERVING, WATERPROOFING and CLEANING all kinds of buildings above grade.

"Caffall's Scientific Process" of Preservation

This process is the standard method of permanently preserving all masonry exposed to the weather, and is recognized as such by government, state and city authorities as well as by the scientists.

The process consists in applying a special preparation of paraffin and chemicals to the exterior walls of marble, granite, brick, terra cotta, stucco, and masonry of all kinds, either old or new. All stone is porous. Moisture penetrates it, especially when accompanied by strong winds. In communities where there is much smoke from factories, etc., carbon soot settles upon the surface and is carried into the pores by the rain. The union of this soot and moisture gives a sulphuric acid solution which quickly causes stone to crumble. Lime salts and frost also cause quick disintegration and are very damaging, especially when moisture is present.

The compound employed in this process is invisible, insoluble and imperishable. It penetrates the material to which it is applied to a depth of ¼ in. or more, depending upon the porosity of the stone, but it is possible to impregnate a brick through its entire thickness. It completely fills all pores or voids, forming an impenetrable barrier to water or moisture and preventing all disintegration.

The preservative used is unaffected by acid and alkali solutions, gases and moisture, and is highly resistent to oxidation. One treatment will last as long as the surface to which it is applied.

"Caffall's Scientific Process" is not an experiment. It has stood the test of time and has an enviable record for durability. Structures treated with it over 50 years ago are still waterproof and in good condition.

Many public buildings of historic interest, as well as churches, monuments, commercial buildings and many private residences have been successfully treated by this process, some of which are:

The Obelisk in Central Park, New York, N. Y.
Fraunces Tavern, Broad Street, New York, N. Y.
The new American Wing of the Metropolitan Museum, New York, N. Y.
Trinity Church, New York, N. Y.
Alexander Hamilton Monument, New York, N. Y.
Christ Church Cathedral, Hartford, Conn.
Buckingham Memorial Fountain, Chicago, Ill.
Residence, I. N. P. Stokes, Greenwich, Conn.
Residence, Carll Tucker, Mt. Kisco, N. Y.
Hotchkiss School, Lakeville, Conn.
Residence, Mrs. Morgan-Hamilton, Sterlington, N. Y.
Hotel Savoy-Plaza, New York, N. Y.

Important Waterproofing Suggestions

There are certain vulnerable parts of the gable walls of buildings, which, if protected against the weather, will go far to insure a dry building. These are the parapet walls. If the average wall is examined, it will be found that the top of the parapet wall is the first part of the masonry to show signs of disintegration and wasting away of mortar joints. If the following specifications are used, the penetration of dampness will be eliminated. North and east exposures are always subject to dampness, but the commencement of the trouble is generally at the top of the building.

Specification Suggestions as Alternate Bid

When "Caffall's Scientific Process" is specified, the furring of walls is unnecessary from the standpoint of weather penetration, and no other form of waterproofing is required. This, with our guarantee, assures the architect and owner of a dry building over a long period of years.

Suggestion No. 1—All exterior walls above grade shall be treated with "Caffall's Scientific Process" for preserving and waterproofing, as applied by CAFFALL-CORNMAN CORPORATION, 9-15 Park Place, New York, N. Y.

Suggestion No. 2—Brickwork of penthouses, bulkheads, side, rear and fire walls topped with stone, tile or terra cotta from roof flashline over and including the coping, down to the lintel level of the top story windows shall be treated with "Caffall's Scientific Process" for preserving and waterproofing as applied by CAFFALL-CORNMAN CORPORATION, 9-15 Park Place, New York, N. Y.

Suggestion No. 3—Brick or stone work of chimneys above roof flashing shall be treated with "Caffall's Scientific Process" for preserving and waterproofing as applied by CAFFALL-CORNMAN CORPORATION, 9-15 Park Place, New York, N. Y.

Guaranteed Results

We guarantee that the masonry (stonework, brick or terra cotta) treated by us with "Caffall's Scientific Process" will not discolor, disintegrate, chip, break, crumble or allow the penetration of moisture or water for a period of twenty (20) years from date of treatment; or should any of the aforesaid defects occur during that period, we will treat same where necessary without charge.

References

New York, N. Y.

H. deB. Parsons, Consulting Engineer
Cass Gilbert, Architect
Grosvenor Atterbury, Architect
Walker & Gillette, Architects
Bowen Bancroft Smith, Architect
I. N. Phelps Stokes, Architect
Geo. B. Post & Sons, Architects
Alfred Busselle, Architect
Richard C. Hollyday & Co., Inc., Real Estate
Julius Gregory, Architect
McKim, Mead & White, Architects
C. P. Jennewein, Sculptor
Geo. A. Fuller Co., Building Construction

Other Cities

Bennett, Parsons & Frost, Architects, Chicago, Ill.
Whiton & McMahon, Architects, Hartford, Conn.
Brown & Von Beren, Architects, New Haven, Conn.
Hacker & Hacker, Architects, Fort Lee, N. J.
John P. Koch, Architect, Rocky Mount, N. C.

THE PHILIP CAREY COMPANY

Manufacturers of Waterproofing and Dampproofing Materials

LOCKLAND, CINCINNATI, OHIO

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

FACTORIES: LOCKLAND, OHIO, AND PLYMOUTH MEETING, PA.

For other Carey Products, see Manufacturers' Index

Carey PRODUCTS

TRADE-MARK
Registered

Carey Waterproofing Specifications

Designed for application over concrete, brick or other hard surfaces.

Waterproofing to be protected with a course of masonry or earth backfill.

General Application Instructions

Preparation of Surface—The surface to be waterproofed must be prepared by others and shall be dry, smooth and free from tie wires and debris of all kinds. It shall be swept clean and be free from dust or laitence before waterproofing is started.

Working Conditions—All form lumber, timbers or other obstruction must be cleaned away by others, leaving plenty of room and free accessibility to the surfaces to be waterproofed before work is started. Working space shall be at least four feet in width.

Note: All work shall be so regulated that at the close of each day's work all felts laid shall have received the final mopping of asphalt.

Protection courses on vertical surfaces shall be applied by others not later than eighteen hours after waterproofing is applied. The application of the waterproofing felts shall be started at the low point of the surface so that the flow of water will be over the felt laps.

Above Ground Application—If this specification is to be used for application above ground, No. 114 asphalt shall be substituted in place of No. 113 asphalt, in all instances.

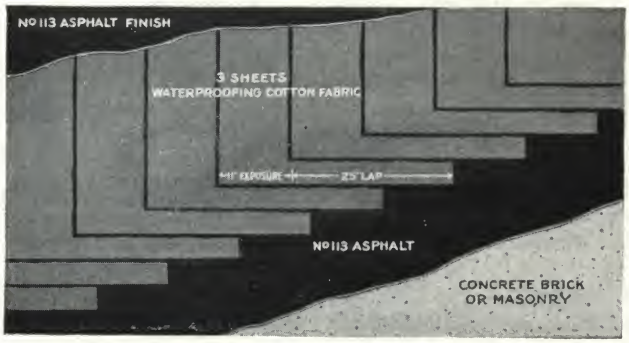
Application Over Flat or Horizontal Surfaces—If this specification is to be used for application over flat or horizontal surfaces, the asphalt specified in this specification for each mopping shall be reduced approximately 10 lb. per mopping.

Omission of Protection Course—If protection course of masonry or earth backfill is to be omitted, surface to be waterproofed shall first be primed with one coat of Carey Asphalt Primer applied cold, after which the waterproofing specification shall be applied in the usual manner except that No. 114 asphalt shall be substituted for No. 113 asphalt, in all instances. On vertical surfaces waterproofing sheets should either extend over the top of the wall to provide additional anchorage for the waterproofing membrane or be secured to the wall with nails driven through flat tin caps into wood nailing strips near top of the wall. If the nailing method or any other system of anchorage is used which perforates the membrane, two additional sheets shall be mopped over the top of all areas where nails or other securing devices have been used.

Fabric Waterproofing Specification No. 13-WP

Application — The surface to be waterproofed shall be mopped with Carey No. 113 Waterproofing Asphalt into which, while hot, shall be laid three layers of Carey Standard Waterproofed Cotton Fabric, 36 in. wide, cementing solid between the sheets with hot asphalt, each sheet to overlap the previous sheet 25 in., leaving 11 in. exposed.

The entire surface of the fabric shall be mopped with a top or finished coating of No. 113 Waterproofing Asphalt.



Approximate Weight Completing Materials per Square—

	Lb.
(a) Carey Waterproofing Asphalt.	45
(b) Carey Standard Waterproofed Cotton Fabric	9
(c) Carey Waterproofing Asphalt.	35
(d) Carey Standard Waterproofed Cotton Fabric	9
(e) Carey Waterproofing Asphalt.	35
(f) Carey Standard Waterproofed Cotton Fabric	9
(g) Carey Waterproofing Asphalt.	35

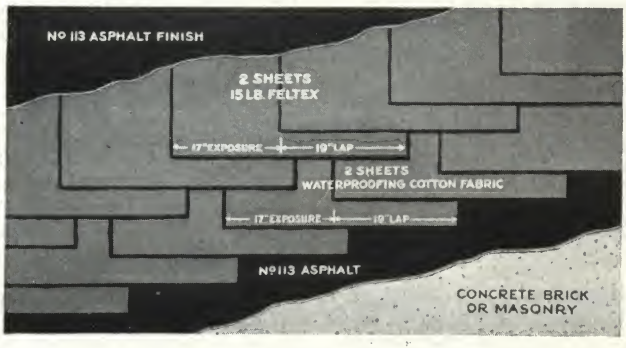
Feltex Waterproofing Specification No. 43-WP

This waterproofing specification is identical to Specification No. 13-WP shown above except that three plies of 15-lb. Feltex (asphalt saturated felt) are used in building up the membrane in place of the waterproofed cotton fabric shown above.

Application—Lappings of sheets and moppings of waterproofing asphalt remain the same.

Fabric and Feltex Waterproofing Specification No. 12-42-WP

Application — The surface to be waterproofed shall be mopped with Carey No. 113 Waterproofing Asphalt into which, while hot, shall be laid two layers of Carey Standard Waterproofed Cotton Fabric, 36 in. wide, lapping same 19 in., leaving 17 in. exposed, cemented solid between the sheets with hot asphalt, over the top of which shall be laid in a mopping of hot asphalt two plies of 15-lb. Waterproofing Felt, 36 in. wide, lapping same 19 in., leaving 17 in. exposed, cemented solid between sheets so that at no point shall felt touch felt.



The entire surface of the felt shall be mopped with a top or finished coating of No. 113 Waterproofing Asphalt.

Approximate Weight Completing Materials per Square—

	Lb.
(a) Carey Waterproofing Asphalt.	45
(b) Carey Standard Waterproofed Cotton Fabric	9
(c) Carey Waterproofing Asphalt.	35
(d) Carey Standard Waterproofed Cotton Fabric	9
(e) Carey Waterproofing Asphalt.	35
(f) Carey Waterproofed Felt	15
(g) Carey Waterproofing Asphalt.	35
(h) Carey Waterproofing Felt	15
(i) Carey Waterproofing Asphalt.	35

CENTRAL IRONITE WATERPROOFING COMPANY

Contractors for Waterproofing and Concrete Restoration

111 West Washington Street
CHICAGO, ILL.

MILWAUKEE OFFICE: 456 Broadway

"Ironite"

A very finely divided powder made from gray cast iron. This powder is treated chemically and physically to produce the necessary waterproofing qualities through the rapid oxidation and development of the iron particles.

IRONITE
Reg. U. S. Pat. Off.
Waterproofing — Flooring

"Ironite" is the trade-mark adopted and used by the Ironite Company, Chicago, Illinois, to designate its manufactured product and is registered in the United States Patent Office.

Certain unscrupulous manufacturers and contractors have been known to offer their material under the name "Ironite" to obtain advantage of the enviable reputation acquired by genuine "Ironite" over a period of many years of successful application.

Application

"Ironite" is applied in a series of brush coats to the inner surface of walls and the upper surface of rough floors or subfloor slabs. It will resist and withstand any hydrostatic pressure that the wall or floor slab is capable of withstanding.

Uses

Waterproofing—"Ironite" is used for the waterproofing of basement and subbasement walls and floors in all types of buildings; pits, tanks, swimming pools, tunnels, subways, water reservoirs, bridge decks, dams and retaining walls.

Other Than Waterproofing—"Ironite" is used to protect concrete against water, frost action, and disintegration, in grain elevators, stadia, buildings, walls and other above-earth structures. "Ironite" is used in Imhoff tanks, tunnels and other portions of sewage works to protect against the action of sewage and gases. It is also used to protect bridges, smokestacks and other structures against the action of smoke and fumes. It is used to oilprooof storage tanks and greaseproof vats and floors. It has also been successfully used to protect acid and alkali tanks.

"Ironite" is resistant to most acids and alkalis, molasses, oils, greases, gasoline and many other commercial products encountered in tanneries, paper mills, soap factories, packing houses, dairies, etc.

The protective purposes for which "Ironite" waterproofing is applied to concrete and brick are too numerous to detail here. If you have a difficult problem in protection or disintegration of concrete, submit it to our experts. No doubt we have successfully overcome similar conditions.

Finish

"Ironite" when applied to a concrete surface discolors it but may be followed with a finish coat, which leaves the surface in the natural gray portland cement or white cement finish, as desired.

On swimming pools or like areas that are to receive tile or plaster, the surface is left with a rough bonding coat ready to receive an additional scratch coat or tile finish.

A surface treated with "Ironite" leaves an excellent base to receive paint as it precludes any free lime or moisture action from within.

Reliability

"Ironite" has been in successful use for more than twenty years throughout the United States and foreign countries. We maintain a force of trained and experienced mechanics and contract to do all work under written guarantee.

Reminders

Have you provided continuous accessible interior waterproofing?

Have you designed and reinforced your subbasement floors and walls to withstand a possible maximum water pressure?

Are your basement floor slabs keyed into the walls and columns?

Have you properly designed your boiler pits and flues to allow room for sufficient insulation over the waterproofing? (This condition is most important.)

Have you insured against unusual conditions in the surrounding areas—a broken water main or sewer?

Have you specified that all waterproofing be completed before partitions, pipes, machinery or other obstructions are placed?

Have you provided for necessary expansion and proper construction joints?

General Specifications

The inner surface of all enclosing walls and floor slabs, in contact with the earth, all pits, trenches, columns and wall footings, together with such other surfaces as may be hereinafter mentioned or indicated upon drawings, shall be waterproofed with "Ironite" by the "Ironite" method and applied by the CENTRAL IRONITE WATERPROOFING COMPANY, 111 W. Washington St., Chicago, Illinois.

All the above work to be guaranteed by them to be waterproof and watertight according to terms of their regular contract.

The above specification is a general one covering only the simplest needs. We prefer, however, to write a separate specification for each specific job. This service is free to you and without obligation on your part.

Concrete Restoration

We are thoroughly experienced and equipped to rebuild, restore, protect and preserve dams, grain elevators, docks, stadia, abutments, bridges, buildings and reservoirs.

Submit your difficult problems to our experts.

CERESIT WATERPROOFING CORPORATION

Waterproofings, Dampproofings, Floor Hardeners, Protective Coatings

512 South Canal Street, CHICAGO, ILL.

Products

CERESIT WATERPROOFINGS (Integral).
CERESIT METALLIC WATERPROOFING.
CRESOLAC TRANSPARENT WATERPROOFING.
CERESIT METALLIC HARDENER.
INDURITE LIQUID HARDENER.
CERÓX COLORED CEMENT.
CERETONE CEMENT COLORING PIGMENT.
LUXSTAR WATERPROOF CEMENT COATING.
CERESIT DAMPPROOFING and PLASTER BOND.
CERESIT CAULKING COMPOUND.

Service

Over twenty years' experience in the manufacture of waterproofings and allied products enables us to supply any required technical service. Descriptive literature sent on request.

Ceresit Waterproofing Compound

Description—Ceresit Waterproofing Compound waterproofs, densifies and lubricates concrete and other cement mixtures. It performs three important functions:

(1) Insures positive and permanent waterproofness.

(2) Produces a "fatty" mix, thus increasing workability. It makes concrete flow more easily through chutes and forms and around reinforcing.

(3) Permits a noticeable reduction in the water content, which adds to the strength and produces concrete of greater density.

Ceresit Waterproofing Compound is a plastic paste, a small proportion of which is added to each batch at the time the cement, sand, stone and water are placed in the mixer drum.

Requirements—***Mass Concrete***—Use 8 lb. per cu. yd. of concrete in the proportions of 1 part Ceresit Compound to 24-36 parts water. 1 pt. of Ceresit weighs 1 lb.

Cement Topping—Mortar—Stucco—Use 8 lb. per 100 sq. ft., 1 in. thick in the proportions of 1 part Ceresit to 18 parts water.

Ceresit Waterproofing Powder

Description—Ceresit Waterproofing is put up in powder form to make it more adaptable to certain classes of work.

For dry mixes, such as used in making concrete products, this powder provides a practical and permanent means of effective waterproofing. Thorough mixing of the powder and portland cement is essential.

Requirements—2 lb. per sack (94 lb.) of portland cement.

Ceresit Waterproofing Liquid

Description—Ceresit Waterproofing Liquid is mixed with the tempering water.

Ceresit Liquid contains the same basic materials as Ceresit Compound. Add the liquid to the tempering water in the mixer.

When mixing by hand simply add the liquid to the water.

Requirements—1 gal. per cu. yd. of concrete or approximately ⅔ qt. per sack (94 lb.) of portland cement.

Ceresit Metallic Waterproofing

Description—A finely pulverized iron compound used for waterproofing by what is known as the iron method.

Ceresit Metallic Waterproofing provides an economical and thoroughly practical method of waterproofing basements, pits, and similar work. It is equally applicable to new and old structures.

Application—***Surface Preparation***—Clean surface with stiff wire brush. Cut out cracks and breaks sufficiently to permit patching. Remove all soft or "honeycomb" concrete. Flush surface with water to absorbent capacity, just before waterproofing application.

Preparation of Waterproofing—Mix Ceresit Metallic Waterproofing with sufficient water to make a thick paint. In mixing, add water slowly, stirring actively until of proper consistency.

First Coat—Apply above mixture to the wet surface with stucco brush, working material into all cracks and openings. After two or three hours, when surface turns red, sprinkle with water and sprinkle frequently.

Second Coat—Apply about 24 hours later in same manner. Before second coat fill all cracks and openings with a stiff mortar of 1 part Metallic Waterproofing, 2 parts sand, and 4 parts cement. Trowel smooth and even.

Third Coat—After 24 hours apply third or finish coat. For this coat mix—dry—20 lb. Metallic Waterproofing, 1 sack cement and 50 lb. sand. Add water to make a very thick paint. Apply this mixture to surface, putting on as much as will adhere. When sufficiently set, sprinkle and keep wet for at least 48 hours.

Floor Treatment—Roughen surface and apply one heavy coating of Metallic Waterproofing, mixed with water to heavy paint consistency, using about 25 lb. waterproofing per 100 sq. ft. Fill all cracks at juncture of floor and walls. When this coating is dry, apply cement topping with cove where floor and wall meet.

Cresolac Transparent Waterproofing

Description—Porous and moisture absorbent surfaces can be permanently waterproofed with Cresolac Transparent Waterproofing without changing the surface color or appearance. Applied with spray or brush.

Cresolac effectively seals and waterproofs brick, stone, stucco, plaster, concrete and masonry surfaces. It protects against staining, frost checking, and untimely disintegration due to extreme temperature changes.

Building exteriors treated with Cresolac are protected for all time against driving rains. Every rain washes and cleans the surface.

Cresolac contains no wax or paraffin, but fills and seals the surface pores with an insoluble water-repellent agent which leaves no evidence of its presence.

Cresolac is not recommended for application upon any surface which has been previously painted.

Requirements—***Brush Coating***—Cresolac is applied in two coats, 24 hours apart.

Spray Coating—One thorough application is sufficient when Cresolac is applied with a spray. Complete saturation of the entire surface is essential.

The covering capacity depends upon the porosity of the material to be treated. One gallon of Cresolac will cover approximately 100 sq. ft. for two brush coats or one spray coat.

Ceresit Metallic Hardener

Description—Ceresit Metallic Hardener is a pulverized iron compound. The incorporation of this material in the topping of concrete floors produces a hard, dense, wear-resistant and dustproof surface.

This material is entirely free from oil, grease, and other impurities. When combined with a cement topping

Continued on next page

the iron particles interlock, binding together with the portland cement. When set the topping becomes extremely dense and flint-hard. A floor surface of this kind will not dust or granulate.

Ceresit Metallic Hardener is a product of modern manufacturing methods. The pulverizing process produces jagged particles of iron. This material is machine screened so as to give proper grading, from coarse to fine. The use of a metallic aggregate of this character as a hardener for concrete floors has become current practice. No other material has so thoroughly demonstrated its fitness for producing a floor which will withstand heavy traffic.

Ceresit Metallic Hardener is made in two colors—Gray and Red. It is shipped in 100-lb. bags.

Application—The most approved method and the method in greatest general use is the dust-coat application. The recommended quantity is 30 lb. of Ceresit Metallic Hardener per 100 sq. ft. of surface. For extra heavy duty floors use 40 lb. per 100 sq. ft.

Place the cement topping in the customary manner. Thoroughly mix—dry—equal parts of Ceresit Metallic Hardener and portland cement. When the topping is partially set and floated to an even and true surface, dust over same 60 lb. of the above mixture per 100 sq. ft. of surface. Float in and trowel. Give this surface a second troweling at the proper time to secure a smooth and even finish. Protect the floor surface with wet sand or sawdust for several days.

Indurite Liquid Hardener

Description—A liquid chemical compound, to be used as a surface application for hardening and dustproofing old or new concrete floors. The hardening effect of Indurite is that of chemical reaction and neutralization. The chemical solution penetrates the topping and acts on the free lime in the cement. The result is that of permanently case hardening the concrete surface.

Requirements—100 sq. ft. per gal. for two coats.

Cerox Colored Cement

Description—Cerox is a ready-mixed cement made in various colors to be used wherever a colored cement surface is required. It is a combination of imported oxide colors, Ceresit Waterproofing Compound and portland cement, accurately proportioned, reground and machine mixed.

Cerox insures permanent and attractive cement finishes. Recommended for the topping of concrete floors, walks, drives, swimming pools, porches, stucco, and cement work of every description, outdoors or indoors. Airmarking concrete highways and runways is a new and practical use for Cerox. Chrome yellow Cerox markings are permanent and easily visible from above. Cerox directional lines and letters have sharpness of outline and distinct legibility. It comes to the user ready proportioned, which saves time and labor, and insures uniformity of color in the finished work. For dry mixes, Cerox gives unusually fine results. If kept dry it will not deteriorate with age.

The colors used in Cerox are selected particularly for cement work, insuring attractive and non-fading floor surfaces and stucco finishes. Cerox contains all materials for concrete floor topping or stucco finish with the exception of the necessary sand.

Requirements—Used in the same manner as portland cement requiring the following:

¾ in., 228 lb. per 100 sq. ft.
½ in., 152 lb. per 100 sq. ft.
¼ in., 76 lb. per 100 sq. ft.

Shipped in 50-lb. bags.

Ceretone Cement Coloring Pigment

Description—Ceretone is a coloring compound in paste form to be dissolved in the mixing water. Its greatest use is for coloring concrete floors. It produces an attractive floor surface of uniform and permanent color, extremely hard, wear-resisting, dustproof, and waterproof. By using Ceretone, colored concrete floor work can be finished in remarkably fast time. Its quick-setting properties make early use of the floor possible and a finished floor is secured which has permanency of colors, is waterproof, durable and dustproof.

Ceretone is made of pure oxide colors of the highest grade obtainable. It readily dissolves in the mixing water and is added to the batch in this form. Its use insures uniformity of color difficult to obtain when dry colors are used.

Requirements—Quantities of Ceretone Coloring Pigment required per sack of portland cement:

Red	12 lb.	Brown	12 lb.
Buff	15 lb.	Black	12 lb.
		Green	15 lb.

Luxstar Waterproof Cement Coating

Description—This decorative coating is an economical and effective treatment for concrete, stucco, plaster, brick, cement block, stone and similar surfaces. It is excellent for basement walls and ceilings.

Luxstar is a waterproof paint pigment in powder form. Mixed with water, it is applied like ordinary paint with brush or spray. Its base is portland cement, which is reground and machine mixed with colors and other ingredients. Luxstar provides a waterproof paint film which will retain its color and will not peel, crack or check. Made in white, cream, light gray, stone gray, buff, red, brown and green.

Requirements—***Covering Capacity***—10 lb. of Luxstar with water makes a gallon of finished paint which covers 250 sq. ft. for single coat work, and 150 sq. ft. for two-coat work.

Application—***Paint Preparation***—Mix 10 lb. Luxstar pigment with 3 qt. of water. Add the water to the paint powder slowly, making first a paste, then adding water gradually until of proper consistency. Stir thoroughly, breaking down all lumps, and stir frequently while using to prevent settling. Do not mix more than will be used within two or three hours as it will begin to harden. Clean brushes and buckets at the end of the day's work.

Surface Preparation—Clean surface carefully and saturate with water just before paint application, as Luxstar must be applied over damp surface. *First Brush Coat*—While surface is wet apply a generous coat, covering entire area thoroughly. Allow to dry completely. *Second Brush Coat*—Wet surface again and apply in same manner.

Spray Work—Mix Luxstar powder with less amount of water to produce a slightly heavier paint. Screen twice and pour into tank. For most work one spray coat is sufficient.

Ceresit Dampproofing

Description—A heavy asphaltic paint for dampproofing foundation walls and substructure work.

Made from high grade asphalt combined with preservative elements which assure a protective coating that will not disintegrate and peel off.

Requirements—60-75 sq. ft. per gal. for one coat, 40-50 sq. ft. per gal. for two coats.

Ceresit Plaster Bond

Description—A dampproofing and bonding asphaltic compound for application on the inside surfaces of outer or exposed walls before application of plaster. Its use prevents dampness from injuring plaster and interior decorations.

Requirements—60-75 sq. ft. per gal. for one coat, 40-50 sq. ft. per gal. for two coats.

Ceresit Caulking Compound

Description—Ceresit Caulking Compound is a plastic, puttylike material adapted for every class of caulking, glazing, and pointing work. It remains pliable and elastic and is not affected by temperature changes.

COLORLESS DAMPPROOFING, INC.

Dampproofing Engineers and Contractors

OFFICES

BIRMINGHAM, ALA., 3415 27th Avenue, North
BOSTON, MASS., 82 West Dedham Street
BUFFALO, N. Y., 316 Jackson Building
NEWARK, N. J., Military Park Building
NEW YORK, N. Y., 342 Madison Avenue
PITTSBURGH, PA., 901 B. F. Jones Law Building
RICHMOND, VA., 503 American National Bank Building
TAMPA, FLA., 511 Wallace S. Building

WESTERN'S REPELLANT

A Colorless Outside Dampproofing

Service and Experience

We apply Western's Repellant under guarantee to masonry walls above ground to prevent the penetration of rain or dampness without in any way changing the natural architectural appearance as to color, texture or form. The adoption of Western's Repellant by us was the result of years of careful study and experiment.

Both the manufacture and application of Western's Repellant are under our control—we do not sell the material and it is applied only by our own trained and experienced forces. The success of our method is evidenced in the many jobs executed during the past 12 to 15 years.

Material

Western's Repellant is an emulsion composed of non-soluble chemicals held in suspension in water. These chemicals have the property of neutralizing capillary attraction. *No weather conditions can affect these chemicals or reduce their efficiency.*

Penetrates Surface

It is applied with a spray gun which drives the Repellant into the masonry. The capillarity of the wall draws the emulsion in more deeply and the evaporation of the water content from the emulsion leaves only the non-soluble chemicals inside the surface.

Colorless

Our company name is derived from this important feature. Before application, the material has a milky hue which disappears completely with absorption. After application, it is not possible to discern from surface appearance whether or not the masonry has been treated.

Surface Textures Unchanged

Western's Repellant does not fill the pores—instead it is absorbed beyond the surface leaving the pores open as before treatment, but neutralizing capillary action back of the surface pores. By leaving the pores open no change is made in the texture of the surface.

If limestone, cast stone or other light colored surfaces are treated when erected, they will remain clean, as the chemicals in Western's Repellant allow no penetration of dirt into the pores and rains keep the surfaces washed.

For All Types of Masonry—New or Old

We can treat brick, stone, cast stone, terra cotta, concrete, stucco or any other porous or slightly porous masonry, regardless of age. If not porous, the masonry is watertight, except at the mortar joints which we tighten under our guarantee.

Economy

In preventing rain and atmospheric dampness getting beyond the surface of building walls, cost of periodic repairs to damaged wall plaster, paint and interior decorations caused by rain or moisture is eliminated.



St. Mary's Church, Stamford, Conn.
O'Connell & Shaw, Architects

Specifications

For New Buildings—All exposed exterior masonry surfaces above ground level shall be treated with Western's Repellant as applied by Colorless Dampproofing, Inc. (give address of nearest office). Application to be made by spray under air pressure. Window and door frames to be caulked tight with Western's Special Caulking Cement. All exposed joints on horizontal top surfaces in stone, cast stone, marble and terra cotta, shall be left raked out by the mason to a depth of at least one-half inch and shall be pointed by Colorless Dampproofing, Inc.

This work to carry the regular 5-year guarantee of Colorless Dampproofing, Inc., as to watertightness, except for causes beyond their control.

For Old Buildings—Consult us.

Installations

Churches
Church of the Holy Cross, Holyoke, Mass.
Synagogue, Congregation Kehillath Israel, Brookline, Mass.

Telephone Buildings
New York Telephone Co., Utica, N. Y.
New York Telephone Co., Poughkeepsie, N. Y.
Southern New England Telephone Co., Bridgeport, Conn.

Colleges
Braker Hall, Tufts College, Medford, Mass.
La Salle Academy, Providence, R. I.

Bank Buildings
Markle Bank & Trust Co., Hazleton, Pa.
Berkshire Loan & Trust Co., Pittsfield, Mass.
Putnam Trust Co., Greenwich, Conn.

School Buildings
High School, Hazleton, Pa.
High School, Attleboro, Mass.

Store and Office Buildings
Lindsay, Morgan Co., Savannah, Ga.
Alabama Power Co., Birmingham, Ala.
Borden Building, Goldsboro, N. C.

Residences
J. B. Duke, Newport, R. I.

Institutions
Italian Children's Home, Boston, Mass.
St. Mary's Convent, No. Attleboro, Mass.

Factory Buildings
Public Service Corp., New Jersey (24 substations)
Duplan Silk Co., Hazleton, Pa.
Gillette Safety Razor Co., Boston, Mass. (3 buildings)

CONCRETE MATERIALS CORPORATION

Manufacturers of Concrete Specialties

OFFICE AND FACTORY
318-320 West Austin Avenue
CHICAGO, ILL.

Products

CONCRETE SPECIALTIES as follows:
Metallic Hardener
Iron Waterproofing
Liquid Hardener
Integral Waterproofing Powder
Transparent Waterproofing
Repair Cement
Floor Resurfacer
Colored Pigment
Colored Cement
Integral Liquid Hardener and Waterproofing
Concrete Coating

Also Comco Plaster Bond, Dampproofing and Stone Backing.

"The Best by Test"

Comco No. 1 Metallic Hardener

Gray integral metallic hardener, incorporated in the topping. For heavy duty floors in warehouses, shops, platforms, runways, etc.

Specify 25 to 40 lb. per 100 sq. ft., depending on the duty required of the floor, and placed according to manufacturer's directions.

Also in red and other colors for decorative floors.

Comco No. 2 Iron Waterproofing

Chemically prepared metallic waterproofing for waterproofing concrete, brick or stone walls and floors after completion of construction; below water level basements, pits, etc., under pressure; and for all classes of construction where a positive waterproof condition is necessary.

Successful under all conditions no matter how severe.

Applied to the surface in 3 coats. Specify 40 lb. to 100 sq. ft., according to manufacturer's directions.

Comco Metallic Binder

For a perfect bond between the slab and topping finish for old or new floors.

Comco No. 3 Liquid Hardener

A liquid-after-treatment for new or old floors. Gives a dustproof and wearproof surface when applied according to manufacturer's directions.

One gallon required for each 100 sq. ft.

Comco No. 4 Integral Waterproofing Paste

An integral waterproofing for mass concrete or cement mortar. Also in liquid or powder form.

For Mass Concrete—Specify 8 to 10 lb. per cu. yd. of concrete, as per manufacturer's directions.

For Cement Plaster—Use 2½ lb. per 100 sq. ft., ¼ in. thick.

For Cement Stucco—Use 4 lb. per 100 sq. ft., ¼ in. thick.

Comco No. 6 Transparent Waterproofing

For sealing the pores and repelling the water from concrete, brick, stone, stucco, plaster or masonry surfaces. One gallon covers 150 sq. ft., two coats.

An effective surface waterproofer.

Applied with brush or spray.

Comco No. 7 Repair Cement—Quick Setting

For patching concrete floors, driveways, platforms, swimming pools, basements, alleys, etc. Sets over night.

Comco No. 8 Floor Resurfacer

A resurfacing cement for replacing an old and worn topping on concrete floors. Can be applied any thickness from ¼ in. up. Sets up in 24 to 48 hours.

Special instructions furnished.

Comco Colored Pigment

Put up in paste form to be dissolved in the mixing water. For coloring concrete floors. Makes an attractive floor of permanent and uniform color. Wearproof, dustproof and waterproof.

Sets quickly, allowing early use of floor. Dissolved in mixing water and added to the batch in this way. Uniform in color. The uncertainty of uniformity where dry colors are used is eliminated.

Comco No. 11 Colored Cement

Made for topping of concrete floors, walks, drives, stucco finish or any cement finish, inside or outdoors, also for manufacture of concrete products.

Comco No. 13 Integral Liquid Hardener and Waterproofing

Added to the gauging water. One quart to each bag of cement used.

Comco No. 15 Concrete Coating

A high grade concrete paint for floors, etc., that is lasting.

Colors: white, cream, buff, gray, brown or red.

Apply over dry clean surface in two coats.

Covering capacity approximately 150 to 175 sq. ft., two coats.

THE ELATERITE PAINT & MANUFACTURING CO.

Waterproofing and Bonding Materials

DES MOINES, IOWA

EASTERN DISTRIBUTERS

ELATERITE PRODUCTS CORPORATION

NEW YORK, N. Y., 22 East 17th Street—Telephone, Algonquin 9084 BOSTON, MASS., Room 819, 6 Beacon Street—Telephone, Haymarket 3346

PACIFIC COAST DISTRIBUTERS

LOS ANGELES, CAL., Borland-Dorsey Waterproofing Co., 8048 West Third Street—Telephone, Oregon 7407
SAN FRANCISCO, CAL., H. E. Borland, Room 704, 16 California Street—Telephone, Kearney 1142
SEATTLE, WASH., F. T. Crowe Corp., 216 Walker Building—Telephone, Main 7950

AGENCIES IN ALL PRINCIPAL CITIES OF THE UNITED STATES

Products

No. 60, Des Moines Elaterite for Waterproofing and Bonding; No. 65, Des Moines Elaterite for Stone Backing.

Also manufacturers of Preservative Paints for all classes of surfaces, including Acid and Heat Resisting Paint, and Metal Protective Paint.

DES MOINES ELATERITE

TRADE-MARK

No. 60, Waterproofing and Bonding

No. 60, Des Moines Elaterite, is both a waterproofing and a bonding material. Its base is an intensely adhesive, extremely elastic, non-porous, acid resisting, absolutely waterproof hydro-carbon known as "mineral rubber." It seals the pores of concrete, cement, brick, tile or stone, destroys capillary attraction and provides a continuous film which completely shuts out dampness. In addition, its intensely adhesive quality makes it an ideal bonding material, permitting the direct application to it of plaster or stucco coats.



Applying Plaster Coat Directly to "Des Moines Elaterite" Waterproofing and Bonding Coat

Uses—For waterproofing all brick, stone, concrete and cement surfaces and as an integral waterproofing to be mixed in concrete or cement mortars, plaster, floor and roof toppings and stucco, and for bonding plaster, stucco, tile, linoleums, etc.

Advantages—Intensely adhesive, permanent character; extreme resistance to all acids, preventing disintegration; permanent pliability and elasticity, preventing breaking of the waterproof film from hair cracks or expansion and contraction; smooth liquid character, providing a continuous, rubbery blanket; absolute waterproof character, sealing the surface against passage of dampness; combination of waterproofing and bonding, permitting doing away with lath or furring, economizing room and saving in labor and material costs. It meets every waterproofing requirement, thus there is no need to specify a different material for outside foundations, inside walls, basement floors or bonding or integral waterproofing.

Application—Applied cold, it spreads rapidly with broad flat brushes or may be applied with an air gun or spray. No hot swabbing or layers of felt required and any workman can apply it.

Covering Capacity—100 to 150 sq. ft. (one coat) per gal. or from 80 to 100 sq. ft. (two coats) on cement, brick or stone, depending on porosity; 250 to 300 sq. ft. on wood or metal.

Specifications—*(a) For Waterproofing Substructures*—The waterproofing contractor shall apply a waterproof membrane of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by The Elaterite Paint & Manufacturing Co., Des Moines, Iowa, to the outside of all foundation walls to a point 6 in. above grade, including piers, and to be carried over all footings and properly joined to waterproofing course on outside walls. Membrane to consist of 2 coats properly applied so there shall be no pinholes or uncovered spaces. At least 24 hours must elapse after the application of first coat before applying a heavy second coat, allowing it to dry thoroughly before covering. Walls shall be cleaned thoroughly to remove all loose particles, must be dry and, if of concrete, thoroughly set before applying No. 60, Waterproofing and Bonding, Des Moines Elaterite.

(b) For Dampproofing Interior Walls Which Are to Be Plastered, or for Waterproofing Exterior Walls Which Are to Be Stuccoed—The contractor is to apply 2 coats of No. 60, Waterproofing and Bonding, Des Moines Elaterite, manufactured by The Elaterite Paint & Manufacturing Co., Des Moines, Iowa, over the inside surface of all exterior walls which are to be plastered, and outside surface of all walls which are to be stuccoed. The walls are to be clean and dry and the application to be so made that there shall be no pinholes or uncovered spaces. At least 24 hours must elapse between the application of the first and second coat, which is to be a heavy coat.

Plaster is to be applied directly over the coating of No. 60, Des Moines Elaterite, after the second coat is "set" but while it is still "tacky," though not sooner than 3 hours after the second application, nor longer thereafter than 10 days. Stucco is to be applied directly over the coating of No. 60, Des Moines Elaterite, while it is "tacky," but not sooner than three hours after application of the second coat nor longer thereafter than 10 hours.

The waterproofing and bonding coats may be applied with air gun or spray, if contractor prefers.

(c) For Integral Waterproofing Use—All mortar to be made waterproof must have No. 60, Waterproofing and Bonding, Des Moines Elaterite, as manufactured by The Elaterite Paint & Manufacturing Co., Des Moines, Iowa, incorporated integrally, proportioned either with the water used for tempering or with the quantity of portland cement used in the batch in the following manner:

If proportioned with the water used for tempering it should be 1 to 8—1 part No. 60, Des Moines Elaterite, to 8 parts water.

If proportioned with the portland cement it should be 1 gal. No. 60, Des Moines Elaterite, to each 1⅔ bags of portland cement used.

The No. 60, Des Moines Elaterite, is to be added to the mixture in the foregoing proportions after the water has been put in for tempering, and the mixing is then to be continued until there is complete and thorough distribution throughout the mixture. It must not be added to the water before the latter has been put in for tempering the mixture.

This specification covers mortars for laying up brick or rubble stone; for stucco; plaster for coating the inside of cellar and other walls; for cement floor and roof toppings; for cement slabs to be spread over cinder fill in roof construction; for concrete not subject to heavy water pressure.

For integral mixture in waterproofing concrete which is subject to heavy water pressure the proportion should be changed to 1 part No. 60, Des Moines Elaterite, to 4 parts water used—1 gal. No. 60 to each 4 gal. of water. The No. 60 to be added after the water has been stirred into the mixture and the stirring continued until there is complete distribution.

No. 65 Stone Backing

Specification—All stone to be coated, before setting, on the five unexposed sides; also entire inner surface, including joints, to be coated after the stone is set with No. 65, Stone Backing, Des Moines Elaterite, as manufactured by The Elaterite Paint & Manufacturing Co. of Des Moines, Iowa.



Protecting Stone Facing from Discoloration with "Des Moines Elaterite"

Prices and References

These will be gladly sent on request.

EUCLID CHEMICAL COMPANY

Manufacturers of Concrete Floor Hardeners and Waterproofings

7012-7016 Euclid Avenue, CLEVELAND, OHIO

Products

EUCO IRON WATERPROOFING.
EUCO CONCRETE FLOOR BOND.
EUCO FLOOR HARDENER CRYSTALS.
Also Integral Hardeners; Waterproofings; Colors; Anti-Freeze Compounds; Window Caulking Compounds; Floor Enamels.

Engineering Service

Our Engineering Department is at your service. They will be glad to study your problems in connection with cement or masonry construction and recommend the best methods for waterproofing, hardening, bonding or other treatment of cement and masonry.

EUCO IRON WATERPROOFING

Description

Euco Iron Waterproofing is a heavy powder, chemically prepared, one of the principal ingredients of which is finely divided metallic iron. It is applied in a mixture of cement grout to the interior or exterior. While the grout or cement is setting the iron oxidizes, forming a binder which hermetically seals all pores and forms an effective barrier against water.

Advantages

Positively seals the surface of masonry and concrete walls against pressure. Easily applied by any handy building laborer.

Applicable to either old or new jobs. Inexpensive—20 lbs. will cover 100 sq. ft. of surface with 3 coats.

Directions for Use

Clean the walls with a stiff brush to remove all loose particles. Wet the surface before the waterproofing coat is applied.

Mix dry 2 qts. of Euco Iron Waterproofing with 1 qt. of portland cement in a 2-gal. bucket and add water until the mixture has the consistency of heavy paint. Keep well stirred so that the iron, which is heavier than cement, does not settle to the bottom. Apply with a brush, giving three coats, allowing time for each coat to dry. Continue to apply over moist portions until leaking is completely stopped.

"Bleed" the wall, if flow is very heavy, by chiseling a small hole and inserting pipe. Apply waterproofing around pipe. After waterproofing is hardened, remove pipe and plug hole with blue clay or yellow ochre mixed with Euco Iron Waterproofing.

Leaks around doors may be stopped by removing frame and waterproofing surface against which frame rests.

Specifications sent on request.

EUCO FLOOR HARDENER CRYSTALS

Description

It is a well-known and definite fact that magnesium fluosilicate is the hardening agent in practically all liquid surface floor hardeners. Euco Magnesium Fluosilicate Crystals have won a widespread reputation in surface hardening operations on concrete floors based on their convenience, economy and uniformly good results. Instead of buying trade-named hardening solutions that carry a large element of advertising expense and a still larger profit let us furnish you with Euco Magnesium Fluosilicate in dry (crystal) form.

After careful investigation, the Associated General Contractors of America conferred its "Seal of Successful Performance" on Euco Crystals based upon recommendations from members who had used them and were unanimously favorable in their reports.

Directions for Use

To make hardener solution, dissolve crystals on the basis of 2½ lbs. to a gallon of water. (Sufficient for treating 100 sq. ft.)

Method of Application—First sweep the floor as clean as possible, then apply as follows: *First Coat*—Mix 1 part hardener and 2 parts water. This is to be flushed over the surface and distributed evenly with brush or broom. *Second Coat*—Equal parts hardener and water. *Third Coat*—Two parts hardener and 1 part water.

Allow from 12 to 24 hours between coats for surface to dry.

After third and last coat has thoroughly dried, flush or mop the floor with clear water. This completes the hardening process and the floor is ready for use.

EUCO CONCRETE FLOOR BOND

Description

Euco Concrete Floor Bond is a finely pulverized metallic substance chemically treated, which, when applied to concrete slabs prior to laying the topping, effectively and permanently bonds the topping to the slab and forms a bond stronger than the concrete itself. It is a time-tried and time-tested product that has been used with unfailing success. Its trifling cost makes its use profitable on all jobs. Over one million sq. ft. of concrete toppings have been permanently bonded with Euco Concrete Floor Bond.

Advantages

Eliminates for all time the risk of toppings coming loose as it bonds the slab and topping together with a lasting mechanical key.

Topping and slab are made into one unit that has same co-efficient of expansion so that it is unaffected by temperature changes.

Inexpensive—5 lbs. will bond 100 sq. ft. of floor surface at a cost of a fraction of a cent per square foot.

Directions for Use

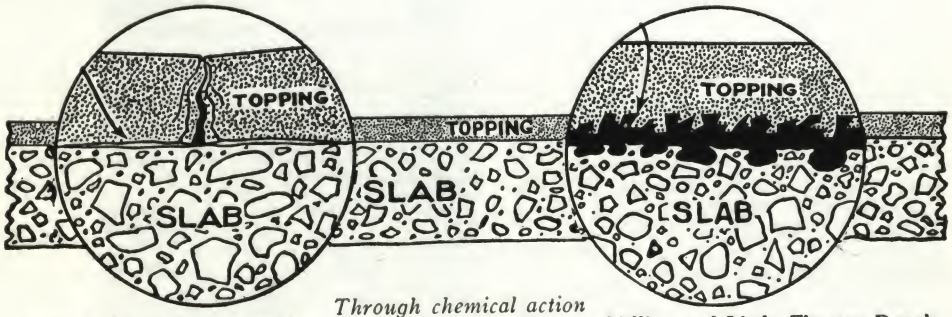
The floor slab should be thoroughly cleaned with a wire brush or broom. If surface is extremely smooth, roughen slab.

Remove all loose particles, dust, etc.

Where surface is oil soaked, greasy, etc., wash the slab with 1 part muriatic acid and 5 parts of water.

Twelve hours before applying floor topping, soak the slab with water. When the water is absorbed, apply bond coat as follows: Mix 1 measure of portland cement and 2 measures Euco Concrete Floor Bond, into a 5-gal. bucket. This should be mixed thoroughly (dry), then add sufficient water and stir until this mixture becomes the consistency of a heavy paint.

Apply with white wash brush or broom, thoroughly brushing this slush coat into the surface and immediately follow with the floor topping, laid in the usual manner.



Loose Topping Is Caused by the Failure of the Topping to Adhere to the Concrete Slab

Through chemical action Euco Concrete Floor Bond unites Topping and concrete slab into one unit

Millions of Little Fingers Reach Up and Grip the Topping After Euco Concrete Floor Bond Is Applied

EVERSEAL MANUFACTURING COMPANY, INC.

Manufacturers of Waterproofings, Dampproofings, Cement Hardeners, Varnishes, Paint Specialties

EXECUTIVE OFFICES
Fisk Building, Broadway and 57th Street
NEW YORK, N. Y.

TELEPHONE
COLUMBUS 4902

CABLE
"EVERSEAL, NEW YORK"

FACTORY AND LABORATORY: RIDGEFIELD, N. J. (Erie R. R. Siding)

Transparent Waterproofing

A transparent waterproof brush coating. For preserving virgin surfaces, such as brick, stone, concrete, cement mortar, or cement stucco without affecting the textured finish.

Prevents absorption of water from beating rainstorms or atmospheric moisture; splitting and cracking due to frost.

Prevents metal laths from rusting, due to absorbed moisture.

Checks efflorescence, prevents dirt and foreign matter from adhering to the surface which can be easily washed away by rain. Protects interior decorations from dampness.

Everseal Caulk-Glaze

A compound for caulking the joints between any material, making it permanently airtight and moistureproof. Adapts itself instantly to the vicissitudes of weather, seasons and climates.

For caulking window frames, for embedding slate, tile and other types of roofing materials and for pointing up brick, stone, terra cotta, etc.

Everseal Caulk-Glaze has been used with utmost satisfaction on buildings of every type, style and size. Applied with caulk glaze gun, extremely simple in operation.

Preservol Concrete Hardener Crystals

Dissolved in water, Preservol crystals produce a solution that penetrates deeply into soft, porous concrete, making it hard as granite and acid-resistant.

A concrete floor hardened with Preservol will not dust under the most severe trucking. Applied to virgin concrete floors.

Comes in steel kegs of 100 and 50 lb. net.

Niagratite

Water absorption, a defect common to concrete or mortar made with untreated portland cement, is easily, economically and permanently overcome by using Niagratite.

Put into the mix in the proportion of 8 lb. (1 gal.) to a barrel of cement (generally about 2%), it becomes integral with the concrete or mortar.

Uses—In foundation and retaining walls, piers, dams, reservoirs, cisterns, and cement blocks; prevents upheaval and cracking due to frost; protects against dampness and prevents damage by water.

Dampproofing

A coating for dampproofing brick, stone, or terra cotta walls. Applied to all interior of exposed walls. Insulating brick. Will reduce the cost of heating buildings. Keeps them cooler in summer. Prevents discoloration of plaster. Positively prevents staining and peeling of paint. Preserves plaster mural decorations from disfigurement, protects decorated walls and prevents moisture from coming through the walls and dissolving alkaline salts in plaster. Shipped in 60 and 40 gal. steel drums.

Spandrel Beam Cement

A special cement for waterproofing spandrel beams in buildings of every type.

This cement is specially prepared and assures the architect and builder of security from leakage. Full details on request.



Structural Steel Paint (Shop Coat, Field Coat)

We recommend this special grade on account of its wearing qualities. Sets quickly and is very adhesive and elastic; will not become brittle or crack.

Everseal Plastic

The asphalt asbestos cement for making a waterproof, seamless covering for roofs, foundations, or any surface. Can be used wherever waterproofing, dampproofing, or leakproofing is required. Ready for use.

Everseal Liquid

Composed of an asphalt asbestos coating; guaranteed to contain no coal tar. Applied with a brush. Is immune to all destructive agencies to which any surface can be exposed. Has a tough, rubberlike consistency, expanding and contracting perfectly under all conditions. Applied to roofs, foundations, retaining walls, and is very effective for all waterproofing requirements.

Blakanamel

Waterproof and acid-resistant. For interior and exterior use. Dries with a hard, tilelike black enamel finish. Protects, preserves and prolongs the life of any surface.

Beautex

The plastic paint applied with a brush to any interior surface that can be painted. The textured, plaster or antique effects so much in demand today can be produced with tools employed by the painter and decorator in everyday use, in any color or combination of colors and tones desired.

Other Everseal Products

Superlite Mill White—A lustrous, washable oil paint that stays white.

House Paint—Contains lead, oil and zinc. White and 12 colors.

Flat Wall Paint—A washable oil paint. White and 12 colors.

Primekote—A pigment priming paint for new cement, plaster or brick surfaces. Prevents lime and alkali burning.

Dado Paint—A lustrous gloss finish. 12 colors.

Concrete Floor Paint—Tough, elastic floor coating, 6 colors.

Concrete and Stucco Paint—Waterproof finish for concrete, stucco and brick surfaces. 10 colors.

Emco Supreme Paint—First quality barn and industrial paint. 12 colors.

Flowtile—High grade liquid covering for all floors, concrete, wood, linoleum; indoors or outdoors.

Marine Paints—All types of products, colors and finishes.

Surfacekote—A cold mastic asphalt for repairing concrete floors.

Duraconomy—A utility paint, choice colors for building maintenance. Especially priced for industrial plants.

Service

We maintain a completely equipped laboratory and engineering department for your service to help solve your waterproofing and paint problems.

You are urged to utilize this service for whatever required. There is absolutely no charge.

THE HYDROLITHIC WATERPROOFING CO., INC.

Engineers and Contractors for Waterproofing
725 Grant Building, PITTSBURGH, PA.
TELEPHONE, ATLANTIC 1890, 1891
EASTERN REPRESENTATIVE: TAYLOR-HYDROLITHIC CO., 95 Liberty Street, New York, N. Y.—Telephone, Bowling Green 3295

Registered
HYDROLITHIC
TRADE-MARK

Services

We are ENGINEERS and SPECIALISTS for WATERPROOFING, making a specialty of Cement Coat Waterproofing.

We contract for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools, boiler rooms, elevator pits, etc.; guaranteeing a positive and permanent waterproofing for all kinds of masonry construction.

Our Engineering Department is always at the service of architects, contractors, or others.

Advantages

The advantages of our Hydrolithic System over the old membrane method or integral waterproofing are many, as follows:

It is permanent; it is cheaper, no extra supporting walls are required; no additional floor finish is necessary; ease and economy with which repairs can be applied without delaying the other building trades; it can be applied as readily to old buildings as to new; it forms a good wearing surface on the floor and an attractive wall finish; it is not affected by heat and can be used in boiler rooms and other places where the heat would destroy pitch and felt waterproofing.

Over Thirty Years without a Failure

All work is executed in the well-known Winslow's Hydrolithic System which was invented by E. J. Winslow more than 30 years ago.

It is the original plaster coat method and, although its wonderful success has inspired a host of imitators, it is still easily the leader in its field. During the thirty years it has been in use, we have not had a failure.

Application

Hydrolithic is applied as a cement plaster coat to the inside of exterior walls and top of floors. Wall coatings are ⅝ in. and floor coatings 1 in. thick, all surfaces being thoroughly roughened and cleaned before application. Due to the special qualities of Hydrolithic and the expert care with which it is applied, a perfect bond is secured.

Hundreds of successful installations are in existence all over the country where Hydrolithic has for many years remained absolutely dry, although subjected, in many cases, to very high hydrostatic pressures.

Specifications

The interior surface of all exterior walls to a height of .... feet above the finished basement floor and the upper surface of the concrete floor slab of the entire basement [sub-basement] as well as all trenches, pits and machinery foundations shown on the plans, shall be waterproofed with Winslow's Hydrolithic Cement Coatings, applied by THE HYDROLITHIC WATERPROOFING CO., INC. All surfaces, before waterproof coating is applied, shall be thoroughly roughened and cleaned. Wall coating shall be ⅝ in. thick, applied in three coats, a slush coat, scratch coat, and finish coat. Wall coat may be finished with a wooden float or with a steel trowel to a straight even finish, free from pit holes, catfaces or other imperfections.

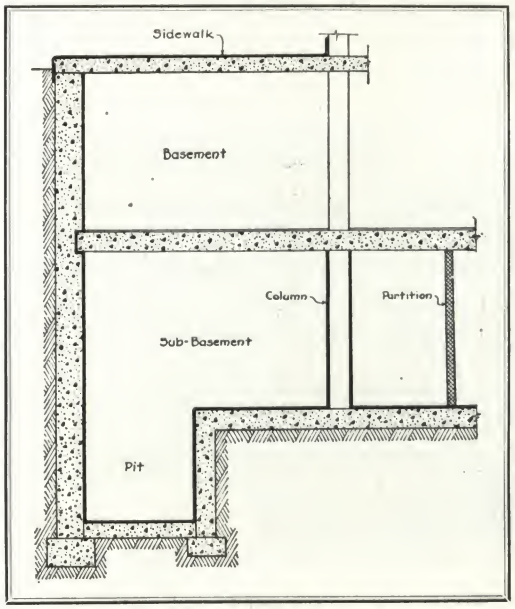
Floor work shall be 1 in. in thickness and may be finished same as walls. Our waterproofing on floors is applied directly on top of floor slab, serving as the wearing surface as well as the waterproofing agent, and eliminates the cost of the ordinary 1-in. topping coat.

Guarantee—THE HYDROLITHIC WATERPROOFING CO., INC., shall furnish a written guarantee covering their work for a period of three years. During this time they shall, at their own expense, promptly repair any leaks which may develop; providing such leaks are not due to structural changes in the building or to external damage to the waterproofing for which they are not responsible.

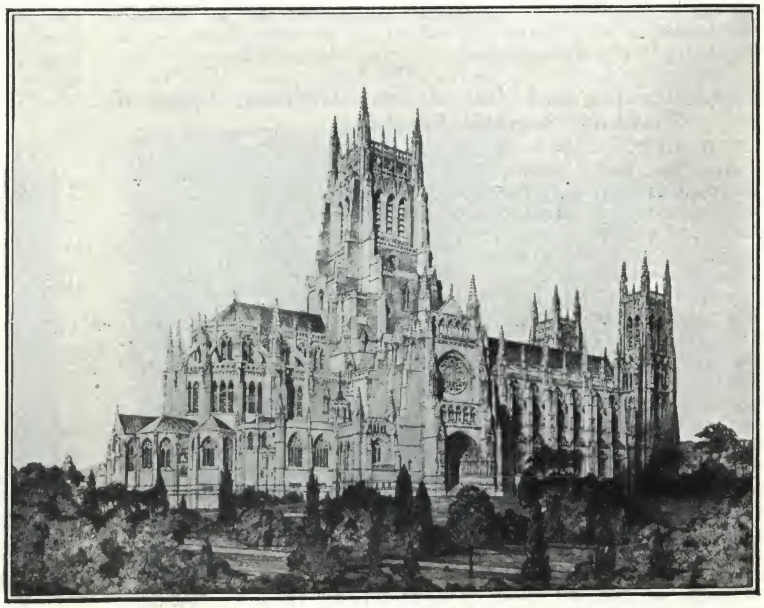
Representative Contracts

BUILDING	LOCATION	ARCHITECTS
Mellon National Bank	Pittsburgh, Pa.	Trowbridge & Livingston and E. P. Mellon
H. J. Heinz Auditorium	Pittsburgh, Pa.	Albert Kahn
Exchange National Bank	Pittsburgh, Pa.	Weary & Alford
Joseph Horne Store	Pittsburgh, Pa.	Benno Janssen
Colonial Trust Company	Pittsburgh, Pa.	F. J. Osterling
Professional Building	Pittsburgh, Pa.	Hunting, Davis & Dunnells
Catholic Boys High School	Pittsburgh, Pa.	Edward A. Link
Fifth Avenue Building	New York, N. Y.	Maynicke & Franke
Manhattan Eye & Ear Hospital	New York, N. Y.	York & Sawyer
Standard Oil Building	New York, N. Y.	Carrere & Hastings
Oil City National Bank	Oil City, Pa.	Weary & Alford
B. F. Goodrich Company	Akron, Ohio	Purdy & Henderson
Third National Bank	Springfield, Mass.	Starrett & Van Vleck
U. S. Post Office	Asbury Park, N. J.	U. S. Government
Victor Talking Machine Co.	Camden, N. J.	Ballinger & Perrot
Standard Sanitary Co. Bldgs.	Various Cities	Hunting, Davis & Dunnells
Peoples National Bank	Jackson, Mich.	Rockers & Vatet
National Exchange Bank	Roanoke, Va.	Wyatt & Nolting
New York Harbor Dry Dock Co.	Staten Island, N. Y.	
Bell Telephone Buildings	Various Cities	Voorhees, Gmelin & Walker

Hundreds of other structures over the United States.



Interior Method of Foundation Waterproofing



Cathedral of St. John the Divine, New York, N. Y.
Waterproofed by THE HYDROLITHIC WATERPROOFING CO., INC.

THE FLINTKOTE COMPANY

Manufacturers of Industrial Asphalt Emulsions

100 East 42nd Street, NEW YORK, N. Y.

For Built-up Roofs, see pages of The Richardson Roofing Company (Division of The Flintkote Company) as listed in Manufacturers' Index

Products

FLINTKOTE ASPHALT EMULSIONS for—
Protective Coatings
Mastic Flooring
Insulation Protection
Waterproofing
Dampproofing
Plaster Bond
Roof Coating
Adhesives
Caulking
Sound-deadening



TRADE-MARK

Manufactured under U. S. Patent Nos.: 1,506,371; 1,620,899; 1,733,497; 1,734,437; reissue 16,328 and others.

Flintkote Method

Pure asphalt unadulterated and not "cut-back" with solvents, has been known for centuries as the best protecting substance from the effects of water, acids, alkalis and corroding gases. Until recently, it has not been possible to obtain a pure asphalt in a suitable form that could be used without the employment of heat or resorting to solvents generally termed "cut-backs."

Flintkote Process

Flintkote Asphalt Emulsion as produced under the Flintkote patents and processes is obtained by the following method:

A given pure asphalt is broken up into minute particles (averaging from 1/5000 to 1/1000 inch in diameter) in the presence of water and a definitely small percentage of an inert mineral colloid. The emulsion thus produced is in continuous suspension until the water vehicle is evaporated.

After the asphalt in the emulsified form is applied, the water vehicle evaporates, the minute particles of asphalt coalesce, and the result is a uniform body of the original pure asphalt with all its inherent protective qualities absolutely unimpaired.

The process of emulsification does not in any way affect the qualities of elasticity, pliability, ductility and viscosity inherent in the asphalt of which the emulsion is made. The absolute absence of solvents assures against progressive deterioration.

It is impossible to use successfully one type of asphalt emulsion for all purposes. Each of the products listed below has been formulated especially for the uses intended.

Characteristics and Uses of Some Different Types of Flintkote Asphalt Emulsions

C13HPC—This is an *asphalt emulsion* of heavy painting consistency, and contains no fillers or fibres of any kind. This material is used as a protective coating generally on all types of surfaces; for dampproofing and waterproofing; for plaster bond and similar work. It is not to be used for mastic work, except as a priming coat. This type of emulsion is either sprayed or brushed on.

N13F—This is an *asphalt emulsion* made of higher melting point asphalt with which is incorporated special high tensile strength fibre. It is used in the preparation of mastics for flooring according to flooring specifications in combination with Portland cement and sand.

C13F—This is similar to N13F but made from softer asphalt base, and is suitable for preparation of mastics for cork insulation according to master specifications in combination with Portland cement and aggregate.

C13A—This is an emulsion to which has been added long-fibred asbestos to form a heavy troweling consistency mastic. This material is used for extreme waterproofing or insulation protection.

F13A—This is similar to C13A, but produced with a higher melting point asphalt base. This is suitable for heat insulation protection where the higher temperatures are met.

General Instructions

Protective Coatings

All surfaces to which Flintkote Asphalt Emulsion is to be applied should be cleaned of all dirt, dust or loose particles. Oils or grease should be removed by proper solvents and the surface washed with clean water. Rust or mill scale should be removed from metal surfaces by the use of wire brush or sand blast.

Dry or porous masonry should be scrubbed down with water or water containing 10% of emulsion before Flintkote Asphalt Emulsion is applied.

Thinning, whenever necessary, should be done with clean cool water only. No oils or solvents should be used in Flintkote Asphalt Emulsion or on tools or brushes used in its application.

Thickness of Coating—One gallon of Flintkote Asphalt Emulsion C13HPC will cover 100 sq. ft. of surface with a dried film approximately .01 in. in thickness.

For exposed surfaces under severe conditions a dried film thickness of .05 in. is recommended.

Roofing and Roof Coating

Over metal, composition, shingle, or asphalt built-up roofing, the characteristics of Flintkote Asphalt Emulsions are of particular value when applied as roof coatings. Specifications for this work will be given upon receipt of full data regarding the surface to be coated.

Insulation Protection

Preparation of the Surface

1. Brush down surface to free it of all loose particles, dust, dirt, etc.

2. Apply a coating of C13HPC diluted with water to proper consistency (not over 20% dilution). This can be applied by brush or air spray and will require from 1 to 1½ gal. of C13HPC per 100 sq. ft. of surface. Allow this coating to dry before continuing the work.

3. Point up all breaks and joints with the mastic to be used, and allow to dry.

Specification No. 1

Where the problem is only one of protecting the insulation from the penetration of air or moisture, and of waterproofing the insulation, the surfaces of which are not subject to any form of abrasion, a second or finishing coat of C13HPC Emulsion, undiluted, should be applied to the surface prepared as under "Preparation of Surface" above.

This will require 3 gal. of C13HPC Emulsion per 100 sq. ft.

Specification No. 2

This application is most suitable where extreme flexibility is desired.

Where it is desirable, in addition to air and moisture protection, to protect the insulation with a mastic finish, the following specifications should govern:

(a) Prepare surface as under "Preparation of Surface" above.

(b) Apply by trowel C13A Emulsion (which contains Asbestos Fibre) to a thickness of ⅛ in. This will require about 12 gal. of C13A per 100 sq. ft.

Specification No. 3

This mix is recommended where drying conditions are extremely bad.

To protect the insulation against severe abrasion, in addition to protecting it from air and moisture, the following specification should govern:

(a) Prepare surface as under "Preparation of Surface" above.

(b) Apply by trowel ¼-in. mastic prepared under directions following:

Mix thoroughly 1 volume Portland cement and 3 volumes of clean sharp sand. Add enough water to form a heavy mortar

Continued on next page

and mix thoroughly. Add to this mortar 2 volumes of Flintkote Asphalt Fibrated Emulsion, C13F, and mix until of uniform black color. This mastic is applied by trowel.

For 100 sq. ft. of surface the following materials will be required:

For prime coating, 1½ gal. C13HPC.

For mastic, ½ bag Portland cement, 7½ gal. C13F Emulsion (fibrated), 1½ cu. ft. of sharp, clean sand.

In many cases it is desirable to mix a mastic finish at the point of application without the use of Portland cement. This is accomblished by mixing aggregate and filler with C13F. Proportions used and methods of mixing will be fully explained upon request.

Industrial Mastic Flooring

Applied by trowel, without heat or inflammable solvents, over concrete base. (Write for detailed specifications where mastic is to be applied over wood base.)

Clean concrete of loose particles of dirt or grease and wash well with water. Apply a bonding coat of C13HPC at the rate of 1½ gal. per 100 sq. ft. Allow this to dry thoroughly. Then apply ½-in. coating of one of the following mastics:

Specification No. 1 (110 Sq. Ft. ½ In. Thick)—*Mastic* —Mix together (dry) 1 bag of Portland cement and 3½ cu. ft. of clean, sharp sand; then add enough water to form a heavy mortar, mixing thoroughly. Add to this mortar 15 gal. of N13F Emulsion, mixing thoroughly until of uniform color and consistency.

Specification No. 3 (120 Sq. Ft. ½ In. Thick)—*Mastic* —Mix together (dry) 1 bag of Portland cement, 2 cu. ft. of clean, sharp sand, and 3 cu. ft. of ¼-in. gravel. Add enough water to this dry mix to form a heavy concrete mortar. Add to this 15 gal. of N13F Emulsion and mix until of uniform color and consistency.

Installation costs are remarkably low and under usual conditions flooring may be opened to industrial traffic in 48 hours. Flooring Information Bulletins covering costs and methods for complete floor resurfacing, repairing, and leveling (for installation of tile or block flooring materials) are available upon request.

Dampproofing—Plasterbond—Interior or Exterior Masonry Walls Above Grade

(1) Masonry surfaces should be brushed and washed down to remove all traces of dust, dirt, or loose particles. A rough surface presents the greatest bond.

(2) Wet the surface with water before applying dampproofing and bonding course.

(3) Apply a priming coat of C13HPC Emulsion, reduced 20% with water and applied by suitable air spray or hand brush at the rate of 1 gal. per 100 sq. ft.

(4) After drying, apply a second coat of C13HPC Emulsion at the rate of 1½ gal. per 100 sq. ft.

(5) The surface should be dry before plaster is applied.

The above applies to lime and gypsum plaster only, the application of which should be made in accordance with approved specifications for this class of materials.

Waterproofing Below Grade, Exterior

Specification A

(1) From the grade line to a point 1 in. below underside of basement floor, with a reinforcing cove at juncture of footing and wall, the exterior surface of walls and top of footing shall receive a priming coat of Flintkote Emulsion, C13HPC, thinned 20% with clean, cool water and applied by suitable air spray or hand brush at the rate of 1 to 1½ gal. of emulsion to 100 sq. ft.

(2) Over dried priming coat apply a second coat of C13HPC at the rate of 3 gal. of emulsion per 100 sq. ft.

Specification B

For Extreme Conditions

(1) Apply priming coat as outlined in paragraph 1 of Specification A.

(2) Over dried priming coat, Flintkote Asbestos Emulsion Mortar, C13A, shall be troweled to a thickness of ⅛ in. This will require 12 gal. per 100 sq. ft.

Where a head of water exists, a membrane of saturated fabric shall be placed over the second coat of Flintkote Emulsion C13HPC or the alternative C13A trowel coat, and shall be followed by an additional coat of C13HPC applied at the rate of 2 gal. per 100 sq. ft.

The reinforcing cove at the juncture of side wall and footing shall be made of Flintkote Asphalt Emulsion Mastic suitable for this work.

Service

Our laboratory and technical departments invite the opportunity to work with you in developing new uses for our material or on installations that present unusually severe conditions.

Special Reports and Directions

Special reports and directions for all uses of Flintkote Asphalt Emulsions are available upon request.

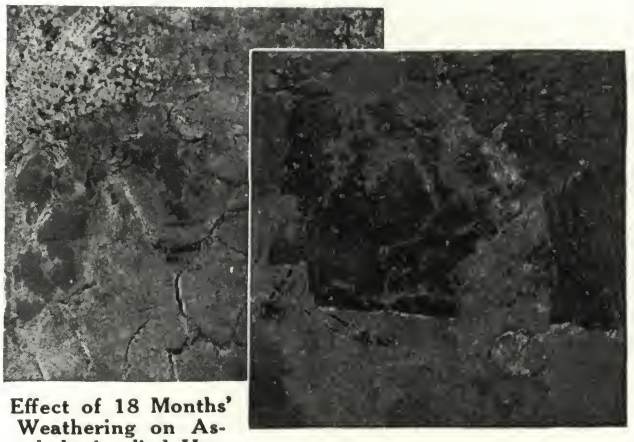
Address: The Flintkote Company, Industrial Emulsion Div., Pershing Square Building, New York, N. Y., or Peoples Gas Building, Chicago, Ill., or Park Square Building, Boston, Mass.

The Effect of Weathering on Protective Coatings of Asphalt After Eighteen Months' Exposure

The photograph below shows a steel plate coated with hot asphalt after about 18 months' exposure to the weather. The uncoated portions of the plate are shown to be rusted, and the coated portions show the "alligatoring" which has resulted under the exposure conditions. Attention is also called to the tendency of this asphalt to internal convection flow so that as the surface becomes hardened and contracts as shown by the wrinkles, breaks and cracks, fresh asphalt from beneath flows into the cracks and the process is repeated until the asphalt has hardened and cracked through to the metal.

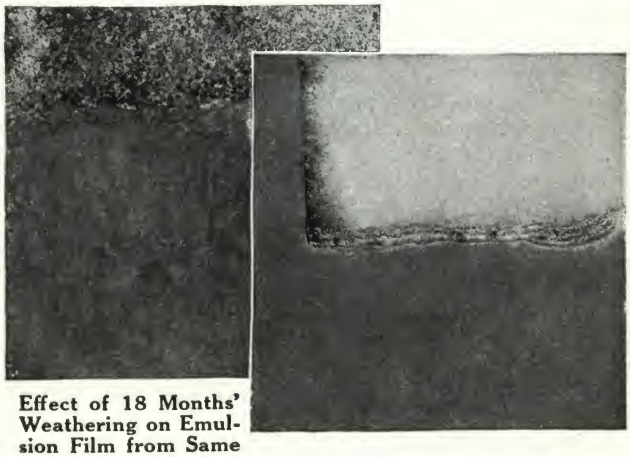
Flintkote Asphalt Emulsion is not subject to the same deterioration. After 18 months' exposure to the same conditions, it shows no indication whatsoever of checking, "alligatoring," or flowing. On account of the peculiar structure of the dried film no internal movement takes place and the oxidized or weathered surface film continues to protect the underlying material.

The exposure test demonstrates the fact that Flintkote Asphalt Emulsion remains stable under severe weather conditions, whereas the same grade of asphalt, applied by the cutback or hot application method will soon show cracking or "alligatoring" when exposed to the weather.



Effect of 18 Months' Weathering on Asphalt Applied Hot on Steel Plate

Note that coating is cracked and "alligatored" and that plate on which coating was applied is rusted *underneath* coating



Effect of 18 Months' Weathering on Emulsion Film from Same Asphalt

Note that coating is smooth, having no cracks or checks and metal is bright and undamaged where coating has been removed

HEADLEY EMULSIFIED PRODUCTS COMPANY

SUCCESSOR TO HEADLEY GOOD ROADS COMPANY (ESTABLISHED 1908)

Franklin Trust Building
PHILADELPHIA, PA.

CHICAGO OFFICE, One LaSalle Street Building

MAIN PLANT: MARCUS HOOK, PA.

Headley Asphalt Products

Headley Asphalt Products are made by one of the oldest and largest manufacturers of emulsified asphalts and meet existing engineering standard specifications for dampproofing, waterproofing and protective coatings.

HEADLEY Emulsified ASPHALTS REG U S PAT OFF

Headley Emulsified Asphalts—For industrial uses. Protective coatings for concrete, masonry, structural steel, pipe lines, metal, etc., against the destructive influences of fresh and salt water, moisture, gases, chemical fumes, brine, acids and alkalis, etc. Protection of concrete and masonry against disintegration. Dampproofing and waterproofing of foundations, basements, reservoirs, sumps, pits, cisterns, vats, tanks, floors, walls, roofs, etc. Bonding and cementing bituminous flooring, linoleum, plaster, stucco, tiles, blocks, slabs, bituminous bridge and crossing planks, fibrous and mineral wall boards, corkboard and other insulation. Paving and patching of highways, walks, airport runways, railway platforms and crossings, industrial floors, etc. Marking traffic zone lines for highways and streets.

Headley Asphalt-base Aluminum (Not Emulsified)—For general protective coating of metal, concrete, wood, fabric, etc.; increasing light reflection from all dark surfaces; for reducing temperature variation in storage tanks, tank cars, etc., thus reducing loss of volatile contents during periods of intense heat.

Headley Saturated Cotton Fabric—For membrane waterproofing, roofing, etc.

Headley Emulsified Asphalts

Headley Emulsified Asphalts consist of selected grades of straight steam-distilled Mexican asphalt finely dispersed, all of the minute particles being individually enclosed within a soapy film which prevents them from coalescing or sticking together while in emulsion form. The asphalt particles are completely and uniformly dispersed and remain so until the emulsion is applied. On application, the film of soap solution enclosing each asphalt particle quickly breaks, due to physicochemical changes as well as evaporation of water, and the particles unite to form a uniform continuous coating of pure asphalt, tacky or non-tacky as desired.

The superiority of Headley Emulsified Asphalt comes primarily from (a) the high content of specially selected asphalt base, (b) the small amount and advantageous nature of the soap emulsifier, (c) the low water content, (4) cold application, (e) resistance to destruction by freezing, (f) bond to wet or moist surfaces, (g) freedom from appreciable sedimentation, and (h) imperviousness after setting up.

Headley Emulsified Asphalts Combine All These Further Advantages—Applied cold (at temperatures above 35° F.) spread evenly by flowing, spraying, brushing or squeegee. No heating kettle, no cutting of drums and material. No skilled labor or tedious mopping required.

Standard grades with different characteristics afford a choice for specific requirements.

Can be applied (a) as is, (b) diluted with clear water (not over ½ pt. per gal.), or (c) mixed with various inert fillers or aggregates all of which should be thoroughly wet with water before admixture. Special grades mixed with filler or aggregate to form a mastic can be troweled, tamped or rolled.

Bonds perfectly to any clean surface, wet or moist, assuring complete protection. No priming coat required. Small particle size assures maximum penetration.

Not injured by freezing. Can be stored in unheated warehouses.

Freedom from injurious mineral suspending agents and inert fillers. No ingredient impairs ductility, bonding or imperviousness of the finished coating.

Useful properties fully retained. No beneficial physical properties of the asphalt are impaired or permanently lost by the emulsification process.

Emulsion film breaks and coating sets almost immediately on application. Will not re-emulsify after setting up.

Very stable. No appreciable sedimentation or separation on long storage.

No flammable or toxic fumes to endanger health in unventilated locations. No dangerous solvent to create fire hazard.

Odorless and tasteless. No contamination of food, or water, etc., in refrigerators, tanks, etc.

Efficient and permanent. Apply uniformly, set readily, dry in a few hours and thereafter thoroughly resistant to temperature changes, water, acids, alkalis, and other corrosive agents. Form a continuous coating of pure asphalt, remain ductile and will not crack, creep or flow under ordinary exposure conditions.

Standard Grades Headley Emulsified Asphalts

No. 10—Tacky finish for general dampproofing, waterproofing and protective coating purposes.

No. 10-A—Tacky finish for heavy coating and cementing purposes.

No. 11—Non-tacky finish for general dampproofing, waterproofing and protective coating purposes.

No. 12—Plaster bond; for plaster, mortar and stucco.

No. 1 and No. 6—Paving binders for summer application.

No. 2 (Viafalt)—Paving binder for winter application.

No. 5 Headley Zone-Marking Emulsified Asphalt—For marking traffic zone lines on streets and highways.

Shipped in 50 to 55-gal. or 30 to 33-gal. steel drums or 5-gal. steel pails.

Continued on next page

Headley Saturated Cotton Fabric No. 90 for Membrane Waterproofing

A special woven cotton fabric saturated with pure selected asphalt which meets A. S. T. M. Specifications. Is used in connection with Headley Emulsified Asphalts or hot-applied asphalts to form a waterproofing membrane. Is flexible, conforms to surface irregularities, is elastic, is of sufficient tensile strength to resist breaking or weakening of the seal in case of cracking, opening of joints or shifting of masonry, reinforces adjacent material, and provides a permanently impervious membrane.

Weight no less than 12 oz. per sq. yd.

Shipped in 58-yd. rolls of 34 to 36-in. width.

Headley Asphalt-base Aluminum No. 30

Headley Asphalt-base Aluminum Coating (not emulsified) consists of aluminum flakes and pure refined Mexican Asphalt with enough volatile solvent added to produce good brushing or spraying consistency.

On application, the aluminum flakes float to the top surface, then the solvent evaporates leaving a uniform continuous deposit of asphalt covered with a continuous armor coat of metallic aluminum. The finished coating remains efficient, elastic, and will not crack or creep under ordinary atmospheric temperatures. The aluminum giving maximum protection to the asphalt base and lengthening its useful life.

Shipped in 50 or 30-gal. drums and 5 or 1-gal. steel pails.

Instructions for Applying Headley Emulsified Asphalts

(1) As Protective Coatings Over Iron, Steel or Other Metals—Against corrosion by weather, water, acids, alkalis. Clean surfaces thoroughly of all loose material. Brush or spray first coat Headley Emulsified Asphalt No. 11, 70 to 80 sq. ft. per gal. After first coat is dry, one hour usually being sufficient, apply second coat, 50 to 60 sq. ft. per gal.

As an alternate priming coat, Headley Asphalt-base Aluminum Coating No. 30 can be used effectively by brushing or spraying (spraying recommended) 1 gal. per 300 sq. ft.

(2) For Dampproofing Exterior Walls and Foundations—Clean surface of all loose particles, dirt, mortar, etc. Apply first coat Headley Emulsified Asphalt No. 10 or 11, 70 to 80 sq. ft. per gal. After first coat is thoroughly dry, one hour usually being sufficient, apply second coat, 50 to 60 sq. ft. per gal. Backfill can be made as soon as second coat has set up. Dry and porous surfaces should be thoroughly moistened before application of the material.

(3) Plaster Bonding and Dampproofing on Brick, Tile, Concrete, Stucco, etc.—Apply first coat of Headley Emulsified Asphalt No. 12 (Plaster Bond), 70 to 80 sq. ft. per gal. After first coat is thoroughly dry, one hour usually being sufficient, apply second coat, 50 to 60 sq. ft. per gal. After second coat has set up for 24 hours or longer, plaster finish may be applied where desired. Dry and porous surfaces should be thoroughly moistened before application of the material.

(4) For Waterproofing Parapet Walls—Two brush coats are recommended using 1½ to 2 gal. per 100 sq. ft. per coat of Headley Emulsified Asphalt No. 11.

(5) Backing Cut Stone—Apply Headley Emulsified Asphalt No. 11 on the back and edges (not nearer than 1½ in. from the face) of the individual stones; also on the back of the limestone veneer or on the face of the back wall. Dampen back and edges of stone before applying material.

(6) Dampproofing New Concrete Floors—After rough pour of concrete, brush clean of all loose particles and if dry, dampen. Apply Headley Emulsified Asphalt No. 11, 50 to 60 sq. ft. per gal. by brush or squeegee. After first coat has set up, one hour usually being sufficient, apply second coat of Headley Emulsified Asphalt No. 11, 50 to 60 sq. ft. per gal. As soon as second coat has been applied, pour top layer of concrete.

(7) Concrete Floor Repairing—Blow cracks in floors free from dust and chip out, if necessary. Dampen with water. Use Headley Emulsified Asphalt No. 10 or No. 11 and work into dampened surfaces with fibre brush, applying two or three coats one-half hour to one hour apart. If crevices are deep after application as above, fill crevices about one-half full of damp sand, using No. 14 mesh for smaller crevices or No. 8 for larger ones. Then pour Headley Emulsified Asphalt No. 10 or No. 11 over the sand and after 15 or 20 minutes tamp down and fill upper part of the crevices in like manner with No. 11.

In cases of large areas to be treated, the crevices may be covered longitudinally with 1-ply Headley Saturated Fabric laid in Headley Emulsified Asphalt No. 11, allowing the first coat to dry one-half to one hour. Then lay down fabric and cover with second coat, thoroughly brushing the softened fabric free from folds and wrinkles. The entire floor area may be covered in this manner with Headley Saturated Fabric. A working surface of cold mastic ½ to ¾ in. thick may be laid on top of this membrane using Headley Mineral Emulsion.

(8) Coating Old Roofs—Asphalt, Felt, Tar, Gravel, etc.—Clean roof of all foreign material, loose gravel, cinders, etc. Give areas to be patched a heavy coat of Headley Emulsified Asphalt No. 10, extending from 3 to 6 in. beyond the edge of the patch. Allow to stand until material is thoroughly dried out, one hour usually being sufficient, then brush or press down a layer of roofing felt or Headley Saturated Fabric (fabric recommended). Then cover with a heavy coating of Headley Emulsified Asphalt No. 11, using 3 gal. per 100 sq. ft.

If roof is old or felt has dried out, first coat may be absorbed to such an extent that a second coat of Headley Emulsified Asphalt No. 11 should be applied, using 2 gal. per 100 sq. ft.

(9) Laying Headley Saturated Fabric (Waterproofing Membrane)—Surface must be fairly smooth, free of all foreign materials. Clean with wire brush, if necessary. Very dry surfaces should be dampened. Apply first coat of Headley Emulsified Asphalt No. 11, 50 to 60 sq. ft. per gal. and allow to set up from one-half to one hour. Lay down first layer of Headley Saturated Fabric, brushing over with a second heavy coating of Headley Emulsified Asphalt No. 11, 50 to 60 sq. ft. per gal., and brush the softened fabric free from folds and wrinkles. For two-ply membrane allow to dry for one hour and cover with a second layer of Headley Saturated Fabric with side lap of 2 in. and end lap of 12 in. Then apply the third coating of Headley Emulsified Asphalt No. 11, 40 to 50 sq. ft. per gal., brushing the softened fabric free from folds and wrinkles. When the material is dry, the weave of the fabric should be completely covered by the emulsion.

(10) General—For brushing, fibre brushes (Tampico, etc.) are recommended. All brushes should be wet thoroughly with gasoline before using. Shake out and then wet with water before starting application. After application, brushes should be cleaned with gasoline or suitable solvent.

Almost any type of spray gun can be used. Stowe type has been found very satisfactory. Use not less than 85-lb. air pressure for the above-mentioned materials to insure complete atomizing of the asphalt.

Engineering Service

On request, we will mail specifications covering standard applications, assist in drawing up unusual specifications, advise as to correct selection and application, or undertake investigations in connection with problems involving the use of emulsified asphalts.

Literature

Bulletin 230—Typical Applications of Headley Emulsified Asphalts.

Bulletin 330—Waterproofing, Dampproofing, and Protective Coatings.

Bulletin 430—Headley Asphalt-base Aluminum Coating.

Any of these will be mailed on request.

HYDROSEAL WATERPROOFING COMPANY

829-835 North 3rd Street, PHILADELPHIA, PA.

Products

HYDROSEAL BITUMASTIC COATINGS; PENETRITE INTEGRAL WATERPROOFINGS; PENETRITE FLOOR HARDENERS and COATINGS; HYDROSEAL METALTITE; KLING-KOAT CEMENT COATING; MASONRY COATINGS; CAULKING COMPOUND. Below is a list of the specific materials for average conditions.

Hydroseal

PENETRITE

METALTITE

TRADE-MARKS

20 Years of Proven Service

Since 1911 Hydroseal Products have been successfully used on both old and new constructions, materially reducing the cost of maintenance against further disintegration and damage.

We are not only manufacturers, but also engineers and contractors. We maintain a corps of skilled mechanics who apply our products under the supervision of men recognized as authorities in their field.

The many well-known buildings on which our products have been successfully used are permanent testimonials to the quality of our materials, and our thorough knowledge of waterproofing.

Laboratory and Field Tested

There is a Hydroseal Product for every waterproofing need. Each product has not only been laboratory tested but has thoroughly proven itself by most satisfactory results in actual use. Since our beginning in 1911 we have endeavored to make the finest possible materials. We have never sacrificed high quality to meet price.

The fact that Hydroseal Waterproofings are so generally used proves that our clientele realized that it is folly to jeopardize the entire result of a job by using an inferior grade of waterproofing when there is so little difference in cost.

We co-operate with the architect to see that he receives the results he desires, as well as to see that the material is applied correctly. We are glad to send literature on any Hydroseal Product.

Brands, Uses and Specifications

PURPOSES	MATERIAL	SPECIFICATIONS
For Dampproofing and Waterproofing Concrete, Brick and Cement		
To dampproof exposed walls to be plastered—unfurred or furred with hollow brick, furring tile or concrete blocks.	*Hydroseal* No. 330	Coat the interior of all exposed walls 1 coat, and, if necessary, 2
To prevent surface infiltration and dampness in basements and cellars	*Hydroseal* No. 640	Apply 2 heavy continuous coats
For dampproofing the interior of exterior walls above or below grade	*Hydroseal Semi-mastic*	To be applied (stipulate where) by a 4 knot brush, to be a continuous coating from grade to roof line, 1 ft. on ceiling
To prevent and resist severe conditions of dampness and water below sub-level	*Hydroseal* No. 640, in conjunction with burlap, felt or cheesecloth	Apply No. 640, and burlap, etc., alternately 3 to 5-ply until the hydrostatic pressure is equalized
To render waterproof by physical mixture with concrete and cement	*Penetrite* Integral Waterproofing Paste	For ordinary work add 1 gal. to 32 gal. of water
	Penetrite Integral Waterproofing Powder	Use 2 lb. to a bag of cement; under most severe conditions, 3 lb.
An iron waterproofing applied on the inside face of exterior walls below grade, and on top of structural slabs	*Hydroseal Metaltite*	To be applied and guaranteed by Contract Department of H. W. Co.
Used as an integral waterproofer, an integral hardener, as well as an anti-freeze	*Conwatco Mix*	Conwatco Mix as waterproofer for mass concrete, use 1 gal. to 15 gal. of gauging water
For Stainproofing Limestone and Marble		
For the protection of limestone, marble, etc., against stain caused by the cement through surrounding masonry	*Hydroseal* No. 309	Apply to all unexposed sides of stone, 1 continuous coat
To prevent water penetration through old walls of stucco, cement faced brick or stone by an exterior application	*Penetrite* Transparent Compound	Apply 2 coats, having joints well mortared
For the Protection of Metal		
For prevention against electrolysis and corrosion of exposed structural steel	*Hydroseal* No. 352	Apply 1 shop coat, to be followed by a field coat, different color
For Waterproofing and Beautifying Concrete and Plaster Surfaces		
To beautify and protect exterior walls of brick, stucco cement, and concrete	*Kling-Koat* Cement Coating (flat and gloss)	Applied like paint, 2 coats
To prevent water penetration through old walls of stucco, cement faced brick or stone by an exterior application	*Penetrite* Transparent Compound	Apply 2 coats, having joints well mortared
For Treatment of Floors		
To prevent the dusting and abrasion of concrete floors	*Penetrite* Floor Finish	Apply 1 coat primer and 2 coats finish. Allow 24 hours between applications
For application after cement or concrete floor is laid. Makes the floor hard, dustproof and waterproof	*Penetrite* Liquid Floor Hardener	One application is all that is necessary if the condition is not severe
Mixed with the cement to harden and waterproof	*Penetrite* Metallic Floor Hardener	Approximately 20 lb. to a sq. ft. in the 1-in. top coat
Used as an integral waterproofer, an integral hardener	*Conwatco Mix*	For mass concrete and top coat use 1 gal. of gauging water. For mortar work use 1 qt. to 1 bag of Portland cement
For Caulking		
Between masonry and window panes, wood or steel, caulking joint of coping, overhanging cornices, etc.	*Hydroseal* Caulking Compound	

WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

FOR THE CONSERVATION OF BUILDINGS



A.C.Horn Company
WORKS-LABORATORIES-EXECUTIVE OFFICES
Long Island City-New York

Foreword

Do Architects Sell or Buy?

Architects sell. They must accept in good faith the statements of manufacturers. They must hazard their finest asset, reputation, in selling suggestions to their clients. High pressure salesmanship—extravagant claims used as a cloak for high prices and uncertainty—spell trouble and downfall for the architect. Lack of pride in generations of success—lack of financial stability—and lack of extensive and careful laboratory facilities jeopardize the architects' livelihood and prestige.

New or Time-tested?

The third generation of HORN conducts under owner-management the leading business of its kind in America. Pride of quality and tradition permeate the entire national organization. Prestige and not profit, governs production. This is the surest guarantee of enduring quality.

Dun's or Bradstreet's?

The financial rating of the A. C. HORN COMPANY is A-A-A-1. This highest possible credit standing, together with the millions of dollars invested in plants, advertising and valuable trade-marks, demand conservatism. This is the surest guarantee of honest performance.

Research Laboratories or Guesswork?

The staffs of well-known and respected authorities in the HORN Research Laboratories are continually advancing the science of preservation and decoration. Scientific facts have won for the HORN COMPANY its nation-wide preference among leading architects. The buying power of carefully supervised mass production assures moderate and standardized selling prices.

The famous stamp

HORN

is the safest guarantee of years of test and usage in thousands of buildings. It is a seal of the integrity of partnership which must exist between architect and manufacturer.

ALBANY
ATLANTA
BOSTON
BUFFALO
CHICAGO
CLEVELAND
DALLAS
DETROIT
FORT WORTH
HONOLULU
HOUSTON
INDIANAPOLIS
KANSAS CITY
LOS ANGELES
MILWAUKEE
MONTREAL



NEW ORLEANS
NEWARK
OAKLAND
PHILADELPHIA
PITTSBURGH
SAN ANTONIO
SAN FRANCISCO
SHANGHAI
SEATTLE
ST. LOUIS
SYDNEY, AUSTRALIA
TOKIO
TORONTO
UTICA
WASHINGTON

A. C. Horn Company
Works, Laboratories, Executive Offices
Long Island City, N. Y.

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

ACHIEVEMENT



The Grand Central Zone of New York is one of . . . if not *the* greatest building accomplishment of all time.

Horn Products have been used wherever there is a yellow dot.

Proven Merit.

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PRODUCTS FOR THE CONSERVATION OF BUILDINGS

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

APPROVED FLOOR FINISHES FOR EVERY PART OF EVERY STRUCTURE

HORN'S CEMENT FLOOR SCHEDULER	Basements	Bedrooms	Billiard playrooms	Boiler rooms	Cafeterias	Closets	Coal bunkers	Corridors	Dining rooms	Dynamo rooms	Driveways	Entrances	Filling station areas	Freight platforms	Furniture handling	Garages	Grill rooms	Heavy mfg. traffic	Kitchens	Laboratories	Light mfg. areas	Lobbies	Locker rooms	Lounge rooms	Offices	Passenger platforms	Rest rooms	Roof gardens	Shipping platforms	Sidewalks	Showrooms	Stairs—main	Stairs—service	Stock rooms	Stores—sales areas	Store rooms	Terraces	Toilets	Warehouse areas	X-ray rooms
Abattoirs	g			g	c					c	g	c		g		f		n	c	n		c	c		c				g	d		c	c					c	n	
Airports	h				c			c	c		c	c	c	g		f	c		c	c		c	c	c	c	c	c		g	d		o	c	f		f		t	f	
Apartment houses	h	e	c	g	c	k	g	c	c	c	c	o				f	c		c			o	c	c	c			d	f	d		o	c		c	d	t		
Banks	h			f	c	k	g	o		c	c	o							c			o	c	c	c		c			d		o	c	c		c		t		
Candy plants	g			g	c		g	c		c	g	c		g		g		n	c	n		c	c		c		c		g	d	c	c	c	n		n	d	c		
Canneries	g			g	c		g	c		c	g	c		g		g		n	c	n		c	c		c		c		g	d		c	c	f		n		c		
Chemical plants	h			g	c		g	c		c	g	c	g	g		g		n	c	n	f	c	c		c		c		g	d		c	c			n		c		
Churches	h	c	c	g		k	g	c	c		c	o							c			o	c	c	c		c			d		o	c			c	d	t		
Clubhouses	f	c	c	g		k	g	c	e	c	c	o				f	c		c			o	c	c	c		c	d	g	d		o	c			c	d	t		
Dairies	g			g		g	g	c			g	c		g		g		w		n	f	c	c		c		c		g	d		c	c		c	c	d	c	g	
Department stores	n			g	c		g	c	c	c	g	c		g	p	g	c		c		f	o	c	c	c		c	d	g	d	c	o	c	c	c	c	d	t	n	
Dormitories	h	c	c	g	c	c	g	c	c	c	c	c					c		c			c	c	c	c	c		d	f	d		c	c			c	d	t		
Driveways											d	d	d			c											c		d		d					d				
Factories	g			g	c	g	g	c		c	g	c	g	g	p	f		n	c	n	f	c	c		c		c	d	g	d	c	c	c	g		g	d	c	g	
Filling stations	h										d	d	d			c							c	c	c	d	c			d	c	d			c	c	d	c		
Freight depots	g			g	c						g	c		g			g				f	c	c		c		c		g	d		c	c					c	g	
Furniture factories	g			g	c	g	g	c		c	g	c	g	p	p	f		p	c	n	p	c	c		c		c	d	g	d	c	c	c	g	c	p	d	c	p	
Garages	f			g		f	g	c			c	c	g			f		f			f	c	c	c	c	c	c	d	g	d	c	c	c	g	c	f	d	c		
Hangars	f		c	g	c	k	g	c			c	c	c	g		g		f	c	n	f	c	c	c	c	c	c		g	d	c	c	c	g		g	d	c	g	
Hospitals	n	m	c	g		c	g	v	c	c	c	o		g		c			c	t		o	m	c	c		c	d	g	d		o	c	c		k	d	t		x
Hotels	f	e	c	g	c	k	g	v	c	c	c	o	c	f	p	g	c		c	n	f	o	c	c	c		c	d	g	d	c	o	c	c	c	c	d	t		
Loft buildings	f			f	c	k	g	c		c	g	c		g			c	f	c	n	f	c	c		c		c	d	g	d	c	c	c	f	c	f		c	f	
Office buildings	h			f	c	k	g	c		c	c	o		g		f	c		c	n	f	o	c		m		c	d	g	d	c	o	c	f	c	k	d	t		x
Power houses	h			g	c		g	c		c	g	c		f					c	n	f	c	c	c	c		c		g	d		c	c			f	d	c	f	
Schools	c	m	c	f	c	c	g	c	c		c	c					c		c	n	f	c	c	c	c		c	d	g	d		o	c	c		c	d	t		x
Sugar refineries	n			f	c		g	n		c	g	c		n		g		n	c	n	n	c	c		c		c		n	d	c	c	n	n		n		c	n	
Terminals, R.R. & bus	h			g	c		g	c	c	c	c	c	c	g			c	g	c		f	o	c	c	c	c	c	d	g	d	c	o	c			c	d	t	n	
Theaters	h			f	c	k	f	c		c	c	c					c		c			c	c	c	c		c	d		d		o	c	f	c	k	d	t	f	
Warehouses	g			g			g	g			g	c		g	p			g	c	n	g	c	c		c		c		g	d	c	c	c	g				c	g	
Y.M.C.A.'s	c	m	c	f	c	k	g	v	c	c	c	o		g			c		c	n	f	o	c	c	c		c	d	g	d		o	c		c	k	d	t	f	

Key to Scheduler

c—COLORUNDUM (green, brown, red, black or French grey) scored into tile by the HORN grinding method with shallow dustfree joints of any desired size and design. Develop surface and lightly wax annually. *See pages 12 and 13.*

d—COLORUNDUM scored as in "**c**" but on exterior work do not develop or wax. Use a coating of DEHYDRATINE No. 2 if a deeper color is desired. *See pages 12, 13 and 20.*

e—DEHYDRATINE No. 80 integral liquid hardener, dustproofer and accelerator. *See page 8.*

f—FERRO-FAX METALLIC HARDENER, 30 lb. per 100 sq. ft. *See pages 4 and 5.* Glaze floors and protect with MAT-O-HORN. *See page 11.*

g—FERRO-FAX METALLIC HARDENER, 40 lb. per 100 sq. ft. Monolithic. *See pages 4 and 5.* Glaze and MAT-O-HORN. *See page 11.*

h—HYDRATITE waterproofing to be used in all floors and concrete below grade. *See pages 16 and 17.*

k—KONCREX, two coats. Any color. *See page 6.*

m—One coat KONCREX. Linoleum laying must be delayed until building dries out, otherwise linoleum glue rots and smells. Beautify and dustproof for first six months with economy. *See page 6.*

n—Wearproof and acid resistant floors are best made by using DEHYDRATINE No. 80 in topping, then 40 lb. per 100 sq. ft. dustcoat FERRO-FAX. Then develop with HORNITE Glaze, renewing HORNITE periodically. *See pages 4, 5 and 8.*

o—Omit cement floors and use marble, terrazzo, slate or tile.

p—DEHYDRATINE No. 80, plus 30 lb. dustcoat FERRO-FAX plus glazing plus waxing. Sliding furniture eliminates trucking. Do not joint floor. *See pages 4, 5 and 8.*

t—Terrazzo colored with Horn's STAYBRITE waterproofing dry colors. *See page 10.*

v—In corridors use linoleum, rubber tile or carpet. Install cement base and border, using STAYBRITE waterproofing dry colors in MIX. Develop and wax. *See page 10.*

w—Same as "**n**" but omit developer. *See pages 4, 5 and 8.*

x—Mix BAR-X in the floor topping and plaster of walls. *See page 9.* Apply one coat of KONCREX to floors. *See* "**m.**" *See page 6.*

A.C. HORN COMPANY. LONG ISLAND CITY, N.Y.

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WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

CHECK WATERPROOFING IN EVERY BUILDING AT THESE POINTS

HORN'S WATERPROOFING SCHEDULER	Basement walls—Exterior below grade. Membrane method	Basement walls—Interior below grade. Integral and plaster coat	Brick walls—Exterior surfaces above grade	Brick walls—Interior surfaces above grade	Brick mortar joints—To prevent leakage, efflorescence or to color properly	Bonding new to old concrete surfaces. Patching cement work.	Caulking windows, stone, sills	Concrete walls—Integral	Concrete floors—Integral	Copings	Elevator pits	Expansion joints	Foundation walls—Concrete	Limestone	Marble	Parapet walls—Back of	Parapet walls—Front of	Pools	Roof slabs—Concrete	Sills	Spandrel beams	Steel work	Stone stainproofing backing	Stone waterproofing	Structural timbers	Stucco	Terra cotta—Ornamental and its mortar	Tile—Back-up and its mortar	Vault lights	Winter concrete or brick work	Windows
BONDSIT—*page 9* Concrete bonding compound						★					★							★													
DEHYDRATINE No. 1—*page 22* Black dampproofing brush coating				★																								★			
DEHYDRATINE No. 2—*page 20* Transparent waterproofing brush coating			★		★					★							★			★				★		★					
DEHYDRATINE No. 2A—*page 20* Colorless waterproofing brush coating			★		★					★				★	★		★			★				★		★					
DEHYDRATINE No. 3—*page 24* Stone stainproofing backing														★	★								★	★							
DEHYDRATINE No. 4—*page 24* Black foundation brush coating	★												★																		
DEHYDRATINE No. 5—*page 24* For steel imbedded in masonry																						★									
DEHYDRATINE No. 6—*page 24* Black foundation trowel coating	★												★																		
DEHYDRATINE No. 7—*page 24* Hot foundation mop coating	★										★		★			★		★	★												
DEHYDRATINE No. 10—*page 23* Mastic. Dampproofing black trowel coating reinforced with asbestos				★												★			★		★							★			
DEHYDRATINE No. 10—*page 23* Semi-mastic. Black brush coating containing asbestos fibre				★												★			★									★			
EXPANSION JOINT CEMENT—*page 14* Black hot-pour compound												★	★					★	★										★		
FERRO-FAX (Grey or Red)—*pages 4-5* Metallic floor hardener										★																					
HORNROCK (Powder Form)—*page 15* Brick and cement colored coating			★															★								★					
HYDRATITE INTEGRAL—*pages 16-17* Paste, powder and liquid waterproofing		★			★			★	★		★		★					★	★							★	★	★			
KOPPER KARBOL—*page 9* Wood preservative																									★						
METALON—*page 25* Metallic brush coat waterproofing		★				★					★		★			★		★	★												
NO-FREEZE LIQUID—*page 9* Permits winter work																														★	
STAYBRITE—*page 10* Waterproofing dry colors					★													★								★	★				
SYMENTREX (All Colors)—*page 21* Brick and cement brush coating			★							★						★	★									★					
TRIPLE-FLEX FABRIC—*page 23* Black saturated fabric	★										★		★			★		★	★	★	★										
VULCATEX CAULKING—*pages 18-19* Non-hardening compound, Slate Grey, Light Stone Grey, Limestone Color and White. For pointing, caulking and expansion joints							★			★		★		★	★	★	★			★				★			★				★

Notes on Waterproofing

(1) Sub-structures

Design of Walls and Floor Slabs—Foundation walls and floor slabs must be designed to resist the maximum pressure to which they are to be subjected.

Preparation of Surface—When the cement plaster coat method is used for waterproofing concrete foundations, swimming pools, etc., the surface must first be thoroughly chipped, cleaned and washed with BONDSIT to insure effective bond between the plaster coat and the underlying masonry.

(2) Super-structures

In waterproofing the exterior of a building the surface must be rendered thoroughly sound before application of the waterproofing. All cracks must be cut out and pointed, all soft or disintegrated bricks must be cut back and resurfaced and all loose or foreign matter removed. The surface so prepared will then present a solid foundation for the protective coating to be applied. All window frames must be caulked and parapet walls, copings and cornices must be waterproofed by approved methods.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

FERRO-FAX

Metallic Hardener for Cement Floors

Producing Permanently Wearproof, Waterproof and Dustproof Floors

The R. H. Macy Company tests and re-orders prove quality



R. H. Macy Warehouses, New York, N. Y.
Robt. D. Kohn and Associates, Architects
Barney-Ahlers Construction Corporation, General Contractors
1928—300,000 sq. ft. 1930—300,000 sq. ft.

Fifty Million Feet Cannot Be Wrong

Fifty million square feet of Ferro-Fax metallic hardened floors, under every type of traffic, installed over a period of many years, stand today as proof of durability. Metallic hardener has become a commodity rather than a specialty. Its specification is universal. No longer is it a question of "Shall we specify metallic hardener?" but rather "Which metallic hardener shall we use?"

The A. C. Horn Company has developed a cement floor service which is recognized nationally as the leader. Restricted by courtesy and etiquette, no reference may be made to the many interesting comparisons and tests made by the best known testing and concrete institutes, except the modest and respectful statement that the opportunity of such co-operation and confirmation has been deeply appreciated on our part.

Do Metallic Hardeners Differ?

Most decidedly. Metallic aggregates, poorly graded, filled with grinding oils and chips of foreign metals, are being offered as substitutes for Ferro-Fax, at a lesser price. On the other hand, high pressure selling organizations, in order to justify elaborate advertisements, must create an atmosphere of mystery around their materials. Therefore good, plain metallic hardeners are being offered with chatter about strange ingredients and impossible acid-proofings—these claims being a cloak for the high price which expensive merchandising methods make necessary.

A good, clean metallic hardener, manufactured by a company of solid financial worth and good standing, installed over a period of many years of successful usage, is the best test. When measured by this conservative yard-stick of quality, Ferro-Fax leads the field.



Continental Can Company Building, Chicago, Ill.
Francisco & Jacobus, Architects
E. E. Davis Company, Floor Contractors
The Continental Can Company, after using several brands of metallic hardeners, incorporated Ferro-Fax in the floors of their latest plant—a most pleasing tribute to the durability of Ferro-Fax



Western Union Telegraph Company Building, New York, N. Y.
Voorhees, Gmelin and Walker, Architects
Marc Eidlitz & Son, Inc., General Contractors

SPEED SPEC.

The cement floors shall be dustproofed by using Ferro-Fax in accordance with the exact directions of the manufacturer, the A. C. Horn Company, as filed in Sweet's Architectural Catalogues.

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

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WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

SPECIFICATIONS FOR FERRO-FAX FLOORS

I. Installation

TOPPING METHOD

For making dustproof, wearproof and waterproof cement finish floors in every type of building, it is recommended that the topping be laid before the base is set whenever practicable.

(a) Proportions of Topping—The topping (thickness at least full ¾ in.) shall consist of the following proportions:

One (1) part tested Portland cement.

Two (2) parts coarse, gritty, clean sand.

(b) Measuring Volumes—These proportions shall be accurately measured by volume in suitable size boxes. No counting by shovels or measuring by wheelbarrows, or other approximation will be permitted.

To determine the proper proportions it is understood that one bag of cement shall be equal to one cubic foot of sand or grits.

(c) Addition of Water—Mix thoroughly dry until uniform in color, showing no streaks or patches of constituents. If mixed by hand topping aggregate shall be turned over dry three times. Add sufficient water to saturate mixture and then mix thoroughly again. The topping shall at no time be made sloppy.

(d) Application of Topping—Lay and straight edge the topping to a true and even surface. Float the surface well with wooden floats to close all voids and hollows.

(e) The Wearproof Finish—A dry mixture of two bags (200 lb.) FERRO-FAX to one bag (100 lb.) tested Portland cement (by weight), mixed to an even color, shall be sprinkled over 600 sq. ft. of surface. This mixture of FERRO-FAX and cement shall be floated in and thoroughly trowelled. The surface shall be given a burnishing trowelling when it has set sufficiently to polish hard and smooth. Under no circumstances shall the wearproof finish be applied when there is any surplus water on the floated surface.

MONOLITHIC METHOD

Recommended for use in warehouses, automobile service stations, factories, foundries, etc.

This specification is recommended for mild weather only.

(a) Preparation—The concrete base or slab shall consist of a mixture of 1:2:4 or 1:2½:5 when gravel is used, and the aggregate shall pass a 1-inch screen. The concrete is deposited between screeds to the finished floor level (on heavy slabs exceeding 6 inches, ⅛ inch allowance must be made for shrinkage) and then screeded thoroughly and tamped with the customary straight edge substantially as a separate mortar finish is smoothed off, leaving no hollows or pockets on the surface.

(b) Preliminary Finish—Immediately following process of leveling off the concrete slab, deposit upon the surface uniformly a dry mixture consisting of:

1 bag FERRO-FAX (100 lb.)

2 bags of standard Portland cement

3 bags of clean, coarse sand.

This dry batch shall be mixed thoroughly and then evenly dusted over approximately 1,000 sq. ft. of surface. This "preliminary finish" will immediately saturate with the surplus water remaining on the surface and shall then be thoroughly floated into the concrete with heavy wooden floats, but do not steel trowel.

(c) Hard Finish—Then a dry mixture of two bags (200 lb.) FERRO-FAX and one bag (100 lb.) standard Portland cement shall be evenly distributed over each 1,000 sq. ft. of floated surface. This dust coat shall be floated in with wooden floats and followed immediately with a steel trowelling. The floor shall be given a second steel trowelling after the surplus water has disappeared. The finished surface must be free from depressions and shall present a smooth and even texture.

II. Safeguarding the Floor

Do not wet the new cement floor surface until it is 48 hours old. After the topping has set up 48 hours, the contractor shall cover it with a uniform layer of soft wood sawdust, shavings, or other suitable covering. This covering must not be applied until experiment shows surface hard enough to prevent covering from scratching or injuring the finish. Surface shall be kept wet for at least five days. Floors, if protected as above, will be ready for light traffic in a week, and heavy traffic in three weeks, under favorable weather conditions.

As an alternate to this protection and wetting, the floors may be cured under Horn's MAT-O-HORN.

Glaze interior surfaces by applying one coat of Horn's Transparent KONKREX.

Quantities of Ferro-Fax Required

The foregoing is the standard method of procedure for the average building. The 30 lb. of FERRO-FAX recommended per one hundred (100) square feet will give a surface which will withstand any average service. However, there are some cases where the quantities should be varied. These exceptions follow:

(a) For floors which receive extremely heavy wear, use 35 lb. of FERRO-FAX to every one hundred (100) square feet instead of 30 lb. for the wearproof finish.

(b) For loading platforms, railroad repair shops, forge shops, piers, etc., use 40 lb. of FERRO-FAX to every one hundred (100) square feet instead of 30 lb. for the wearproof finish.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

KONCREX

Dustproof, Decorative Wearing Surface for New or Old Cement Floors

One Million Square Feet of Floor Surface Treated in 1914— Still a "Show" Job



Equitable Building, 120 Broadway, New York, N. Y.

Protection of Cement Floors

KONCREX is more than a cement floor paint. For more than a generation, KONCREX has been recognized as solving this problem of indoor cement floor protection.

This liquid coating penetrates the topping to a certain extent, binding the surface particles together and providing a wearing finish.

Unlike ordinary coatings, KONCREX is unaffected by the destructive alkaline reaction of cement and retards the absorption of stains, oils and greases. It is extremely resistant to traffic and maintains the fine appearance of the floor. The coating is easily cleaned.

KONCREX is produced in colors and in the transparent.

The long, successful record of KONCREX, as attested by millions of square feet of floors in thousands of office buildings, hospitals, hotels, schools and other structures of every description, has thoroughly established its reputation as the most desirable decorative floor coating possible to obtain.

Two coats of KONCREX are recommended. In new office buildings, it is customary to apply one coat of Transparent KONCREX to all cement floors, preventing dusting and improving the appearance of the floors; afterward applying the standard KONCREX colors to meet the requirements of tenants. One coat of Transparent KONCREX containing 5% of Bluestone Grey KONCREX is often used on floors to be covered with linoleum. This presents a finished surface during the six months that linoleum must be kept off the uncured floors to prevent glue rot.

All cement floors in contact with earth, to which KONCREX is to be applied, must be waterproofed. Very soft floors may be treated advantageously with HORNSTONE CRYSTALS before KONCREX is applied.

Covering Capacity

KONCREX covers from 160 to 200 sq. ft. per gallon, two coats

Shipping Data

KONCREX is shipped in barrels, half-barrels, 5-gallon steel pails and 1-gallon cans

403 Bluestone Grey

409 Brown Stone

407 Mosaic Green

402 Tile Red

408 Dust

401 Cement Grey

Directions for Use

(1) Curing—Cement floors shall be allowed to cure thoroughly before KONCREX is applied.

(2) Cleaning—Floors shall be dry and clean; all plaster, dirt and grease being removed before the KONCREX is applied.

(3) Application—KONCREX must be well stirred before using. Containers must be kept covered when not in use.

KONCREX shall be applied in two coats. Brush out each coat well. Allow no pools to form in low spots. Twenty-four hours to elapse between coats.

On a dense floor thin first coat with one pint turpentine to each gallon of KONCREX. Apply second coat without thinning.

Do not expose to traffic for at least 48 hours after application.

SPEED SPEC.

When cement floors are thoroughly cured and cleaned, two coats of KONCREX shall be applied in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

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WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

HORNSTONE CRYSTALS

The Chemical Treatment for Producing Dustproof Cement Floors

Easily applied at low cost, producing a hard, dense, insoluble, dustproof and permanently wearing surface, highly resistant to traffic and chemical disintegration.

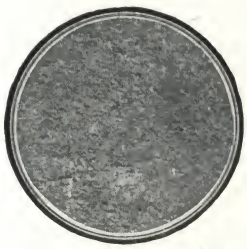
(1) Dusty cement floors are unnecessary, unsanitary and costly.

(2) They can be rendered flint-like and impervious to wear by simply washing with HORNSTONE CRYSTALS.

(3) It is unnecessary to tie up traffic for more than one hour, while treating the cement floors to render them dustproof.

(4) Dirt in machinery bearings, ruts in the floors, dust on shelves of merchandise, are due to dusty cement floors—all easily prevented with HORNSTONE CRYSTALS.

The positive, time-tested remedy adopted internationally to cure cement floors of their inherent weaknesses.



Microphotograph of Floor Before Treatment

HORNSTONE CRYSTALS are of a complex, mineral salt composition. Dissolved in water and simply flushed over the floor with a mop or broom, they soak into the concrete, with which they react chemically, filling the voids and producing hard, dense, permanent wearing surfaces, which will not dust.

HORNSTONE CRYSTALS do not produce a surface film, but penetrate the concrete. The depth of penetration varies in different floors. A hard and dense floor requires less penetration and less HORNSTONE for maximum strength. A soft, porous floor allows greater penetration and requires more HORNSTONE CRYSTALS to produce an efficient result.



Microphotograph of Floor After Treatment



Before Treatment **After Treatment**

Standard Specifications

The cement surfaces to be treated shall be clean and free from dust, dirt, and stains. The floors shall be treated with a sufficient number of coats to saturate the surface. Saturation will be denoted by the appearance of a slight white discoloration after the floor is dry.

1st Application—Dissolve one-half pound (½ lb.) of HORNSTONE CRYSTALS in 1 gallon of water and apply freely—brooming around with a soft floor brush or corn broom.

Secondary Applications—Dissolve two pounds (2 lb.) of HORNSTONE CRYSTALS in 1 gallon of water and apply when first application is dry. Use a soft floor broom or a rubber squeegee to brush puddles on to high spots. All surfaces should remain soaking wet for at least two minutes.

Covering Capacity

On average floor covering capacity is approximately two pounds (2 lb.) HORNSTONE CRYSTALS per one hundred (100) square feet.

Shipping Data

HORNSTONE CRYSTALS are packed in 100 lb. kegs and in 14 lb. cartons.

SPEED SPEC.

All cement floors shall be saturated with HORNSTONE CRYSTALS in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

KERAMIK

Beauty and Durability of Tile for Cement Floors Already Installed

KERAMIK

A color penetrant for concrete surfaces. KERAMIK reacts chemically with the lime content in Portland cement. It imparts beautiful, variegated colors in greens and browns. The A. C. HORN COMPANY supplies expert workmen to score the floors mechanically and apply KERAMIK.

Send for our elaborate catalogue on KERAMIK.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

DEHYDRATINE NO. 80

Dustproof Commercial Floors—Fatty Fast Setting Brick Mortar

Double the Strength in Half the Time

Premature traffic ruins ordinary floors and stairs. DEHYDRATINE No. 80 gives adult strength to youthful surfaces.

With DEHYDRATINE No. 80 speed with safety can accomplished in brick laying. Joints can be struck sooner, mortar drippage avoided and more courses of brick laid per day by adding this clever liquid to the mortar in mixing. Summer conditions may be had on cold weather brick work by varying quantities of DEHYDRATINE No. 80 to suit temperatures.

Conclusive tests by a prominent university (on file in our laboratories) show that DEHYDRATINE No. 80 develops both an initial and final set in the standard brands of Portland cement, in less than one-half the ordinary time. Simultaneously, DEHYDRATINE No. 80 is proven nearly to double the compressive strength at the end of one day, thereby justifying the claim of seven days' strength at the end of the first day.

A Nationally Known Builder Builds for Himself



Fuller Building, New York, N. Y.
WALKER & GILLETTE, Architects
GEO. A. FULLER CO., General Contractors

The Geo. A. Fuller Company, nationally known builders, with their wealth of experience in every product of competitive value, selected DEHYDRATINE No. 80 for their own office building—a most pleasing tribute to Horn's material

Causes for Increased Strength Are:

(1) It reduces the amount of water used. (See Duff Abrams on effect of water content.)

(2) More completely hydrates the Portland cement by reducing the surface tension of the water and giving a quicker saturation of the cement and sand particles.

(3) Formation of new cementitious material, the oxychlorides.

Tests conducted by the U.S. Bureau of Standards, as the result of investigations made for the U. S. Engineers' Office at Memphis, Tenn., resulted in the conclusion that DEHYDRATINE No. 80 composition accelerated the rate of increase in strength of cement mortar.

Cheaper "In" Than "Out"

Because

(1) Hastens the setting of cement mortar for floor and brick work, saving labor costs.

(2) Produces in 48 hours a result having the strength of a seven-day untreated mortar.

(3) Acts as an anti-freeze—a precaution and protection in freezing weather.

(4) Hardens cement floors throughout, producing dust-free cement floors and making possible a high polish.

(5) Lubricates concrete, causing it to "spade" and "chute" more easily by increasing the plasticity, making it "flow" readily around reinforcement.

(6) Makes cement mortar "fatty" and smooth.

(7) Increases the bond in stone and brick masonry.

Directions for Use

A one-inch floor topping shall be installed, composed of one part standard Portland cement and two parts clean coarse sand. To the mixing water shall be added DEHYDRATINE No. 80 as manufactured by the A. C. HORN COMPANY, in the proportion of one gallon for each barrel (4 bags) of cement. Pour, straight-edge, float and steel trowel in the usual manner. A second polishing trowelling shall be given when surface has set sufficiently to finish hard and smooth. Protect surface from traffic and keep wet down for ten days.

For brick mortar use from one quart to one gallon of DEHYDRATINE No. 80 to each ten gallons of mixing water, depending upon speed of set desired.

For Estimating—*Floors*—One gallon DEHYDRATINE No. 80 per one hundred square feet of one-inch topping.

Brick Work—From two quarts to one gallon of DEHYDRATINE No. 80 per thousand bricks.

Shipping Data

Shipping weight 11 lb. per gallon. Packed in 55-gallon steel drums; half-drums (30 gallons); and 5-gallon pails.

SPEED SPEC.

Cement floors and mortar shall contain DEHYDRATINE No. 80 in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A.C. HORN COMPANY. LONG ISLAND CITY. N.Y.

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WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

WOODCREX

Wood Floor Preservative

Prevents Wear and Discoloration of Wood Floors (Maple)

This is a pale, amber-colored liquid containing various gums and resins, which, when applied to wood floors, penetrates to a considerable depth, filling the pores of the wood with a resinous material which replaces the sap lost in kiln drying, and thus restores the wood to its former resilient condition. These gums, filling and setting in the pores, toughen the floor against the splintering shocks of traffic and exclude moisture and dirt. A Woodcrexed floor retains its natural beauty of grain and color.

Woodcrex is quick drying, it being possible, under average conditions, to open the floor to traffic within 24 hours after application.

Average Covering Capacity—*On Maple—One Heavy Flowed-on Application*—250 sq. ft. per gallon; 200 sq. ft. per gallon when dipped.

Shipping Data—Average weight 8 lb. per gallon. Packed in drums; half-drums; fives and ones.

KOPPER KARBOL

To Check Dry Rot—As a Wood Preservative

A solution of copper and creosote combined by our own process into a compound of highly penetrative and preservative value. The wood is completely preserved not only against the destruction by insects, but its most dangerous enemy—dry rot. It will protect wood from dampness, check further advance of decay that has begun, and will resist the growth of fungi or other parasites that hasten decay.

Kopper Karbol may be applied either cold or at a temperature of 150 degrees Fahrenheit; it may be applied by a brush, or by spraying or dipping.

Covering Capacity—*Rough Lumber*—200 sq. ft. per gallon. *Shingles*—One gallon will dip and afterwards brush 350 shingles.

Shipping Data—10 lb. per gallon. Packed in drums; half-drums; fives and ones.

BONDSIT

An Aid in Bonding Old and New Concrete

A granulated compound for use in bonding the topping of cement floors after the rough concrete has been placed; bonding plaster or stucco to concrete or cement surfaces; for making watertight joints in (a) waterproof construction, and (b) the construction joints caused by the end of the day's work or by temporary delays in securing labor or materials. Bondsit prepares the old surface by removing the laitance; increases the strength of the bond by at least 15%, which is sufficient for all needs.

Two pounds in solution will treat approximately 150 sq. ft. of surface.

Packed in jars of 5 lb. each, 6 jars to the case.

NO-FREEZE

Summer Speed on Winter Work

A rectified solution of maximum strength having a specific gravity of 32 degrees Baumé. Increases the rate of hydration of Portland cement mixtures, thereby developing heat by chemical reaction and lowering the freezing point. It also lowers the freezing point of the water, making possible the pouring of concrete, laying of brick in cement mortar, and the laying of cement floors in winter time.

Guaranteed not to reduce the strength of the concrete.

Mixed with the gauging water in the following proportions:

Anticipated temperature, deg. Fahr.	No-Freeze, gal.	Water, gal.
32	1	15
28	1	12
23½	1	9
22	1	8

Shipping Weight—11 lb. per gallon. Packed in drums; half-drums; fives and ones.

BAR-X

X-Ray Proof Floors and Walls

Bar-X is a dry compound which, when incorporated in cement floors as well as ceiling and wall plaster, absorbs the destructive X-ray, preventing injury to persons in adjoining rooms. Bar-X functions more efficiently than barium salts or barium sands in the construction of X-ray rooms.

Made standard by leading hospital authorities.

Packed in bags of ½ cu. ft. (75 lb.). Used in the following proportions:

For Cement Floors—1 cu. ft. (2 bags) Bar-X; 1 cu. ft. (1 bag) cement; 2 cu. ft. sand.

For Wall Plaster—One cu. ft. (2 bags) Bar-X; 2 cu. ft. wall plaster. These proportions to be used through all coats.

Send for special BAR-X data sheet

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

STAYBRITE
WATERPROOFING DRY COLORS
2 in 1
For Brick Mortar, Stucco, Cove Base, etc.

Why Mortar Colors Fail

(1) Ordinary colors add to the formation of efflorescence. The porous, leaky mortar admits driving rains. The water dissolves the salts present and evaporation deposits an unsightly discoloration on the outer face. This white film hides or masks the color in the joint.

(2) They contain excessive inert and organic impurities. These weaken the mortar and cause disintegration plus leakage.

(3) They fade due to sunlight and action of the alkali in cement.

(4) Mortar colors have low tinctorial power. They require too many pounds per bag of cement. This results in high cost, leakage, efflorescence, disintegration and loss of color.

Why Staybrite Functions

(1) STAYBRITE waterproofs as well as colors. This tends to prevent efflorescence, which is caused by porous, leaky mortar. The elimination of efflorescence prevents the hiding or masking of the color. Horn's famous waterproofing is ground into STAYBRITE at the factory in exactly correct proportions. The necessity of specifying or using additional waterproofing is thereby eliminated.

(2) STAYBRITE contains only pure high-grade metallic oxides, free from impurities and fillers.

(3) STAYBRITE is unaffected by the actinic rays of sunlight, and is impervious to chemical reactions prevalent in cement and lime mortars.

(4) STAYBRITE has the highest of tinctorial strength because of its pure concentration. Economy is gained by the small quantities required per bag of cement. The results are—low cost, no weakening or leakage of mortar, no efflorescence or loss of color.

Staybrite Is the Fool-proof Flag of Color in the Mortar Which Assures the Architect that Waterproofing in the Proper Proportion Is Present. Staybrite Comes Packed in Paper Bags Containing the Exact Quantity Required per Bag of Cement. No Weighing or Measuring Necessary

TO WATERPROOF AND MATCH THESE COLORS IN 1:3 MORTAR USE PER BAG OF CEMENT OR LIME:



2 lb.	*8 lb.*	*5 lb.*	*5 lb.*	*5 lb.*	*5 lb.*	*5 lb.*
Japanese Black	**Tile Red**	**Egyptian Green**	**Persian Yellow**	**Linoleum Brown**	**China Blue**	**Alaskan Brown**

Directions for Use

Each batch must contain the same proportions of cement, sand and STAYBRITE COLOR, which should be thoroughly mixed dry until the entire mass presents a uniform color, showing no streaks. The gauging water shall then be added in the smallest quantities that will produce a stiff workable mixture.

Mechanical mixing shall be done by a batch mixer only. The use of "continuous" type mixers should not be permitted, if uniformity of color is desired.

When mixing is done by hand, spread out half of the cement in a layer in the mixing box. Sprinkle STAYBRITE COLOR over it and cover with balance of cement. Mix thoroughly and add the sand, turning the mass over until the mass presents a uniform appearance. Add the water sparingly as above directed by pouring into a well-shaped depression made in the mass and hoe thoroughly until a uniform color and consistency is obtained.

SPEED SPEC.

All brick mortar, stucco, and colored cement floor base are to be colored and waterproofed by using STAYBRITE as manufactured by the A. C. HORN COMPANY and of a color to be selected by the architect.

A.C. HORN COMPANY. LONG ISLAND CITY, N.Y.

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WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

MAT-O-HORN

The Non-tearing Waterproof Tarpaulin

Modern Curing and Protection for Cement Floors

Until recently, it has been customary to specify that "the finished cement floors shall be covered with sawdust or sand and kept wet for two weeks." An admittedly inefficient and unsatisfactory procedure—particularly in the case of colored cement work which becomes badly stained and disfigured from plaster droppings and construction traffic.

Today, in the modern building, the floors immediately after installation are covered with MAT-O-HORN, *the non-tearing waterproof tarpaulin.* Under this protective airtight covering the cement work "sweats" for two weeks and cures under damp conditions without the necessity of wetting down. The usual building traffic will not mar or stain the surface protected by the tough MAT-O-HORN—which is kept in place until completion of the building. The cost of this method is no more than that of sand or sawdust protection and far more effective.

MAT-O-HORN consists of a strong woven fabric saturated with asphalt and faced on each side with a non-staining tough membrane. MAT-O-HORN has a thousand uses besides the curing of cement—such as enclosing winter work, blocking openings, covering work and material—in fact, wherever ordinary canvas "tarps" formerly were used.

MAT-O-HORN comes in a form convenient for handling, and is priced not for profit, but for service to Horn customers.

OMIT SAWDUST CURING—MAT-O-HORN COSTS LESS

GLAZING CEMENT FLOORS

The Biggest of Buildings Serviced by Horn



The Merchandise Mart, Chicago, Ill.

Greatly annoyed by dust, upon moving into this wonderful structure, the Marshall Field Co. sent for Horn Floor Service experts. A pleasing tribute to Horn leadership and today a satisfactory job

A new term, coined to describe the remedy produced by the Horn laboratories to cure the initial dusting of cement floors. Any well laid floor, whether a hardener or color has been used, will, because of the floating and trowelling of its surface, present a thin film of laitance or "glut" which must wear off before the true, permanently dustproof surface is revealed. Because this wearing off, or initial dusting, takes place during the first few months while the owner is moving in, the architect is often unfairly criticized for poor floors.

The remedy is simple and of very low cost. Apply a single coating of HORNITE or Transparent KONCREX, to the clean, dry floor after it has cured. This binds the soft film of laitance together, causing it to polish off slowly instead of dusting off. If the life of a cement floor surface is started by a polishing action instead of a gritty, disintegrating dusting, a dense finish is immediately developed and porosity avoided.

In sweeping a cement floor which has been glazed, the bristles of the broom slide smoothly over the polished surface—instead of catching in the pores of an unglazed surface. Thus is avoided the flicking of the dust and dirt into the air to settle back upon merchandise and machinery.

Directions

Do not cure floors by using wet sawdust or sand. Cover finished floor surface with MAT-O-HORN tarpaulin the day after trowelling. Do not wet down the floors, either before or after covering with MAT-O-HORN. Upon completion of all plastering, painting and cleaning down of building, remove MAT-O-HORN covering, allow floors to thoroughly dry and apply one coat of Transparent KONCREX or HORNITE No. 61 to the clean, stain-free surface.

CURE AND PROTECT THE MODERN WAY

SPEED SPEC.

All finished cement floors shall be cured by covering within twenty hours after installation with MAT-O-HORN, which shall be left in place until completion of the building. Upon removal of the MAT-O-HORN, the cement surfaces shall be glazed with one coat of Transparent KONCREX or HORNITE No. 61 in accordance with the directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

COLORUNDUM

Beauty and Durability of Tile at Cement Floor Prices

Non-Fading—Non-Slip

COLORUNDUM forms a colored armorplate integrally with the cement finish, similar to that of ceramic tile in thickness and quite comparable in durability.

The constant repetition of the cry for tile beauty when only cement floors could be afforded, forced the Horn laboratories to evolve this remarkable material.

COLORUNDUM is a dry powder, composed of powerful coloring mediums, fused aggregates, waterproofing and hardening elements plus cementitious binders. It is used exactly as it comes from its container and permits the foolproof application of a dust-coat floated and trowelled into the topping.

Outdoors or indoors, COLORUNDUM stands the time test. It is fadeproof, limeproof, waterproof and dustproof. Its tough integral thickness is wearproof.

Mortar colors have proven most inefficient in cement floors. They fade, soften the cement and dust badly. Integral paste colorings have proven unsatisfactory, as they crack and check the floor surface, fade out and require constant oiling or waxing.

To fuse a tile finish over the cement floors would be ideal. COLORUNDUM may be said to accomplish that result through its clever composition.

The non-slip, dense surface of COLORUNDUM makes it an ideal flooring for school corridors, auditoriums, stores, showrooms, sidewalks and ramps. Its beauty makes it applicable in every type of structure, from the modest cottage veranda to the monumental edifice.



Sidewalk

Price

COLORUNDUM, because of its large volume of sales, is manufactured in quantity production, enabling the price to compare with that of a painted cement floor, while its immaculate finish is comparable in permanency and beauty to tile floors.

All colors priced the same.



Retail Salesroom



Green

HORN SCORING METHOD

Through the development of mechanical grinding of joints with special abrasive wheels, COLORUNDUM floors may today be scored into 8-in., 12-in. or any sized tiles or random and ashlar design at half the cost of the old-fashioned hand method joining. Ground joints will sweep dust-free and exactly reproduce tile mortar joints. The A. C. HORN COMPANY supplies these special grinding wheels at cost.



Brown

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

COLORUNDUM

Specifications

A. Topping Method

Straight-edge a one-inch topping, composed of one part Portland cement, two parts clean, coarse sand, to finish floor level. When water has disappeared from the surface and topping has set sufficiently to hold up knee boards, dust on dry COLORUNDUM exactly as it comes from the container, in the proportion of twenty pounds per hundred square feet of floor surface. Wood float this dust coat thoroughly into the floor, but do not steel trowel. Then apply a second dust coat of dry COLORUNDUM in the proportion of ten pounds per hundred square feet. Wood float and steel trowel. When set sufficiently to take a hard burnishing, give the floor a final polishing steel trowelling. At the end of twenty-four hours, cover the floor with Horn's MAT-O-HORN, the reinforced paper-fabric tarpaulin, and protect from traffic for one week

B. Monolithic Method

Straight-edge the concrete, composed of one part cement, two parts sand, four parts stone, to finish floor level. When surplus water has disappeared, dust on a dry mixture of one part cement and two parts sand, in the proportion of fifty pounds of mixture per one hundred square feet. Float this into the surface with a long wooden darby, but do not steel trowel. When surface has set sufficiently to hold up knee boards, dust on dry COLORUNDUM in the proportion of twenty pounds per hundred square feet. Wood float thoroughly, but do not steel trowel. Apply a second dust coat of dry COLORUNDUM in the proportion of ten pounds per hundred square feet. Wood float and steel trowel. Give final burnishing steel trowelling when set sufficiently to finish hard and smooth. After twenty-four hours cover with Horn's MAT-O-HORN, the reinforced paper-fabric tarpaulin and protect from traffic for one week.

C. Duo-tone Variegated Effects

Beautiful mottlings or blended Duo-tones may be obtained by using a different color of COLORUNDUM in the second dust coat. Do not wood float second dust coat in this case, but pat in and steel trowel.

D. Walls

Where COLORUNDUM is specified for vertical surfaces, it shall be applied as a finish-plaster coat. The ground coat shall be thoroughly bonded, put on one-half inch thick and scratched. Ground coat shall be composed of one part Portland cement and three parts sand. The final plaster coat (similar to the white-coat in lime plaster work) shall be composed of COLORUNDUM exactly as it comes from the container, with only water added to make a thick paste. This shall be applied not less than one-sixteenth inch thick and not more than twenty-four hours after the ground coat. Give the finish plaster coat a hard dense trowelling. Spray the walls each day for one week.

E. Interior Work

To deepen color or to obtain a waxed finish, the COLORUNDUM surfaces may be given a coating of Horn's DEVELOPER AND SURFACER, after they are cured and dry. Efflorescence should first be dry brushed off.



Stadium

F. Exterior Work

All COLORUNDUM surfaces shall be dry scrubbed to remove film ot efflorescence or laitance, if any appears. To deepen color, apply one coat of Horn's DEHYDRATINE No. 2, after curing and drying.

G. Jointing

Forty-eight hours after installation, the COLORUNDUM topping shall be scored into twelve-inch tiles, unless otherwise required, using the Horn Method of a power-driven abrasive wheel. Joints shall be true and straight, one-quarter inch wide and one-sixteenth inch deep. At the time the topping is laid blind joints shall be installed each way every four feet, cutting through the topping with a small pointed trowel and trowelling over smooth. Scored joints shall be over the blind joints.



Automobile Show Room

Quantities Required

Floors require thirty (30) pounds of COLORUNDUM per one hundred (100) square feet.

Walls require fifty (50) pounds of COLORUNDUM per one hundred (100) square feet.

Shipping Data

COLORUNDUM is packed in one hundred (100) pound metal containers only.



Tile Red

SPEED SPEC.

The cement floor shall be finished in accordance with the A. C. HORN COMPANY'S COLORUNDUM Method, as filed in SWEET'S ARCHITECTURAL CATALOGUE; of a color to be selected by the architect and scored as directed.



French Grey

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

Swimming

POOLS

Lily

The installation of pools in this country is becoming so prevalent that the subject deserves attention. As the leading waterproofing manufacturer, the A. C. Horn Company Engineering Staff is constantly called upon for consultation in this regard. Our experience and data are available to the building industry without charge.



A Typical Private Estate or Club Swimming Pool

The actual engineering details of thickness of side walls and floor slabs, steel reinforcement, construction of scum gutters, drain outlets, etc., are simple. The perplexing points, particularly in swimming pools without tile linings of floors and walls—where concrete surfaces represent the final finish—are as follows:

1. How to waterproof the concrete thickness of walls and floor slabs?

   Answer: Use Hydratite Integral Paste Waterproofing, 2 lb. per bag of cement in the concrete.

2. How to decorate the side-walls—since the algae, or vegetable discoloring growth which forms in the water, seems permanently to stain with a slimy scum?

   Answer: Apply two brush coats of Hornrock (green color suggested), the waterproof cement paint. Its extremely low cost and ability to bind allows the pool to be recoated each year—thus at the beginning of each season the pool presents an immaculate appearance well worth the small effort and cost of application. The surface permits of scrubbing without deterioration.

3. How to construct the bottom or floor to avoid cracking?

   Answer: Leave a one-inch space between floor and all walls. Divide the floor slab into ten-foot squares, each separated by a one-inch space. Fill all of these spaces with Horn's Expansion Joint Cement, after first priming joints with Dehydratine No. 1.

4. How to finish the floor of the pool?

   Answer: Use the Horn's Colorundum Monolithic Method (preferably green). Leave the surface under a rough steel float and thus produce a non-slip result regardless of algae or slime.

If in doubt on any points regarding new or old pools, write the A. C. Horn Company.

Lily Pools

To construct a satisfactory lily pool, simply hollow out a bowl-like depression of any shape in the ground, approximately two feet deep at center. Put in a lining to the bowl of any size wire mesh reinforcement held up one inch on pebbles, then on top of that a lining of four inches of 1:2:4 concrete, waterproofed with Hydratite Integral Paste Waterproofing 2 lb. per bag of cement. Finish off concrete with Horn's Colorundum Monolithic Method (preferably green) or apply two coats of Hornrock to the trowelled off ordinary cement. Omit drains—they always clog and are abandoned. Fill with a hose and empty by syphoning or with a shovel. Upon completion put in a foot of rich earth, plant perennial lilies, fill with six inches of water, stock with goldfish. The combined presence of the fish and the lilies will keep the water pure all season—constant emptying is inadvisable. Line edges with rocks if desired.

HORN'S EXPANSION JOINT CEMENT

A solid asphalt in conjunction with vulcanized oils. Bonds perfectly and permanently and remains flexible and elastic from 0 to 160 deg. F. Maintains a permanently waterproof horizontal joint. Prime sides of joints with Dehydratine No. 1 before applying the Expansion Joint Cement, which should be melted and poured hot.

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

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WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

HORNROCK

For Decorating Wet or Dry Walls

Ordinary coatings have proven ineffective for wet or damp surfaces—oil paints peel, kalsomines contain organic matter (casein, glue, etc.) which decay; cement washes effloresce and crumble.

HORNROCK is composed of inorganic, cementitious compounds which adhere to the underlying surface of which it becomes an integral part. It is washable, immune to the action of salt air, steam, vapor and condensation. Exterior or interior concrete and masonry may be made bright, sanitary and attractive with HORNROCK immediately after construction without waiting for the surface to "cure."

HORNROCK is ideal for pools, basements, creameries, laundries, factories, interior or exterior wet or dry concrete or masonry surfaces of all kinds.



806. Light Green



808. Blue



807. Dark Brown



802. Stone Grey



801. White



804. Buff



805. Brick Red

Directions for Use of Hornrock

1. Preparation of Surface—Old paint, whitewash, kalsomine, etc., must be removed. Wash the surface with a 1% to 15% solution of hydrochloric or muriatic acid according to the strength required to remove the particular coating. Wash off the acid. Oil paint should be burned off.

Surface previously coated with kalsomine or similar materials must be scrubbed clean. Efflorescence (a white salt brought out by moisture evaporating in the sun) must be removed with a wire brush or a 10% solution of muriatic acid. Wash off the acid.

All loose dirt, etc., must be brushed off. Where waterproofing is required it is necessary properly to point all cracks and openings in the surface before HORNROCK is applied.

New or slightly damp plastered walls can be treated with HORNROCK without sizing. They should be well soaked with water before HORNROCK is applied.

The surface to which HORNROCK is applied must be thoroughly wet. The wetting of the wall must keep ahead of the HORNROCK application. Care must be taken between coats to prevent the moisture in the coating from evaporating too quickly. This is accomplished by gently spraying the surface of the first coat with water. Water is necessary for hydraulic setting of the material and must, therefore, be supplied as above to prevent undue loss by absorption. Brush and clean out cracks and soak with water.

2. Mixing—No more than will be applied in one continuous operation should be mixed to a creamy consistency. Add the dry powdered HORNROCK to clean water and stir well.

3. Application—The paint is best applied with a stiff-bristled whitewash or Dutch brush, using horizontal, sweeping, rather than vertical motion. Be sure the surface is wet ahead of the work. Do not go over a covered surface as this action may cause the paint to pull and be uneven. For small cracks, force the paint in by brushing over them several times.

The first coat usually takes about 24 hours to harden. Mix the second coat in the same way as the first, using slightly less water. Be sure it is applied to a moist surface. The first coat should be wet down with a soft spray of water before the application of the second coat. Follow all the above directions as given for applying the first coat. When the second coat has begun to harden, spray it gently.

Covering Capacity

Eight pounds of HORNROCK added to 3 quarts of water make 1 gallon for application, which will cover 200 to 300 sq. ft. (one coat), depending upon porosity and texture of the surface.

Shipping Data

HORNROCK is shipped in drums containing 100 lb. and cans containing 10 lb. each.

SPEED SPEC.

Surface (mention areas) shall be thoroughly cleaned and then given two coats of HORNROCK in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

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WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

HYDRATITE

Paste—Powder—Liquid

(Patented)
U. S. Patent Numbers 851,247; 1,031,003; 1,255,116; 1,088,022
Canadian Patent Number 156,443

Ammonium Stearate Compound to Be Mixed with Cement to Make Permanently Watertight Concrete and Cement or Lime Mortars

The "Official" Waterproofing

Nothing Equals Hydratite—Accept No Substitute

For technical opinions we respectfully refer in *toto* as well as specifically, to the following reports among several of prominent authorities:

American Face Brick Association—
"Wet Walls and Efflorescence" (page 26)
Mellon Institute Fellow Mr. F. O. Anderegg, 1930—
"Construction of Watertight Masonry" (page 322)
Bureau of Standards—
Report No. 370 (page 594)

Hydratite Means Waterproofed

There is no happy medium. A man is either dead or he is not. A building is either waterproofed, or it is not. Just as life is something that cannot be put back into the body, so waterproofing is something which cannot be put back into the concrete, brick mortar or stucco. after the building is built, *therefore:*

You Are Allowed But One Guess

But why guess at all, as to what brand or type of waterproofing to specify and use in your building. The Bureau of Standards at Washington, the American Face Brick Association, the Mellon Institute, through its Portland Cement Association Fellow Mr. F. O. Anderegg, as well as several other highly technical investigators, all agree that ammonium stearate satisfactorily waterproofs. Such associations are organized for your benefit—profit and economize by consulting leading research men. Our thousands of successful installations, the standardization of HYDRATITE by the largest architectural and engineering firms, our thirty-five years of leadership in the waterproofing field—are your factors of safety.

Do Not Approve "Solid Gold"

That is the only comparison which can be made when you are asked to approve a cheap competing product to HYDRATITE. You cannot prevent a manufacturer of cuff links from saying that his product is "solid gold" although he sells them for ten cents a pair. If you were specifying gold cuff links, you would either stipulate the karats of gold, or call for a reputable trade-marked article. This is equally true of ammonium stearate. To say a product contains ammonium stearate is not sufficient and most misleading. To say it is an exact duplicate of HYDRATITE is properly defining a product. Nobody can manufacture HYDRATITE as economically or efficiently as the A. C. HORN COMPANY —so why not insist upon the standard material itself.

Accept No Substitute for Hydratite

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

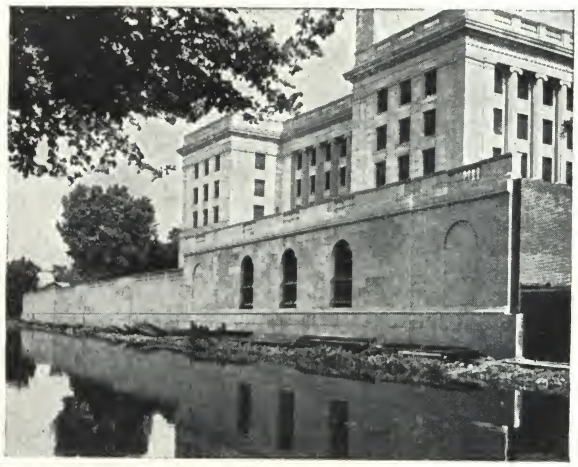
WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

Hydratite Specifications

Use Two Pounds or One Quart of Hydratite to Each Bag of Cement

CEMENT MORTAR PER 100 SQUARE FEET

Thickness, in.	Cement, bbl.	Sand, cu. yd.	Hydratite (8 lb.= 1 gal.) lb.
½	.50	.14	4
⅝	.625	.17	5
¾	.75	.21	6
1	1.00	.29	8
1½	1.50	.43	12



New Jersey State Power House, Trenton, N. J.

CONCRETE PER CUBIC YARD
(1:2:4-Mix)
Read down

Mixtures	A	B	C
Cement, bbl.	1.53	1.46	1.34
Sand, yd.	0.47	0.44	0.41
Stone, yd.	0.93	0.89	.....
Gravel, yd.	.....	.....	0.81
2% Hydratite, lb.	11.6	11.0	10.5

A: Using 2½-in. stone, most small stone screened out.
B: Using 1-in. stone and under, dust screened out.
C: Using ¾-in. gravel and under, sand screened out.

All concrete shall be placed in one continuous operation, each batch being puddled to insure maximum density and to avoid "pockets." In cases where joints are absolutely unavoidable, surfaces shall be roughened, cleaned, treated with Horn's BONDSIT (to join new and old concrete) wetted and cement grouted before placing additional concrete.

For waterproofing mass concrete (1:2:4), cement plasters or topping (1:2), cement and lime mortars, or stuccos (1:1:2), HYDRATITE shall be used in the proportion of two pounds of HYDRATITE Powder or Paste, or one quart of HYDRATITE Paste or Liquid, to each bag of cement or lime. For strictly lime mortar use HYDRATITE Paste or Powder.

Add HYDRATITE Powder to the dry cement.
Add HYDRATITE Paste or Liquid to the gauging water.
Maintain stiff mixtures at all times.

Guard Against Efflorescence on Brick Work

Unsightly efflorescence, or white discoloring salts on brick work, are generally due—not to the face brick, but to the mortar joints. Rain beats into the walls through the unwaterproofed joint—penetrates into the soft back-up brick and evaporation draws the salt-laden solution to the outer face, where the water evaporates and the white deposit remains. By waterproofing the brick mortar joints with HYDRATITE mixed in the brick mortar at the time of laying, the ride of the salts to the outer face is prevented.

Specify HYDRATITE in the proportion of two pounds or one quart per bag of cement and avoid, at trivial cost, this marring of the building's costly beauty.

Hundreds of buildings and the world's leading authorities on brick work attest the value of HYDRATITE for dry walls and the prevention of efflorescence.

SPEED SPEC.

All concrete below grade and all brick mortar shall be waterproofed with HYDRATITE in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

Accept No Substitute for Hydratite

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

VULCATEX

(Patented)

Knife Grade *Power Gun Grade* *Hand Gun Grade*

Elastic Caulking Compound

Ninety percent of building leaks are due to open joints improperly pointed up. Ineffective bond between joint material and sides of the joints in stone, brick, cast-stone or terra cotta work, as well as joints between masonry and window frames of steel and wood—are responsible for water damages and huge heat losses.

VULCATEX has been on the market for a quarter of a century, and yet the life of its enduring plasticity is yet unknown. It is an extraordinary elastic and rubber-like vulcanization of China wood oil which alone has stood the test of time. Its bond cannot be broken.

Consult us for tests by:

1. Terra Cotta Association.
2. Indiana Limestone Association at Bureau of Standards.
3. Thompson & Lichtner, testing laboratory for Stone & Webster.
4. Department of Buildings—City of Chicago.

Every Building Requires Caulking and Pointing—Do It Once for All Time By Using Vulcatex

Specifications for Vulcatex

1. General

VULCATEX is shipped ready for use. Because of its consistency a pointing trowel is used in its application. Dipping the trowel in crude oil or water or DEHYDRATINE No. 2 will prevent adhesion of VULCATEX to the tool.

Variation in temperature will affect the consistency of VULCATEX. Low temperature will thicken it to a consistency difficult to apply. The correct consistency is shipped from the factory, but the temperature at destination cannot be controlled. Place a bucket of VULCATEX in a tub of hot water and it will soften. VULCATEX is best workable at normal temperature. Joints must be free from dirt or dust. Nothing will adhere to a dusty surface. The sides of all joints shall be coated with DEHYDRATINE No. 2 Transparent Waterproofing, before pointing with VULCATEX.

2. Caulking Windows

(a) Jambs and Heads (see Fig. 1)—Staff beads, if present, shall first be removed. The space between the window frame and the masonry shall be caulked with picked oakum driven in tight to within ½ inch of the surface and the joint then filled with VULCATEX.

(b) Sills (New Construction) (see Fig. 2)—In new construction, the space between the sill and masonry shall be sealed with VULCATEX to a depth of at least 2 inches. The VULCATEX should be applied from inside the building as shown in Fig. 2.

(c) Sills (Buildings Already Erected)—In buildings already erected, the space between the sill and masonry shall be caulked by forcing VULCATEX into this space from the outside for a depth of at least ½ inch.

(d) Factory Steel Sash (see Fig. 3)—After the sash is set tight, VULCATEX shall be forced into the space between the sash and masonry to a depth of ½ inch.

3. Pointing Up Terra Cotta, Stone and Cast-stone Work

All joints in projecting cornices, overhanging stone, terra cotta or cast-stone balustrades, parapets and free standing features shall be raked out ½ inch. The sides of these joints shall then be coated with DEHYDRATINE No. 2 Transparent Waterproofing. After this coating, the joint shall be pointed full with VULCATEX.

4. Quantities Required

VULCATEX is sold by the gallon, which contains 231 cubic inches. The amount required can be calculated by computing the cubical contents of the voids or spaces to be filled.

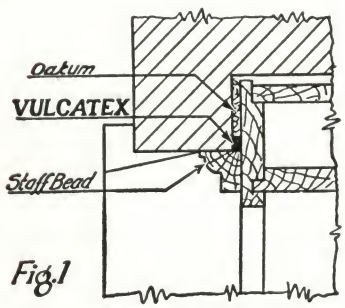
1 gallon of VULCATEX will caulk approximately nine windows, 4x7 feet.
1 gallon of VULCATEX will fill a joint ½x½ inch for 77 linear feet.
1 gallon of VULCATEX will normally be required to point occasional joints in 1000 square feet of brick work.

5. Colors

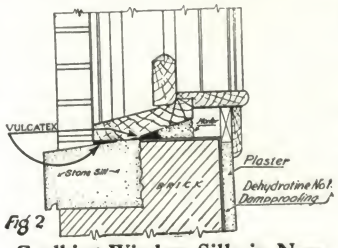
Slate Grey; Light Stone Grey; White; Limestone Color.

Shipping Data

Shipping weight, 15 lb. per gallon. Packed in 50 gallon barrels; half barrels (30 gallons); 5 gallon steel pails; and 1 gallon cans.

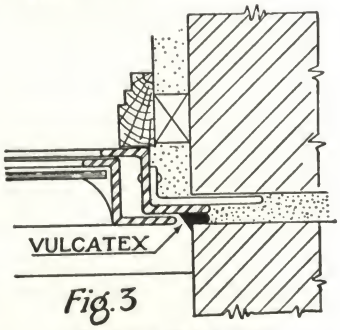


Window Caulking Detail—Horizontal Cross Section of Sash



Caulking Window Sills in New Construction

Space between sill and masonry Caulked from inside



Caulking Steel Sash

SPEED SPEC.

All caulking and pointing shall be done with VULCATEX in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

THE HORN POWER VULCATEX GUN

Requires NO { *Compressors, Electric Motors, Lengthy Hose Lines, Electric or Steam Power Lines, Bulky, Heavy Equipment*

Nothing to get out of order
One Man Can Carry
Ideal for Scaffold Work
Can be Set Up and Filled Quickly

200 Pounds Pressure in Caulking With Vulcatex Without the Expense of a Compressor



Fig. 1

The diagram below shows the details of the Horn Power Vulcatex Gun. It consists of a steel vessel, Shrader valve, air hose with fittings, delivery hose with its fittings and a pressure relief valve, as a safety device, to take care of any abnormal pressure. The outfit has been tested to a pressure to 300 lb. per sq. in. It comes complete as shown on the list of materials with the exception of items 15, 16, 17, 18, 19 and 20. The complete equipment comes in a specially designed case, that is suitable for shipping and also for carrying from place to place, as it has a hinged top, hasp and handles.

Liquid carbon dioxide is the gas commonly used with these guns, since it is convenient, cheap and readily available in all cities. It is generally bought in cylinders holding 20 lb. of *liquid carbon dioxide*. If carefully used, one of these 20 lb. cylinders will be sufficient to caulk 175 to 200 windows of average size. (Carbonated water in tanks, such as soda fountains require, *is not to be used.*) We do not supply the tank of gas or the pressure reducing valve. Both of these items may be secured from the local source of liquid carbon dioxide.

Effects of Temperature on Vulcatex—Just as molasses becomes thick and slow flowing in cold weather, all plastic materials such as Vulcatex become heavier when cold.

Vulcatex of power gun consistency is formulated to flow properly at temperatures between 60° and 70° F. If it is stored in a cold place, it will become too thick to flow readily from the placing nozzle except by the use of excessive gas pressure. To remedy such a condition, it is necessary only to warm the material by placing the package in hot water, or storing for 24 hours in a warm place.

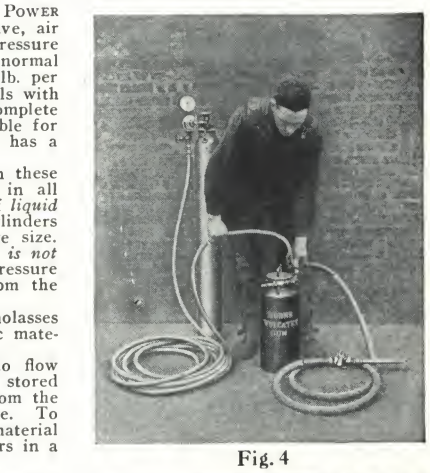


Fig. 4



Fig. 2

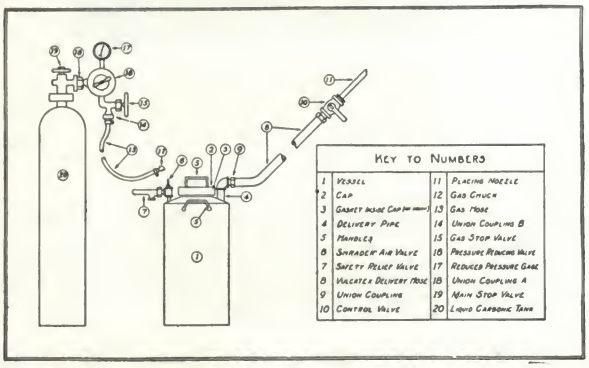




Fig. 5



Fig. 3



Fig. 6

Fig. 1—The Vulcatex delivery hose is attached to the vessel by means of the union coupling with which it is fitted and the control valve on the nozzle is closed.

Fig. 2—The large cap on the vessel is unscrewed and the cylinder filled to within about 2 in. of the top with Vulcatex of power gun consistency. Cap is replaced and screwed up tight enough against gasket so as not to allow any gas to leak out.

Fig. 3—Attach pressure reducing valve to carbon dioxide cylinder by means of union coupling. The air hose is fastened to the carbon dioxide reducing valve by means of the union connection with which the hose is fitted. Valve (19) on top of gas tank is opened and the pressure reducing valve is adjusted to maintain a delivery pressure of between 115 and 150 lb., depending upon temperature conditions and the speed with which the material is required to flow.

Fig. 4—Be sure washers in union couplings are in place, (a) reducing valve washer and (b) air hose washer. Remove the cap from the Shrader tank valve on vessel. Open valve (15) below pressure reducing valve. Apply air chuck to the Shrader valve until gas no longer flows, a point which can be determined by sound. Open control valve on delivery hose.

Fig. 5—In a few minutes hose will fill with Vulcatex and it will flow from nozzle. Caulking may then begin. If flow becomes slower, due to pressure lowering in the tank, renew pressure by application of the air chuck to Shrader valve as mentioned in Fig. 4, closing valve on delivery hose during the pressure renewing operation.

Fig. 6—Lack of Vulcatex in cylinder will be indicated by gas passing through delivery hose and the nozzle will "spit." Close control valve immediately, To refill the vessel, *reduce pressure in vessel by depressing needle of the Shrader valve.* Use cap of valve. *When pressure has been entirely relieved,* unscrew cap on vessel and refill as mentioned in Fig. 2.

Caution: Never remove cap of vessel without first relieving pressure in vessel.

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

DEHYDRATINE NO. 2

Exterior Transparent Coating For VIRGIN Surfaces

(For Indiana Limestone, Sandstone and other light-colored masonry specify Dehydratine No. 2A)

DEHYDRATINE NO. 2

DEHYDRATINE No. 2 has become the by-word in architectural and engineering circles for efficiency and economy in preserving brick, stone, concrete and stucco. In preventing the absorption of water, from beating rainstorms or atmospheric moisture, not only are damp stains guarded against, but also splitting and cracking from frost, rusting of metal lath, etc.

Today the presence of efflorescence upon a well-designed building is considered an unkempt reflection upon its constructors. DEHYDRATINE No. 2 insures a cleaner structure by sealing the pores, preventing the appearance of the ugly appearing stored-up salts called efflorescence, and eliminating the absorption of dirt particles.



Hotel Lamar, Houston, Texas
ALFRED C. FINN, Architect
HEWITT CONSTRUCTION CO., Contractors
Fifty prominent buildings in Houston have been treated by Horn

DEHYDRATINE NO. 2A

DEHYDRATINE No. 2 Transparent Waterproofing slightly deepens the color of the surface to which it is applied—a decided advantage upon many walls.

To meet the necessity for a colorless transparent treatment for Indiana limestone, sandstone and other light colored masonry, our DEHYDRATINE No. 2A was designed.

In service for many years, tested and approved by the Department of Testing Materials of the Indiana Limestone Association, DEHYDRATINE No. 2A, with its deep penetration and resistance to erosion and disintegration, has become the standard.

General Specifications

Materials

(1) DEHYDRATINE No. 2, as manufactured by the A. C. HORN COMPANY, Long Island City, N. Y., is to be delivered in original and sealed packages on the building site. It must be applied as received without the addition of any thinning material.

(2) VULCATEX Elastic Cement (four standard colors), as manufactured by the A. C. HORN COMPANY, Long Island City, N. Y., is to be used for pointing up all cracks, openings, and joints on wall surfaces and copings and to be used in caulking all windows before the application of DEHYDRATINE No. 2.

Cleaning

Surfaces should be carefully dry wire-brushed to remove all efflorescence, loose particles and other foreign matter such as dust, etc.

Application Temperature

The best results are obtained from the application of DEHYDRATINE No. 2 when temperature is above 60° F.

Method of Application

Not less than two coats of DEHYDRATINE No. 2 are to be applied (mention exterior surfaces) and where the surface is very porous apply the necessary amount of DEHYDRATINE to saturate. Use a spray or a short-handled stiff 4-in. brush in order to drive the material into the surface. Keep material luke-warm and when not in use, in a closed container.

To Cure Efflorescence—Dry brush the surface with a scrubbing brush until all the whitish salts are removed—*under no circumstances must water or any liquid be used in the removal of the salts*—mechanical action only must be used. Apply two coats or more of DEHYDRATINE No. 2 until the surface will not further absorb.

For Dampproofing Exterior Stucco, Brick or Concrete Surfaces—"Point" up all cracks, joints, openings, windows and copings with VULCATEX Elastic Cement. (Send for special pamphlet.)

VULCATEX is made in four standard colors so as to conform to architectural effects: Slate grey, light stone grey, white, limestone color.

Dry brush the surface and apply not less than two coats of DEHYDRATINE No. 2.

For Waterproofing Tanks, Silos, and other Water Containers—The surface must first be allowed to dry thoroughly. All pin holes, cracks, and joints must be filled with VULCATEX. DEHYDRATINE No. 2 is then applied in not less than two coats on the water side of the containers.

Covering Capacity

Approximately 125 sq. ft. per gallon, 2 coats.

Shipping Data

Weight—9 lbs. per gallon. Shipped in drums, half-drums, 5-gallon cans and 1-gallon cans.

SPEED SPEC.

All exterior masonry surfaces shall receive not less than two coats of DEHYDRATINE No. 2 in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

SYMENTREX

Decorative Waterproof Coating for Concrete and Masonry

Description

For thirty years SYMENTREX has been recognized as the leader of coatings combining color and waterproofness. It is immune to weather and disintegration by the alkalies in cement. Its fine texture may easily be washed with soap and water to renew its attractive and lasting color. Furnished in liquid form, applied to the dry surface in two coats by means of brush or spray, SYMENTREX solves the problem of waterproofing and beautifying masonry surfaces, including brick, concrete and stucco.

Since the cost of material approximates less than 25% of the total expense of effectively waterproofing and decorating in one operation, the use of cement washes or linseed oil paints has been discarded for the permanency of SYMENTREX.

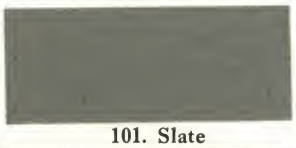
Cumar gum, one of the constituents of SYMENTREX, may be boiled in caustic soda without disintegration—so strong is its resistance to alkali.

Whether it be the humble stucco cottage in Maine, or the palatial hotels of Florida and California—SYMENTREX has long been withstanding the severe conditions of sun, rain, freezing and still worse—the attack of the alkali elements in the surface to which it is applied.

Truly a time-tested and proven product of the Horn Line.

Covering Capacity

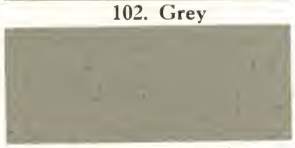
SYMENTREX covers 200 sq. ft. per gallon first coat and 300 sq. ft. per gallon second coat, depending upon the surface.



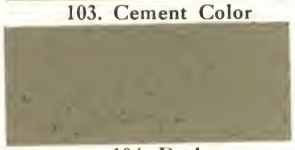
101. Slate



102. Grey



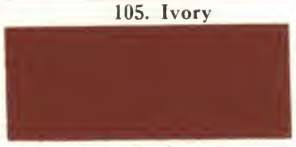
103. Cement Color



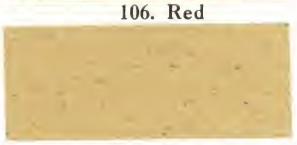
104. Drab



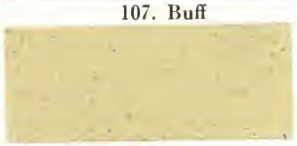
105. Ivory



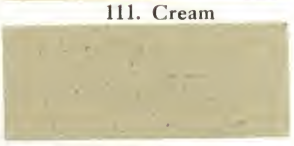
106. Red



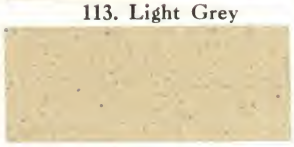
107. Buff



111. Cream



113. Light Grey



114. Sandstone

Shipping Data

SYMENTREX is shipped in barrels (approximately 50 gallons); half-barrels (30 gallons); 5-gallon steel pails; 1-gallon cans (6 cans to the case).

Directions for Use

Preparation and Condition of Surface—

Surfaces to receive SYMENTREX must be clean and dry. Concrete or stucco should be thoroughly cured before the coating is applied. All loose or foreign matter must be removed from the surface by wire-brushing or scraping before the coating is applied. All cracks or holes shall be cut out and carefully pointed with 1:2 Portland cement mortar.

Application—

SYMENTREX should be applied in two (2) coats. The material should be thoroughly stirred before using and as often as may be necessary to keep the base in suspension. SYMENTREX for the first coat should be thinned with turpentine in the proportion of ½ to 1 pint turpentine per gallon of SYMENTREX.

SYMENTREX for the second coat (or succeeding coats) should be used as received without thinning.

SPEED SPEC.

All exterior stucco and concrete shall be given two coats of SYMENTREX, in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

DEHYDRATINE NO. 1

Furring Compound

Dampproof the inner walls by surrounding them with an impervious, moisture-proof coating, thereby protecting the plaster from dampstains.

Plaster (not cement) *bonds perfectly* with DEHYDRATINE No. 1, as is proven by the many millions of square feet of walls now dampproofed.



Dehydratine No. 1 Will Protect Your Plastered Walls from These Dampstains

DEHYDRATINE No. 1 is composed of a complex blend of the finest asphalts combined with non-volatile oils, minerals, treated vegetable oils and pitches, thinned with mineral distillates. Intimate combinings of heat processes and proportions provide elasticity, adhesion, toughness and pliability to withstand expansion and contraction of walls.

Insulation — the absence of heat losses from within and of penetrating cold air from without — have made DEHYDRATINE No. 1 a most essential protection.

DEHYDRATINE No. 1 is not to be used as a coating for, or over, cement.

Specifications for Applying Dehydratine No. 1

Dampproofing Brush Coating for Inner Faces of All Weather Exposed Walls

(1) Material—DEHYDRATINE No. 1 Dampproofing Brush Coating as manufactured by the A. C. HORN COMPANY, Long Island City, N. Y., is to be purchased direct from the manufacturer or their authorized agents, and is to be delivered on the building site in original sealed packages.

It must be used without the addition of any thinning agents or any adulterants.

(2) Caution—Great care must be taken in the application of this coating to see that no pinholes remain and that a thorough covering coat is obtained.

(3) Pointing—All large holes must be pointed up with DEHYDRATINE No. 1 to provide a surface to receive the dampproofing.

(4) Number of Coats—Two thorough covering coats of DEHYDRATINE No. 1 are to be applied to (name surface), 24 hours being allowed between coats. These coats must be absolutely continuous and perfect in every respect.

(5) Plastering—Plaster may be applied over surfaces covered with DEHYDRATINE No. 1 within an interval of from 1 to 30 days.

Covering Capacity

DEHYDRATINE No. 1 covers 50 sq. ft. per gallon, double coat; 80 sq. ft. per gallon, one coat.

Shipping Data

Weight—8.5 lb. per gallon. Shipped in drums, half-drums, 5-gallon pails and 1-gallon cans.

SPEED SPEC.

The inner faces of all exterior walls are to be dampproofed with DEHYDRATINE No. 1 in accordance with the exact specifications of the manufacturer, the A. C. HORN COMPANY, as filed in SWEET'S ARCHITECTURAL CATALOGUES.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

MASTIC

DEHYDRATINE NO. 10

SEMI-MASTIC

A Dampproofing Which Spans the Holes and Cracks

Guarantee Against Poor Workmanship

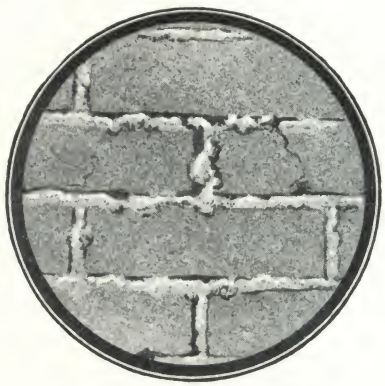
DEHYDRATINE No. 10 is your guarantee against poor workmanship in masonry walls. In spite of the utmost care in supervision, holes, poorly filled joints, cracks between mortar and bricks, will occur on the average job. To span these openings with a brush coating is difficult. Only a heavy mastic can hope to bridge over actual cracks.

Real Dampproofing-Heatproofing

The small difference between the cost of a good brush coating ordinarily called a "plaster-bond" and the cost of a heavy coating of DEHYDRATINE No. 10 is not a saving. This difference will be spent every year by the building owner because of increased fuel bills. DEHYDRATINE No. 10 not only preserves the building from damp spots but also is a proven insulating medium. The subject of heat loss has assumed equal importance with weatherproofing. Both are cared for by specifying the use of DEHYDRATINE No. 10. Prevent condensation and sweating.

Elasticity—Adjusts itself to any possible expansion or contraction of masonry or joints.

Adhesiveness—Bonds solidly to any dry masonry or metal.



Fire-Retarding—The reinforcing element is, in itself, a check to fire.

Waterproof—Will successfully resist a hydrostatic pressure if facing the head of water.

Erosionproof—The plastic character of the compound prevents its being worn away by erosion.

Acidproof—By its nature and composition DEHYDRATINE No. 10 is proof against acids or alkalies or other corroding influences, neither is it affected by water containing sulphates, carbonates, nitrates or chlorides in solution.

Temperature-proof — DEHYDRATINE No. 10 remaining, as it does, indefinitely plastic, there can be no possibility of cracks, even in the coldest weather. It will not flow after application in even the warmest weather.

Specification for Holeproofing Walls

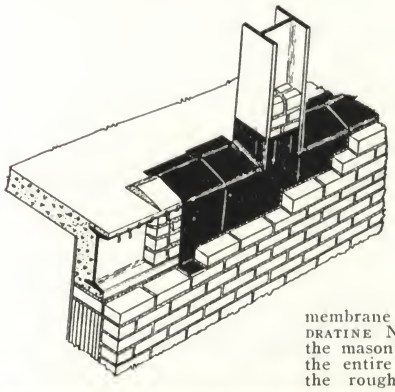
The inner surfaces of all weather-exposed walls are to be thoroughly coated with DEHYDRATINE No. 10, as manufactured by the A. C. HORN COMPANY. No crevices are to be left uncovered. All pinholes and voids to be pointed. Plaster to be applied directly over DEHYDRATINE No. 10 at any time within an interval of thirty days after the walls have been coated.

HORN'S SPANDREL BEAM WATERPROOFING

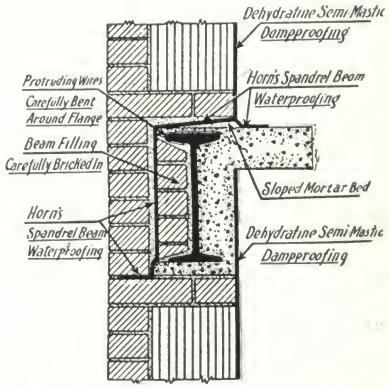
Specifications

(a) All wires shall be bent against underside of beam flanges. On top of outside edge of floor arch lay a bedding of cement mortar sloping back to thickness of ⅝ in. and 8 in. wide. Space between web and flanges on outside of spandrel beams and wall columns to be filled with brickwork to form a smooth surface.

(b) Apply TRIPLEFLEX FABRIC buttered on one side with DEHYDRATINE No. 10 Mastic, both as manufactured by the A. C. HORN COMPANY, to the outside of all exposed beams, butter side to masonry, carried 3 in. beyond inside wall line and out 3 in. on first course of brick below bottom of beam. Flash membrane up 6 in. on all but inner face of outside columns. No wrinkles permitted.



(c) Waterproofing Spandrel Beams—The outside of all exposed beams shall be waterproofed by the application of a membrane of Tripleflex Fabric, one side of which has been given a trowel coat of DEHYDRATINE No. 10 Mastic Dampproofing, these materials manufactured and supplied by the A. C. HORN COMPANY, Long Island City, N. Y. The membrane shall be applied with DEHYDRATINE No. 10 covered side next to the masonry. It shall extend through the entire wall and be carried in on the rough concrete floor at least 3 in. beyond the wall line so as to lap on the wall dampproofing which will be applied later. The membrane shall be carried down the face of the beam filling for depth and then out 3 in. on first course of brick below bottom of beam. All joints shall be lapped at least 3 in. and well buttered with DEHYDRATINE No. 10. The membrane shall be flashed up at least 6 in. at the outside and two adjacent sides of all wall columns and on all faces of corner columns. The membrane shall be applied in units approximately 3 ft. wide and of sufficient length to conform to the construction detail as specified above. After the columns have been flashed as above described, the flashing around the corners shall receive a reinforcing strip of the waterproofing which shall be applied to the outside corners extending for the full height of the flashing and at least 3 in. on each face of the column. The membrane shall be pressed tightly against the underlying surface so there shall be no wrinkles. This contractor shall cooperate with the mason contractor in order to schedule his work properly and avoid delays. All brickwork, bending of wires, and application of mortar bed on top of the floor arch shall be done by others.



A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

Other Famous

DEHYDRATINES

DEHYDRATINE NO. 3—Stone and Trim Stainproofing Backing

A specially prepared, quick-drying *black brush coating* to be applied on all unexposed surfaces of cut stone or of wood trim.

This compound has for its object the protection of limestone and other light colored stones from the stains caused by the percolation of dampness through the grain and which afterwards are revealed in discolorations on the face of the stone.

The sources of these stains may be traced to the coloring matter and salts absorbed from the brick backing into the stone by saturation.

DEHYDRATINE No. 3 should be used on the back of all trim to prevent warping and dry rot.

Covering Capacity—100 sq. ft. per gallon, 1 coat.

Shipping Data—Weight, 8.5 lb. per gallon. Shipped in drums, half-drums, fives and ones.

DEHYDRATINE NO. 4—Foundation Brush Coating

A viscous black bitumastic compound to be applied *cold* with a brush.

Is especially designed for substructural work. Excludes ground water and gases from the substructures. Keeps the concrete or masonry dry and free from the disintegrating influences of dampness. For waterproofing:

(1) Concrete or masonry foundation walls (applied to the outside surface below grade).

(2) Bridge abutments, retaining walls, and culverts.

(3) As a damp course, over:

(a) Footing, (b) top of foundation walls in buildings without basements, (c) concrete floors on the ground to be overlaid by wood or linoleum.

(4) Rear of parapet walls and fire walls projecting above the roof.

(5) Cisterns, tanks, etc.

(6) In priming masonry surfaces to be coated with asphalt.

In its composition, DEHYDRATINE No. 4 has all the properties requisite for efficient results when used for the above mentioned purposes. It is bituminous, tough, plastic and elastic; heavy in body and water resistant. It is applied cold, thus saving the expense and inconvenience of liquifying by heat.

Covering Capacity—33 sq. ft. per gallon, 2 coats.

Shipping Data—Shipping weight, 8.5 lb. per gallon. Shipped in drums, half-drums, fives and ones.

DEHYDRATINE NO. 5—Saponification-Proof Steel Paint

A field coating for structural steel, metal lath or miscellaneous iron that is to be covered with masonry, concrete or plaster. It is a fused hydro-carbon paint, formed into a homogenous mass and does not settle to the bottom as a pigment coating would. Its homogeneity insures a uniform coat over the surface to which it is applied, no stirring of the liquid being necessary.

Its ingredients are selected for their resistance to acid and alkali; they are combined and treated so that a film of DEHYDRATINE No. 5 has the same elasticity as the steel itself. This gives an added durability because the paint does not peel or crack.

The resistance of DEHYDRATINE No. 5 to acid is important particularly where the film comes in contact with cinder concrete, or where such gases as carbon dioxide or sulphur dioxide are present.

DEHYDRATINE No. 5 is not affected at all by the alkali of mortar or concrete. It is a non-conductor of electricity, one coat resisting six hundred volts.

DEHYDRATINE No. 5 is a steel preservative in every sense of the word.

Covering Capacity—500 sq. ft. per gallon, 1 coat.

Shipping Data—Shipping weight, 8.5 lb. per gallon. Packed in drums, half-drums, fives and ones.

DEHYDRATINE NO. 6—Waterproof Trowel Coating

(See Dehydratine No. 4 for brushing consistency)

A black compound similar to DEHYDRATINE No. 4, but of a heavier consistency and to be applied with a trowel. For application to uneven surfaces which cannot be effectually covered with a brush coating.

Works readily into small holes and irregularities. Has a good consistency and bonds tightly to the surface to which it is applied. Is proof against alkali and acid reactions of ground waters.

Among the uses of DEHYDRATINE No. 6 may be included the following:

(1) Dampproofing foundations below grade against surface drainage.

(2) As a damp course across footings and over tops of foundation walls, in buildings without basements.

(3) As a waterproof cut-off course under masonry copings and sills.

(4) Waterproofing rear surfaces of brick parapet walls.

Note: It is recommended that surfaces to be coated with DEHYDRATINE No. 6 should be primed with a brush coating of DEHYDRATINE No. 4.

Covering Capacity—26 sq. ft. per gallon, coating $\frac{1}{16}$ inch thick.

Shipping Data—Shipping weight, 10 lb. per gallon. Shipped in drums, half-drums, fives and ones.

DEHYDRATINE NO. 7—Hot Foundation Mop Coating

A specially prepared and blended asphaltic compound for application directly to outside of foundation walls below grade; or in conjunction with TRIPLEFLEX FABRIC in membrane waterproofing.

It is chemically inert; is acid and alkali proof; it never becomes brittle and remains ductile and flexible at all ordinary temperatures. It yields without breaking under flexure, expansion and contraction.

Physical Properties of Dehydratine No. 7—

Specific Gravity 77 deg. F.	1.07
Melting Point (Ball and Ring Method)	164 deg. F.
Penetration at 77 deg. F.	10 to 20
Penetration at 32 deg. F.	9 or over
Ductility	3+
Flash Point	610 deg. F. min.
Evaporation Loss	1% max.
Solubility in Carbon Bi-Sulphide	99.8% min.

Covering Capacity—33 sq. ft. per gallon, 1 coat.

Shipping Data—Shipping weight, 8.5 lb. per gallon. Shipped in drums.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

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WATERPROOFINGS A HORN PRODUCT FLOOR TREATMENTS

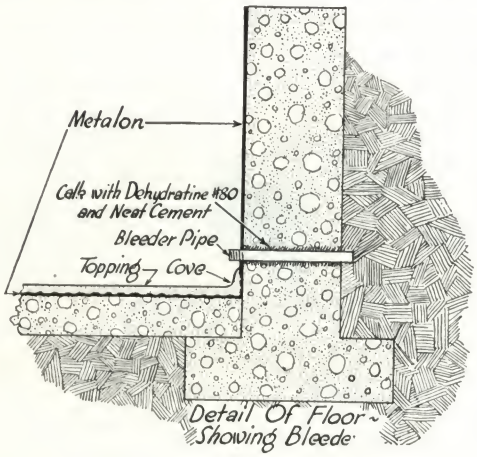
METALON

Horn's Iron Method

For Inside Waterproofing of Concrete and Brick Walls

Although general waterproofing practice has been to waterproof structures on the water side, or at the point of contact of the water, repeated requests for a material to be applied *to the inside* of exterior walls on structures already built have mothered the development of METALON—*Horn's Iron Method* of waterproofing. Many years of results have been very successful.

METALON may be applied to concrete, brick, cement block or similar masonry surfaces. Five or six coats of METALON are required to insure against pressure.



Where pressure is encountered, the floor must be treated as well as the walls. When the operation is completed it will be necessary to protect the iron membrane on the floor with the usual topping of cement. At the junction of the wall and floor sufficient material of each mixture must be applied to provide a cove joining the wall and floor.

The finished surface will present a reddish brown appearance which may be decorated by one application of A. C. HORN COMPANY'S HORNROCK or a wash of Portland cement and water.

Directions for Use of METALON

(1) Clean and roughen all surfaces thoroughly, making them free from laitance and other foreign matter, by scraping all loose material off and wire brushing if necessary. Cut out all cracks and openings to a depth of one inch and fill with a stiff mortar made with DEHYDRATINE No. 80 and Portland cement (no water or sand to be used in this mixture). This is essential where heavy pressures are encountered.

(2) Wet the entire surface to be waterproofed, using a four-inch brush for applying the water (under no circumstances apply METALON to a dry surface).

(3) Apply not less than five coats of METALON, using a four-inch paint brush.

(4) Never make up more material than can be used in thirty minutes.

(5) Make METALON coating for first coat as follows:

Add METALON to water slowly, constantly stirring to the consistency of heavy cream. Keep constantly stirred and apply with a stiff brush to the wet wall. The material should be well rubbed in, with a rotary motion, to insure entrance of the fine material into the pores of the surface. Allow to become thoroughly dry until wall has assumed reddish brown color. No cement is to be used with METALON for first coat. The first coat should be gently dampened at intervals, commencing about two hours after application, preferably by the use of an insecticide spray.

(6) For second coat, use equal parts of METALON and Portland cement. Mix and apply as before, wetting down at intervals as for first coat. For second and later coats, a four-inch paint brush should be used.

(7) For third coat, use equal parts of METALON and cement. Mix and apply as before.

(8) For fourth and fifth coats, use mixture same as for second coat. Surface can then be given cement wash if desired, using Portland cement and water, or HORNROCK, furnished in colors if desired, as manufactured by the A. C. HORN COMPANY.

(9) Always wet the surface over which each is to be applied and *always keep the mixture stirred* and to the consistency of heavy cream, adding water as soon as the mixture heavies up.

(10) Over floor surfaces use the same mixture and the same procedure but never permit puddles of water to accumulate in wetting the floor—the water should always be spread out before application is begun. Install a new cement topping to protect METALON coatings. Topping should be one inch thick laid over two inches of concrete and run up on walls in a cove base. If floors are only cracked, cut out cracks one-half inch wide and one inch deep, slush all sides of cracks with grout coat of one part METALON, one part cement and sufficient water to make a thin cream. While slush coat is still wet, fill in cracks with a mixture of one part METALON, one part sand and one part Portland cement mixed with water to a stiff putty. Trowel smooth. After setting, cover cracks with wet burlap bags for one week.

(11) Every coat of METALON must be allowed sufficient time to become rusty, before a succeeding coat is applied. Keeping the material damp assists the rusting.

(12) Where pressure requires, bleed walls to sump pit and cap bleeders upon completion of waterproofing

Covering Capacity

One pound per square foot of surface treated, 5 coats.

Shipping Data

100 lb. steel pails and 20 lb. kits.

SPEED SPEC.

Floors and walls below grade to be waterproofed with METALON in accordance with the exact directions of the manufacturer, the A. C. HORN COMPANY, as listed in SWEET'S ARCHITECTURAL CATALOGUES.

A.C. HORN COMPANY, LONG ISLAND CITY, N.Y.

Continued on next page

WATERPROOFINGS HORN PRODUCT FLOOR TREATMENTS

LEAKY BUILDINGS

Remedial Waterproofing is a big subject, difficult to treat in a general or condensed manner. Water will travel great distances in walls and may come out at a point far distant from its source. It is essential in diagnosing a leaky structure to check the following points:

(1) Roof

Diagnosis—Be sure that all the laps are properly joined, the felt free from pin holes and not sun-dried.

Remedy—Sweep roof clean, apply Horn's DRI-N-TITE to sun-dried felt, using plastic consistency if pin holes exist. Replace gravel. One gallon will cover 25 sq. ft., $\frac{1}{16}$ inch thick.

(2) Gutters

Diagnosis—Examine for leaks in tin, copper or other metal leaders, gutters or water outlets.

Remedy—Patch them by soldering.

(3) Flashings

Diagnosis—Do they extend from roof to underside of copings on parapets and fire-walls?

Remedy—Apply DRI-N-TITE Plastic with a trowel.

(4) Coping Joints

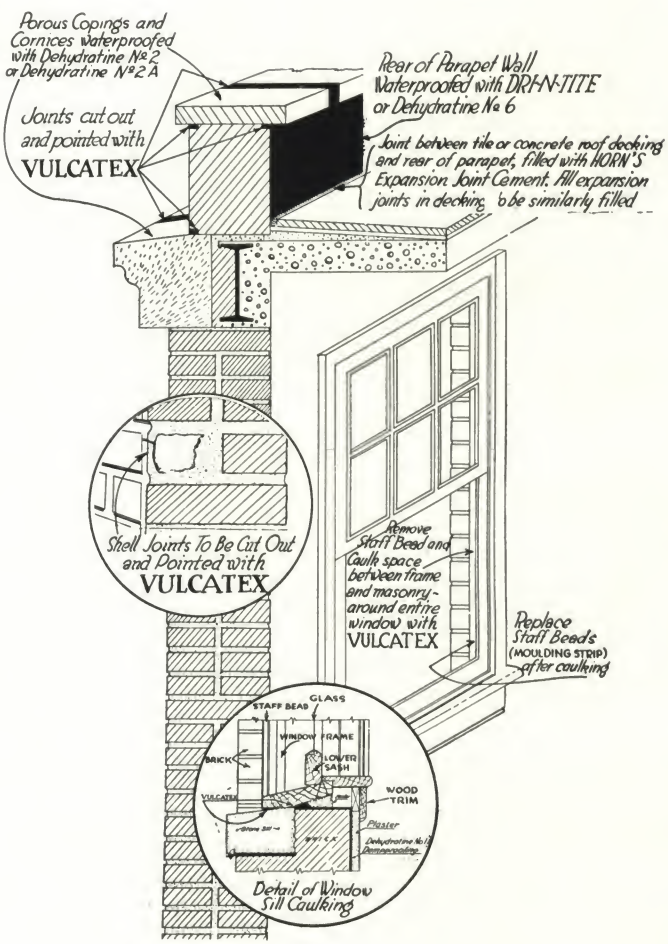
Diagnosis—Examine for open cracks between stone and mortar, dried out caulking compounds and poor workmanship.

Remedy—Clean out to depth of ½ inch, then point, caulk or fill all joints both on underside of copings and tops of all horizontal projections such as art-stone work, etc., using Horn's VULCATEX Elastic Cement.

(5) Window Openings

Diagnosis—Actually remove staff-beads (moulding strips) and look for poor caulking.

Remedy—Caulk every window or other opening with VULCATEX, including joints underneath sills. One gallon of VULCATEX is usually sufficient for nine windows.



(6) Masonry and Brick Joints

Diagnosis—Examine for hair cracks. Tap all joints with light tack hammer to locate hollow shell joints (a very prevalent source of leakage).

Remedy—Cut out shell joints and cracks at least ⅜ inch wide and ½ inch deep. Caulk with VULCATEX.

(7) Walls

Diagnosis—Assume that masonry is porous.

Remedy—If exterior masonry is a virgin surface, apply at least two coats of DEHYDRATINE No. 2 over all. If exterior surface has been previously painted, use Horn's SYMENTREX coating in two coats.

(8) Basements

Diagnosis—Examine for leaks due to porous walls, cracks, open joints in masonry between floor and wall and in floor slabs.

Remedy—Clean and roughen walls and apply METALON. Cut out floor cracks ½ inch wide and 1 inch deep and install METALON. *See reverse side of this page.*

For Remedial Waterproofing on Monumental Structures

The A. C. HORN COMPANY maintains several subsidiary organizations throughout the United States, composed of specially trained waterproofing engineers, superintendents, foremen and expert mechanics. To them has been entrusted the remedial waterproofing of such notable structures as the Yale Bowl, Wellesley College Quadrangle Group, the Ritz Towers, etc.

We solicit your inquiry regarding this highly organized and extremely economical and efficient branch of our business.

A. C. HORN COMPANY, LONG ISLAND CITY, N.Y.

REPRESENTATIVE JOBS OF HORN PRODUCTS

Akron, Ohio
Seiberling Factory

Albany, N. Y.
D. & H. Railway Co. Office Bldg.

Aledo, Ill.
Kraft-Phenix Cheese Factory

Amherst, Mass.
Amherst University

Annapolis, Md.
U. S. Naval Academy

Atlanta, Ga.
Cable Bldg.
Dept. Store, Chamberlain, Johnson and DuBoise

Auburn, N. Y.
Auburn City Hospital

Aurora, Ill.
C. B. & Q. Railway Depot

Austin, Tex.
Norwood Tennis Courts

Baltimore, Md.
Metropolitan Savings Bank Bldg.

Barrytown, N. Y.
St. Joseph's School

Beaumont, Tex.
San Jacinto Life Insurance Bldg.
Stone & Webster Power Plant

Berkeley, Calif.
H. J. Heinz Corp.

Biltmore, N. C.
Biltmore Estate

Boston, Mass.
American Radiator Co., Whse.
First Church of Christ Scientist
John Hancock Mutual Life Ins. Bldg.

Bound Brook, N. J.
Bakelite Company

Bridgeport, Conn.
City National Bank Bldg.

Bristol, Conn.
Bristol High School

Bronx, N. Y.
Bronx Terminal Market
DeWitt Clinton High School

Brooklyn, N. Y.
Mergenthaler Linotype Co.
U. S. Ptg. and Litho. Co.

Buffalo, N. Y.
International Milling Co.
N. Y. Telephone Co.

Charleston, W. Va.
Kanawasha Valley Bldg.

Chicago Ill.
C. & N. Railroad Depot
The Chicago Tribune Bldg.
Edgewater Beach Hotel
Palmolive Bldg.
Popular Mechanics Magazine Bldg.
Western Electric Co. Bldg.
Women's Athletic Club
Wrigley Bldg.

Cleveland, Ohio
Sloane Bldg.

Columbus, Ohio
Columbia Savings Bank and Trust Co.

Dallas, Tex.
Dallas Telephone Bldg.
General Motors Co.
Magnolia Petroleum Bldg.
M. K. & T. Railroad Station
Sears-Roebuck Whse.
Western Electric Whse.

Detroit, Mich.
Alhambra Theatre
Edsel Ford Home
Ford Motor Car Co.
La Salle Theatre

Easton, Pa.
Sterling Products Co.

Emeryville, Calif.
C. K. Williams Co. Plant

Ensley, Ala.
5-Million-Gallon Reservoir

Fitzdale, Vt.
Fitzdale Paper Co.

Fort Worth, Tex.
Y. M. C. A. Bldg.

Galveston, Tex.
American National Bank Bldg.

Hamilton, N. Y.
Colgate University

Hartford, Conn.
Phoenix Mutual Life Ins. Co.

Hoboken, N. J.
Lackawanna Terminal

Hollywood, Calif.
Pantages Theatre Bldg.

Hot Springs, Va.
Bath National Bank

Houston, Tex.
Cotton Exchange Bldg.
Electric Bldg.
Esperson Bldg.
Gulf Bldg.
Majestic Theatre
Medical Arts Bldg.
Merchants and Manufacturers Bldg.
Petroleum Bldg.
Rettigs Ice Cream Plant
Rice Hotel

Ithaca, N. Y.
Cornell University

Jacksonville, Fla.
Purity Ice Cream Co.

Kansas City, Mo.
Bell Telephone Bldg.

Kenwood, N. Y.
Oneida Community Office Bldg.

Lake Placid, N. Y.
Lake Placid Club

Long Beach, Calif.
Ford Motor Co.

Long Island City, N. Y.
American Eveready Works
Ford Bldg.

Los Angeles, Calif.
L. A. Central Library
Exposition Park
1st Baptist Church
Harold Lloyd Estate
Los Angeles County Hospital
Los Angeles Tennis Club
Pacific National Bank Bldg.
Paramount Lasky Corporation
Willard Battery Plant
Women's Athletic Club

Louisville, Ky.
L. & N. Railway Co.

Massena, N. Y.
U. S. Aluminum Co.

Middletown, Conn.
Wesleyan University

Montreal, Quebec
Y. M. C. A.

Mount McGregor, N. Y.
Metropolitan Life Ins. Co. Sanitarium

Newark, N. J.
Alderney Diary Company
Kent Automatic Garage
N. J. Bell Telephone Co. Bldg.

New Haven, Conn.
Yale University

New Orleans, La.
Hotel Denechand

New York, N. Y.
American Tel. & Tel. Bldg.
Bee Lines, Inc., Bus Terminal
Canadian Pacific Bldg.
Chrysler Bldg.
Columbia University, School of Mines
Arnold Constable Bldg.
Eleto Warehouse
Empire State Bldg.
Fred F. French Bldg.
Garment Center Capitol
General Motors Bldg.
Heckscher Bldg.
Hotel Ambassador
Hotel New Yorker
International Magazine Bldg.
Kent Automatic Garage
Lehigh Valley Freight Terminals
Lexington Ave. Subway Stations
New York Central Bldg.
No. 1 Park Avenue
Park and Tilford Warehouses
Salvation Army Headquarters
Savoy-Plaza Hotel
Schrafft's Restaurants
Standard Oil Bldg.
S. W. Strauss & Co. Bldg.
Ward Baking Co.
Warner Bros. Bldg.
R. C. Williams Warehouses
Woolworth Bldg.

Niagara Falls, N. Y.
American Cyanamid Co.

Oakland, Calif.
Capwell Emporium Dept. Store
Durant Motor Co. Plant
Fisher Body Corp.
Shredded Wheat Co.

Philadelphia, Pa.
Fairmount Art Museum
Hahneman Hospital
Integrity Trust Bldg.
Irvine Auditorium
Rochester Gas & Electric Co.
University of Pennsylvania
Pennsylvania R. R. Main Station.

Pittsburgh, Pa.
Plaza Office Bldg.

Port Chester, N. Y.
United Hospitals

Providence, R. I.
Narragansett Gas Co. Bldg.

Rochester, N. Y.
Eastman Kodak Co.

Rome, N. Y.
Montgomery Ward Co.

Sacramento, Calif.
Civic Auditorium

St. Louis, Mo.
Anheuser-Busch "Bevo" Plant
Metropolitan Bldg.

San Antonio, Tex.
Majestic Theatre Bldg.

San Diego, Calif.
State Teachers' College Bldg.

San Francisco, Calif.
United States Custom House

Schenectady, N. Y.
American Locomotive Works

Seattle, Wash.
Bon Marche
Standard Furniture Co. Bldg.
Washington Athletic Club

Springfield, Mass.
Westinghouse Electric Co.

Stamford, Conn.
Yale & Towne Mfg. Plant

Syracuse, N. Y.
Syracuse University Hospital

Tia Juana, Mex.
Agua Caliente Racing Pavilion

Tonawanda, N. Y.
American Kardex Co.

Trenton, N. J.
W. & J. Sloane Linoleum Plant

Utica, N. Y.
Crane Company
Westinghouse Mfg. Co.

Washington, D. C.
Cary Ice Cream Co.
U. S. Senate Office Bldg.

Wellesley, Mass.
Wellesley College

A PRODUCT FOR EVERY CONDITION and METHOD

FLOOR TREATMENTS

WATERPROOFINGS



DAMPPROOFINGS

TECHNICAL PAINTS

A.C.Horn Company
WORKS-LABORATORIES-EXECUTIVE OFFICES
Long Island City-New York

JOHNS-MANVILLE

EXECUTIVE OFFICES
292 Madison Avenue, NEW YORK, N. Y.

For Branch Offices, see Section on Wall Tile

Products

CELITE for concrete and mortar.

Also Packings for all purposes; Refractory Cements; Waterproofing and Dampproofing; Asbestos Ebony; Asbestos and Asphalt Roll Roofing; Rotproof Roofs; Asbestos Products of all kinds.

For the following Johns-Manville products, see Manufacturers' Index:

Acoustical Treatment and Sound Isolation; Shingles; Built-up Roofing; Home Insulation; Insulating Board and Plaster Lath; Insulations; Tile Flooring; Transite, Flat and Corrugated; Wall Tile.

CELITE FOR CONCRETE AND MORTAR

Celite is a specially prepared grade of diatomaceous silica which when used in concrete and mortar becomes a permanent element therein and does not affect the time of setting. It is not a substitute for Portland cement but acts as an ultra-fine aggregate which serves to improve workability and to keep the cement and aggregates uniformly distributed, preventing segregation.

Improved Workability—The first benefit of Celite in a concrete mixture is improved workability. It obviates the use of excess mixing water and makes it possible successfully to place concrete of drier consistencies in mass structures or in intricate forms, without danger of honeycombing or segregation.

What Improved Workability Means—(1) It results in quicker and cleaner discharge from the mixers, chutes, buggies, etc.

(2) The concrete can be placed with less labor and manipulation.



Celite in Concrete Makes Possible the Casting of Intricate Designs Direct in Place from a Form

(3) Greatly improved appearance because the concrete will flow into the forms around intricate reinforcing, completely filling all corners and recesses.

(4) Relatively dry concrete can be satisfactorily handled by chutes without need for excess water.

(5) In cases where central mixing is employed no segregation will be encountered in transit from the mixer to the job, and difficulties in dumping from trucks will be eliminated.

Uniformity and Strength—Segregation is the principal cause of non-uniformity in a concrete structure. It can be absolutely overcome through the correct use of Celite, so that the minimum strength (which is, in fact, the effective crushing strength of the concrete) is greatly increased.

A higher average strength also is made possible since concrete containing Celite can be placed with less slump, ordinarily, than would otherwise be used.

Watertightness—Celite provides integral watertightness in concrete in which it is used—a result of improved uniformity and decreased void sizes.

Method of Use—No changes of equipment or in methods of mixing or placing concrete are involved in the use of Celite. This powdered material is simply added with the other dry ingredients at the mixer. The mix is handled in the usual manner. No more water is added to a concrete mix containing Celite than is necessary to give an equal or lesser slump than would be secured with plain concrete.

In Straight Cement-sand Mortars—Celite used at the rate of from 0.5 to 0.8 cu. ft. per bag of cement will give mortars that will work easier, stretch farther and "stand up," assuring a neat clean job. Moreover, these mortars possess greater tensile and compressive strengths. Celite contains no soluble salts to cause efflorescence.

In Lime-cement Mortars—A mixture of one-half part lime, one part Celite, one-half part cement and three parts sand will give high compressive and tensile strengths and excellent working properties.

In Lime Mortars—An addition of from 6% to 10% of Celite by weight of lime will give a mixture adding high early strength, increased stretching properties and will make a harder mortar.

Amount of Celite Necessary—The quantity of Celite which should be used to secure best results varies with the mix. Harsh aggregates may require a slight increase over the amounts specified. In any case, however, the amount of Celite constitutes only a very small proportion of the entire mixture.

AMOUNT OF CELITE RECOMMENDED

Concrete mix	Economic limits	Recommended average
1:1½:3	1½-3 lbs. Celite	2 lbs. ($\frac{7}{10}$ cu. ft.) Celite
1:2½:3½	2 -4 lbs. Celite	3 lbs. ($\frac{8}{10}$ cu. ft.) Celite
1:2:4	2 -4 lbs. Celite	3 lbs. ($\frac{8}{10}$ cu. ft.) Celite
1:2½:5	3 -6 lbs. Celite	4 lbs. ($\frac{9}{10}$ cu. ft.) Celite
1:3:6	4 -8 lbs. Celite	5 lbs. ($\frac{9}{10}$ cu. ft.) Celite

Johns-Manville Service

Architects are urged to avail themselves of the free service of Johns-Manville's Architectural Service Department and engineers for assistance on all problems.

ESTABLISHED 1889

H. B. FRED KUHLS

Manufacturer of Kuhls' Elastic Waterproofing Pointing and Surface Compositions

OFFICE AND FACTORY

6411-6423 Third Avenue, BROOKLYN, N. Y.

AGENTS HAVING STOCKS

CHARLESTON, S. C., Wm. M. Bird & Co., 205 E. Bay Street
CHICAGO, ILL., N. J. Bique & Son, 126 W. Grand Avenue
CHICAGO, ILL., Athey Co., 24th and La Salle Streets
CLEVELAND, OHIO, Upson-Walton Co., 1310 W. 11th Street
DALLAS, TEX., Lingo Lumber Co., San Jacinto Street
DULUTH, MINN., Thomas Williams Co., 114 Lake Avenue
JACKSONVILLE, FLA., Geo. E. Chase & Co., 325 E. Bay Street
LOS ANGELES, CAL., W. C. Lea, 653 So. Clarence Street
LOS ANGELES, CAL., California Minwax Corp., 1322 So. Los Angeles Street
NEW YORK, N. Y., Weinstock Bros., 384 Third Avenue
OMAHA, NEB., G. H. Alwine Co.
PHILADELPHIA, PA., E. Webb & Son Co., 136 So. Front Street
PITTSBURGH, PA., Fort Pitt Mfg. & Supply Co., 116 7th Street
PORTLAND, ORE., Beebe Co., First and Washington Streets
SAN FRANCISCO, CAL., C. J. Hendry Co., 25 Main Street
SEATTLE, WASH., F. W. Farrington & Co., L. C. Henry Building

Products

Elastic Pointing Up Composition—For joints in copings, tops of cornices and flashings, joining of tin roofs to walls and all other projecting courses in stone or terra cotta work.

Elastic Seam Composition—For expansion joints in terrazzo tile roofs, swimming pools, etc. For all joints on a horizontal plane that are subject to expansion and contraction.

Elastic Expansion Joint Composition—For joints in tile roofs, domes, etc. All joints on an incline where a great deal of expansion and contraction takes place.

Elastic Tile Bedding Composition—For bedding slate and tile roof.

Elastic Waterproof Coatings—For outside walls and foundations.

For Kuhls' Elastic Glazing and Caulking Compositions, see Manufacturers' Index.

Kuhls' Elastic Waterproofing Compositions

Elasticity—Kuhls' Elastic Waterproofing Compositions never become hard or brittle. They never crack or crumble, always remain elastic and flexible, withstand heat, cold, moisture, excessive vibration, gases, fumes and rapid changes of temperature, and always make a weathertight joint.

Bond—Kuhls' Elastic Waterproofing Compositions will adhere strongly to galvanized and raw iron, steel, wood, glass, stone, concrete, terra cotta, tin, copper or any other material.

Colors—The stock colors are light gray and white, but Kuhls' Elastic Waterproofing Compositions can be manufactured in any color to harmonize with the color of the structural material at no extra charge. *These colors do not stain.*

Consistency—Kuhls' Elastic Waterproofing compositions are made for use with a trowel, knife or gun.

How Shipped—Put up in cans of 1, 2 and 5 lb.; in drums of 12½, 25, 50 and 100 lb.; in half-barrels of 100 to 500 lb.; and in barrels of 700 and 800 lb.

Service—H. B. Fred Kuhls have in their employ men experienced and trained in their respective lines to co-operate in the fullest measure with architects, engineers and contractors. They offer a complete and efficient service in the use of Kuhls' Elastic Waterproofing Compositions.

To assist architects located in the west, H. B. Fred Kuhls refer them to their west coast representatives, the California Minwax Corporation, 1322 So. Los Angeles Street, Los Angeles, Cal., and F. W. Farrington & Co., L. C. Henry Building, Seattle, Wash., who have a staff of trained waterproofing engineers who will gladly furnish any information and samples without obligation.

Specifications—***Pointing Up Stone, Terra Cotta and Flashings***—The joints shall be cleaned out thoroughly, and painted with Kuhls' Elastic Joint Paint. The joints shall then be filled with Kuhls' Elastic Pointing Up Composition with a pointing tool, knife or gun. Colors can be obtained to match the stone or terra cotta.

Note: The Elastic Joint Paint should always be used in the joints first, as it is especially prepared to prevent absorption of the oil in the Elastic Pointing Up Composition by the adjoining materials.

Pointing Joints in Copings, Tops of Cornices or Other Projecting Courses in Stone or Terra Cotta Work—The cross joints of all coping courses, tops of cornices or other projecting courses in stone or terra cotta work shall be raked out clean of all portland cement mortar for a depth of at least ¾ in. Sides of joints shall then be thoroughly painted with one or two coats of Kuhls' Elastic Joint Paint (manufactured by H. B. Fred Kuhls, Third Avenue and 65th Street, Brooklyn, N. Y.) or until the surface shows a gloss. The joints shall then be filled with Kuhls' Elastic Pointing Up Composition thoroughly worked and pressed into the joint, to fill the entire joint, and shall be neatly finished flush with adjoining surface. Color of Kuhls' Elastic Pointing Up Composition shall be of the color as selected by the architect.

Kuhls' Elastic Seam Composition for Expansion Joints

Especially adapted when used with Kuhls' Elastic Joint Paint for expansion joints in promenade roofing tile, swimming pools, concrete work, all joints on a horizontal plane, etc. It has been successfully used on the terraces of the Capitol at Washington, Army Base in Brooklyn, and for other prominent buildings, bridges, railroad work, etc. Exposure to sudden and extreme changes of temperature, as well as movement and vibration, does not affect it. It will remain elastic and stick to the sides of the joints for many years. The joint must always be painted with Kuhls' Elastic Joint Paint before applying the Elastic Seam Composition in order to secure the best results.

ELASTIC TRADE MARK SEAM-COMPOSITION

Specifications—Expansion joints shall be provided in promenade tile roofing where noted on drawings. All expansion joints shall be cleaned out down to the waterproofing course. After this, one or two coats of Kuhls' Elastic Joint Paint shall be applied, or until the surface of the joint shows a gloss. Then the joint shall be pointed up with Kuhls' Elastic Seam Composition, thoroughly working the material into the joint to fill the space. Finish shall be left crowned above the adjoining surfaces.

Kuhls' Elastic Expansion Joint Composition

Should be used in all joints on an incline where a great deal of expansion and contraction takes place. Used in joints on domes, faces of clocks, tile roofs, monuments, bridges, etc.

Continued on next page

Specifications—All expansion joints shall be cleaned out down to the waterproofing course. One or two coats of Kuhls' Elastic Joint Paint shall be applied, or until the surface of the joint shows a gloss. Then the joints shall be pointed up with Kuhls' Elastic Expansion Joint Composition, thoroughly working the material into the joint to fill the entire space. The finish shall be left crowned above the adjoining surfaces.

Kuhls' Elastic Seam and Joint Paint

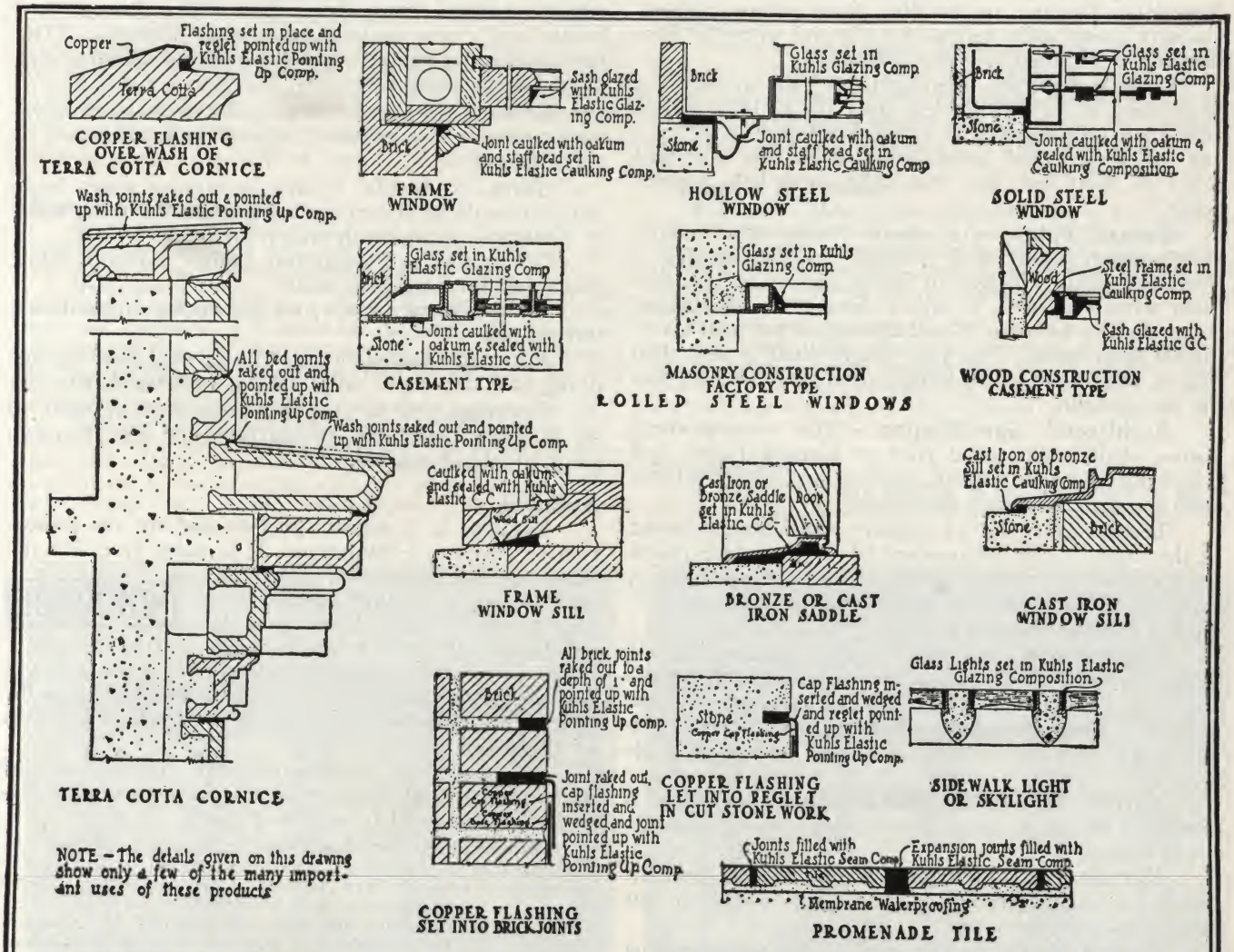
These paints are made especially for use with Kuhls' Elastic Waterproofing Compositions and should always be specified to be applied as follows: Seam Paint for wood, and Joint Paint for stone and terra cotta, etc., as it preserves the composition, preventing the oil from being absorbed by adjoining material. These paints dry in about 10 minutes. Shipped in ½-pt., 1-pt., 1-qt., ½-gal. and 1-gal. cans.

A Few Buildings on Which Kuhls' Elastic Waterproofings Have Been Used

Northern Swimming Pool, Madison, Conn.
Seamen's Institute, Newport, R. I.
Boston & Albany Railroad, Worcester, Mass.
Baker Library, Harvard University, Boston, Mass.
Arlington Memorial Bridge, Washington, D. C.
Army Supply Base, Brooklyn, N. Y.
Rhinelander Building, New York, N. Y.
Williamsburg Savings Bank, Brooklyn, N. Y.
Biltmore Hotel, Los Angeles, Calif.
Pader Pelton Building, Los Angeles, Calif.
Plaza Hotel, New York, N. Y.
B'nai B'rith Temple, Los Angeles, Calif.
Western Union Building, New York, N. Y.
Woolworth Building, New York, N. Y.
Pennsylvania Terminal, New York, N. Y.
New York Central Railroad, New York, N. Y.
No. 1 Wall Street Building, New York, N. Y.
Chrysler Building, New York, N. Y.

Some Architects Who Have Specified Kuhls' Elastic Waterproofings

J. C. Austin, Los Angeles, Calif.
Allied Architects, Los Angeles, Calif.
Charles P. Baldwin, New York, N. Y.
Claude Beelman, Los Angles, Calif.
Carrère & Hastings, New York, N. Y.
Cass Gilbert, New York, N. Y.
Halsey, McCormack & Helmer, Inc., New York, N. Y.
Koch & Wagner, Brooklyn, N. Y.
Lee & Hewitt, New York, N. Y.
Meyer & Hunt, Los Angeles, Calif.
McKim, Mead & White, New York, N. Y.
George B. Post & Sons, New York, N. Y.
Palmer & Hornbostel, New York, N. Y.
Charles A. Platt, New York, N. Y.
Sugarman & Berger, New York, N. Y.
Warren & Wetmore, New York, N. Y.
Isaac A. Allen, Jr., Hartford, Conn.
Voorhees, Gmelin & Walker, New York, N. Y.



A FEW OF THE MANY USES OF KUHLS ELASTIC WATERPROOFING COMPOSITIONS

LEWIS ASPHALT ENGINEERING CORPORATION

SUCCESSORS TO GARDINER AND LEWIS, INC.

ENGINEERS AND MANUFACTURERS

Specializing in Protection Against Water and Corrosion

30 Church Street, NEW YORK, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

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Karnak Membrane Waterproofing System

The Karnak system is based on the use of a highly refined and very ductile asphalt, reinforced and held in place by a strong elastic interlocking membrane, made of cotton cloth saturated with asphalt. Because Karnak asphalt contains no impurities or foreign matter and because this waterproofing is held in place by a strong elastic binder, less plies are required than in felt systems. In the usual case, 2 plies of Karnak fabric with 3 heavy moppings of Karnak asphalt will give absolutely adequate results.

KARNAK

Uses—This system will be found to be thoroughly dependable for use on building foundations, bridges, viaducts, pump wells, retaining walls and wherever construction is exposed to water pressure.

Karnak Asphalt—Melting point 150° to 160° F.; penetration at 32° F. not less than 10, at 115° F. not more than 100; ductility at 77° F. not less than 30 cm.; loss in weight and penetration under the standard A.S.T.M. heat test, less than 0.5% and 10% respectively.

Karnak Fabric—An elastic cotton fabric, thoroughly impregnated with Karnak Asphalt, having a minimum tensile strength of 50 lbs. per in. and a minimum stretch of 10% in either direction. The thread count shall be between 18 and 26 threads per inch assuring an open mesh. The raw weight shall be less than 4½ oz. and the saturated weight from two to three times the raw weight.

Architects' Specification — The waterproofing course shall consist of 2 plies of Karnak Fabric and 3 layers of Karnak Asphalt, applied in strict accordance with the manufacturer's directions.

Tests—Every lot of asphalt and fabric is tested at the source by an independent laboratory which places its seals and identification numbers on each package. A copy of this test will be sent directly to the architect by the testing laboratory.

Publications—We have bulletins covering all points: a technical discussion of bituminous waterproofing; lists of architects, engineers and railroads who use Karnak; lists of typical Karnak installations; detailed descriptions of some particularly interesting projects.

Karnak Cut-backs and Plastics—We make a complete line of primers, brush plastics, trowel plastics, joint fillers.

Karnak Special Purpose Asphalts—To meet the needs of manufacturers. State your needs to our Engineering Department.

Karnak Roofing—The same as the waterproofing blanket. Particularly adaptable for roofs protected with tile or concrete because the expansion of the surfacing will not tear the roofing blanket.

Krodeproof

A Preventive of Corrosion and a New Method of Applying Asphalt as a Waterproofing Agent—Krodeproof consists of minute particles of asphalt suspended in water together with a mineral dispersing agent. When applied to any surface, wood, steel or concrete, the water evaporates and there is left a composite structure of asphalt and agent particles which is actually more effective than pure asphalt as a protective coating.

KRODEPROOF

TRADE-MARK

Advantages—Krodeproof, being a dispersion of asphalt and water, is always applied cold and can be applied to damp or even wet surfaces with no loss in adhesive values. It can be applied with an air spray or brush; and it may be built up to any thickness. After the Krodeproof has set up it will not flow, bleed or run at any temperature up to 300° F.

Uses—Krodeproof is most effectively used wherever protection is required against moisture, acid or alkali fumes.

Users—Railroads; against locomotive gases, brine drip and on decks of concrete bridges, and retaining walls.

Marine; against salt water corrosion.

Contractors and engineers; against moisture below grade and for surfacing roofs.

Hydro-electric plants; on penstocks, transmission towers, etc.

Manufacturing plants; for lining coal bunkers, for lining acid chimneys, boiler setting compound, etc.

Coverage—60 sq. ft. per gal. per coat on steel; 40 sq. ft. per gal. per coat on concrete—not less than two coats should be applied.

Korkseal

Korkseal is an asphalt plaster used for the protection of corkboard insulation. It is made from Krodeproof mixed with inert materials; which gives a creamy plastic, very easy to apply, firmly bonding to the corkboard—setting up into a tough rubbery protection coating which will not crack, and will not permit the penetration of air or moisture into the corkboard—thereby preserving the original usefulness of the insulating material.

KORKSEAL

TRADE-MARK

Engineers and contractors have found Korkseal more efficient, and less expensive. A representative list of installations will be sent on request.

Refrigeration Specifications—To maintain efficiency of corkboard as an insulator, it must be kept dry; to do this it is necessary to keep all "live" air out of the corkboard. Therefore: (1) Prime masonry wall with Krodeproof. (2) Erect corkboard to the primed masonry wall with 180° M.P. Karnak Asphalt. (3) Prime corkboard with one coat of Krodeproof using 3½ to 4 gals. per 100 sq. ft. of corkboard surface. (4) Protect exposed surface with a ⅛-in. coat of Korkseal. All of these materials to be applied strictly in accordance with the instructions of the manufacturer.

O. H. MANN & CO., INC.

Waterproofing Specialists

604 Fairfax Building
KANSAS CITY, MO.

LOS ANGELES, CALIF., 1008 Washington Building
SAN FRANCISCO, CALIF., 2024 Hunter Dulin Building

AGENCIES

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DENVER, COLO.
WICHITA, KAN.
OMAHA, NEB.
DES MOINES, IOWA
MINNEAPOLIS, MINN.

Service

We furnish a complete specialized service in Waterproofing, Dampproofing, Cleaning and Tuckpointing Brickwork, Caulking Openings, Terra Cotta and Stone Work; Restoration of Disintegrated Concrete, Decorative Treatment of Concrete Structures, Floor Hardening and Treatment of Fire Walls. All work is done exclusively under contract and guaranteed to be and remain watertight.

Technical Assistance

The services of our Engineering staff are always available for consultation and assistance in the solution of any problem concerning new or existing buildings.

Experience

Twenty years' experience and accomplishment in our specialized field enables us to select the best material for use, and adopt the best method of application in the solution of any problem. The performance of each product has established its outstanding permanence and efficiency and in many cases has created a new standard of excellence. Complete detailed data and a list of executed contracts will be furnished on request.

Ironite Waterproofing

Adaptation—We recommend and apply Ironite Waterproofing for basement walls, floors, tunnels, subways, pits, swimming pools, reservoirs, dams, retaining walls, etc.

Description—Ironite Waterproofing is a finely pulverized gray iron containing chemicals. Water is added to the Ironite and this compound is brushed on the surface to be waterproofed, causing the iron particles to lodge in the surface pores. Chemical reaction causes rapid oxidation of the iron with the resultant expansion of the iron particles, which completely fill the surface pores and seal them against leakage.

Sufficient coatings are applied to completely fill all pores. The first coats form the base filling and the succeeding coats form an oxidized iron film which is extremely dense and impervious, not alone to the action of water but also to oil, diluted acid, etc. Ironite will withstand any pressure for which the structure itself is designed.

Application—Ironite Waterproofing is applied either to the inside or outside surfaces of walls, and to the top of rough floor slabs whether wet or dry.

Membrane Waterproofing

Recommended for bridge floors, flat slabs and large exposed areas. Only the highest grade, open mesh cotton fabric and waterproofing asphalt is used. The necessary number of layers are applied to obtain satisfactory results.

Dampproofing

On the interior surfaces of exposed walls above grade a bituminous paint of a special composition is sprayed on in two coats completely filling all voids, crevices, cracks, etc. This paint has a decided value as an insulating medium.

Caulking

A permanent elastic material unaffected by temperature changes is used for caulking joints around windows, joints of terra cotta and masonry and also expansion joints in floors, terraces, etc. It is colored to match masonry to which it is applied.

Treatment of Concrete

Restocrete Restoration Method—This is a process for restoring distintegrated concrete and preventing further disintegration. Old structures are thoroughly cleaned, patched, repaired and waterproofed and finished with a decorative coating which restores them to their original appearance and condition.

Decorative Treatment—Our method comprises the grinding down, bush hammering and treatment of exterior concrete surfaces with a finish of either a colorless waterproofing or pigment waterproofing which will give a decorative effect comparable to that obtained with other building materials.

Specifications

It is our preference to assist in the preparation of specifications for each specific job, but general specifications will be furnished on request.



Before Restocrete Treatment



After Restocrete Treatment

A Typical Example of a Restoration Problem Solved by the Restocrete Process

THE MASTER BUILDERS COMPANY

Hardeners, Colorings, Waterproofings and Allied Technical Treatments for Concrete and Masonry

CLEVELAND, OHIO

SALES OFFICES IN 110 CITIES INCLUDING:

NEW YORK, N. Y.	CHARLOTTE, N. C.	LOUISVILLE, KY.	CINCINNATI, OHIO	SEATTLE, WASH.
CHICAGO, ILL.	WINNIPEG, MAN.	HELENA, MONT.	VANCOUVER, B. C.	INDIANAPOLIS, IND.
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ATLANTA, GA.	BOSTON, MASS.	MILWAUKEE, WIS.	LOS ANGELES, CAL.	COLUMBUS, OHIO
BALTIMORE, MD.	KANSAS CITY, MO.	BUFFALO, N. Y.	ST. LOUIS, MO.	ST. PETERSBURG, FLA.
	PHOENIX, ARIZ.		SAN FRANCISCO, CAL.	

In 1910 THE MASTER BUILDERS COMPANY instituted the principle of hardening concrete floors by replacing the brittle sand in the wearing finish with tough, ductile metallic particles. Since that time, every improvement made in metallic hardeners has been made by our Research Laboratories. As the problems of hardeners are inseparably connected with the study of portland cement, our field has been enlarged during our twenty years in business to include the perfection not only of metallic hardeners but also of concrete floor colorings, waterproofings, dampproofings and paints.

Among the important discoveries of our Research Laboratories are: (1) water absorbent metallic hardener, (2) non-ferrous metallic hardeners, (3) integral gauging water dye principle of coloring cement finish, (4) stain principle of coloring floors, (5) metallic waterproofing method, (6) colorless surface waterproofing, (7) waterproof cement paint, (8) the Omicron method of greatly reducing soluble elements in concrete, making it corrosive resistant.

Our representatives are practical concrete men who may be called at any time by an architect or engineer to assist with a difficult concrete floor or waterproofing problem. Further, our Research Laboratories are at the service of all.

Concrete Floor Hardeners

Metalicron
The complete concrete floor hardener for industry. Armors against abrasion and corrosion by a combination of Metallic Hardner and Omicron.....**Pages 2 and 3**

Non-slip Metalicron
A Metalicron floor with the added quality of being positively non-slip .....**Pages 2 and 3**

Metallic Hardner
A twenty-year-old, time-tested concrete floor hardener. Replaces brittle sand in industrial wearing finish.....**Page 4**

Master Mix
A colorless hardener, waterproofer and dustproofer of cement floor topping for commercial, light industrial or foot traffic. Contains Omicron as a basic ingredient. Functions fully at low temperatures and is therefore valuable in winter construction of floors.....**Page 5**

Saniseal
A chemical after-liquid surface hardener which combines with the lime in cement forming a new crystal that stops dusting. Recommended for new or old floors—both cement finish and terrazzo. Data and specifications on request.

Colored Concrete Floors

Colormix
A gauging water dye which, when diluted with water, produces a hard, waterproof, permanently colored topping. Colormix contains Omicron which increases the strength of the concrete and protects colors from alkali action. Comes in nine basic colors.....**Pages 6 and 7**

Dycrome
A hardening, dustproofing and coloring "after treatment" for finished cement floors. Comes in seven colors which may be used singly or in duo-tone effects.....**Page 8**

Colored Metalicron
An integral hardener, colorer, waterproofer and slip-proofer. Contains Omicron which protects colors from alkali action. Comes in nine colors.....**Page 9**

Colorseal
Tough elastic surface coating. China wood oil base. Color and dust proof. Data and specifications on request.

Waterproofing

Brikron
A semi-liquid compound for protecting portland cement brick mortar. Minimizes efflorescence, waterproofs by lining the pores with water repellent stearate. Nullifies attacks by acids and alkalis precipitated from smoke and air on joints. Prevents lime-burning of mortar color. Makes mortar fatty and lime unnecessary.....**Page 10**

Masterseal
Colorless surface waterproofing for portland cement stucco, brick, concrete, limestone. Prevents cracking and spalling due to alternate wetting and drying out.....**Page 11**

Mastertex
A pure portland cement paint in eleven colors which when mixed in water and applied to the surface with either brush or spray, forms a hard waterproof coating that will not rub or flake off. For portland cement stucco, brick, concrete and stone .....**Page 11**

Liquid, Paste, Powder, Integral Waterproofing
Mixed integrally with mortar or concrete at mixer. Give permanent waterproof results by nullifying capillarity action of pores .....**Page 12**

Allied Products

(Not described here—Specifications on request)

Wood Preservatives—Unlike paints, varnishes, etc., Master Builders Wood Preservative penetrates far below the surface—impregnates with elastic gums.

Acid Resisting Paint—A black, ready mixed paint for application to concrete, wood or metal.

Metallic Waterproofing—A dependable, pressure-resisting surface waterproofing for walls, tanks, vats, conduits, swimming pools, basements, etc.

Plaster Bond—An interior dampproofing.

Foundation Coating—For dampproofing the exterior of masonry below grade.

Continued on next page

Metallic Hardner, Plus Omicron, Plain and Heavy Duty Floors

METALICRON

Description

Master Builders Metalicron is the combination of perfectly graded, pure water absorbent metallic aggregate, Master Builders Metallic Hardner, *plus Omicron*, and is especially designed and manufactured for mixture with sand and cement in producing concrete floors subject to heavy wear.

Metalicron is immediately distinguished from all other metallic type hardeners by its Omicron content. Omicron, known as the fifth ingredient, was discovered and perfected in 1928 by the Master Builder Research Laboratory. This remarkable material combines with portland cement to reduce the ratio of solubles in set concrete, thereby increasing not only the strength of the concrete but likewise its resistance to the disintegrating action of corrosive acid and alkali agents present to a greater or less degree on all floors.

Non-slip Metalicron

Metalicron is also manufactured with a non-slip grit element. Floors built with Non-slip Metalicron not only have all the advantages Metalicron floors possess but in addition are non-skid.

Colors

Standard gray, which adds no color; also in seven colors: battleship gray, tile red, brown, buff, black, blue, and green. See page 9 for Colored Metalicron.

Merits and Advantages

In Metalicron there is provided for the first time the check both to abrasive wear and to disintegration—the often unseen but ever present corrosive action of solutions encountered in modern industry.

Metalicron is further distinguished from ordinary hardeners by its absolute freedom from impurities of any kind, such as oils, greases, dirt or foreign metals. It is water absorbent. The metallic particles are scientifically graded in size; the metal replaces its own volume of brittle sand, imparting to the floor the metallic qualities of ductility, toughness, strength and permanence, which no natural aggregate no matter how hard can give.

The metallic particles in contact with the wet mortar oxidize, expanding to fill the pores left by evaporating moisture. This expanding action not only renders the surface waterproof but to an important degree reduces shrinkage of the mortar in setting. The film of ferric oxide formed around each particle not only reduces shrinkage and waterproofs, but is of itself a permanent cementing factor strengthening the floor.

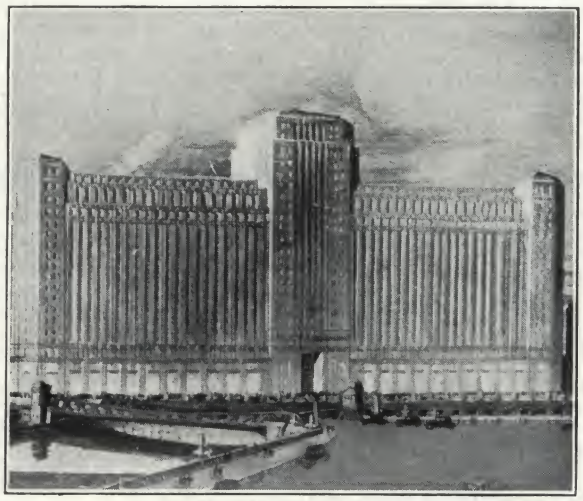
Resistance to Disintegration

The increased resistance to the disintegrating action of acids and alkalis is indicated by tests of plain and Metalicron concrete cured 7 days in water then immersed 21 days in (A) clear water, (B) 1% solution of sulphuric acid, and (C) 8% solution of magnesium sulphate with 2% solution sodium sulphate added. Tensile breaks made on 28th day.

Conditions	Plain	Metalicron
28 days in water	440	793
7 days in water, then 21 days in 1% sulphuric	397	771
7 days in water, then 21 days in 10% alkali	347	990

The action of these acid and alkali solutions reduce the tensile strength of plain cement briquet 10% and 21.4%, respectively. Under like acid conditions the tensile strength of Metalicron cement is reduced only 1.6%.

The action of this alkali solution on Metalicron cement actually increases the strength of the mortar due to the increased oxidation of the metallic element in contact with the alkali, which in turn produces in this instance 24.6% increased strength.



Merchandise Mart

Has half a million square feet of heavy duty floors, hardened with Metalicron. Over four million square feet devoted to commercial usage are hardened with Master Mix

Where Metalicron Is Used

Metalicron concrete floors are recommended for use in areas subject to the hardest type of wear. Metalicron floors offer the maximum resistance to physical as well as to disintegrating wear encountered in industrial plants. To resist traffic—such as steel wheel trucking, the movement, storage, shipping and sliding of heavy objects—in boiler rooms, trucking aisles, shipping platforms, loading docks, elevator approaches, forge shops, iron foundries, machine shops, sidewalks, stairways, in all kinds of buildings. Generally applicable in the following types of buildings: warehouses, freight stations, passenger stations, paper mills, printing shops, packing plants, power plants, docks and piers, garages and manufacturing plants.

Although Metalicron floors offer definite and valuable resistance to the ordinary acid and alkali action present in greater or less degree in practically all buildings, it must not be concluded that a Metalicron floor will resist the direct and continuous contact of strong acids as encountered in the chemical industries and elsewhere, and for which no concrete floor is recommended.

Where Non-slip Metalicron Is Used

Non-slip Metalicron floors are recommended for areas around machinery, ramps, sidewalks, railroad platforms, stairs and all such areas where a non-slippery floor is required.

Continued on next page

Topping Metalicron Floors

These are built by (1) floating into a freshly floated topping a dry mixture consisting of 4 parts Metalicron, 3 parts portland cement, (2) following with two steel trowelings.

Monolithic Metalicron Floors

These are built by (1) floating a dry mixture of sand, cement and Metalicron into a freshly screeded base slab, (2) following immediately with a second floating in of a dry mixture consisting of 4 parts Metalicron, 3 parts cement, (3) finishing with two steel trowelings.

Partial List of Installations

Martha Cotton Mills, Thomaston, Ga.
City Sewer, Cleveland, Ohio
U. S. Chain & Forging Co., York, Pa.
Ohio Power Company, Fostoria, Ohio
B. F. Goodrich Co., Akron, Ohio
Pittsburgh Plate Glass Co., Crystal City, Mo.
Fleishmann Yeast Co., Langdon, D. C.
Pierpont Motor Co., Pittsburgh, Pa.
Acme Rayon Corp., Cleveland, Ohio
International Milling, Buffalo, N. Y.
National Metal Plating Co., Brooklyn, N. Y.
Oil Country Specialties (Union Pacific R. R.), Los Angeles, Cal.
Merchandise Mart, Chicago, Ill.
Dairy Products Co., Cleveland, Ohio
Nashville Pure Milk Co., Nashville, Tenn.
Mobile Steam Plant, Mobile, Ala.
Pittsburgh-Butler Airport, Butler, Pa.
Locke-Insulator Co., Baltimore, Md.
Sears-Roebuck, Gary, Ind.
Edw. S. Vale Butterine Co., Chicago, Ill.
Darbing & Co., Chicago, Ill.
Dairy (Glenwood Tile Co.), Philadelphia, Pa.
Industrial Controller, Milwaukee, Wis.
Grant Harris Reffley Motor Co., Atlanta, Ga.
Independent Oil & Gas Co., Muskogee, Okla.
Mohawk Carpet Co., Amsterdam, N. Y.
Pennsylvania Hotel, New York, N. Y.
Rodes-Hoverty Building, Atlanta, Ga.
Delray, San Francisco, Cal.
Schaefer Lunch, Fordson, Mich.
J. Swartwart, Euclid Village, Ohio
American Enka Corp., Enka, N. C.
Independent Oil & Gas Co., Kansas City, Kan.
American Lace Paper Co., Port Washington Rd., Milwaukee, Wis.
Quaker Oats Co., St. Joseph, Mo.
Furst McNess Co., Freeport, Ill.
Madsen Construction Co., Freeport, Ill.

Metalicron Specifications

Topping Type (Short Specification)

All cement finish as indicated shall be finished according to THE MASTER BUILDERS COMPANY, Cleveland, Ohio, Topping Specifications using Metalicron Hardner. No less than (here insert "30 lb." for average traffic, "40 lb." for heavy traffic or "50 lb." for extra heavy traffic) of Metalicron shall be used per 100 sq. ft. of floor area.

Topping Type (Detail Specification)

(1) Application of Topping

The topping shall be applied in a thickness of not less than ¾ in. and shall consist by volume of:

1 part tested portland cement.
2 parts coarse, gritty, clean sand.

For heavy duty floors these proportions should be:

1 part tested portland cement.
1 part coarse, gritty sand.
2 parts hard crushed rock such as granite, trap rock or pea gravel grading from ¼ to ⅜ in.

Not over 5 gallons of water per bag of cement is recommended. This includes moisture in the aggregates.

The topping shall be laid and straight-edged to a true and even surface. The surface shall be well floated with wooden floats to close all voids and hollows.

(2) Application of Metalicron

After the surface has been floated, but before steel troweling a dry mixture of four (4) parts by weight of Master Builders Metalicron to three (3) parts of tested portland cement, mixed to an even color, shall be sprinkled evenly over the surface.

Not less than (here use "52 lb." for ordinary traffic, "70 lb." for heavy traffic or "88 lb." for extra heavy traffic) of this mixture shall be distributed in this manner over each 100 sq. ft. Under no circumstances shall this mixture be applied when there is any surplus water on the floated surface.

This mixture shall be floated in thoroughly and followed by troweling as soon as the concrete has hardened sufficiently to prevent excess fine material from working to the surface. A second steel troweling shall be given when the surface has set sufficiently to finish hard and smooth.

Expansion joints are recommended at regular intervals in all topping floors. Joints to be cut through the full thickness of the topping with narrow tool and the edges to be hard finished.

(3) Curing and Protecting the Floor

When the concrete has sufficiently hardened, the concrete contractor shall cover the surface with at least two inches of sawdust or curing sand without grit or any other material which will afford equally good protection. This covering shall be kept wet for not less than eight days.

Monolithic Type (Short Specification)

All concrete floor slabs as indicated shall be finished according to THE MASTER BUILDERS COMPANY, Cleveland, Ohio, Specifications using Metalicron Hardner. No less than (here insert "30 lb." for average traffic, "40 lb." for heavy traffic or "50 lb." for extra heavy traffic) of Metalicron shall be used per 100 sq. ft. of floor area.

Monolithic Type (Detail Specification)

(1) Mixing and Placing of Slab

The concrete base or slab shall consist of the following:

1 part standard portland cement.
2 parts clean, coarse, gritty sand.
3½ parts crushed rock or gravel graded from ⅜ to 1 in. in size.
6 gal. or less of water per bag cement is recommended.

These materials shall be mixed and deposited between screeds to the finished floor level and then thoroughly screeded and tamped with the customary straight edge in the same manner as a separate mortar finish is smoothed off. Special care shall be taken to leave no hollows or pockets on the surface.

(2) Preliminary Application of Master Builders Metalicron

Immediately following the process of leveling off the concrete slab, deposit uniformly upon each 1000 sq. ft. of surface a dry mixture consisting of:

1 bag Master Builders Metalicron (100 lb.).
2 bags standard portland cement.
3 bags clean, coarse sand.

(3) Final Application of Hardener

As soon as the moisture has disappeared from the preliminary finish, a dry mixture consisting of four (4) parts by weight of Master Builders Metalicron and three (3) parts of standard portland cement, mixed thoroughly to a uniform color, shall be evenly sprinkled over the floated surface (here insert "35 lb." for ordinary traffic, "52 lb." for heavy traffic, and "70 lb." for abnormally heavy traffic) of this dry mixture shall be distributed over each 100 sq. ft.

This hardener application shall be floated in with wooden floats and followed by steel troweling when the concrete has hardened sufficiently to prevent excess fine material from working to the surface. The floor shall be given a second steel troweling when it has hardened sufficiently to finish hard and smooth.

(4) Curing and Protecting Floor

When the concrete has sufficiently hardened, the concrete contractor shall cover the surface with not less than 2 in. of sawdust or curing sand without grit, or with other material which will afford equally good protection. This covering shall be kept moist for not less than eight days.

Continued on next page

For Industrial Floors

METALLIC HARDNER

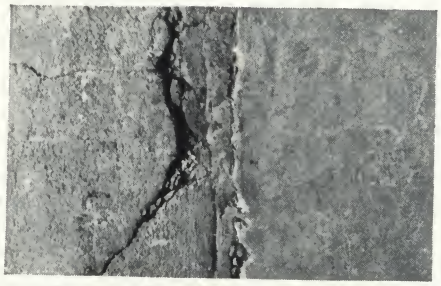
Description

Master Builders Metallic Hardner is a specially designed metallic aggregate used to replace brittle sand in the top eighth inch of a cement floor wearing finish. This armors the floor against abrasion in industrial and heavy duty commercial areas. It is used by mixing with portland cement and troweling into a freshly floated floor.

Merits and Advantages

Pound a piece of sand with a hammer—it crushes to powder because it is brittle. Pound a piece of iron—it dents but does not crush.

In a metallic hardened floor subject to heavy traffic, the same thing takes place. The metallic particles which have replaced the brittle sand bend and give but do not crush as sand would. This explains why Masterbuilt Metallic Hardened floors have outlived plain finish floors three times with little or no repair.



Two Sections of a Concrete Floor Installed Side by Side

Both sections have borne the same volume of traffic for seven years. The Masterbuilt floor at the right is still intact, repaying its cost again and again in repair-free service

Besides being wearproof, Metallic Hardened floors are positively waterproof. When troweled into the floor the metallic particles oxidize slightly, expand and make the wearing finish impervious to water, oil or grease.

Meets Portland Cement Assn. Standards

In its book "Concrete Floor Finishes," the Portland Cement Association makes the following recommendations:

"Metallic aggregates have been used successfully in the wearing surface of concrete floors. In selecting this material particular attention should be directed to proper grading, freedom from oil, grease, non-ferrous metals and other harmful impurities. It should not be water-repellent."

Master Builders Metallic Hardner satisfies all these conditions. (1) *Grading*—scientifically graded from fine to coarse to give greatest density and least voids. (2) *Free from oil and grease*—oil and grease prevent adhesion and an oily metallic hardener will not bond perfectly with cement. (3) *Free from non-ferrous metals*—positively no babbit, brass or non-ferrous metal in Master Builders to cause blistering of the cement finish with gas bubbles. (4) *Free of impurities*—Dirt, dust and all impurities removed scientifically. (5) *Water absorbent*—immediately trowels in and becomes an integral part of the floor. Water repellent Metallics roll around under the trowel and will not readily mix into the floor. This causes scaling.

Compressive Strength Tests

That the introduction of Metallic Hardner greatly increases the strength of the floor is proven by tests made by the Robert W. Hunt Company's Pittsburgh Testing Laboratories.

The results of these tests nhow the relative compression strength of Metallic Hardened concrete and plain concrete clearly.

SUMMARY OF RESULTS OF TEST

Age days	1 part cement 2 parts sand	1 part cement ½ part Metallic Hardner	Percentage of increase
3	3274	6,927	111
7	3626	8,695	139
28	6129	13,245	116
90	6583	14,302	117

Monolithic Floors

Master Builders Monolithic Floors are built by (1) floating a mixture of sand, cement and Metallic Hardner into a freshly screeded base slab, (2) following immediately with a second floating in of a mixture of equal parts of cement and Metallic Hardner, (3) finishing with two steel trowelings.

Topping Floors

Master Builders Topping Floors are built by (1) floating into a freshly floated topping, equal parts of cement and Metallic Hardner and (2) following with two steel trowelings.

Service Record

The following representative installations of Master Builders Metallic Hardner, many showing the years in service to date, demonstrate the wearing capacity of a Master Built Metallic Hardened Floor.

Packard Motor Car Co., Boston, Mass.—14 years
Davis Hat Company, Dallas, Tex.—14 years
McLaughlin, Gormley, King Co., Minneapolis, Minn.—15 years
Dominion Express Co., Winnipeg, Can.—15 years
Niagara Falls Power Co., Niagara Falls, N. Y.—13 years
Wisconsin State Prison, Waupun, Wis.—13 years.
Sebring Pottery Co., Sebring, Ohio—13 years
American Sign Company, Kalamazoo, Mich.—13 years
City of Montreal, Harbor Sheds—12 years
Electro Dental Mfg. Co., Philadelphia, Pa.—13 years
Chesapeake Iron Works, Baltimore, Md.—8 years
Kansas City Wholesale Grocery Co.—13 years
Gilkey Printing Co., Cleveland, Ohio—13 years
Audit Novelty Mfg. Co., Williamsport, Pa.—12 years
H-O Cereal Company, Buffalo, N. Y.—14 years
Hanke Iron and Wire Works, Chicago, Ill.—13 years
Municipal Dock, City of St. Louis—8 years
Architects Building, New York, N. Y.—12 years
Federal Reserve Bank, New York, N. Y.
Auerbach Candy Company, New York, N. Y.—13 years
Baum Safe & Lock Co., Cincinnati, Ohio—12 years
Bullard Machine Tool Co., Bridgeport, Conn.—8 years
Bush Terminal Exhibit Building, New York, N. Y.—11 years
Central Steel Company, Massillon, Ohio
Cleveland Auditorium, Cleveland, Ohio
Columbian Building, Chicago, Ill.—7 years
Endicott Johnson Shoe Co., St. Louis, Mo.
Ford Motor Car Company, Detroit (1912), Milwaukee, Wis. (1913), Kansas City, Mo., Long Island City, N. Y., and other branch plants
Garden City Spring Company, Chicago, Ill.—14 years
Grand Central Terminal, New York, N. Y.—13 years
McGraw Hill Publishing Co., New York, N. Y.—12 years
Hyatt Roller Bearing Company, Harrison, N. J.
Loose-Wiles Biscuit Co., Long Island City
Nairn Linoleum Company, Kearney, N. J.
New York Times, New York, N. Y.
Pennsylvania R. R. Freight House, York, Pa.—13 years
Public Service Co. of New Jersey, Jersey City, N. J.
Public Service Co. of No. Illinois, Chicago, Ill.
Richman Bros. Co., Cleveland, Ohio—10 years
Snellenberg Warehouse, Philadelphia, Pa.—13 years
S. W. Strauss Company, New York, N. Y.
Victor Talking Machine Co., Camden, N. J.
Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.
May Co., Warehouse, Cleveland, Ohio
Horne Warehouse, Pittsburgh, Pa.

Metallic Hardner Specifications

All concrete floor finish as indicated shall be hardened by troweling Master Builders Metallic Hardner into the freshly floated floor, following the manufacturers' specifications for (here insert "monolithic" or "topping") type floors. The quantity of Metallic Hardner used shall be (here insert "30 lbs." for regular traffic, "40 lbs." for heavy traffic, or "50 lbs." for extra heavy traffic) to each 100 sq. ft.

Continued on next page

Master Mix Integral Floor Hardener—Colorless

Master Mix
CONTROLS CONCRETE
TRADE-MARK

Description

Master Mix is a semiliquid chemical admixture added to the gauging water of cement aggregates to increase permanently the strength of the concrete throughout, to produce floors that are wear-resisting, dustproof and waterproof.

These results are accomplished in three ways: by the addition of a waterproofing element, through improving the workability of the mortar and increasing its density, and by the colloidal action of Omicron, the hardening, corrosion resisting ingredient discovered and perfected by the Master Builders Research Laboratories in 1928.

Merits and Advantages

The hardening, densifying action of Master Mix is always positive, uniform and beneficial. While ordinarily good workmanship is necessary, more than this is not required with Master Mix to produce good results.

Master Mix is the easiest to use of all types of concrete hardeners. By merely adding it to the gauging water, in the simple proportions of 1 gal. of Master Mix for every barrel of cement gauged, the full manual operation is completed.



Field Museum, Chicago, Ill.

Approximately a million square feet of Master Mix floor laid in the winter of 1918-1919. After nearly 12 years of daily foot traffic, the floor surfaces are as sound as when new

Plus Omicron

In combination with portland cement, the Omicron constituent combines with and minimizes the ratio of soluble factors in the concrete. These factors have heretofore constituted the vulnerable point of concrete, especially in the presence of corrosive agents, and exist in the structure as waste matter contributing no strength. Through the action of Omicron they are converted from liabilities into insoluble, permanent assets in the floor.

Master Mix hardens a cement floor topping throughout the entire thickness of the topping, usually a full inch or more, at a cost no greater than for a surface treatment which affects only the top fraction of an inch.

Furthermore, Master Mix improves the "workability" of cement mortar, which enables finishers to finish many more square feet per day, thus reducing labor cost, and to produce a practically perfect dense, smooth surface.

Master Mix floors are ideal for covering with linoleum or rubber tile. The Omicron content nullifies the action of free lime on the binding glue and saves the latter from deterioration due to this cause.

Where Master Mix Is Used

Master Mix hardened concrete floors are recommended for use in all commercial, store and office buildings, and on areas subjected to light industrial traffic, heavy foot traffic, or constant or frequent moisture—basements in residences, apartments, hotels, etc.—or in all cement floors over which linoleum, carpets or rugs, or other semi-permanent coverings will be laid.

The following types of buildings or industries find Master Mix hardened floors most efficient: office buildings, schools, churches, Y.M.C.A's., hospitals, hotels, laundries, loft buildings, theaters, and many with similar activities and traffic.

Compression Strength

Made by Pittsburgh Testing Laboratory—No. 62951.

COMPRESSION STRENGTH TESTS OF PLAIN AND TREATED 1-2 CEMENT MORTAR

Age	Plain mortar, lb. per sq. in.	Master Mix mortar, lb. per sq. in.
7 days	3683	4220
28 days	6047	6810
90 days	7033	7567

Master Mix Specifications

General

All concrete floors shall be hardened by the use of Master Mix, used in accordance with the directions of the manufacturers, The Master Builders Company, Cleveland, Ohio.

Mixing of Topping

A 1-in. topping shall be applied, apportioned 2 parts clean, coarse, sharp sand, and 1 part fresh tested portland cement. The sand and cement shall be mixed thoroughly dry until uniform in color, showing no streaks or patches of the constituents.

Master Mix shall be added to the gauging water in proportion of 1 gal. of Master Mix for every barrel of cement used. If mixed in concrete mixer 1 qt. of Master Mix shall be poured into mixer with every bag of cement mixed.

Application of Topping

The cement mortar topping shall be poured, floated and troweled in the usual manner. A second steel troweling shall be given when the surface is sufficiently set to produce a hard, smooth finish.

Protecting the Finished Floor

When the concrete has sufficiently hardened, the concrete contractor shall cover the surface with not less than 2 in. of sawdust or curing sand, properly wet down. The floor shall be kept wet and shall not be used for traffic until hard.

Continued on next page

Colormix Colored Integral Hardener and Waterproofer for Concrete Floors

COLORMIX

Description

Master Builders Colormix is a scientifically compounded colored concrete hardener and waterproofer, which is dissolved in and dyes the water with which the cement-sand mix is gauged.

The Colormix method employs a principle which in the beginning was entirely new. Instead of being a dry color, mixed with sand and cement, with the consequent lack of uniformity, Colormix acts as a gauging water dye. As a result there is a perfect and complete distribution of the hardening and waterproofing elements and of the color throughout every particle of the mass.



In John Wanamaker's New York Store, Gray Colormix Floors Help to Attract Crowds of Shoppers and Withstand the Heavy Traffic

Plus Omicron

Like Master Builders other integral hardeners, Colormix contains the corrosion-resisting ingredient Omicron, perfected by Master Builders Research Laboratory in 1928, and since that time a basic constituent of Colormix. Omicron, through combination with the soluble elements in portland cement, not only increases the tensile and compression strengths of the concrete but renders it much more highly resistant to the dissolving action of acids and alkalis.

Where Colormix Is Used

The application of Colormix floors is almost universal. New uses are developed daily. Practically every class of building has a greater or less area where Colormix floors fill a real need. Public buildings, private residences, schools, churches, office buildings, industrial plants, hospitals, clubs, theaters, stores.

Specific areas where Colormix has been extensively used include lobbies, corridors, offices, salesrooms, auditoriums, washrooms, laboratories, restaurants, dining rooms, cafeterias, basements, service quarters of clubs, hotels, apartments and residences, roof gardens, porches, terraces, solariums, power plant generator rooms, and many others.

Colors

Nine colors—tile red, linoleum brown, nile green, buff, blue, white, battleship gray, French gray, black.

In Colormix The Master Builders Company has combined with proven hardening and waterproofing elements the best coloring agents that can be obtained. Those familiar with colors and coloring products know that the utmost care must be taken in their selection to insure high quality. Purity and permanence characterize the colors used in Colormix and uniformity of color is obtained as a result of this superior quality, and of the method of dissolving the Colormix in the gauging water. This uniformity extends throughout the full thickness of the topping.

A Colormix floor is waterproofed by the waterproofing element present in Colormix. No other waterproofing measures are required.

Protected by Stainproof Paper

Colormix floors have the exclusive advantage of being protected during their curing period by Colormix Stainproof Paper, the new advanced method of protecting and curing fresh concrete floors. Many a fine concrete floor that was perfect when finished has been ruined by traffic, staining and marring during the construction period but with Colormix Stainproof Paper Colormix floors are insured against such risks and perfect final results produced.

Precautions—It is important that the new Colormix floor be protected from traffic, from staining by plasterers, painters, or other trades, by the use of Colormix Stainproof Paper as called for in the Specifications.

No other hardening admixture or surface hardeners need be or should be used in or on a Colormix floor.

Oil or Wax Finish

When waxed with Master Builders Colorwax or oiled with Coloroil, a Colormix floor has a feel under foot like good linoleum while the full luster of the color is brought out. The luster and feel remain indefinitely, giving a surface easy to keep brushed clean, virtually marproof, moisture-repellent, non-staining, disintegration-resisting and totally free from dusting.

Continued on next page

Tests Show Colormix Concrete Stronger Than Plain Concrete

It is apparent from the table that Colormix concrete of all colors is definitely higher in compression strength than plain concrete. The new battleship gray Colormix shows a 28-day compression strength increase of 499 lb. per sq. in. over that of plain concrete. Blue Colormix, the strongest of all, shows an increase of 1803 lb. or 68% increase in strength over plain concrete.

COMPRESSION STRENGTHS

Color	1 day	3 days	7 days	28 days
Plain Concrete	551	1262	1961	2619
White Colormix	636	1846	2195	3496
Blue Colormix	764	2290	3212	4422
Green Colormix	382	1622	2004	3530
Red Colormix	350	1305	2258	3562
Battleship Gray Colormix	572	1527	2132	3118
French Gray Colormix	477	1558	2386	4040
Black Colormix	445	1558	2482	3690
Brown Colormix	382	1654	2800	4134
Buff Colormix	541	1877	2862	4103

Colormix Specifications

General

All concrete floor finish shall be hardened and colored with Master Builders (name color) Colormix, used in accordance with the directions of the manufacturers, The Master Builders Company, Cleveland, Ohio.

The surface shall be protected during the curing and construction period with Master Builders Stainproof Paper, applied in accordance with the directions of the manufacturers, The Master Builders Company, Cleveland, Ohio, and which shall not be removed until all work is finished.

Preparation of the Colormix Top Finish

The mortar for the top finish shall be proportioned as follows: 1 part tested portland cement, 2 parts coarse, clean, gritty sand.

Sand shall be selected carefully to provide grading in size of grain and to insure maximum density. Proportions shall be accurately measured and not approximated.

If mixed by hand, the sand and cement shall be mixed thoroughly dry until uniform in color, showing no streaks. If mixed in a mixer, the latter shall be allowed to turn an additional half-minute before dumping.

Thoroughly dissolve ... [see table below] pounds of (name color) Colormix in clear water for every bag of cement in the batch. Use this colored water to gauge the dry mixture, adding, if necessary, just enough clear water to produce a complete mix. Care shall be taken not to make a sloppy mix.

Proportions of Colormix to Be Used

Colormix must be proportioned exactly to each bag of cement per the following schedule. Weigh each batch of Colormix before dissolving:

Color	Lb. to each sack of cement
Tile Red Colormix	12
Seal Brown Colormix	12
Battleship Gray Colormix	5
Nile Green Colormix	17
Buff Colormix	17
White Colormix	14
Black Colormix	10
French Gray Colormix	10
Blue Colormix	17
Terra Cotta Colormix	17

Application of the Top Finish

When applied to a set slab the top finish shall be run in two layers, using a layer of ordinary 1 cement, 2 sand mortar scratched over the slab in a thickness of ¾ in. This mortar coat shall be floated on with wood floats leaving it ¾ in. below the finished surface line. This shall be followed immediately by the Colormix top finish, ¾ in. in thickness.

When applied to a green slab the Colormix top finish shall be applied direct and in a thickness of not less than ¾ in.

Apply the Colormix top finish to the floor and straightedge, float and trowel in the usual manner. Expansion joints cut through the full thickness of the topping shall be inserted at intervals of not over 6 ft. square.

A second troweling and burnishing shall be given the surface when it has set sufficiently to ring under the trowel. During this final troweling the surface shall not be "worked" so as to disturb the setting of the cement which shall be compressed and polished with the hard action of the trowel. Under no circumstances shall water be sprinkled or otherwise applied to the surface during the troweling process or for purposes of curing after the floor is finished.

Protecting the Finished Surface

Master Builders Colormix Stainproof Paper shall be applied to the surface 36 hours after final troweling is completed, without the previous use of water for curing the concrete surface.

However, where the absorbent nature of the base or fill causes quick drying out of the topping, the surface shall be kept wet with clear water for three days. On the fourth day, when surface moisture has disappeared, the Colormix Stainproof Paper shall be spread over the floor and covered with a two-inch layer of curing sand or sawdust for additional protection.

The Colormix Stainproof Paper shall not be removed until just before the floor is to be turned over for use.

Coloroil Finish—After the Stainproof Paper has been removed and the floor is dry, the surface shall be given an application of Master Builders Coloroil of the same color as the floor. This Coloroil shall be painted over the floor evenly in one coat with a wide brush and the floor blocked off until dry.

Colorwax Finish—After the Colormix Stainproof Paper has been removed and the floor is again dry, the surface shall be given an application of Colorwax, manufactured by The Master Builders Company, wax to be of the same color as the floor. This Colorwax shall be applied evenly over the entire surface by the use of brushes and when dry shall be polished, using soft bristle brushes or clean rags. (Electric rotary polishers are recommended for applying and polishing Colorwax.)

Installation of Base, Stairways and Stringers

Colormix mortar finish for the base, stairways and stringers, shall be mixed exactly as specified above for the field of the floor, and applied in a layer of the same thickness. The base in all cases shall be laid before the field of the floor or at the same time as the field, all surfaces of base and borders shall be coated with an application of Colormix Stainproof Paper before laying the adjoining floor finish to protect the base from staining by the fresh mortar used in the field of the floor.

Continued on next page

Dycrome Hardening and Coloring "After Treatment" for Finished Floors

DYCROME

Description

Master Builders Dycrome is a chemical compound which, applied to concrete surfaces, produces by chemical reaction with the cement a great variety of permanent, attractive tints and colors. At the same time, Dycrome hardens and renders the surface wear-resisting and dustproof.

Colors

Dycrome produces unusual color results, in either single color or combinations of colors. The intensity of the color or colors varies as the degree of chemical reaction between the Dycrome and cement varies on different parts of the floor, giving a cloudlike duo-tone effect. This results in mottled patterns that lend interest and a distinctive character to a Dycrome finish floor.

The colors include flemish oak, weathered bronze, cordovan, palmetto green, jade and nile green, and various combinations of these single colors in duo-tone effects.



Weathered Bronze and Cordovan Dycrome Floor, in the Studio of F. R. Walker of the Firm of Walker & Weeks, Architects, Cleveland, Ohio

Merits and Advantages

Dycrome produces decorative concrete floors of unusual beauty, interest, and distinctive character, that can be obtained in no other way.

Dycrome increases the hardness of the floor and its resistance to abrasion and renders the surface dustproof.

The Dycrome treatment can be applied to surfaces which were left as "plain cement" in the original specifications but which are later found to require a decorative finish. This is a very material advantage to those erecting buildings to be occupied by tenants with varying requirements which cannot be incorporated in the original specifications but which must be provided before the tenant moves in.

The coloring and hardening effects of the Dycrome treatment are proof against damaging wear under normal traffic conditions. Dycrome floors when finished receive application of special Dycrome Oil that gives a smooth, soft feel under foot, easily brushed and kept clean.

Dycrome Stainless Oil

A special oil finish developed by the Master Builders Laboratory for use on Dycrome surfaces to prevent staining by water, oil, grease, dirt or other causes. The oil finish brings out the full color values and enhances the beauty of the floor.

Dycrome Stainless Oil is not affected by moisture. This is of unusual value in preserving the attractive appearance of a colored floor and is available only on Master Builders Dycrome Floors.

Where Dycrome Is Used

The Dycrome Treatment produces floors of unusual beauty, particularly well suited for residences, clubs, hotels, pavilions, stores, shops, offices, salesrooms, theaters, churches, etc.

For exterior use on porches, walks, drives, patios, courts, tennis courts, roof gardens.

Dycrome can be applied on floors, walls and stairs.

The Dycrome treatment is applied by or under the supervision of Master Builders Service, Incorporated, a service organization of experts specializing in the treatment of concrete floors.

Specifications for Floor to Be Colored by Dycrome

All cement floor toppings to be treated with Dycrome shall be of proportions 1 part standard portland cement and 2 parts clean, sharp sand. Before the cement is added there shall be mixed thoroughly into the sand 2 lb. of hydrated lime for every bag of cement used. Cement shall then be added and mixed dry, then tempered with just sufficient clear water to make a workable mortar. No integral or surface hardeners or waterproofers, other than Dycrome, shall be used.

All surfaces shall be given two hard steel trowelings and shall be left uniformly smooth and free from trowel marks. Joints shall be cut throughout the full thickness of the topping, where and as indicated on plans, and shall be kept clean and unmarred by troweling. All special jointing or marking as indicated on plans shall be exactly followed. Under no circumstances shall retempering of surface be done by sprinkling water, nor shall any cement be dusted on surface.

Curing of Cement Surface—All cement floors to be treated with Dycrome shall be cured by spraying once or twice a day with water for 4 days. If this is not possible, floors shall be covered 48 hours after final troweling with 2-in. layer of clean sand which shall be kept thoroughly wet for a period of a week.

No building paper, sawdust, earth or shavings shall be used to cover floor.

Floors shall be at least 30 days old before Dycrome is applied.

Protection of Cement Floor During Curing Period—Traffic shall be kept off floors for a period of not less than 4 days, and no heavy traffic shall be permitted until the Dycrome process is fully completed.

Drop cloths shall be used to protect surface from staining by paint, putty, oils, solder paste, marking by wire insulation, or any other damage that may result from other crafts working over the floors.

These floors to be treated with Dycrome shall be turned over to Master Builders Service, Inc., or the Dycrome contractor, free from paint, grease, oil, scratches, mars, stains or other disfigurements which will in any way interfere with the Dycrome processing or injure the final results.

The general contractor shall arrange to keep these areas free from interruption or trespassing during the application of the Dycrome treatment, and any surfaces that are injured by other crafts either before or after treatment shall be replaced or reconditioned at the expense of the craft responsible for the damage.

Continued on next page

COLORED METALICRON

For Building Low Cost, Colored Non-Slip and Hardened Concrete Floors

Description

Colored Metalicron is a product perfected by and manufactured under the close supervision of the Master Builders Research Laboratories for building inexpensive, colored, non-slip, hardened and waterproofed concrete floors. Colored Metalicron Floors are built by mixing Colored Metalicron with portland cement and troweling the mixture into the freshly floated finish of a concrete floor. The result is a deep colored non-slip floor, far more resistant to abrasion and corrosion than plain finish floors and which is positively waterproof. The cost of Colored Metalicron Floors is approximately that of plain cement finish plus two paint coats.

Like Master Builders other integral hardeners, Colored Metalicron contains Omicron, an ingredient discovered by our Research Laboratories in 1928, which through combination with the soluble elements in portland cement increases tensile and compression strengths of the wearing finish and protects the color as well as the floor from color clouding and marring.



Red Metalicron Floor, Basement Sears Roebuck Store, Cleveland

Excellent background for merchandise display. The decision to build color into the floor rather than painting it afterward is saving from 4 to 6 cents per sq. ft. annually in maintenance cost

Omicron for Color Protection

By reducing the solubles in the concrete the Omicron functions to eliminate efflorescence, which is a cause of color impermanence. It reduces the free lime, which attacks and spoils many colors used with cement, giving such colors new beauty and permanence. As a result, brighter, cleaner and more pleasing decorative effects are obtained with Colored Metalicron. At the same time Omicron checks the attack of corrosive agents that might mar the finish, such as are frequently encountered in kitchens, basements or on exterior areas or from the corrosive effect of cleansing compounds high in alkali content.

Color Ingredient

Only first quality coloring oxides are used in Colored Metalicron. All raw oxides are but 200 mesh or approximately the same fineness as portland cement. Oxides used in Colored Metalicron are ground to a fineness approaching 400 mesh which will pass a screen having 160,000 openings per square inch. This degree of fineness (four times that of portland cement) permits the color to completely coat each particle of cement and sand, giving the floor a denser, brighter color than is possible with coarser colors.

Non-Slip Surface

Colored Metalicron Floors, although they are smooth troweled, present a positive non-slip wearing surface. This desirable quality without, in any way, interfering with the uniform color and wear resistiveness of the floor, is secured by a special processing of the product.

Less Expensive than Paint

For years, the practice has been to specify all stair areas, corridors, basements, service rooms, locker rooms, kitchens, etc., with plain cement finish, leaving it up to the owner or lessee to paint the floors if color and a more pleasing finish were desired. Painting concrete floors is poor practice due to the fact that to keep the concrete covered, frequent repainting is necessary. This is expensive. As Colored Metalicron floors cost but the price of two good paint coats and as they require little or no maintenance, the aggregate saving in paint maintenance over a twenty-year period is surprisingly large. Various building managers estimate the cost of painting floors at four cents per square foot, which would make the cost of 80 cents per square foot in twenty years. By building color in instead of painting it on the floor, 85% of this maintenance or 68 cents per square foot, may be eliminated.

Where Used

The application of Colored Metalicron floors is almost universal. New uses are developed daily. Practically every class of building has areas where Colored Metalicron floors fill a real need. Public buildings, private residences, schools, churches, office buildings, industrial plants, hospitals, clubs, theatres, stores.

Specific areas where Colored Metalicron has been extensively used include lobbies, corridors, ramps, offices, salesrooms, auditoriums, washrooms, laboratories, restaurants, dining rooms, cafeterias, basements, service quarters of clubs, hotels, apartments, residences, roof gardens, porches, terraces, solariums, power plant generator rooms and many others.

Specifications

See page 3 for short and detailed specifications for building Colored Metalicron Floors. Same specifications apply for Colored Metalicron.

Partial List of Installations

Hapeville Methodist Church, Hapeville, Ga.
Sears Roebuck, Atlanta, Ga.
Barco Mfg. Co., Chicago, Ill.
Catholic Sister's Home, Dodgeville, Wis.
Drexel Park Church, Chicago, Ill.
Federal Furnace Plant, South Chicago, Ill.
Lombard Fire Station, Lombard, Ill.
Peoples Gas Building, 97th and Baltimore Streets, Chicago, Ill.
Stewart Warner Speedometer Corp., Chicago, Ill.
Youngstown Sheet & Tube Co., Indiana Harbor, Ind.
Perkins Institute for Blind, Watertown, Mass.
Great Falls High School, Great Falls, Mont.
C. E. Atwater Co., Stromsburg, Neb.
Canadian General Electric Co., Toronto, Ont.
So. Calif. Edison Steam Plant, Los Angeles, Calif.
Tappan School, Detroit, Mich.
Corrigan McKinney Steel Co., Cleveland, Ohio
Lake Norconian Club, Norco, Calif.
Medinah Athletic Club, Chicago, Ill.
Motor Parts Co., Los Angeles, Calif.
Pantages Theatre Building, Los Angeles, Calif.
Public Service Production Co., Trenton, N. J.
Reliable Packing Co., Chicago, Ill.
Salem Country Club, Salem, Mass.
Shell Oil Co., Cleveland, Ohio
International House, Berkeley, Calif.
M. Cain Co., Inc., Washington, D. C.
Sears Roebuck Store, Pittsburgh, Pa.
Popular Mechanics Building, Chicago, Ill.
Stewart Motor Co., Buffalo, N. Y.
Troy Auto Supply Co., Troy, Ohio
Negro Library Branch, San Antonio, Tex.
Independent Oil & Gas Co., Columbia, Mo.
Wornall Baptist Church, Kansas City, Mo.
Milwaukee Gas Light Co., Milwaukee, Wis.
Outboard Motor Co., Milwaukee, Wis.
Daisy Hill Farm, Cleveland, Ohio
Sterling Building, Houston, Tex.
Wilson Creamery Co., Wilson, N. C.
Workmen's Sick Benefit Building, Brooklyn, N. Y.
Worcester Gas Light Co., Worcester, Mass.
Smith Young Tower, San Antonio, Tex.
Bank of Philadelphia & Trust Co., Philadelphia, Pa.
Edgewater Beach Hotel, Chicago, Ill.
Hundreds of others throughout the country

Continued on next page

BRIKRON

Omicron Admixture for Masonry Mortar

Description

Brikron, a product perfected in the Master Builders Research Laboratories for use in mortar mixes, is a compound of an impalpable powder known as Omicron and a powerful stearate waterproofing. When added to portland cement mortars, Brikron places a definite double check on masonry mortar troubles by (a) minimizing mortar joint efflorescence; (b) making mortar plastic and buttery; (c) adding substantially to early high strength; (d) preventing fading action of lime salts on mortar color; (e) producing mortar joints that are waterproof, highly resistant to crazing and cracking, corrosion, spalling and disintegration.

Minimizes Mortar Joint Efflorescence with Omicron

Efflorescence from mortar joints which spoils the appearance of carefully selected color combinations, fine stone and expensive tooled surfaces consists of soluble salts brought to the surface of the wall and deposited thereon by moisture evaporation. Brikron minimizes efflorescence from mortar joints due to the action of one of the principal ingredients—Omicron. Omicron, an impalpable powder found only in Master Builders products, is unique in that it reduces the ratio of soluble salts in set portland cement forming new and insoluble combinations. As the soluble salts are replaced with insoluble materials, efflorescence from the mortar joint is checked at its source.

Gives Required Plasticity

A buttery, easily workable mortar is a positive necessity in laying up brick or stone. So important has this been considered by workmen that excesses of lime or fine inert materials have been added and a consequent reduction in strength and increase in porosity due to excess water required has resulted. The Omicron content of Brikron in addition to largely replacing the soluble salt content, provides a workable buttery mortar without the use of these fines. As some Architects will prefer to use lime in their mortars, the product has been designed to permit the use of lime up to 10% of the volume of cement without interfering with the action of the Omicron ingredient.

Protects Mortar Color

Oxide colors for coloring mortar joints lose their permanent color and beauty due to an adulteration of the color by whitish soluble salt crystals. Due to the action of the Omicron ingredient, Brikron protects the original beauty of the color by preventing its adulteration.

Increases Strength

Unless mortar has sufficient quick strength to hold up four or five courses of brick without danger of mortar of the bottom course being squeezed out, work is delayed. This condition is often met in cold weather. Brikron adds to the original strength of the mortar and controls the setting time, thereby insuring satisfactory working conditions and eliminating costly delays.

HOW BRIKRON CONTROLS SETTING TIME

1:3 mix, cement mortar with 10% hydrated lime	Compressive strength, lb. per sq. in.		
	1 day	7 days	28 days
A. Untreated	445	2195	4548
B. With Brikron	764	2418	4676

Waterproofs

When gauging water evaporates from mortar, its volume is replaced with air cells or pores. One cubic yard of mortar (requiring approximately 30 to 36 gal. of water workable mortar) will contain as much as 2½ cu. ft. of air cells due to evaporation of excess water. These microscopic air cells or pores coupled with capillary attraction causes such mortar to absorb moisture which results in (1) leaky walls and (2) spalling and cracking if the moisture freezes in cold weather. Porosity cannot be eliminated but capillary attraction may be nullified by lining the pores with a water repellant stearate. Brikron contains a powerful waterproofing stearate which effectively nullifies capillarity.

HOW BRIKRON WATERPROOFS MORTAR

1:3 mix, cement mortar with 10% hydrated lime	Per cent absorption water, by weight					
	1 hr.	2 hrs.	4 hrs.	6 hrs.	24 hrs.	48 hrs.
A. Untreated	2.08	2.60	2.97	2.97	3.42*	3.42
B. With Brikron	.60	.82	1.04	1.04	1.19	1.27*

*Equilibrium—No further absorption on longer immersion.

Protects Joints from Deterioration

Soot from coal smoke plus water forms dilute sulphuric acid. Salt from sea air plus moisture forms sodium chloride solution. In addition to these, various chemicals in the air from divers industries plus water form corrosive solutions. Such acid and alkaline solutions deposited in mortar joints are a contributing cause to joint deterioration as they open up the joint by attacking the soluble content of the mortar. Due the action of Omicron in largely replacing the soluble salt content with insoluble products, Brikron makes them highly resistant to any corrosive attacks.

How Used

Brikron is recommended with use in a 1 part portland cement to 3 parts sand mortar mix for maximum efficiency although all mixes are greatly benefited by its use. The addition of lime up to 10% of the volume of cement may be permitted. One quart of Brikron is required per bag of cement and is used by throwing the Brikron into the mixer together with the gauging water. When mortar is mixed by hand, Brikron is stirred into the mixing water.

How Packaged

Brikron is packed in 60 and 35-gal. steel barrels, 5-gal. and 1-gal. cans, plainly labeled bearing our name, trademark and directions for use.

Continued on next page

MASTERSEAL

A Colorless Surface Waterproofing That Protects Brick, Stone, Stucco and Concrete Surfaces from Spalling and Cracking

Description

Masterseal is a transparent liquid for waterproofing the exposed surface of brick, stone, stucco and concrete. It is applied like paint with either brush or spray gun and fills the surface pores with a time defying water repellent transparent substance. It is made in two grades, Masterseal No. 1 and No. 2. No. 1 slightly darkens light colored surfaces while No. 2 is positively colorless and no change in the appearance of a treated surface is perceptible. No. 1 is a permanent treatment while surfaces treated with No. 2 sometimes require retreating at the end of two or three years.

Merits and Advantages

Masterseal prevents cracking and spalling of mortar joints, limestone, brick, stucco and concrete due to moisture seepage and subsequent freezing.

Masterseal protects masonry surfaces from attacks of precipitated solutions such as salt solution from sea air, sulphuric acid solutions from smoke and soot, etc.

Masterseal effectively protects interior plaster of the popular hollow tile and brick monolithic type of wall construction.

Masterseal prevents absorption of dust, soot and dirt by the surface pores of limestone, brick and concrete and consequently prevents staining due to this cause.

Masterseal prevents cracking due to alternate wetting and drying of the masonry surface.

Masterseal does not discolor as it ages but remains in the same transparent condition as when first applied.

Covering Capacity

One gallon of Masterseal covers from 125 to 150 sq. ft. one coat or 75 to 100 sq. ft. two coats.

Application of Masterseal should be made at temperatures above 50° F. and only on surfaces which are warm, with the pores free from moisture.

Suggested Specifications

All exposed (brick, stone, stucco) surfaces shall be waterproofed with Masterseal (No. 1 or No. 2) applied according to directions of The Master Builders Company, Cleveland, Ohio.

MASTERTEX

Waterproof and Decorative Cement Paint Decorates and Protects from Cracking and Spalling

Description

Mastertex is a specially designed coating for waterproofing and decorating portland cement stucco, brick, stone and other masonry structures. It is applied with brush or spray. Unlike oil paints it does not flake or blister when exposed to the elements.

Merits and Advantages

Mastertex decorates and protects surface from cracking and spalling due to alternate wetting and drying, freezing, etc.

Mastertex contains Omicron, the material which protects surfaces from dilute acid and alkali attacks.

Mastertex may be used on reinforced concrete buildings in place of the plaster coat, being applied directly to the structure.

Mastertex will not rub or brush off or turn yellow.

Mastertex contains no volatile elements such as oil, glue, casein, etc., which deteriorate in sun and rain.

Mastertex may be applied to concrete surfaces just as soon as the forms are down. Can be applied to stucco within a day after final plastering.

Mastertex waterproofs as well as decorates.

Mastertex may be applied to wet surfaces.

Where Used

Brick, stucco and stone buildings, concrete swimming pools, gymnasiums, auditoriums, bridges.

Industrial interiors subject to steam and acid fumes, basement walls, concrete storage vats, retaining walls, apartment house air shafts.

Eleven Colors

Light Green, Blue, Brick Red, Ivory, Cream, Pink, Brown, Light Gray, French Gray, Dark Gray, and White.

Suggested Specifications

All exposed areas as indicated shall be waterproofed and decorated in the color selected with Master Builders Mastertex.

Mastertex shall be applied according to the directions of The Master Builders Company, Cleveland, Ohio.

Continued on next page

CONCENTRATED INTEGRAL WATERPROOFINGS

FOR

PORTLAND CEMENT MORTAR AND CONCRETE



(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

A Few of the Prominent New York Buildings Waterproofed with Master Builders Products

(1) Lord & Taylor's (2) Ambassador Hotel (3) Pershing Square Building (4) Equitable Building (5) Federal Reserve Bank of New York (6) Farmers' Loan & Trust Co.

(7) Commodore Hotel (8) Saks Fifth Ave. Store (9) N. Y. Stock Exchange (10) Pennsylvania Hotel (11) B. F. Keith's Theatre

Description

Master Builders Concentrated Integral Waterproofings come in Liquid, Paste and Powder form. When mixed integrally with concrete, they line the pores with a water repellant stearate which changes capillary attraction into capillary repulsion, thus effectively holding out water.

Where Used

Master Builders Concentrated Waterproofings are recommended for use in mass concrete and cement mortar of all kinds, including foundation walls, floor slabs, roof slabs, and all other forms of reinforced or plain concrete.

Merits and Advantages

(1) All three waterproofings are of the stearate type recognized and recommended by leading concrete authorities and building associations.

(2) All three increase the workability of the concrete making it easy to place in and around specially shaped forms. In the case of plaster, the added plasticity furnishes ease in trowelling.

(3) With increased lubrication of a mix or mortar, excessive amounts of water need not be used. This results in less porosity and makes for watertightness.

(4) Because Master Builders Waterproofings are concentrated, maximum results are obtained with a minimum amount of waterproofing.

(5) Concentrated Liquid and Paste Waterproofing are exceptionally easy to use, it only being necessary for the mixer man to throw the proper amount of waterproofing into the mixer along with the gauging water. Where Waterproofing Powder is used, the aggregates and powder must be mixed dry for a half minute before water is added.

Specification

All cement mortar (or concrete) as indicated shall be waterproofed throughout by the use of Master Builders Concentrated Waterproofing (here insert "Liquid," "Paste" or "Powder") following the directions of the manufacturers, THE MASTER BUILDERS COMPANY, Cleveland, Ohio.

ABSORPTION TEST MADE FOR PROMINENT ARCHITECTS,* CINCINNATI, OHIO, BY INDEPENDENT TESTING LABORATORY

	Wt. dry, grams	Wt. after 12 hrs. immersion, grams	% of Absorption
M. B. Liquid	65.75	66.37	.95
A. A super cement	63.37	64.125	1.18
B. Well-known brand	62.5	64.0	2.4
C. Well-known brand	63.5	65.5	3.15
D. Void filling powder	58.75	60.875	3.62

*Name on request.

ABSORPTION TEST MADE BY ROBT. W. HUNT LABORATORY, PITTSBURGH, NO. 14053

Specimen. Time 168 days	Increase in weight, grams	Increase % dry weight
Plain concrete—no waterproofing	11.2	1.13
Material "A"	6.65	.67
Material "B"	7.45	.785
Master Builders Waterproofing Powder	5.65	.585

ABSORPTION TEST MADE IN M. B. LABORATORIES

	1 hr.	2 hr.	4 hr.	6 hr.	24 hr.
1:3 Mix plain	1.6	2.1	2.6	2.6	3.8
1:3 Mix M. B. Paste	0.6	0.9	1.3	1.3	1.9

QUANTITIES REQUIRED FOR SPECIFIC MIXES

Mix	Cement per cubic yard	Waterproofing liquid per cubic yard	Paste per cubic yard	Powder per cubic yard
1:2:4	1.52 barrels	4 qt.	9.0 pounds	12.1 pounds
1:2½:5	1.26 barrels	3 qt.	7.5 pounds	10.0 pounds

Mix	Thickness, in.	Cement per 100 sq. ft.	Liquid per 100 sq. ft.	Paste per 100 sq. ft.	Powder per 100 sq. ft.
1:2	1	1.00 barrel	2.7 qt.	6.0 pounds	8.0 pounds
	¾	.75 barrel	2 qt.	4.5 pounds	6.0 pounds
1:2½	1	.83 barrel	2.1 qt.	5.0 pounds	6.6 pounds
	¾	.63 barrel	1.6 qt.	3.6 pounds	5.0 pounds

QUANTITY OF WATERPROOFING REQUIRED PER BAG OF CEMENT

Concentrated Liquid Waterproofing	⅔ qt. per 94-lb. sack
Concentrated Paste Waterproofing	1½ lb. per 94-lb. sack
Concentrated Powder Waterproofing	2 lb. per 94-lb. sack

MINWAX COMPANY, INC.

A Complete Service for Waterproofing, Dampproofing and the Preservation of Masonry and Wood

11 West 42nd Street, NEW YORK, N. Y.

BRANCH OFFICE: 232 East Erie Street, CHICAGO, ILL.

FACTORY: DELAWANNA, N. J.

For Representatives Refer to Local Telephone Directory and Paragraph on Last Minwax Page

TRADE MINWAX MARK

CONSULTATION AND SERVICE

Realizing that waterproofing cannot be reduced to design formulæ, as can steel, but is dependent primarily on experience, Minwax recommends that waterproofing be studied as a general problem and offers a complete service covering all divisions.

Why Minwax—Minwax materials and the service that stands behind them, are the gradual outgrowth of 25 years' manufacturing and engineering experience in this field. The first products were developed in 1904 by Arthur B. Harrison to make available the special protective qualities possessed by a certain crude, natural asphalt. These qualities were due largely to its high mineral wax content—from which fact the name Minwax originated.

Our service, therefore, is complete and unbiased and recommendations are based on what experience has shown best and not merely on a desire to sell. As part of this service, our engineers will present complete recommendations on the design and specification in connection with any of these problems and will furnish approximate estimates of cost, if desired. We do not apply Minwax products but are in a position to recommend experienced, responsible organizations who specialize in their application.

Consult with the local representative where possible, or write direct, giving details as completely as practicable.

GUIDE AND INDEX TO MINWAX PRODUCTS

For greater convenience our materials have been grouped into four natural divisions with a general discussion at the opening of each division, to serve as a general guide in selecting the most effective methods.

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WATERPROOFING BELOW GROUND LEVEL OR AGAINST PRESSURE

(1A) Introduction—Our experience has demonstrated the necessity of two methods of waterproofing against pressure and two materials for protecting against dampness. For waterproofing we find that practically every condition can be met with the greatest directness and effectiveness by either the Membrane Waterproofing System or by the Metallic Method. For dampproofing all conditions can be met by either the standard or emulsified type of asphalt coating. In each case Minwax materials are offered which embody the best qualities inherent in each system.

Based on our observation of results over the past 25 years, we offer the following as a general guide:

Use Minwax Membrane Waterproofing System where there is danger of vibration, load flexure, temperature movement, etc.; and in all other cases where favorable working conditions can be provided and where maximum insurance against leakage is necessary.

Use Minwax Metallic Waterproofing on most work on existing foundations; where proper working conditions for membrane waterproofing cannot be economically provided. Do not use Metallic Waterproofing where movement or vibration may occur, or where slight leakage would be serious or would cause costly damage.

Use Dampproofing on foundations only where no hydrostatic pressures will exist. Generally a proper drainage system should also be provided. The standard and the emulsified type are used almost interchangeably, except that where surfaces may be very damp Minwax Bituloid (emulsion) is better than Minwax Fibrous Brush Coat (standard).

It must be remembered that the foregoing offer only a general guide, and that many problems will require careful special analysis which our engineers will gladly furnish. Specific information on the products follows.

Minwax Membrane Waterproofing

(1) Introduction—The Minwax System is the original Cotton Fabric system, this company having introduced it in 1905 and pioneered in its development. A quarter century of efficient service has made it recognized as the highest standard of waterproofing engineering.

(2) Description—The Minwax Membrane System consists of alternate layers of Minwax Waterproofing Asphalt and Minwax Saturated Cotton Fabric forming a built-up blanket or mat constructed so as to envelop or cover the portion of the structure to be waterproofed. In placing, the Asphalt is heated until it is fluid, mopped on the surface and the fabric placed in the hot mopping. This operation is repeated to the required number of plies, the work being handled so as to form a continuous unbroken sheet.

Being the original Fabric System, Minwax has largely formed the basis for the standards established by the A. S. T. M., A. R. E. A., Federal Specification Board, etc. Our materials meet all requirements of these specifications and deliver valuable qualities which could not be included in general open specifications.

Tests—Pittsburgh Testing Laboratories show that the completed 2-ply unsupported membrane is waterproof up to a bursting pressure of 374 lbs. per sq. in. and that there is an elasticity of over 10% for the completed waterproofing.

Tests by Columbia University show that, if not cut, the complete waterproofing will stretch, without rupture, ¼ in. at 0° F. under field conditions.

(3) Uses—We believe that, where proper conditions for application exist, the elastic membrane system gives the greatest assurance of permanent waterproofness. The ease with which "proper conditions for application" can be created and the cost involved varies, and will be considered under two headings: First—Open or Above Grade Work; Second—Foundations.

Open or Above Grade Work—In this class may be included: terraces or bridge decks under paving, tracks or fill; roofs under tile or masonry wearing course; sidewalks over basements; floors in factories; hotels or clubs where dampness may occur; shower stalls, bathrooms; swimming pools; tanks and reservoirs, etc. In all these cases not only are proper working conditions usually present, without added cost, but such areas are generally most exposed to temperature movement, vibration, load flexure and conditions tending toward cracking. Therefore Minwax Membrane Waterproofing becomes the logical method in every case.

Foundation or Sub-structure Work—In this class may be included not only basements but also tunnels, subways and underground structures generally. In all of these cases a careful study of the design is warranted to provide "proper conditions for application." Admittedly, not only the cost of the waterproofing, but any added cost of masonry, excavation, etc., demand study in relation to the necessity for the maximum protection. In all cases, therefore, where waterproofing is of real importance careful study of all factors is justified. Our experience is at your disposal.

(4) Minwax Saturated Cotton Fabrics—This company produces three fabrics known as Minwax Specification Fabric, Minwax Cotton Cord Cloth and Minwax Subway Fabric. The fabric is the reinforcing element analagous to steel in concrete. They are saturated by the same process and woven of the same high quality pure cotton and are, therefore, elastic, tough, pliable and stretchable at all temperatures.

Specification Fabrics—A fabric of great strength, suited to the most exacting requirements. The margin of safety which this quality material insures, makes it necessary for the architect or engineer to grant it a small preference.

How shipped—Sheets 36 in. wide, shipped in 50-yd. rolls.

Cotton Cord Cloth—A fabric similar to the above, but lighter in weight and more open in mesh. Possesses every quality necessary to accomplish a first-class waterproofing job. This particular fabric is most widely used and more than meets the average specification.

How shipped—Sheets 36 in. wide, shipped in 50-yd. rolls.

Subway Fabrics—A special type developed for New York subway work, lighter than either of the above. An excellent quality which meets the requirements of the general open specification, such as American Railway Engineering Association, American Society for Testing Materials, Federal Specification Board, etc.

How shipped—Sheets 36 in. wide, shipped in 100-yd. rolls.

(5) Minwax Waterproofing Asphalt—The asphalt is the waterproofing element to be strengthened and toughened by the fabric. The explanation of the wonderful record developed by Minwax Waterproofing Asphalt during the last quarter century is due largely to the use of a certain crude natural asphalt having physical and chemical properties of great value, not found in other asphalts. The full and complete development of these qualities has been the object of our manufacturing and research departments for the past twenty-five years.

Minwax Waterproofing Asphalt is recognized as the highest point in the development of bituminous waterproofing because it possesses to the highest possible degree, the five requisite qualities: *First,* plasticity and stability at all normal working temperatures. *Second,* stretchability and ductility at all normal working temperatures. *Third,* adhesiveness and cohesiveness. *Fourth,* workability and smooth flowing and high flowing properties. *Fifth,* permanence.

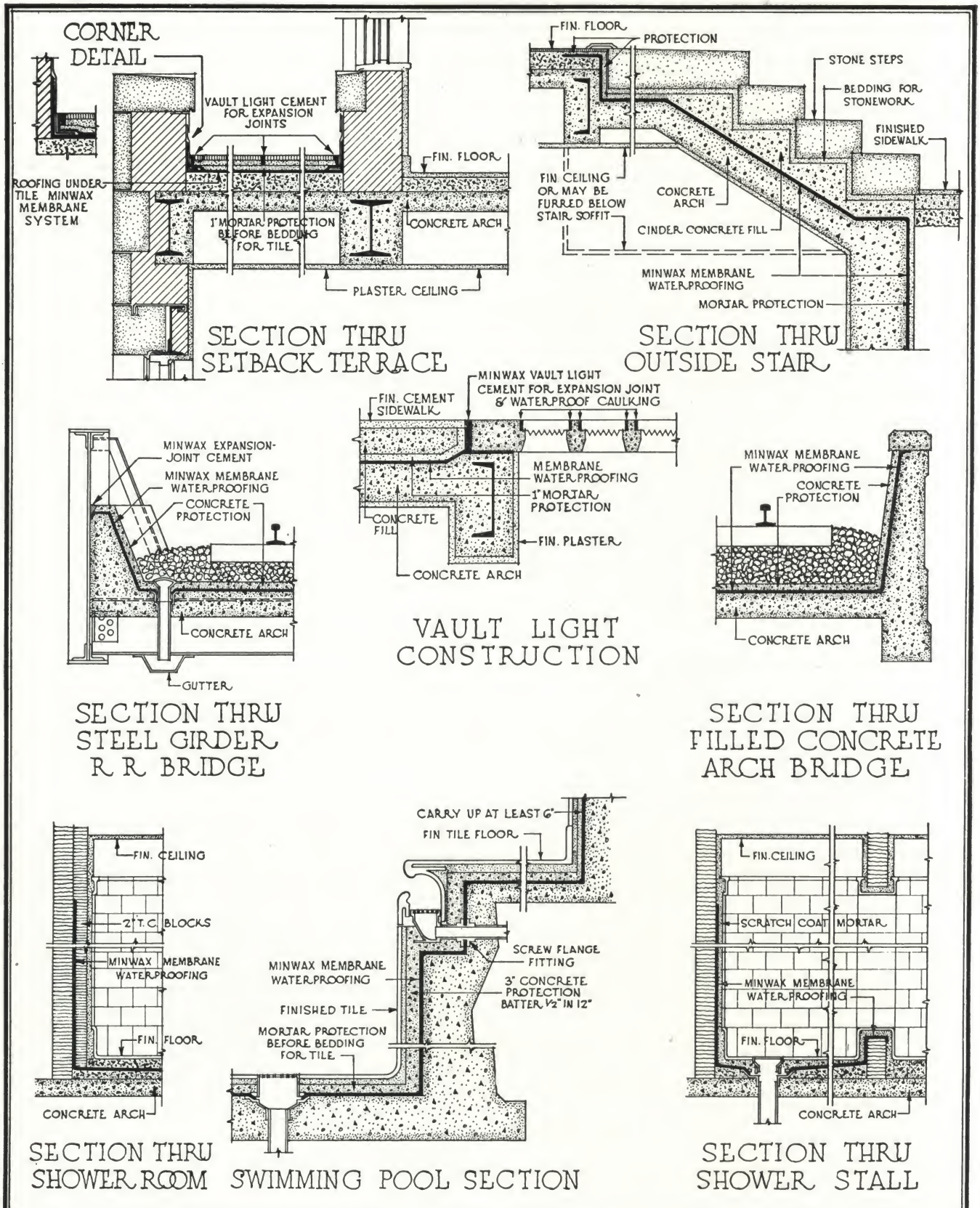
How shipped—In sheet metal drums containing approximately 55 gal.

(6) Specifications—*Note:* Attention is directed to accompanying drawings.

Materials—(General)—Shall be Minwax (stipulate either Specification Fabric, Cotton Cord Cloth or Subway Fabric depending on grade preferred) and Minwax Waterproofing Asphalt as manufactured by the Minwax Company, Inc., New York and Chicago, applied in the number of plies hereinafter designated and in strict accordance with the manufacturer's directions and under his supervision, or by a sub-contractor approved and recommended by him.

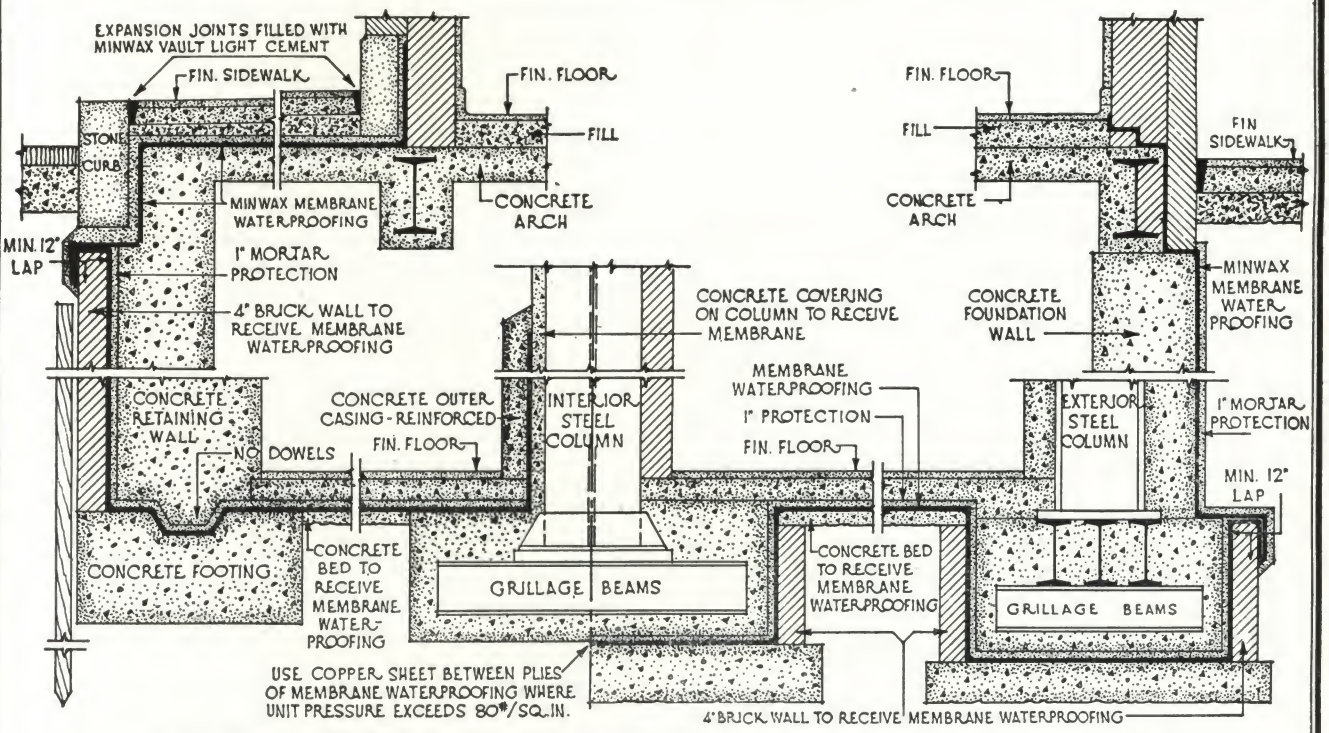
(Specifications continued on third page following)

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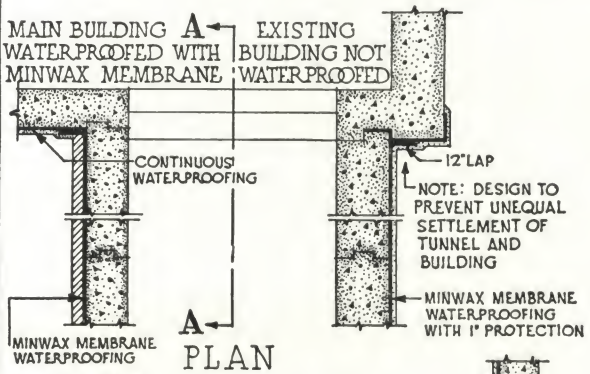


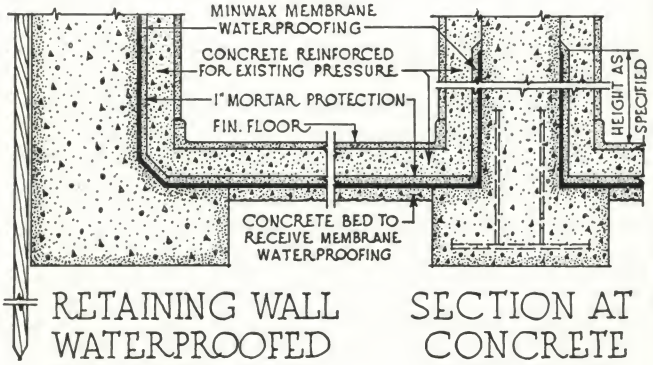
MINWAX CO NEW YORK	ABOVE GRADE DETAILS FOR MEMBRANE WATERPROOFING	PLATE NO. 1 NOT TO SCALE

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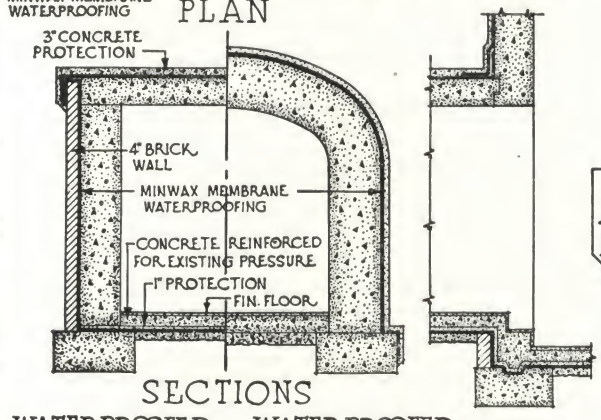
SECTION THRU CELLAR WALLS & FLOOR





RETAINING WALL WATERPROOFED ON INNER FACE

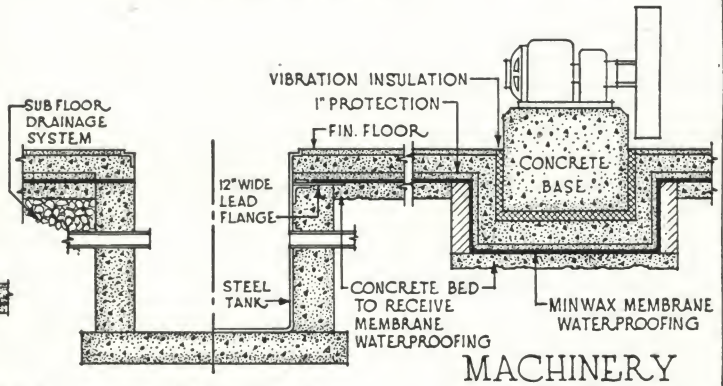
SECTION AT CONCRETE COLUMN



SECTIONS

WATERPROOFED ROOF - SIDES - AND FLOOR

WATERPROOFED ROOF AND SIDES ONLY



SECTION AA

SUMP PITS

MACHINERY FOUNDATION

MINWAX CO. NEW YORK	BELOW GRADE DETAILS FOR MEMBRANE WATERPROOFING	PLATE NO. 2 NOT TO SCALE

Continued on next page

Preparation of Surfaces—(General)—The surface shall be smooth, firm and dry without holes or projections which might cause puncture, wood flat or equal, and no work shall be done in wet or freezing weather. Prime all surfaces with one even coat of Minwax Asphalt Primer to uniform brown color and allow to dry before proceeding.

Protection (General)—All care shall be taken to prevent damage of the waterproofing by other workmen and it shall be protected by mastic, mortar, brick or supporting concrete promptly and under the supervision of the waterproofing contractor. Except where other adequate means are provided not less than ½ in. of portland cement mortar, mixed 1:2, should be applied before any other material is placed.

(7) ***Sidewalks, Floor Construction, Promenade Decks, Tile Roofs, Bridges, etc.***—Waterproofing to be two ply and to flash back of stone base courses, or back of covering, or up parapets, or to turn down on and connect with wall waterproofing, finish or tile to be placed immediately. (Where extra insurance of effective workmanship is desired, as for under tile roofing, etc., specify three ply). All expansion joints in tile, sidewalks or decks shall be filled with Minwax Vault Light Cement.

(8) ***Shower Stalls***—Two ply on floors and up 6 in., one ply on walls, secured to wall at top is usually adequate. On stall construction place mortar directly against waterproofing; in shower rooms place 2-in. furring tile against waterproofing.

(9) ***Swimming Pools, Tanks and Reservoirs***—Waterproofing to be two ply and to extend continuously on the sides and bottom, turning over the tops of the walls and extending across pool room floor, or adjacent construction as shown. All angles to be reinforced with extra sheet, all pipes to have proper flange connections (9 in. all around), protection concrete to be placed immediately and to be self-supporting.

Note: Use a third ply for deep tanks or for extra insurance in pools in upper stories.

(10) ***Foundations***—Pumping provided by the general contractor. The waterproofing of the sub-structure shall be continuous on walls and floors below grade, carried under or up all columns, under and around all pits and trenches beneath the general level of the basement floor connected to sidewalk waterproofing, or carried to a height not less than 6 in. above the joining grades, forming a complete water-tight envelope. If applied on the outside of the walls, it shall be carried through them at level of floor waterproofing courses and protected against backfill by a mortar coat. If applied on the inside of the walls it shall be covered by a secondary wall reinforced to withstand existing pressure.

Three ply should generally be used, with an additional reinforcing ply in pits and trenches and for extra heavy water pressure or difficult working conditions.

Note: All waterproofing must be supported or covered by masonry carefully designed to withstand the maximum expected water pressure.

Quantities—For each square of 100 sq. ft., 12½ yd. fabric are required for each ply; 4 to 5 gal. for each mopping on flat surface, 4½ to 5½ gal. for each mopping on vertical surface.

(11) Minwax Asphalt Primer

Thin liquid primer to assure perfect bond. Allow at least 1 hour after application.

How Shipped—Quart, gallon, 5-gal., 30-gal. and 55-gal. containers.

Covering Capacity—150 sq. ft. per gal.

(12) Minwax Metallic Waterproofing

Description—A finely ground, pulverized iron powder, so chemically treated that, when mixed with portland cement and water, it promptly and tenaciously bonds and seals all pores in concrete, brick and masonry, prevents the penetration and percolation of water.

Advantages—Metallic Waterproofing requires little change on structural design; requires no protection; and, when waterproofed surfaces are exposed, leaks caused by vibration or cracking can be effectively repaired.

Uses—For waterproofing the inside face of foundation walls against dampness and water pressure, under conditions where the use of the membrane system is impractical or uneconomical. For a waterproofing bond coat between concrete and mortar, as underneath tile, as in outside swimming pools, etc.

(13) Specifications—***Preparatory Work***—Walls and floors to be waterproofed shall be constructed of sufficient strength to withstand the expected hydrostatic pressure. Floor slabs shall be keyed to walls or other vertical surfaces. All scale pockets shall be located and cut back and form wires and spreaders cut 1 in. below surface. All laitance shall be removed and surfaces thoroughly cleaned not more than 24 hours before application of waterproofing. Flanged sleeves shall be provided to receive steam pipes or other pipes subject to temperature variation which pass through the surfaces waterproofed. After completion of the piping, space between pipe and sleeves shall be caulked.

Application—On concrete wall, ceiling or floor surfaces the mixture of Minwax Metallic Waterproofing shall be brushed on to the surfaces, in thin coats worked well into the surface, in as many applications as necessary to absolutely seal the wall, allowing sufficient time between coats for complete oxidation. When oxidation is final and application is complete, brush coatings with portland cement, sand and Minwax Metallic Waterproofing shall be applied until the resulting surface finish is similar in appearance to sand finished plaster. Coats shall be spread thin to be kept moist until thoroughly cured.

Where basement rooms are to be subdivided the above waterproofing work shall proceed before the erection of partitions or the placing of machinery or equipment.

Floors shall proceed as specified above and left ready for finished wearing surface, or shall be finished with a 1 to 2 cement topping containing 5 lb. of Minwax Metallic Waterproofing to a sack of cement.

Protection—All Metallic Waterproofing shall be properly protected against freezing until thoroughly cured.

Covering Capacity—Based on not less than two waterproofing coats and one finished coat, the Metallic Method will require from 30 to 50 lb. of Minwax Metallic Waterproofing per 100 sq. ft.

How Shipped—Shipped in 100-lb. waterproof bags.

(14) Foundation Dampproofing

For foundation dampproofing use either Minwax Fibrous Brush Coat (see par. 27) or Minwax Bituloid (see par. 30 to 35) according to following specifications.

(15) Specifications—Walls shall be coated from grade to footing with 2 thorough applications of Minwax Fibrous Brush Coat, or Minwax Bituloid, allowing 12 hours to elapse between coats. Materials shall be applied cold, without adulteration, with a long handled roofer's brush and well brushed into all surfaces, leaving no voids. Backfill in not less than 12 hours, exercising care to prevent damage of surface. Material shall be thoroughly stirred before and during application.

Note: It is important to provide subsoil drainage to carry off water and prevent development of hydraulic pressures.

ASPHALT CEMENTS FOR EXPANSION JOINTS, CRACKS AND GROOVES

(16A) Introduction—Four types are offered, three of which must be heated and poured in hot, one of which can be handled cold. The materials for heating are: Minwax Vault Light Cement, especially for horizontal joints and grooves exposed to traffic; Minwax Fibrous Expansion Joint Cement, for joints not exposed to traffic and where considerable move-

Continued on next page

ment may be localized; Minwax Special Asphalt Joint Filler, for joints in concrete highway pavements. The cold material is Minwax Asphalt Caulking Compound, described in paragraph 55 under "Caulking Material," for vertical joints, grooves, shrinkage joints, etc., requiring a material that can be applied with a cold trowel.

Minwax Vault Light Cement

(16) Description, Uses, etc.—A black, solid, elastic asphaltic compound which is a blend of Minwax Asphalts and special mineral filler for sidewalk or vault light joints in promenade tile decks, swimming pools, reservoirs, tanks, etc. It develops a strong watertight bond to concrete, stone or metal and its reliability has made it standard in the trade. It will not "stew" under sun action or become brittle in cold weather. It should be used only in joints and grooves that are nearly level.

How Shipped—In 1-gal., 5-gal. and 25-gal. containers.

Quantities—One gallon required for each 231 cu. in. of joint.

(17) Specifications—***Tile Roofs***—The joints shall extend through the mortar bedding to the Membrane Waterproofing; in locations where a protection mortar or concrete is placed over the Waterproofing prior to the placing of the tile, joints shall be formed and filled in this protection concrete separately. All joints shall be not less than 1 in. in width. When joints are thoroughly dry, they shall be brushed very carefully so as to remove all loose material and leave only sound surfaces against which the filling material can bond. Minwax Vault Light or Expansion Joint Cement shall then be heated until fluid, and shall be poured into the joints to within approximately ⅛ in. of the upper surface of the tile.

Arrangement and Spacing of Joints—Joints shall be formed against all upright surfaces, and shall be spaced over the general area of the roof, so as to break it into squares approximately 20 to 25 ft. in size, or as shown on the plans. Where roofs are of irregular outline, spacing and arrangement of joints shall be varied as necessary to provide one full inch of joint width for approximately every 20 to 25 ft. of roof.

(18) ***Specifications for Sidewalk, Swimming Pool, Reservoirs and Similar Joints***—Have the joints thoroughly dry; clean carefully so as to remove all dust and loose material, and prime the sides of the joints with Minwax Asphalt Primer. Caulk the bottom of the joints with spun oakum driven firmly but not packed hard so that it might interfere with movement.

Heat Minwax Vault Light Cement until it will flow, and pour it into the cracks. An especially effective seal will be obtained by re-heating the surface of the joint with a torch after the material has cooled.

Caution: This material should never be used on joints having a greater slope than normally required for roof or sidewalk drainage.

Note: Caulking is required to assure a sound bed and prevent the plastic asphalt from being forced through fissures at the bottom of the joint.

(19) Minwax Fibrous Expansion Joint Cement

Description, Uses, etc.—This material is similar in all respects to Minwax Vault Light Cement except that it is slightly softer. It will remain quite soft at low temperatures and will therefore take care of considerable movement. The fibre keeps it from flowing in summer. It is particularly useful for expansion joints in waterproofing membrane and as a mop coating for shrinkage joints in retaining walls and floors.

How Shipped—In 1 gal., 5-gal. and 25-gal. containers.

Quantities—One gallon required for each 231 cu. in. of joint. Applied by mop or brush; 1 gal. to each 15 sq. ft. of surface.

(20) Specifications—Joints must dry. Sides of joints shall be primed with Minwax Asphalt Primer, after which Fibrous Expansion Joint Cement (heated) shall be poured into the joints or applied with mop or Tampico fibre brush.

(21) Minwax Special Asphalt Joint Filler

A solid asphaltic cement designed to meet the most advanced highway specifications for joint filler for concrete pavements.

How Shipped—In 50-gal. sheet metal drums.

(22) Minwax Caulking Rope

Description—A special asphaltic rope moulded from Minwax Vault Light Cement and asbestos fiber. Driven into joints or compressed between metal or stone surfaces, it will bond firmly and form an elastic watertight seal. Material comes in containers of 100, 500 and 1000 ft. and is made in sizes of $\frac{3}{16}$, $\frac{5}{16}$ and $\frac{7}{16}$ in. in diameter.

(23) Specifications—Prime the sides of the joints with Asphalt Primer. Place the rope on a hot surface until it is warmed through and then place it and drive it into the joints.

WATERPROOFING OUTSIDE WALLS ABOVE GRADE

(24A) Introduction—This subject including parapet projection, should be considered and specified under one head as a complete proposition, thus centering responsibility. The ideal method would be (1) dampproof the inner face of the outside wall to prevent built-in dampness for affecting plaster and paint; (2) provide damp courses under copings over foundations and over window heads; (3) treat the exterior surface with Transparent or Colored Waterproofing to keep the whole wall dry, to stop penetration of stains and to prevent the development of efflorescence, etc.; (4) caulk around the window frames and other joints where movement might occur, as in copings, cornices, etc.

In steel frame construction, especially in combination with hollow tile walls and particularly where treatment of the exterior surface is not required, spandrel waterproofing would be included at floor lines.

The Minwax Company manufactures the highest quality of materials for all the above purposes, as described in detail under the following headings. Individual problems will be gladly analyzed and complete recommendations presented.

MINWAX ASPHALTIC DAMPPROOFINGS

For Dampproofing Outside Walls Underneath Plaster and Below Ground:

(24) Introduction—There are two general types of asphaltic dampproofing, the standard type here described and the emulsified type described below under the heading Minwax Bituloid. They can be used interchangeably for many uses, Bituloid being particularly suited for application on damp surfaces.

In each type there is a choice of consistencies, the heavier consistencies being produced by reinforcing the coatings with asbestos. In general, the heavier consistencies, by filling holes and cracks, offer greater insurance and should be specified for very severe exposures. Positive results can be had with all types offered if specifications are followed.

Minwax Dampproofing

(25) Description—A full-bodied, black liquid coating based on Minwax Waterproofing Asphalt, which is combined with special chemically inert solvents to make a material that forms a tacky, plastic, lasting dampproof coating which never hardens, and to which plaster will adhere perfectly even after

Continued on next page

months of exposure. It also resists the acid and alkali conditions that are met in the type of work for which it is recommended.

(26) Minwax Plain Dampproofing—Is the above material in a consistency suitable for spray application or for applying with brush. Recommended for concrete and solid brick masonry.

(27) Minwax Fibrous Brush Coat (Brush Mastic)—This is the same material with the addition of asbestos fluff as a filler and reinforcing agent. It works well under the brush and insures filling incidental holes and cracks. Recommended for concrete and solid brick masonry and especially is best suited for foundation dampproofing (see paragraphs 14-15). Brush applied.

(28) Minwax Trowel Mastic Dampproofing—This is again the same material but with the proportion of asbestos fluff increased to bring the material to mastic consistency and insure filling the larger cracks and holes that develop in hollow or "back-up" tile construction.

For trowel application dampproofing, particularly over hollow tile, also for spandrel waterproofing, waterproof cut-off under copings, over window heads, under sills, etc., spandrel waterproofing, cork insulation protection.

Covering Capacity—Plain Dampproofing and Fibrous Brush Coat—80 to 125 sq. ft. per gal. per coat. Trowel Mastic, 20 to 20 sq. ft. per gal. $\frac{1}{8}$ in. thick.

How Shipped—5-gal. pails, 30 and 55-gal. drums.

(29) Specifications—*Plain and Semi-Mastic*—Apply two thorough coats so as to form a continuous heavy adhesive coating on the surface. Allow 12 hours between coats. Apply plaster in not less than 24 hours or more than three weeks after application.

Trowel Mastic—Apply one uniform continuous coat minimum thickness $\frac{1}{8}$ in. with trowel. Apply plaster in not less than five days or more than three weeks after application.

Note: Not recommended for concrete ceilings, or conditions where weight of plaster is largely suspended from the coating, or under cement plaster.

Minwax Bituloid (Emulsified Asphalt)

(30) Description—Minwax Bituloid is an asphalt emulsion consisting essentially of fine particles of asphalt, suspended in water. This material is a mechanical emulsion, produced and maintained by the addition of a very small percentage of very fine (collodial) mineral matter (aluminum silicate). After application it cures by evaporation of the water, the particles of asphalt welding together, leaving a deposit or coating of pure Waterproofing Asphalt. Minwax Bituloid adheres perfectly to damp surfaces. Applied cold with brush, trowel, or spray, it can be applied with the greatest ease.

Produced in two types as follows:

(31) Plain—A very heavy consistency for straight coating and painting work in all types of waterproofing and dampproofing, as foundations underneath plaster, etc. Forms a very heavy tacky coating, for spray or brush.

(32) Fibrous—Which contains a considerable percentage of pure asbestos fibre, so that it can be applied with a trowel, where a heavier coating is required, as for spandrel waterproofing, cork insulation protection, etc., for brush or trowel.

Uses—Minwax Bituloid has a very wide field of use. It is especially valuable for dampproofing and protective work, where asphalts are suitable, and where the surfaces may be damp. Also for insulation protection in refrigeration over corkboard and magnesia insulation, acid protection and, mixed with sand and cement, for patching concrete floors.

(33) Specifications for Use of Bituloid—*Preparation*— All surfaces to be coated whether of concrete, steel or wood, shall be clean and free from dust, oil or loose scale. No coating work shall be carried on at temperatures below 40 deg.

(34) *Bituloid (Plain)*—For brush application apply two thorough coats, thinning the first coat with water, to assure penetration. If surfaces are specially dry or dusty, wet with clean water before applying first coat. Apply second coat without dilution, just as received. For spray application Bituloid must be strained through a fine sieve or strainer when placing in material container.

(35) *Bituloid (Fibrous)*—Apply priming coat of Bituloid (Plain), thinned with 30% water, and when dry to the touch apply Bituloid (Fibrous) with a trowel to the required thickness. For brush application, thin with water to proper consistency.

Note: Bituloid, being a water emulsion, can be frozen and when frozen the product is destroyed and of no further use.

MINWAX SPANDREL WATERPROOFING AND DAMPCOURSES

(See Drawings on Following Page)

(36) Description—A method of building into spandrel construction over spandrel beams, lintels, etc., in masonry wall, a tough pliable course of waterproofing which will prevent transmission of moisture without affecting bond or strength of the wall. This method is applicable not only for spandrels, but should be used wherever there is particular danger of moisture entering masonry, and at locations where dampness will tend to accumulate and gradually work through to the interior surfaces as: Under copings, cut-offs at grade and at roof flashing; under saddle of door to roof, porch or steps; waterproof pan over window heads; waterproof flashing under window sills; waterproofing at spandrel beams, extending through the wall and connecting to the dampproofing which is under the plaster; dampcourse over footings, etc. See drawings.

There are two methods of spandrel construction using Minwax materials, as follows:

Built-in-Place Spandrel—This consists of two trowel coats of Minwax Dampproofing Trowel Mastic reinforced with one layer of Minwax Cotton Cord Cloth.

Full-Seal Fabric Spandrel—This consists of one layer of Minwax Full-Seal Fabric bonded to masonry and at laps with Minwax Trowel Mastic, and coated with this same material. This method should be specified where utmost speed is required in placing.

(37) *Full-Seal Fabric*—Is a strong, tough, closely woven pure cotton fabric, perfectly sealed, fully saturated and coated with Minwax Waterproofing Asphalt, so that it needs only the final surface seal in the field. Its character prevents the breaking of the masonry bond which would be caused by metal pans or cut-offs, while its toughness and pliability permits it to be left loose and afterwards to be built into place by the masons without danger of tearing, so that spandrel waterproofing can be done well in advance of brick work.

(38) Specifications—*Built-in-Place Spandrel (General)* —For Built-in-Place Spandrel, surfaces shall be smooth, without sharp projections, wires or hardened mortar. All mortar shall be sufficiently set so no free water is present. Apply a full heavy coat of Minwax Dampproofing Trowel Mastic (Fibrous Bituloid alternate) into which set one layer of Minwax Cotton Cord Cloth (Subway Fabric alternate) so as to extend from within 1 in. of the face of the wall to 4 in. beyond the line for the inside face of the wall for turn-up, as indicated by drawings. Apply over the fabric a second coat of Trowel Mastic so to completely conceal the weave of the fabric.

All laps shall be at least 3 in. and shall be carefully sealed. Where fabric is bonded to steel as at web of beam, the second trowel coat shall be carried onto the steel 3 in. beyond the termination of the fabric.

Placing—Specify either two course or continuous.

(39) *Full-Seal Spandrel (General)*—The surfaces shall be furnished sufficiently smooth so that no sharp edges protrude and all ends of wire reinforcing of arches shall be bent

Continued on next page

over the flange in a proper manner. At spandrels the bevel of cement mortar shall be placed over the top of the beam.

The above work shall be performed by the mason contractor and after it is sufficiently set, the surface of the brick and the upper surface of the beams shall be given a coat of Minwax Trowel Mastic and into this shall be set one ply of Minwax Full-Seal Fabric, as shown on drawings, to within 1 in. of all exposed surfaces. The upper surface of this fabric shall then receive one uniform coat of Minwax Trowel Mastic. For spandrel and cut-offs connecting to dampproofing under plaster, the sheets shall be cut to widths so that they will extend not less than 4 in. beyond the inside face for turn up connection. All laps shall be at least 3 in. and shall be sealed between the sheets and over the top of the laps with Minwax Trowel Mastic. All edges as turned up against inside face of wall or at outside edge shall be laid in and buttered thoroughly with trowel mastic.

Placing—Specify either two course or continuous.

(40) ***Two-Course Spandrel Method***—Where conditions create too great a height between window heads and the top of the spandrel, the Spandrel Waterproofing shall be placed in two courses, the first course placed as above and carrying through the wall to within 1 in. of the outside face at the level of the top flange of the spandrel beam. The second course shall start on the web of the spandrel beam at a point 6 in. above the lower flange, but can be carried up to under side of upper flange if desired. The beam shall be coated with Minwax Trowel Mastic and Minwax Fabric (Cotton Cord or Full Seal) shall be set in this as above, and a second trowel coat of Minwax Fibrous Mastic shall be placed over the upper edge, extending onto the steel 3 in. beyond the edge of the fabirc.

Where beams are spliced, a strip shall be carried full height of web covering and sealing splice.

This course of Minwax Spandrel Waterproofing shall extend down to and out on the angle forming the window arch.

(41) ***Continuous Spandrel Method***—Where the distance between the top flange of the spandrel beam is short, the soffitt of the beam shall be bricked in or concreted by the mason contractor and Minwax Spandrel Waterproofing shall be carried in one continuous sheet from the top of the spandrel beam as above specified down over the face of the beam and out on the angle forming window arch, or to within 1 in. of the finished face of the wall.

(42) ***Dampcourses and Waterproofs***—These can be built by either the Built-up or Full-seal Method. Generally Full-seal Method is more convenient requiring only one coating which can be effectively applied by brush using Minwax Fibrous Brush Coat.

MINWAX TRANSPARENT WATERPROOFING

For application to exterior surfaces for waterproofing, frostproofing, stainproofing and preserving Concrete, Brick, Stucco and Stone.

(43) Introduction—There are three types of Minwax Transparent Waterproofings: Minwax Clear Waterproofing for concrete, stucco, stone and brick surfaces; Minwax Heavy Clear Waterproofing for especially porous brick, stucco or concrete and for surfaces subject to immersion; Minwax Colorless Waterproofing for limestone, artificial stone, cream-faced brick and other light colored surfaces. These three types are necessary to most efficiently meet the wide variety of conditions and materials for which a penetrative surface waterproofing is required.

Advantages—All Minwax Transparent Waterproofings are liquids applied as received with a brush or spray. Ease of application assures positive effective results regardless of the character of the surface. When applied they penetrate into and below the surface for a considerable depth, sealing all pores and making the material waterproof. There is, therefore, nothing to be worn off, broken through or to scale loose; the waterproofing is really inside the surface. Minwax Transparent Waterproofings are applied as the final application, protecting the finished job, sealing checks and porous spots. They are independent, positive, insurance against moisture penetration. Their waterproofing value is highly permanent, the result of the mineral wax base, and is proven by 24 years' service and test.

How Shipped—All Minwax Transparent Waterproofings are shipped in 1 and 5-gal. cans, 30 and 55-gal. drums.

(44) Minwax Clear Waterproofing

Description—For concrete, stucco, stone and brick surfaces. A light amber-colored liquid which, when applied, penetrates deeply into the surface and cures, depositing a tough mineral gum which in two applications will completely fill and seal the surface. Its action is purely physical or mechanical rather than chemical and is absolutely positive and independent of the nature of the surface to be waterproofed. It does not form any film or deposit on the surface or change the texture in any way. It changes the color slightly, which change decreases in time.

Covering Capacity—Saturate surface. Generally requires 1 gal. for each 200 to 250 sq. ft. per coat on concrete and stucco; 150 to 200 sq. ft. per coat on brick.

(45) Specifications—***General***—Surfaces shall be thoroughly dry, clean, sound and all bed and vertical joints shall be solidly filled; shall show no holes, voids, or cracks. On new work the waterproofing contractor shall inspect the condition of the wall prior to starting work and shall report to the architect and contractor any unsatisfactory pointing. No work shall be done at temperature below 50°; immediately before starting application dirt and dust shall be brushed from the surface. Apply two thorough saturating coats with brush of air spray, saturating the surface and working the material into all roughness at each coat. Waterproofers shall do incidental pointing as necessary, rubbing Minwax Grey Caulking Compound, color to match the color of the mortar, into small cracks or holes immediately after the first coat of waterproofing. Allow 24 hours between coats.

(46) ***Wall Waterproofing***—All exposed surfaces must be waterproofed from roof flashing over and including coping and down outside surface to grade. Test all brick joints and repoint as necessary, repairing or replacing loose stucco or concrete. Apply 2 coats as above specified. Rewindow: See Minwax Caulking Compounds.

(47) ***Preventing Efflorescence***—Wall must be allowed to become absolutely dry, work should only be allowed to be undertaken under most favorable conditions. Clean off existing efflorescence with wire brush or dilute muriatic acid solution. When surface is thoroughly dry proceed as above for wall waterproofing.

(48) Minwax Heavy Clear Waterproofing

For especially porous brick stucco or concrete and for surfaces subject to immersion. This material is heavier grade having a larger percentage of mineral wax and is applied and functions in the same way as Minwax Clear Waterproofing.

Covering Capacity—See Minwax Clear Waterproofing.

Specifications—See Minwax Clear Waterproofing.

Special Note: No work shall be done at temperatures below 60° F.

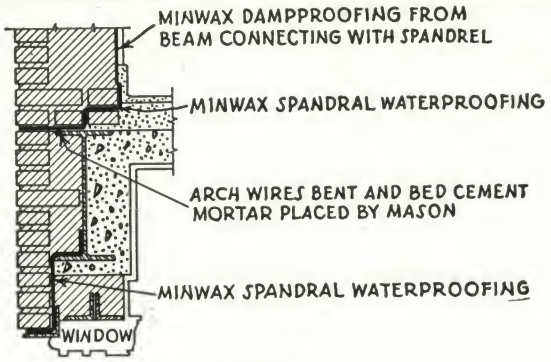
(49) Minwax Colorless Waterproofing

For limestone, artificial stone, cream colored face brick and light colored surfaces. This material, developed from Minwax Clear Waterproofing, deposits a superrefined mineral wax supplemented by certain preservative water-repellent chemicals and causes no change in color on the lightest surfaces.

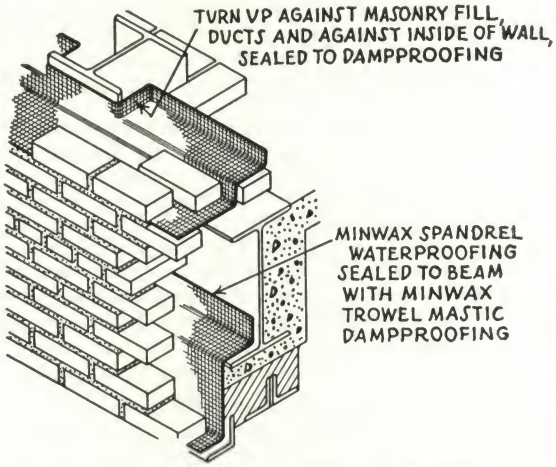
On artificial and natural stone, Minwax Colorless Waterproofing performs three important functions: (1) Applied at the mill it protects the surface of semicured stone from absorption of dirt and stain while in transit and prior to setting.

(Continued on second page following)

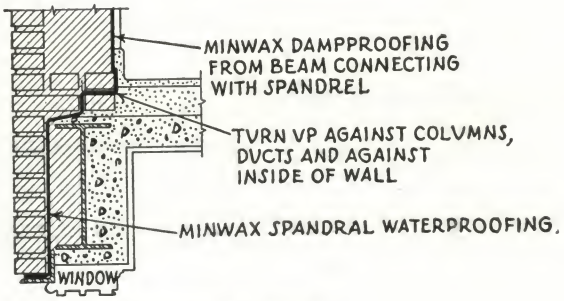
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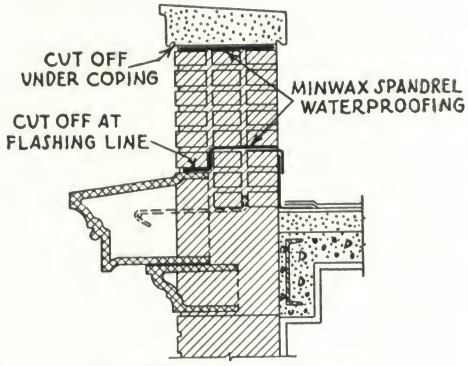
TWO COURSE SPANDREL
(FOR DEEP SPANDREL)



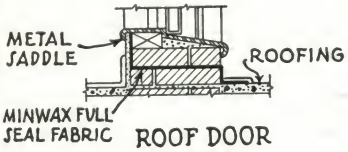
PERSPECTIVE OF TWO COURSE SPANDREL



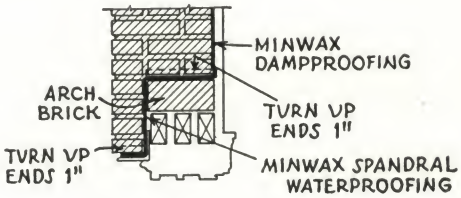
CONTINUOUS SPANDREL
(FOR SHALLOW SPANDREL)



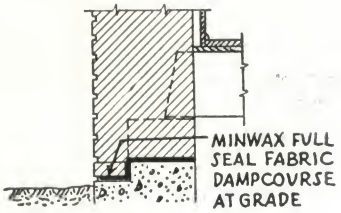
PARAPET CUT OFFS



ROOF DOOR SADDLE

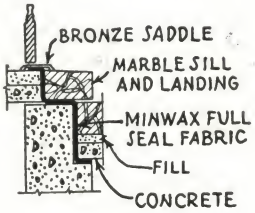


PAN OVER WINDOW HEAD

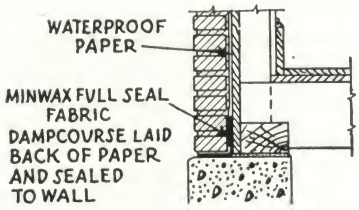


DAMPCOURSE

NOTE: MINWAX SPANDRAL WATERPROOFING INCLUDES TWO TYPES: BUILT IN PLACE, CONSISTING OF TWO TROWEL COATS OF MASTIC AND ONE LAYER OF COTTON CORD CLOTH; FULL SEAL FABRIC WHICH IS COMPLETELY SEALED AND REQUIRES ONLY A TOP BRUSH OR TROWEL COAT



WATERSTOP AT ENTRANCE STEPS



DAMPCOURSE BRICK VENEER

MINWAX CO. NEW YORK	DETAILS FOR SPANDRAL WATERPROOFING DAMPCOURSES AND WATERSTOPS	PLATE No. 4 NOT TO SCALE

Continued on next page

(2) In the completed job it waterproofs the exposed surface so as to prevent the accumulation of grime and stain and assists in keeping the building in a light, clean condition. (3) It prevents water and frost action and serves as a protective preservative treatment against disintegration and weather.

Covering Capacity—Saturate surface. Generally requires 1 gal. for each 150 to 300 sq. ft. per coat.

(50) Specifications — ***General*** — Same as for Minwax Clear Waterproofing except that this material can be satisfactorily applied at temperatures down to 35° F.

(51) ***Cut Stone (new)***—All stone shall be absolutely clean and dry before application of the waterproofing. After erection and cleaning and when dry, all exposed surfaces shall receive the second thorough saturating coat of Minwax Colorless Waterproofing. Special attention shall be paid to horizontal and protecting surfaces as at cornices, copings, etc.

(52) ***Existing Stone Work***—Surfaces shall be cleaned down by washing with soap and water or sandblasting and shall receive 2 thorough saturating coats of Minwax Colorless Waterproofing applied with a brush or spray, 12 hours between coats.

(53) Minwax Brick and Cement Coating for Waterproofing and Decorating Exposed Surfaces of Cast Concrete, Brick or Stucco

This Minwax Product is a pigment coating produced in a series of attractive flat color tones. It is a combination of the highest grade inert mineral pigments obtainable in a carrying vehicle based on Minwax Clear Waterproofing (one of the oldest, best known and most efficient mediums for exposed wall waterproofing).

Colors—Finished in 11 standard colors.

Covering Capacity—Varies between 160 and 250 sq. ft. per gal. per coat, depending upon thoroughness and porosity of the surface to be treated.

How Shipped—In 1, 5, 30 and 55-gal. containers.

Specifications—***General***—All exposed surfaces as directed shall receive 2 thorough coats of Minwax Brick and Cement Coating, color as selected.

Note: A more detailed discussion of this material will be found on Minwax paint page. See Manufacturers' Index.

CAULKING MATERIALS FOR AROUND WINDOWS, ETC.

(54) Introduction—In discussing the question of caulking materials we refer to materials required not only for caulking around windows but for caulking joints in masonry, coping, parapets, etc., or wherever an elastic watertight joint filler is required for walls above grade.

There are two basic requirements a caulking compound must meet: first, it must form and maintain a watertight bond; second, it must remain elastic so as to take up movement. All compounds must meet these requirements, but for some classes of work the color of the compound is occasionally important, so is its tendency to stain or not to stain the surface. Therefore, we manufacture two types: first, asphaltic compounds for locations where color and staining are not important; second, gray and buff compounds, for locations where color and stain are important. The gray and buff is made in two consistencies, depending on the method of application desired.

(55) Minwax Asphalt Caulking Compound

A black, fibrous asphaltic putty, compounded of Minwax Asphalt and asbestos fibre, for caulking around windows, for shrinkage joints, masonry floors, walls, and for general joint work where a plastic asphaltic material which can be applied cold is required.

This type is lower in cost than the gray or colored compound. It will work equally well with a trowel, hand caulking tool or hand caulking gun (supplied by Minwax Company, if desired).

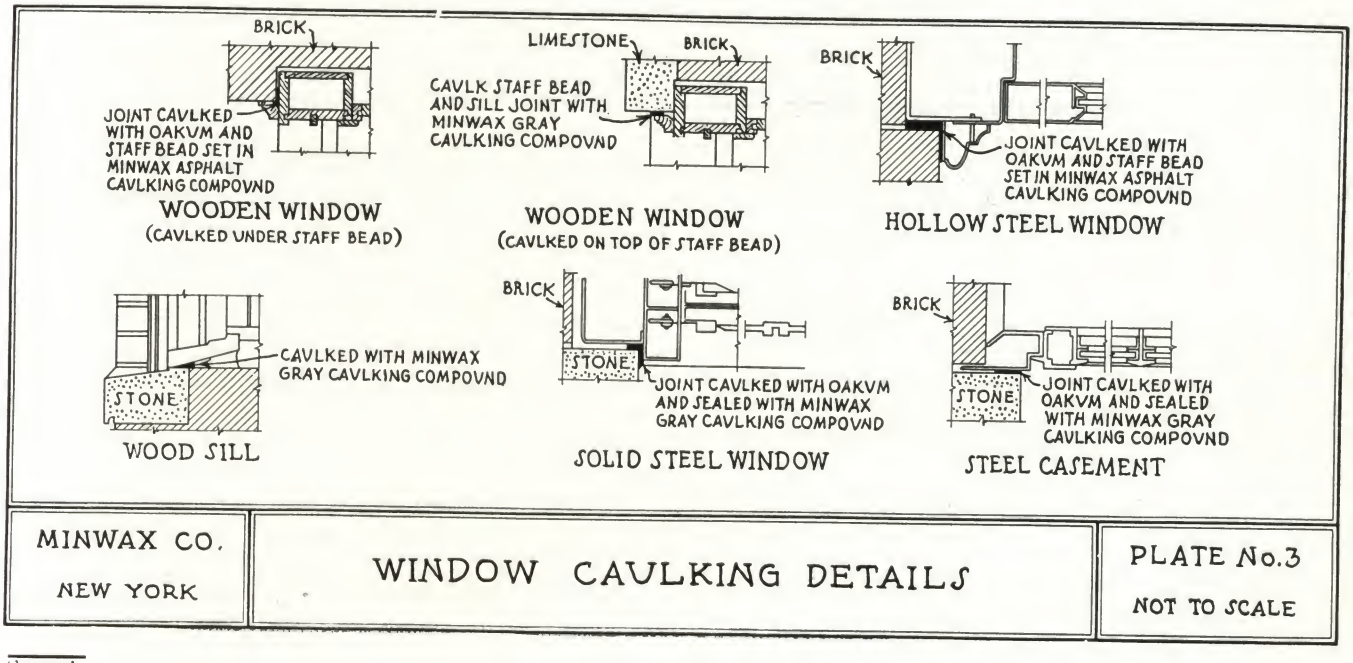
How Shipped—In 1, 5, 30 and 55-gal. containers.

Covering Capacity—For windows, full depth joints, four to six average windows; corner bead only, eight to ten average windows. As seal for shrinkage joints, trowel coat ⅛ in. thick, requires 1 gal. for each 10 to 14 sq. ft. Other types of joints can be figured on the basis of 1 gal. for every 231 cu. in. of joint.

(56) Specifications—For shrinkage joints at pilasters, etc., apply heavy coating Minwax Asphalt Caulking Compound with trowel and build masonry against it. For windows, see below.

(57) Minwax Gray Caulking Compound (Gray and Buff)

The inherent advantage of this type of material is that it can be produced in light colors or in colors to match trim, that it is practically non-staining and that it can be efficiently and



Continued on next page

satisfactorily painted over. This material is a combination of specially treated oils and gums in combination with mineral fillers, which after it is installed, cure to a resilient homogeneous mass that is absolutely weatherproof and which adheres tenaciously to the sides of the joints whether masonry, wood or steel. It is made in two grades, No. 2 (heavy), for application with a hand caulking tool, and No. 1 (soft) for application with a hand caulking gun (supplied by Minwax if desired).

For best and most permanent results, the sides of the joints should be primed with Minwax Caulking Primer before this material is used. This stops the suction of the masonry or wood and prevents it from drawing out the oils before they have been properly cured.

How Shipped—Shipped in 5-lb., 25-lb., 50-lb., and 100-lb. containers.

Covering Capacity—3 to 5 ft. of joint, ¾ in. deep per lb.; surface corner bead 9 to 10 ft. per lb., or 1½ to 2 lb. per average window.

(58) Minwax Caulking Compound Primer—This is a liquid for sealing the surface of masonry wood joints before the use of Minwax Gray Caulking Compound applied in one coat with a suitable brush.

(59) Specifications—The same general specifications apply to all of the above materials and the selection between materials will depend on whether or not it is essential to have a light colored joint and non-staining material, in which event specify Minwax Gray Caulking Compound, or whether the black asphaltic compound would be satisfactory as to appearance—specify Minwax Asphalt Caulking Compound. From the standpoint of efficiency, each material will give splendid and permanent results.

(60) *Wood or Hollow Metal Frames*—Pack space to within ¾ in. of face with oakum and fill solidly with Minwax Asphalt Caulking Compound (or Minwax Gray Caulking Compound as explained above) forced in, carrying caulking, to stone sill in all cases. Caulk head and sill in the same manner.

(61) *Steel Frames*—For new work butter inside edge of masonry opening or surfaces of sash to be embedded with thin coat of Minwax Gray Caulking Compound (or Minwax Asphalt Caulking Compound, as explained above). Caulk finished job or old work around head, jamb and sill carefully with same compound applied with trowel; finish to neat bead. Set cast metal door saddle or sill in Minwax Asphalt Caulking Compound.

(62) *Pointing Stone, Terra Cotta, etc.*—Rake out all joints for elastic pointing ¾ in. deep. Paint sides thoroughly with Minwax Caulking Primer, and fill with Minwax Caulking Compound, color to match or as selected. Horizontal joints in copings, cornices, sills, etc., especially important.

TREATMENTS FOR FLOORS

(63A) Introduction—Minwax treatments for floors have been developed directly from Minwax Clear Waterproofing and are, therefore, fundamentally waterproof and penetrative. Starting from the same source, treatments for masonry and wood floors have been developed into highly specialized materials and will be treated separately.

(63) Treatment for Masonry Floors

Introduction—We produce three separate materials for masonry floors which we have found meet all requirements for almost every condition we have met in the past twenty-five years on all types of floors, including concrete, terrazzo, magnesite, tile, marble, slate, etc. These materials are all applied after the floor is complete and acts through placing a tough mineral gum inside the surface of the floor, adding toughness and density. The materials are, first, Minwax Concrete and Terrazzo Floor Finish, for all average conditions on concrete, terrazzo, magnesite, tile, and marble floors; Minwax Concrete Floor Binder, for particularly porous sandy concrete floors; Minwax Colored Concrete Finish, a stain finish for concrete floors; and Minwax Concrete Floor Paint, a high quality gloss floor enamel.

(64) Minwax Concrete and Terrazzo Floor Finish

Fills the pores in the surface and subsurface of concrete floors with a tough mineral gum. Applied cold as a liquid after the floor has dried and cured, its action is mechanical and positive, creating an absolutely dense smooth surface. It thus eliminates the cause of dusting and disintegration and prevents the penetration of water, stains or liquids of any sort. The mineral gum is highly resistant to and gives maximum protection against the action of brine, creamery and packing plant acids, or oils and dilute acids found in industrial plants, and makes the floors highly sanitary.

On terrazzo and marble tile it brings out color, creates an easily cleaned sanitary surface and prevents dusting and staining. On composition and magnesite it prevents stains, disintegration by water and kills salts.

Covering Capacity—Concrete and composition, 200 to 400 sq. ft. per gal. per coat; terrazzo, marble and tile, 400 to 600 sq. ft. per gal. per coat.

How Shipped—In 1, 5, 30 and 55-gal. containers.

(65) Specifications—*Concrete, Magnesite, etc.*—Floors shall be clean and dry. For concrete and composition floors, apply 2 saturating coats with "T" head cotton floor mop leaving no puddles or excess material, allowing 12 hours to elapse between coats. Second coat to cure 24 hours before using.

(66) *Terrazzo, Tile, etc.*—Mop up surface with water to remove all dust and as soon as surface appears uniformly dry apply first coat of Minwax Concrete Terrazzo Floor Finish. Cross-mop first coat to even out and take up surplus. After 24 hours apply second coat in same manner. Dense tile or terrazzo should be wiped up with dry rags 2 hours after each coat and polished with an electric polisher just before occupancy.

(67) Minwax Concrete Floor Binder

This material is a heavier special grade developed from Minwax Concrete and Terrazzo Floor Finish and is designed for binding together the surface and subsurface particles of a granular, soft or sanding concrete floor.

It is not recommended for average sound concrete floors. On such surfaces Minwax Concrete Terrazzo Floor Finish should be specified and used.

Packages—Same as for Minwax Concrete Floor Finish.

Specifications—Two thorough coats applied with long handled brush. First coat thinned 10% with turpentine.

(68) Minwax Colored Concrete Floor Finish

Penetrating and permanent stain colors are added to Minwax Concrete and Terrazzo Floor Finish at the factory and the Minwax Colored Concrete Floor Finish delivered on the work ready for use. These stains bite well into the surface, giving a soft textured color that will resist even concentrated wear. It is especially valuable for integrally colored concrete and magnesite floors that show uneven appearance.

Covering Capacity and Shipping Packages—Same as Concrete and Terrazzo Floor Finish.

Colors—Gray, linoleum and seal brown, Egyptian and tile red, forest green.

(69) Specifications—Floors shall be clean, dry and absolutely free from dust and stain. Apply 1 thorough coat of Minwax Colored Concrete Floor Finish with a mop, cross-mopping the surface half hour after application to spread material uniformly. After 24 hours apply second coat in exactly the same manner, and about 2 hours after applying

Continued on next page

the second coat, wipe up the surface thoroughly with dry rags. Polish in not less than 48 hours with Minwax Finishing Wax in color to match.

(70) Minwax Finishing Wax (Paste)

This material is a special grade wax which produces a high, durable lustre. For use on concrete it is made in colors to match Colored Concrete Floor Finish and should always be specified.

Colors—Gray, linoleum brown, seal brown, Egyptian red, tile red and forest green.

How Shipped—1 lb., 4 lb., and 8 lb. cans.

Specifications—Apply in thin uniform coat and polish, when dry, with electric polisher. Do not apply until Concrete Floor Finish has cured at least one week.

(71) Minwax Concrete Floor Paint

A high quality long-lived durable floor enamel. Two coats recommended.

Standard Colors—Buff, light gray, dark gray and red.

Covering Capacity—500 sq. ft. per gal. per coat.

(72) Minwax Finishes for Wood Floors

Introduction—Minwax Finishes for Wood Floors are again developed on the basis of depositing into the surface a mineral gum, toughening, binding, waterproofing, preserving and stainproofing the surface. In this division of our catalogue only the preservative protective use of our material will be discussed. For information as to its use as an architectural finish in the stain colors, see our catalogue under the paint section, as listed in Manufacturers' Index.

Two materials are necessary to effectively meet the range of conditions for which preservative protective finishes are required for maple and other floors subject to hard usage: first, a material which will give the greatest surface protection and the finest quality of finish; second, a material which will penetrate the whole body of the wood retarding dry rot and at the same time give effective surface protection and finish. The products we produce are: Minwax Flat Finish No. 9 for partial penetration; Minwax Penetrating Finish for maximum penetration. Used in combination, the first coat of Minwax Penetrating Finish protecting the heart of the wood; the final coat, just before occupancy, of Flat Finish enhancing the surface, ideal results are produced.

(73) Minwax Flat Finish

Minwax Flat Finish is a combination of mineral waxes, oils and gums. It is a clear non-viscous liquid and is applied with a brush or mop. It penetrates quickly into the surface and cures, depositing a tough mineral wax or gum that completely seals the surface. This wax when cured, being mineral in character, is highly resistant to the alkalies in soaps and cleaning compounds and its sealing and waterproofing value is so great that it will practically eliminate the necessity for these soaps and compounds and permit the floors to be cleaned by mopping them with clear water.

Minwax Flat Finish is particularly valuable where service conditions require the use of a dust laying oil; for it prevents the retained dust from being ground into the surface. When these floors are cleaned the labor will be cut in half and the surface can be brought to its natural clear light color.

Note: Minwax Flat Finish is made in natural (No. 9) and in stain colors for residential flooring and wood work in all kinds of wood. No. 9 (Natural) only is recommended for maple.

Over a long period of years Minwax Flat Finish has delivered outstanding service in:

Schools	Factory buildings
Stores	Railroad stations
Hospitals	Office buildings
Dance halls	Churches, etc.

(74) Specifications—***Floors (Partial Penetration)***—Apply 2 thorough saturating coats of Minwax Flat Finish No. 9 in accordance with above directions, using special care to remove all surplus after each coat. Close off the floors and protect them against traffic for at least 3 days to permit perfect curing of the materials. Then cover the floor with paper or clean sawdust until ready for final occupancy.

Note: The stain colors are not recommended for maple floors.

(75) Minwax Penetrating Finish

Will penetrate into the heart of or through 1-in. flooring, sealing and filling the surface and protecting the whole body of the wood, will retard dry rot, warping, swelling, etc. Curing to a tough gum, it binds the surface fibers with tough wear-resisting material. It has given special service on: Floors laid on fill; textile mill floors; outside dance floors; porch floors; schools; industrial buildings; stores, etc.

(76) Specification—***(Complete Penetration)***—Apply 1 thorough even coat of Minwax Penetrating Finish with a brush using 1 gal. for each 350 sq. ft. working it well into the wood. Wipe up the surface thoroughly with clean cloths in not less than 12 nor more than 24 hours after application to remove any excess material. Close off the floor from traffic for from 1 week to 10 days. If necessary, floors can be washed with soap and cold water after thoroughly cured.

(77) Representatives

At the time of going to press there are established Minwax representatives in the following cities. For address refer to local telephone directory.

Albany, N. Y.	Detroit, Mich.	Portland, Ore.
Atlanta, Ga.	Jacksonville, Fla.	Richmond, Va.
Baltimore, Md.	Los Angeles, Cal.	San Francisco, Cal.
Boston, Mass.	Miami, Fla.	Seattle, Wash.
Buffalo, N. Y.	Milwaukee, Wis.	Shreveport, La.
Charlotte, N. C.	Minneapolis, Minn.	St. Louis, Mo.
Cincinnati, Ohio	Nashville, Tenn.	Tampa, Fla.
Cleveland, Ohio	Philadelphia, Pa.	Wilmington, Del.
Columbus Ohio	Pittsburgh, Pa.	

Montreal and Toronto in Canada

MITCHELL-RAND DAMPPROOFING CORP.

ESTABLISHED 1902 SUBSIDIARY OF MITCHELL-RAND MFG. CO.

Manufacturers of Dampproofing Compounds—Dampproofing Contractors

TELEPHONE FITZROY 9872

18 Vesey Street, NEW YORK, N. Y.

FACTORY: JERSEY CITY, N. J.

Products

Spandrel Beam Waterproofing Cloth (Rubberseal Cloth).
Integral Waterproofing Liquid.
Furring Compound (Dampproof Paint).
Semi-Mastic Dampproofing.
Mastic Dampproofing.
Stone Backing Compound.
Integral Double Strength Waterproofing Paste.
Colorless Waterproofing.
Brick and Cement Coating in Colors.
Superior Cement Colors.
Concrete Floor Wax.
Anti-Freeze Liquid.
Cement Accelerator and Hardener.

M-R Protective Coatings

Caulking Cement.
Roofing Cement.
Emulsified Asphalt Coatings.
Fibre Roof Coatings.
Black Asphalt Paint.
Expansion Joint Asphalt.
Integral Waterproofing Paste.

All Materials Used by Our Contracting Department Are Manufactured in Our Own Factory

Special bulletins for your guidance are available on all our products. Inquiries given immediate attention. Consultation service with our specialists is yours without charge.

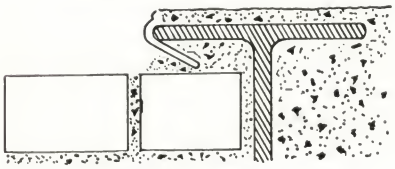
METHODS OF DAMPPROOFING THE SPANDREL BEAM

New ideas in dampproofing should be *sound* ideas. Our specialists and our laboratories constantly devise and check new theories and systems recommended for dampproofing, but before accepting any departure from *proved* experience, tests are conducted extending over long periods of time. Time is all-important in dampproofing. We therefore offer the following time-tested systems.

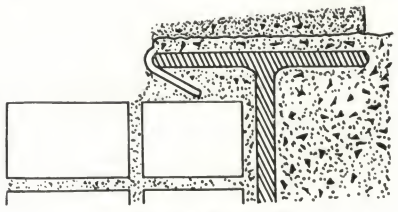
Drawing No. 1 shows a typical cinder concrete arch. The surface is not level, pitching toward the building as often as it slopes outwardly.

Drawing No. 2 shows the arch surfaced with cement mortar, laid with a slight outward slope, the inclination being merely sufficient to act as a drain. The surface is screeded off to avoid punctures to the cloth which is to be applied next.

Drawing No. 3 (see next page). The next step is to lay a brick as indicated and apply the Rubberseal Cloth. This brick should be laid in advance of installing the Rubberseal Cloth so that the cement mortar will have time to set. The purpose of the brick is to serve as a form over which the Rubberseal Cloth flashing is turned while awaiting the work of the other trades. The Rubberseal Cloth is stuck to the arch and brick surfaces by applications of Mastic.



Drawing No. 1



Drawing No. 2

Drawing No. 4 illustrates an average detail for spandrel construction. The top of the spandrel is stuck as described for drawing No. 3 with a loose section of Rubberseal Cloth allowed to flap until the bricklayers arrive. The bricklayers lay in the common brick between the flanges of the spandrel beam. (The Rubberseal Cloth is meanwhile thrown up over the top of the arch.) The Rubberseal Cloth is dropped and the face brick laid against it.

Drawing No. 5 is a variation of No. 4. A flashing of Rubberseal Cloth is placed at the bottom of the flange. This should be used only where deep spandrel beams are used and where the architect desires a protection for the lintels.

Drawing No. 6 is still another variation. The objection to this method is that unless a base of cement is applied to the tile an excessive amount of Mastic is held in the corrugations.

Where the head of the window is more than one foot below the bottom of the beam, a strip of Rubberseal Cloth or a copper pan should be placed over the lintel, either pan or strip extending 12 inches beyond each side of the lintel; or the lower part of the beam directly over the lintel should be flashed with Rubberseal Cloth and liberally cemented with Mastic.

Drawing No. 7. If it is desired to anchor the exterior walls to the arch, metal Z ties can be bedded into the cement grouting course; after the Rubberseal Cloth is laid and cut to permit the tie ends to protrude, a generous application of Mastic will positively insure watertightness.

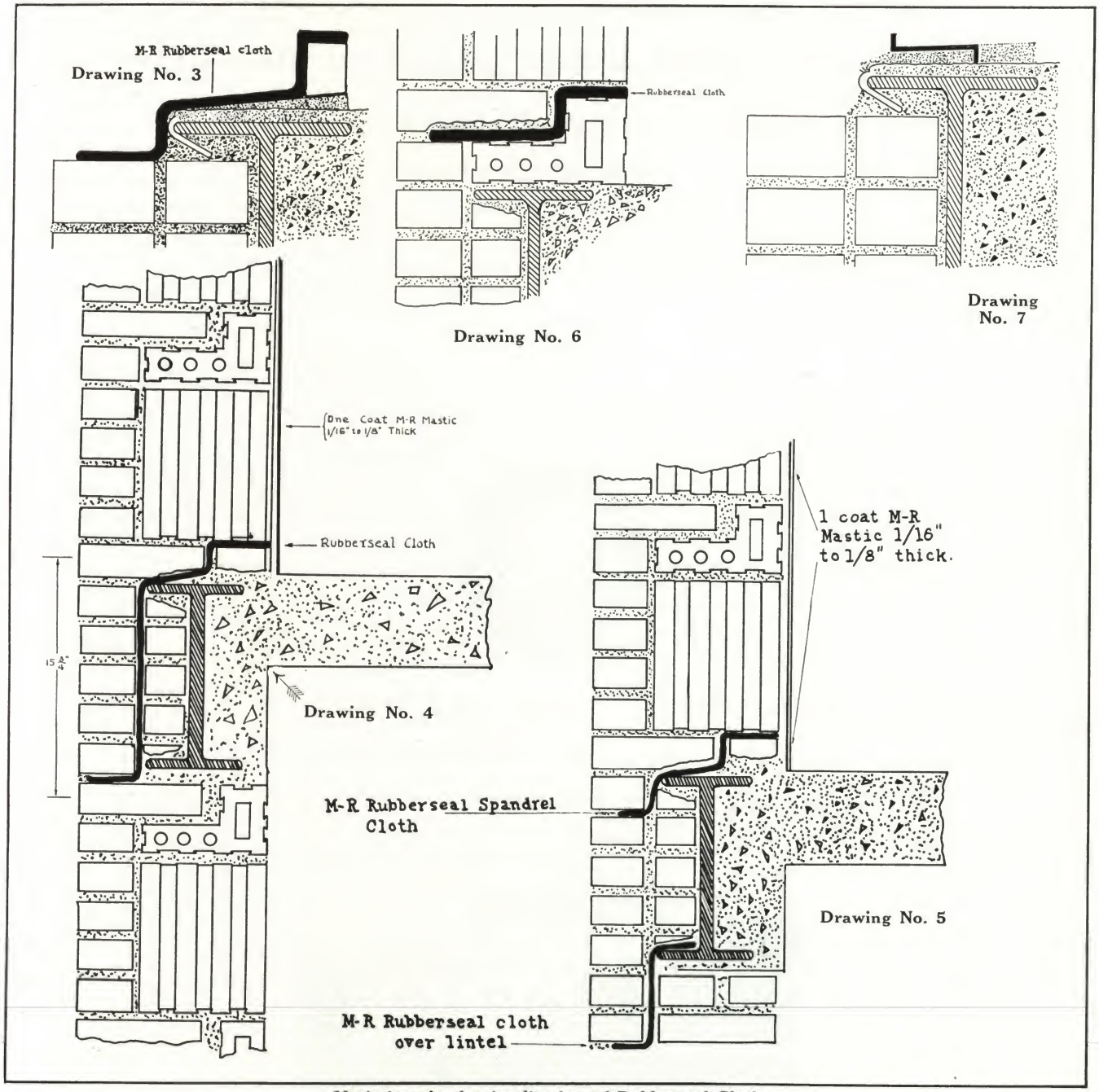
Rubberseal Cloth is a special cotton fabric which is treated with a unique compound. This compound is exclusive with Mitchell-Rand; remains flexible at 5° F. below zero and stands temperatures as high as 180° F. without change. Adheres to metal, dry wood, glass, etc. Comes in fifty foot rolls, 36 in. wide. Proof against acids, alkalis and water.

Mastic Dampproofing for Inner Surfaces of Exterior Walls Above Grade

The amount of material to be used in a given area is most important in specifyng for Mastic. Requiring the contractor to state the number of 50-gallon barrels he guarantees to use is protection against disastrous results of skimping.

Specification—The inner surfaces of all exterior walls, to be dampproofed excepting the basement. All surfaces shall be dry and free from dirt and foreign material. All vertical and horizontal mortar joints are to be pointed up by the mason contractor to the satisfaction of the dampproofing contractor. The Mastic is to be applied with a trowel, $\frac{1}{16}$ to $\frac{1}{8}$ in. thick and shall be returned on the reveals of openings in and around all chases, recesses and cutouts.

Continued on next page



Variations in the Application of Rubberseal Cloth

The Mastic shall be applied in chases and cutouts in which pipes are to be run before such pipes are installed and approved; and the dampproofing contractor shall leave his work whole and in such condition as will insure the best results.

M-R Emulsified Asphalt Coatings

As still another variation of the above systems of dampproofing we have provided emulsified asphalt applications for specific dampproofing problems. Our experience with this material has extended over seven years. We are therefore qualified, by experience, to advise you on the use of emulsified asphalt for dampproofing purposes.

Mitchell-Rand Products Specified For

New York, N. Y.

Bank of the Manhattan Trust Co. Bldg., 40 Wall St.
Empire State Bldg., 34th St. and 5th Ave.
Standard Oil Bldg., 26 Broadway
Bank of America Bldg., 44 Wall St.
American Surety Co. Bldg., 100 Broadway
Church of the Heavenly Rest, 90th St. and 5th Ave.
The News Bldg., East 42nd St.
Irving Trust Company Bldg., 1 Wall St.
College of the City of New York
Hotel New Yorker, 34th and 8th Ave.
Tudor City, East 42nd St.
Lincoln Building, 42nd St. opposite Vanderbilt Ave.

Other Localities

Erie Trust Company Bldg., Erie, Pa.
Firemen's Insurance Bldg., Newark, N. J.
Breakers Hotel, Palm Beach, Fla.
Sage & Allen Bldg., Hartford, Conn.
Magnolia Oil Bldg., Dallas, Tex.
State Capitol Bldg., Lincoln, Neb.
Allerton House, Cleveland, Ohio
Allerton House, Chicago, Ill.
Radcliffe College, Cambridge, Mass.
Haddon Hall Hotel, Atlantic City, N. J.
St. Charles Hotel, Atlantic City, N. J.
State Capitol, Charleston, W. Va.

MEDUSA PORTLAND CEMENT COMPANY

Manufacturer of Medusa Waterproofed Cements

1002 Engineers Building
CLEVELAND, OHIO

BRANCH OFFICES

CHICAGO, ILL., 1704 The Builders Building
CINCINNATI, OHIO, Building Industries Building
GRAND RAPIDS, MICH., 602 Grand Rapids Trust Building
MANITOWOC, WIS.
MILWAUKEE, WIS., 1135 Empire Building
NEW YORK, N. Y., 1521 New York Central Building
PITTSBURGH, PA., 1829 Oliver Building
TOLEDO, OHIO, Second National Bank Building
YORK, PA., 25 No. George Street
WASHINGTON, D. C., Chandler Building

PLANTS

SANDUSKY, OHIO
TOLEDO, OHIO
MANITOWOC, WIS.
DIXON, ILL.
YORK, PA.
WAMPUM, PA.
NEWAYGO, MICH.

Products

MEDUSA PORTLAND CEMENT PAINT.

MEDUSA WATERPROOFING, Powder or Paste.

For Medusa-Mix, the Masonry Cement, Medusa Gray Portland Cement—Waterproofed, and Medusa White Portland Cement—Waterproofed, see Manufacturers' Index.

Literature

Send for our book, "How to Paint Concrete and Masonry Surfaces," A.I.A. File 25c2, size 8½x11 in. Also our colorchip folder showing the colors and giving directions for use.

Literature on any or all Medusa products sent on request.

MEDUSA WATERPROOFING, POWDER OR PASTE

Where to Use

Medusa Waterproofing, Powder or Paste, is to be used where Medusa Gray Portland Cement — Waterproofed, or Medusa White Portland Cement — Waterproofed, is not obtainable.

The powder is mixed dry with the cement and is a preformed waterproofing.

The paste is soluble and is added to the mix through the gauging water. By its use concrete is made impervious to absorption of moisture throughout the full mass of the concrete or mortar.



Sea Lion Pool, Audubon Park, New Orleans, La.
SAM JONES, JR., Architect GEO. J. GLOVER CO., INC., General Contractors
Medusa Waterproofed White used in cast stone made by Architectural Cast Stone Co., New Orleans

Packages

Medusa Waterproofing Powder is shipped in 40-lb. bags and Medusa Waterproofing Paste in 8-lb. and 40-lb. cans and 300-lb. drums.

Waterproofing containers are not returnable.

Quality

Medusa Waterproofing is the original integral waterproofing for concrete and has served the building trade for 25 years.

Specifications

Use two pounds of Waterproofing Powder or Paste to each bag of cement.

MEDUSA PORTLAND CEMENT PAINT

Colors and Packages

Manufactured in white, cream, stone gray, pearl gray, green, blue and red. Put up in 10 and 50-lb. steel cans.

Uses

Medusa Portland Cement Paint is recommended as a dampproof and decorative coating for concrete and masonry surfaces, interior or exterior, and can be applied to wet or dry walls. It is used extensively for stucco, brick buildings, damp basements, swimming pools, etc. It is not recommended for floors.

Description

Medusa Portland Cement Paint is a dry powder to be mixed with water and applied with brush or spray. No sizing or undercoating is required. It has a portland cement base.

NATIONAL WATERPROOFING CO.

ESTABLISHED IN 1909

Waterproofing Engineers and Contractors

1077-1081 Columbus Avenue, BOSTON MASS.

Products and Services

ENGINEERS and CONTRACTORS for WATERPROOFING, DAMPPROOFING and OILPROOFING.

KENNELLY'S LIQUID (INTEGRAL) WATERPROOFING and OILPROOFING for concrete.

KENNELLY'S DAMPPROOFING PAINT and COMPOUND.

KENNELLY'S CONCRETE FLOOR HARDENER.

KENNELLY'S SEMI-MASTIC, for patching and resurfacing all floors.

General

We will absolutely guarantee all waterproofing done by us to be watertight. We will dampproof without discoloring the outside of any concrete, brick or stone structure and will guarantee the work to be absolutely moistureproof. We will apply a floor hardener to any concrete surface and guarantee the work against dusting or softening of the surface.

All work done by us will be carried on in such a manner that no delay will be caused the general contractor or any part of the work.

Engineering Department

Our engineers are always at the service of architects, engineers, contractors and owners for the solution of waterproofing problems, for preparing specifications and for estimating the cost of waterproofing all concrete structures, foundations, tunnels, dams, reservoirs, swimming pools, etc.

Kennelly's Liquid Waterproofing (Integral Method)

Kennelly's liquid waterproofing is an integral waterproofing liquid which crystallizes in the mass as the cement sets, sealing completely and permanently the voids or pores between the sand and cement against the passage of liquids, even under heavy pressure. It is used in concrete or cement mortar to prevent the penetration of water or dampness. Having practically the same specific gravity as water, it immediately becomes part of the tempering water when poured into the barrel, thus becoming evenly distributed throughout the mass. Kennelly's liquid waterproofing not only renders concrete, mortar and stucco permanently impervious to water, but prevents discoloration and efflorescence, gives additional protection to the reinforcement and increases rather than decreases the strength of the mass. It does not affect the color or setting of cement mortars or concrete.

Kennelly's Plaster Waterproofing

If a watertight plaster finish is desired, put the compound into the water used in making mortar and then place the mortar on the surface to be covered and work it out to the desired finish. By this method, concrete, cement mortar and stucco are rendered permanently moistureproof and pressureproof, the finished surface is not discolored, and the strength of the concrete is increased rather than decreased.

Kennelly's Exterior Dampproofing (Colorless)

A colorless liquid for dampproofing exterior surfaces of stucco, brick, stone and concrete masonry. Also extensively used as a sizing for lime plaster on interior walls before paint is applied. It is applied with a brush. Efflorescence and blotches are caused by the absorption of atmospheric moisture and exudation of gypsum and lime. By the use of our dampproofing, we have overcome these disfiguring features without discoloring the original surface or joints.

We will guarantee to make any building dampproof by this method at a reasonable cost.

Kennelly's Interior Dampproofing (Dark)

A compound for coating interior surfaces of brick, stone or hollow tile walls. Forms a continuous waterproof film or coating on the surface, completely sealing walls and preventing penetration of moisture. This method eliminates furring and lathing and thus effects a great saving, as the plaster may be applied directly to this coating.

Kennelly's Concrete Floor Hardener

A liquid compound either *mixed with the concrete* finish in new floors *or applied to the surface* of old as well as new floors. In buildings subject to heavy wear, the dusting of a concrete floor induces disintegration and crumbling of the concrete and thus ruins the floor. Our hardener insures against dusting, and provides a non-absorbent surface, more impervious to wear than ordinary concrete, makes a durable top surface, and provides a sure non-slip foothold.

Kennelly's Semi-Mastic

A real surface protection for patching and resurfacing all classes of floors, including brick, wood, wood block, cement or concrete, and is waterproof, acidproof, and sparkproof.

Specifications

Integral Waterproofing and Oilproofing—To each 50 gals. of water (1 bbl.) used in tempering the mass concrete, add 6 qts. of Kennelly's Liquid Waterproofing, thoroughly mixing the concrete and carefully spading it into place so as to avoid stone pockets.

Plaster Waterproofing—Material used in same proportion as for integral work, mixing the waterproofing with water used in making concrete mortar and then placing the mortar on the surface to be covered, using 6 qts. of waterproofing to 50 gals. of water.

Dampproofing—Thoroughly clean surfaces to be dampproofed by washing with warm water. Allow to dry, and then apply dampproofing with brush, covering surface well. Allow 4 or 5 hours to elapse before making second application; when thoroughly absorbed, make a third application.

Concrete Floor Hardener—First thoroughly clean the floor surface to be treated by scrubbing with warm water, thereby removing all foreign particles, etc. Allow to dry, and then apply the floor hardener with brush, covering the surface well and allow to dry for at least 4 or 5 hours before making a second application. Should any dry spots appear, treat with another coat of hardener.

References

Fuller & Robinson Co., 95 State Street, Albany, N. Y.
Crocker Burbank & Co., Fitchburg, Mass.
Federal National Bank, Boston, Mass.
Pennsylvania Sugar Co., Philadelphia, Pa.
Westcott & Mapes, Inc., New Haven, Conn.
Stone & Webster Engineering Corp., Boston, Mass.
General Electric Co., Pittsfield, Mass.
United Illuminating Co.'s Plants, Bridgeport and New Haven, Conn.

DR. R. CONSTANTIAN, PRESIDENT
FREDERICK S. CONDIT, VICE PRESIDENT

THE OBELISK WATERPROOFING COMPANY

The Heat Method

TELEPHONE
ASHLAND 1740, 1741

1 Madison Avenue
NEW YORK, N. Y.

BOSTON OFFICE: 950 Park Square Building—Telephone, Hancock 0033
DETROIT OFFICE: 400 U. S. Mortgage Trust Building—Telephone, Cadillac 6362

Services

Exterior Surfaces of Stone, Brick and Stucco Buildings, above grade, TREATED with the CAFFALL PROCESS, the Heat Method.

Business, Residential and Monumental Buildings and Churches Restored, Dampproofed and Preserved; Exteriors of Delicate Marble Preserved from Weather Disintegration; Monuments Restored and Preserved.

Guarantee

Work done under contract with a 10-year guarantee, or a cost-plus-percentage basis without guarantee.

Process

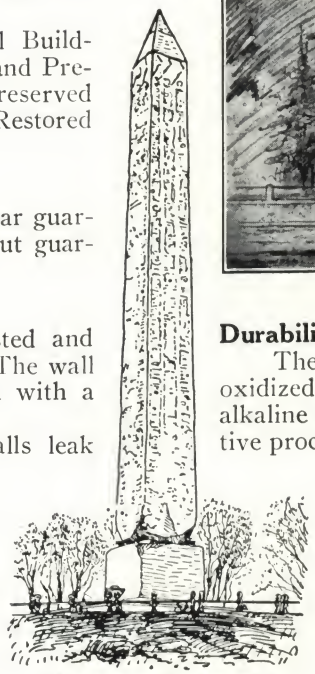
New Structures—The surface is tested and structural defects, if any, are made good. The wall is then impregnated to considerable depth with a melted wax compound forced in by heat.

Old Structures—Where masonry walls leak but material disintegration has not occurred all joints are tested and made sound where necessary, and the entire surface, including joints, treated as above.

This company makes a specialty of repairing masonry buildings which have been damaged by the weather or through vibration or other causes. Many walls which are sound upon casual inspection prove to have been seriously affected.

Where the surface has disintegrated from weather attack, it is restored to sound condition, joints are repointed, and the entire surface treated as above. The treatment leaves the appearance unchanged, and one treatment will last for the life of the building.

It will be understood that application of heat to buildings, particularly to fine marble and granite, requires expert skill. Heat dries out the surface and forces penetration of preservative material. On cooling, the wax congeals and becomes an integral part of the material at and below the surface.



Obelisk or Cleopatra's Needle
Restored and preserved by Caffall Process, the heat method, in 1885



Plymouth Rock
Treated 1921

Durability

The principal components can not be easily oxidized and are insoluble in water, acidulated or alkaline solution, or gases. This is the only preservative process having a successful history covering any considerable period. Buildings treated more than fifty years ago are still dry.

Cost

Cost can be ascertained on application to the company. It is determined by the following elements:

Character of material to be treated.
Area requiring treatment.
Character of surface, whether plain or ornamental.
Condition, whether newly erected, old, or requiring renovation.
Location of building or monument.



St. Paul's Chapel, Broadway and Vesey Street, New York, N. Y.
Restored and preserved in 1930



Walker-Lispenard Telephone Exchange of the New York Telephone Co., New York, N. Y.

SOLVAY SALES CORPORATION

Alkalies and Chemical Products Manufactured by The Solvay Process Company

61 Broadway, NEW YORK, N. Y.

BRANCH OFFICES

BOSTON, MASS. SYRACUSE, N. Y. CHICAGO, ILL. DETROIT, MICH. CLEVELAND, OHIO INDIANAPOLIS, IND.
CINCINNATI, OHIO PITTSBURGH, PA. ST. LOUIS, MO. ATLANTA, GA. KANSAS CITY, MO. PHILADELPHIA, PA.

Solvay Calcium Chloride for Curing, Densifying and Accelerating the Setting of Concrete

A white, dry, flaky chemical which when added to the mixing water accelerates the initial hardening of concrete; at the same time densifies the concrete, making it more waterproof; reduces the freezing point of water, thereby aiding the fresh concrete to resist freezing in low temperatures. Solvay Calcium Chloride is extremely hygroscopic and dissolves almost instantly in water. It can be used with any brand of portland cement.

Comparative Strength Ratios between Treated and Untreated Concrete—After testing 7500 compression specimens, Prof. Duff A. Abrams, then in charge of Structural Material Research Laboratory of the Lewis Institute, Chicago, Ill., reported that Calcium Chloride produced an increase in concrete strength as indicated in the following table:

COMPARATIVE STRENGTH OF TREATED AND UNTREATED CONCRETE, IN PER CENT

Age	2 days	7 days	28 days	3 months	1 year	3 years
Untreated	100	100	100	100	100	100
Treated with 2% to 4% Calcium Chloride	170	125	110	112	117	118

Accelerating Effect—As shown by tests, concrete gauged with Solvay Calcium Chloride, at the end of 48 hours has the same strength as concrete gauged with plain water has at the end of 7 days.

With Solvay Calcium Chloride, floor finishing is possible within a short time after pouring; concrete can be poured late in afternoon and finished, saving overtime charges.

Results Proven by Authoritative Tests—Thorough and extensive tests made by U. S. Bureau of Standards, American Society for Testing Materials, Portland Cement Association, U. S. Engineers, Lewis Institute and our own engineers have definitely established that Calcium Chloride is beneficial to concrete.

Curing—Solvay Calcium Chloride provides a most practicable method of curing structural concrete. Solvay Calcium Chloride incorporated in the mix readily supplies the moisture necessary for proper curing of concrete. Complete hydration can then take place naturally and the concrete is enabled to attain its full strength in much less than the usual time.

Workability—Addition of Solvay Calcium Chloride increases the workability of concrete. Experiments on workability conducted by the New Hampshire State Highway Department indicated that the power required to mix concrete is reduced 20% by the addition of 2% of Calcium Chloride.

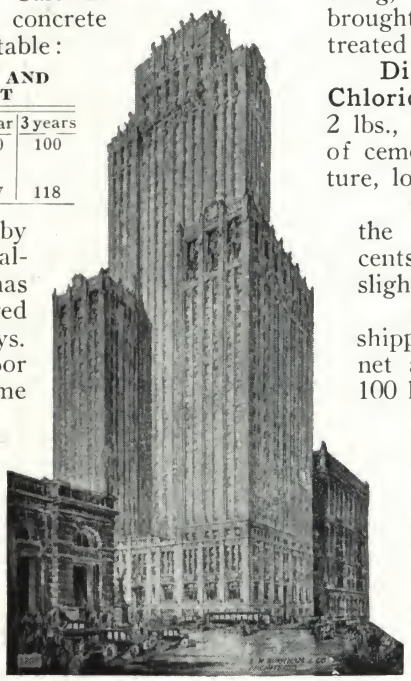
Advantage of Use in Cold Weather—The qualities of quick initial setting, hardening, densifying and reducing of the freezing point of the mixing water make it possible to progress with concrete work in continued cold weather when using Solvay Calcium Chloride.

Waterproofing Qualities—The qualities of hardening, densifying and quick initial setting brought about by Solvay Calcium Chloride make treated concrete more waterproof.

Directions for Using Solvay Calcium Chloride—Amount to be used is approximately 2 lbs., dissolved in the mixing water, per bag of cement according to conditions of temperature, location, mix, etc.

Cost—Solvay Calcium Chloride, east of the Mississippi, costs, approximately, two cents per pound—in the far West cost is slightly higher.

Shipment—Solvay Calcium Chloride is shipped in metal drums containing 400 lbs. net and in moisture-proof bags containing 100 lbs. net. In bags it must be given same care as cement. Stock is carried in 100 cities in the United States. Special arrangement for handling carload lots.



Bankers' Building, Clark and Adams Streets, Chicago

One of the many magnificent modern structures in which the use of Solvay Calcium Chloride was specified

Technical Service

The Solvay Process Company maintains a Technical Service Department whose services are gladly rendered without charge to engineers and architects.

Literature

The new comprehensive 32-page booklet, "Solvay Calcium Chloride in Concrete Construction," Architect's Specification Sheet and Report of the Investigating Committee of Architects and Engineers will be sent without charge upon request.



Hoffman-La Roche Building, Nutley, N. J.
C. H. Benjamin, Architect
J. W. Ferguson, Contractor

Other Typical Buildings

Chicago Tribune Building, Chicago, Ill.
Lincoln Safe Deposit Building, New York, N. Y.
Montreal Rail and Water Terminals
Maccabees Building, Detroit, Mich.
Sesqui-Centennial Stadium, Philadelphia, Pa.
Bankers' Building, Chicago, Ill.
Eaton Tower, Detroit, Mich.
Foshay Tower, Minneapolis, Minn.
Santa Fé Grain Tanks, Argentine, Kan.
Civic Opera Building, Chicago, Ill.



Hearst Publication Plant, New York, N. Y.
Turner Construction Company, Contractors

L. SONNEBORN SONS, INC.

Floor Treatments, Waterproofing Materials, Decorative and Technical Paints

GENERAL OFFICES
114 Fifth Avenue
NEW YORK, N. Y.

BRANCH OFFICES
BALTIMORE BOSTON CHICAGO SAN FRANCISCO PHILADELPHIA DETROIT PITTSBURGH LOS ANGELES SEATTLE

FACTORY: BELLEVILLE, N. J.
SOUTHWESTERN DISTRIBUTORS: SONNEBORN BROS., DALLAS, TEX.

Products

"LAPIDOLITH," the Liquid Chemical Hardener and Dustproofer for concrete and terrazzo floors.

"SONNEBORN'S CEMENT FILLER and DUSTPROOFER" for cement floors (transparent and in colors).

"HYDROCIDE" WATERPROOFING PRODUCTS for interior and exterior surfaces.

"LIGNOPHOL," a Preservative for wood floors.

"CEMCOAT," an Improved Mill White.

"CEMCOAT" FLOOR ENAMEL.

"SONOTINT," a Flat, Washable Wall Coating.

"STIP-EL-ART," for interior stippling or texturing.

Also Amalie Structural Steel Paints, Galvacote, a coating for galvanized iron; Amalie Pipe Enamel; Amalie Radiator Enamel; Amalie Stack and Boiler Paints; Amalie P & D House Paints; Enamelife.

Hardening, Dustproofing and Waterproofing Old or New Concrete Floors

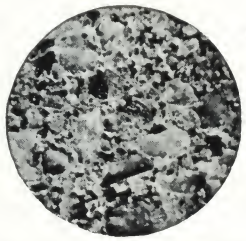
"Lapidolith"—A liquid LAPIDOLITH TRADE MARK chemical which penetrates concrete floors, rendering them hard, dustproof, wearproof and watertight. When applied to old concrete floors, "Lapidolith" will prevent further dusting and disintegration. It does not change the color of concrete.

An Investigation of the Action of "Lapidolith" on Concrete—Following is an extract from the official report of Prof. R. J. Colony of Columbia University, New York, as the result of an examination by him, under the microscope, of treated and untreated concrete:

"The external application of 'Lapidolith' to concrete surfaces results in (a) the formation of an optically isotropic but crystalline substance, derived by a reaction between components of the 'Lapidolith' and the cement matrix of the concrete which (b) has a tendency to fill in voids and cavities and act as a binding agent, thus rendering the surface smoother and more uniform."



No. 1. Untreated Concrete



No. 2. Lapidolized Concrete

Microphotographs of Specimens of Concrete
Magnified 50 diameters

No. 1. Note large numerous voids (black spots) and roughness of surface.

No. 2. Note roughness is reduced and voids filled with network of newly formed hard crystalline substance

Application—"Lapidolith" is mixed with water and flushed on the floor as per detailed directions to be furnished.

Special Service Work—We also contract to apply "Lapidolith" with our own men under the supervision of a service engineer on areas of 20,000 sq. ft. or over at a substantial saving to the owner in material and labor.

Specification for Concrete Floor—Harden and dustproof the following concrete floor (.....) or as noted on the drawings with 3 applications of "Lapidolith," manufactured by L. SONNEBORN SONS, INC., New York, N. Y., and applied as per their directions.

Filling and Dustproofing, also Oilproofing, Concrete Floors Subject to Light Wear

"Sonneborn's Cement Filler and Dustproofer," for concrete floors where there is no excessive wear. Furnished either transparent or in a number of attractive shades. Covering capacity per gallon, 1 coat, is 350 sq. ft.; 2 coats, 200 sq. ft.

Specification—Fill and dustproof the following cement floors (.....) with 2 coats of "Sonneborn's Cement Filler and Dustproofer" manufactured by L. SONNEBORN SONS, INC., New York, N. Y., applied as per manufacturer's directions.

"Hydrocide" Waterproofing Products

"Hydrocide" No. 633 (Also Hydrocide Mastic and Semi-mastic)—Plaster bond for dampproofing the inner surfaces of outside walls above foundations.

Ready for use, applied cold with a brush. Saves furring and lathing expense. Should not be applied to smooth concrete surfaces which are to be plastered unless walls are sufficiently roughened. Covering capacity per gallon of Hydrocide No. 633, 1 coat, is 65 to 100 sq. ft.

"Hydrocide" Mastic and Semi-mastic (Also Hydrocide No. 648)—For waterproofing outer surface of foundation walls and footings.

Ready for use, applied cold. Covering capacity: Mastic, 30 to 40 lb. per 100 sq. ft. troweled on. Semi-mastic, 30 to 40 sq. ft. per gallon, brushed on in one heavy coat.

"Hydrocide" No. 611—For the protection of unexposed surfaces of limestone, caen stone, marble and other fine stones, from stain caused by absorption or communicated by surrounding masonry. Covering capacity from 250 to 350 sq. ft. per gal.

"Hydrocide" Integral Waterproofing (Powder, Paste, and Liquid)—For waterproofing mass concrete, concrete walls, floors, cement stucco and mortars, etc. Mix 2 lb. of powder with each bag of portland cement, then add the sand and stone mixture. Use 1½ qt. of a mixture of equal parts of paste and water for each bag of cement. Use 1 gal. of Liquid for each 10 gal. water, or 1½ gal. for each cubic yard of concrete, 1 gal. for each 100 sq. ft. of 1-in. floor topping.

Continued on next page

Waterproofing Exterior Walls Above Grade without Changing Appearance of Walls

"Hydrocide Colorless" contains no wax, paraffin or similar substance disfiguring the surface.

Grade "A" for light colored surfaces, such as plain concrete and stucco, etc.; "B" for red and buff brick, colored concrete and stucco; "D" for very porous surfaces, such as limestone, concrete cast stone, etc. that are of light color.

Preservative and Finish for New and Old Wood Floors, and for Woodwork

LIGNOPHOL FOR WOODEN FLOORS TRADE-MARK

"Lignophol Penetrating Finish"—Lignophol is a preservative composed of natural wood gums and oils. It penetrates to a considerable depth below the surface of a wood floor, filling the voids in and between the cells and fibers. Prevents splintering, cracking, warping and dry and wet rot.

"Lignophol" also acts as a dampproofer and dustproofer. Contains a powerful fungicide which checks the growth of fungus and mold. It prevents the disintegration of the wood fibers. It makes floors resilient and more resistant to heavy traffic and wear.

Specifications—After scraping, all wood flooring shall be given 1 application of Lignophol Penetrating Finish (color to be selected) as per manufacturer's directions. (Specify 2 coats for floors subjected to heavy wear.)

Note: Application by *dipping* is recommended as the most efficient treatment for thorough impregnation.

"Lignophol Wax Finish"—For residence floors, dance floors, wood trim, and wherever a medium or high gloss in waxed effect is desired.

Specifications—After scraping, all wood flooring shall be given 1 application of Lignophol Wax Finish (color to be selected) and surface to be polished after 6 to 8 hours following application, for medium gloss. Wherever high gloss is required, let about 24 hours elapse after polishing, then apply 1 coat Sonneborn's Paste Wax and polish in about 20 minutes.

Lignophol for Woodwork—Interior and exterior woodwork can be efficiently protected and artistically finished with Lignophol Penetrating or Wax Finish.

Covering Capacity and Colors—One gallon covers 350 to 400 sq. ft., one coat or about 200 sq. ft., 2 coats. Furnished in 4 colors: Natural, Light Brown, Medium Brown and Dark Finish.

Write for complete specifications and details.

"Cemcoat," a Sanitary, Washable, Light-reflecting Enamel Paint for Interior Walls and Ceilings

Cemcoat TRADE-MARK

A white enamel paint which will stay as white as the most expensive enamels. Very opaque, 2 coats will cover as well as 3 coats of ordinary lead and oil paint. Is not poisonous. Is sanitary, can be washed with soap and water or even with a hose without affecting the surface. Will not peel, crack or blister if properly applied to a normal surface.

For Interior Walls—Can be used on concrete or any other masonry materials, wood or metal. A coat of "Cemcoat" flat undercoat followed by a coat of "Cemcoat" finish will give best results. For very porous surfaces, 1 coat *each* of Amalie Gypsum Size, "Cemcoat" Undercoating and "Cemcoat" Finish.

White Flat "Cemcoat" Finish—Scientific laboratory tests have proven that it gives the unusual reflection factor of 86%, contrary to long established theory that gloss paint has the greatest reflective properties.

Eggshell and Gloss "Cemcoat" Finish—Eggshell is recommended for offices, schoolrooms, etc.; Gloss for conditions involving moisture, steam and other cases requiring this type of finish.

Colors—Made in all standard colors.

Covering Capacity—Approximate number of square feet per gallon, per coat:

	First Coat	Second Coat
Concrete	250	300
Brick	250	300
Plaster	300	350
Wood	400	450
Metal	400–500	500–600

Exterior "Cemcoat" for Exterior Walls

For decorating and dampproofing exterior walls above grade. Comes in 12 attractive colors, flat or gloss finish.

Covering Capacity—On concrete, brick, stone and stucco, approximately 175 sq. ft. per gallon for 2 coats; on wood and metal 250 sq. ft. per gallon for 2 coats.

"Cemcoat" Floor Enamel for Cement Floors

Exceptionally elastic and durable; will successfully stand up where ordinary floor enamels would fail. Dries in 24 hours to a glossy washable film. Eight attractive colors.

Covering Capacity—Will cover approximately 200 sq. ft. per gal., 2 coats.

"Sonotint," a Flat Washable Oil Paint for Interior Walls and Ceilings of Hospitals, Schools, etc.

SONOTINT TRADE-MARK

A flat oil paint ready for use, which has all the softness and finish of water colors, with the advantage of being washable. It reflects the light without glare. Manufactured in 16 different shades. A color card will be sent on request. "Sonotint" forms a very hard elastic surface not affected by soap and water. Being very opaque, 2 coats cover perfectly and set without showing brush marks.

Covering Capacity—Will cover approximately 200 to 250 sq. ft. per gal., 2 coats.

Stip-El-Art

A plastic oil base wall finish for stippling or texturing, easy and inexpensive to apply.

Stip-El-Art offers the painter and decorator the widest range for executing individual textured colorful effects. Ready for use, requires no thinning or mixing.

It is adapted for any style of building, domestic, commercial or civic. Solves the most complex decorative problems.

Covering Capacity—Will cover 60 to 100 sq. ft. per gal., 1 coat.

Further Information

The following printed matter sent on request:

"Specification Data" portfolio arranged according to A. I. A. classification. Fits standard correspondence files, comprises floor treatments, dampproofing and waterproofing, painting.

Booklets: "The Preservation and Strengthening of Wood Floors—Lignophol"; "Cemcoat Reflects the most Light."

Samples treated with Lapidolith, Lignophol, Cemcoat, Hydrocide Colorless, Stip-El-Art.

SOMMERS & CO., LTD.

Manufacturers of Permantite Concentrated Liquid Integral Waterproofing

342 Madison Avenue, NEW YORK, N. Y.

WORKS AND LABORATORIES, LINCOLN, N. J.

DISTRIBUTERS IN PRINCIPAL CITIES

Products

PERMANTITE CONCENTRATED LIQUID INTEGRAL WATERPROOFING.

PERMANTITE
TRADE-MARK

Also Dampproofing Paints and Coating; Liquid Integral Cement Hardener; Calking and Glazing Cements; Cement Colors; Anti-Freeze; Steel Coating; Foundation Coating; Stone Backing Paint; Semimastic Dampproofing; Mastic Dampproofing; Liquid and Plastic Asbestos Roof Coating; Cement Floor Hardener; Cement Floor Coating; Transparent Dampproofing; Masonry Coating in Colors; Waterproofing Fabric; Shingle Stains; Technical Paints and Varnishes.

Permantite Adds Valuable Characteristics to, and Permanently Waterproofs, All Cement Mixtures

Due to the commanding place of concrete in modern construction, enterprising architects, engineers and builders are eager and quick to adopt any material or process that adds to its general usefulness, strength and durability. Water absorption and permeability are outstanding defects in concrete and cement mortar that call for corrective measures.

Permantite Concentrated Liquid Integral Waterproofing is a chemical compound which, by intimate combination with the concrete mass, robs concrete and cement mortar of their absorptive propensities, and adds to their initial and ultimate strength.

Permantite is easy to use; is economical both in first cost and in continuous savings; and is lastingly effective.

Value of Permantite Proven by Twelve Years' Use

Approved by Architects and Engineers—The use of chemical admixtures, such as Permantite, for waterproofing and hastening the setting of concrete and other cement mixtures, and for increasing permanent strength under conditions of exposure to disintegrating elements is generally recommended by a substantial body of the building professions. The particular value of Permantite has been proven by twelve years of widespread and repeated use.

Reduces Absorption and Increases Resistance—Concrete or cement mortar gaged with Permantite will absorb considerably less moisture than when gaged with plain water. Owing to decreased porosity, the Permantite treated mixture is more resistant to wear, acids, alkalis, oils and sea water.

Improves Workability of Mix—Permantite has a lubricating action on the mixture that causes the concrete or cement mortar to become more plastic and workable. As a result the particles are cemented together, producing a smooth surface which is much more waterproof than one obtained with untreated concrete.

Quantities Required—Use in the following proportions:

Per cu. yd. of 1:2:4 concrete	1 gal.
Per 100 sq. ft. of cement mortar 1 in. thick	1 gal.
Per 1000 brick (1:3) mortar	1 gal.
Per 25 sq. yd. stucco	1½ gal.

or

For Mass Concrete—Add 1 qt. of Permantite to every bag of portland cement or 1 gal. to every 20 gal. of gaging water.

For Cement Finish—Add 1 gal. of Permantite to every 16 gal. of gaging water or 1 qt. to every bag of cement.

For Cement Stucco—Use in finish coat only as for cement finish.

For Brick or Stone Cement Mortar—Use as in cement finish.

Packages

Shipping weight, 11 lb. per gal. Put up in 55-gal. drums, 30-gal. half drums, 5-gal. pails.

Technical Services

The particulars given above on the quantities of Permantite to be used in various classes of work cover average cases only. It is always advisable to submit a given job to special study. The technical service staff of SOMMERS & CO., LTD., includes specially trained waterproofing and construction engineers, with a tradition of eighteen years of successful waterproofing service. Their services are at your disposal in the interests of waterproofing efficiency and better concrete construction.

Specifications

In all concrete and cement mortar there is to be incorporated, in accordance with the manufacturers' directions, Permantite C. L. I. Waterproofing as manufactured by SOMMERS & CO., LTD., 342 Madison Avenue, New York, N. Y.

Guarantee

SOMMERS & CO., LTD., guarantee satisfactory results from Permantite C. L. I. if used in accordance with their directions.

A Few References—Building, Location and Architect

Hotel Shelton, New York, N. Y., Arthur Loomis Harmon
Municipal Building, Brooklyn, N.Y., Voorhees, Gmelin & Walker
Filley Residence, New York, N. Y., McKim, Mead & White
Dutch Church, Bronxville, N. Y., Harry Leslie Walker
Corn Exchange Bank, New York, N. Y., Fellheimer & Wagner
Standard Building, Albany, N. Y., Shreve & Lamb
Columbia Grammar School, New York, N. Y., Necarsulmer & Lehlbach
Sutton Place Apartments, New York, N. Y., Cross & Cross
New York Life Insurance Co., New York, N. Y., Cass Gilbert
Taft School, Watertown, Conn., James Gamble Rogers
Calvary Parish House, New York, N. Y., Waldeman Ritter
Lutheran Church, New York, N. Y., Mayers, Murray & Phillip
Masonic Temple, Queens, N. Y., Rasmussen & Wayland
Church of The Ascension, New York, N. Y., Robert J. Reiley
Church of the Resurrection, Rye, N. Y., Murphy & Lehman
St. Gabriels House, Hollis, N. Y., Renwick, Aspinwall & Guard
New York (N. Y.), Public Library, Carrere and Hastings
First National Bank, Jamaica, N. Y., Walker and Gillette
Tuxedo (N. Y.) Club, John Russell Pope
Wilson Building, New York, N. Y., York and Sawyer
School, Central Islip, N. Y., Wilson Potter

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Manufacturers of Cement Mixing Compounds and Technical Products

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Sulco Products

Konset, an Integral Cement Mixing Compound—Colorless or in colors, when mixed with concrete, provides five desirable conditions:

(1) Accelerates the initial and final set and increases the early tensile strength.

(2) Gives greater plasticity and workability.

(3) Increases density, making it hard and waterproof.

(4) Increases freezing resistance.

(5) Colors where desired.

Konset, in colored paste form, produces any desired color effect in cement mixtures, such as floors, walls, mortar joints, cement stucco, mortar and cement plaster. Also used for making tile and brick, portland cement paint, etc.

By its use in colorless liquid or colored paste form you save time, labor and money and at the same time obtain a surface hard, waterproof and dustproof. This product has been used in some of the largest projects throughout the world and is a lasting benefit to architects, engineers, contractors and owners.

Aztex, Scientific Chemical Cement Stains—Applied to any porous portland cement surface, plaster, artificial or natural stone, floors, walls, etc. Renders mottled or duo-tone effects. Standard colors, green, brown and blue.

Sealcote—A surface colorless waterproofing for outside walls of brick, stucco, concrete, stone, etc. Prevents efflorescence. Protects against dampness and lengthens the life of the building.

Kemi-Kal, Cement Surface Hardener—In liquid or crystal form. This chemical is for hardening and dustproofing cement floors, walks and roads after they are laid. It also is used for stucco and plaster.

Cemset, Quick Setting and Anti-Freeze Compound—This solution will accelerate cement and freezeproof concrete at 15° above zero without the use of salamanders or other devices.

Waterproofing, Liquid, Powder and Concentrated Paste—Liquid for mass concrete to waterproof portland cement; powder for mixing with dry cement; paste for adding to gauging water to be used for mixing concrete.

Sulco Plaster Bond, Dampproofing and Stone Backing—A tenacious, bituminous, elastic preparation for inside surfaces of outside walls. Eliminates furring and lathing. Also for coating concrete floor slabs and wood sleepers. Prevents discoloration and dampness and renders the inside of walls verminproof and stainproof. For dampproofing foundations, cellars, etc. Not to be used on ceilings or between concrete and portland cement mortar.

Sulco Mortar, Plaster and Stucco Colors—Sulco Paste and Powder Colors possess the characteristics of durability and permanency. The colors run uniformly as to shade due to the special process used in manufacturing.

Sulco Calking and Glazing Compound—For bedding, glazing and calking skylights, conservatories, hothouses, sheet metal frames, window frames, wood sashes, roofs, walls, concrete copings, swimming pools, tile floors, seams in boats, etc.

Konseal—A sanitary liquid filler for cement and concrete surfaces, floors, walls, etc. Made in clear and all colors.

Sulco Powder Paint—Waterproof semi-washable cold water paint. Can be used on almost any surface, interior or exterior. Can also be used with oil straight or in emulsion. Applicable to wet surfaces. Made in all colors.

Iron-Cote, a Metallic Hardener—For concrete floors in factories, garages, loading platforms, piers, packing houses, etc. It is composed of finely ground iron and other materials. Made in all colors.

Sulco Wax, Liquid or Paste—For polishing and treating old and new cement and wood floors; gives a beautiful lustre. Easy to clean and soft under foot. Recommended for use on Konset and Aztex interior floor treatments.

Sulco Acoustical Plaster—Made in colors. For any acoustical treatment desired.

Sulco Acoustical Paint—Recommended for use over Sulco Acoustical Plaster and other acoustical treatments.

Sulco Flameproofing or Wood Preserver—For canvas, wood, shingles and other surfaces.

Cedarize—For mothproofing, preserving and decorating clothes closets.

Kant-Leak—For waterproofing and covering concrete roof decks, flashing and other roofing surfaces. A plastic, adhesive compound made from asbestos and slow-drying oils. Applied in liquid with a brush or plastic with a trowel. Made in all colors.

Ironized Waterproofing—A product manufactured especially for waterproofing masonry surfaces against dampness or hydrostatic pressure by the iron method. An ideal product for waterproofing foundations, basements, tunnels, pits, understructures, etc. Also renders any surface oilproof.

Woodseal—Preserves new or old wood floors, composition floors, cork, rubber and linoleum; prevents warping, wear, rotting, disintegration or splintering. Also wood preserving oil.

Sulco Slipproof Grains—An abrasive material in loose form for impregnating cement or composition floors or stair treads to prevent slipping.

Bux-Skin—A liquid for preserving and rendering awnings, tents, tarpaulins, curtains, covers, fisherman's riggings, hatch covers, canvas and cotton-duck goods proof against mildew and water.

Art-Cote—Plastic paint for obtaining rough plastered wall effects.

Wall Size, Glaze and Star Dust—For scintillating color charm.

Lime Mortar Accelerator—A special product made for use with mortars where hydrated lime is used.

Acitite—A fusible, quick-setting acid and chemical-resisting product. Made in powder or solid.

E-Z Patch—A quick-hardening repair for cement, stucco or concrete.

Wood Cement—A remarkable puttylike composition which hardens under exposure. For all wood repairs.

Sulco Weed Exterminator—Kills the roots as well as the tops.

Komix—Concrete lubricator. Makes all cement mixtures plastic and easier to work. Holds the batch in suspension. Increases workability. Made in black or colors.

Kleenite—A powder for cleaning any surface.

Other Sulco Products

Sulco shingle stains, aluminum paint, enamels, technical paint, varnish, etc. We make a specialty of manufacturing specification goods, so in purchasing material of this kind you are buying high class products 100% pure.

Catalogue

Write for our catalogue and specifications "Life Preservers for Buildings and Equipment," which includes list of representative users. Correspondence or inquiries are solicited on any waterproofing or technical problem.

HENRY M. TOCH, PRESIDENT

TOCH BROTHERS

MAXIMILIAN TOCH, VICE-PRESIDENT

(ESTABLISHED 1848)

Dampproofing and Waterproofing Compounds; Cement Hardeners and Colorings; Technical Coatings and Steel Preservative Paints

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TECHNICAL COMPOUNDS and STEEL PROTECTIVE PAINTS.

R.I.W. REMEMBER IT'S WATERPROOF
Reg. U. S. Pat. Off.
TRADE-MARK

Technical Service Department

An Engineering Department is maintained by us for the use of our clients. This department can be of service where special materials are required or where unusual conditions are met.

Correspondence and personal inquiry are invited on technical paints, cement floor treatments, dampproofing and waterproofing problems.

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"R. I. W." DAMPPROOFING AND WATERPROOFING PRODUCTS

"R.I.W." No. 232 Damp-Resisting Compound and Plaster Bond

Brush or Spray Coat for Dampproofing the Interior of Exterior Walls Above Grade

Description—"R.I.W." No. 232 Damp-Resisting Compound and Plaster Bond is a black, elastic, full-bodied, tacky dampproof compound for application to the interior surface of weather exposed masonry walls to which hard wall plaster is to be applied.

"R.I.W." No. 232 can be either brushed or sprayed. It finally sets and dries out to a black, cohesive; tough and tacky film which becomes a component part of the masonry and prevents moisture, forced by the pressure of the elements, from spreading to and making contact with the plaster. It is absolutely unaffected by the alkalis invariably lodged in masonry materials.

"R.I.W." No. 232 does not dry hard, but remains permanently tacky. This feature gives it the property to perfectly bond the plaster to the masonry wall and to grip and hold the plaster coat permanently. "R.I.W." No. 232 lowers plastering costs and saves the expense of furring and lathing.

Continued on next page

"R.I.W." DAMPPROOFING AND WATERPROOFING PRODUCTS—(Continued)

"R.I.W." No. 232 Damp-resisting Compound and Plaster Bond—(Continued)

"R.I.W." No. 232 is not recommended for use on concrete ceilings, see Specifications, nor should portland cement mortar or concrete be applied over it. Refer to Toch Brothers for engineering advice, special supervision and application service.

Covering Capacity—Covering capacity, per gallon, one coat, approximately 75 sq. ft. second coat, 100 sq. ft.

Specifications

The interior surfaces of either brick, terra cotta or concrete walls above grade (not ceilings, except under special instructions of Toch Brothers Engineering Department), shall be dampproofed with "R.I.W." No. 232.

All holes and voids in the brick or terra cotta walls shall be carefully filled with portland cement mortar, all joints shall be struck flush, previously to the application of "R.I.W." No. 232. When the walls are dry and free from any foreign matter which would interfere with the penetration and bonding properties (concrete wall surfaces should be wire brushed to remove cement dust and laitance or roughened up), the "R.I.W." No. 232 shall be applied uniformly and thoroughly with a good bristle roofer's brush, or with a spray gun, to the interior of the outside walls of the entire building from grade level to penthouse so that the finished walls present an even black appearance.

The second coat shall be applied after a lapse of not less than 12 hours. "R.I.W." No. 232 shall be applied in the same manner between the floor level and ceilings below. If arches of floor slabs are placed prior to the application of "R.I.W." No. 232, this material shall be carried back 6 in. to 1 in. on the rough floor slab and the underside of the ceiling.

Cut-outs, wall chases or recesses shall be thoroughly coated with "R.I.W." No. 232 before installing pipes, etc. Plastering shall be started not less than 24 hours after the application of "R.I.W." No. 232 to the walls.

"R.I.W." Plastertox (Plaster Bond)

A Trowel Coat that Points, Dampproofs and Plaster Bonds in One Operation

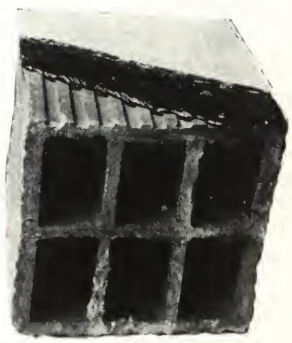
Description—"R.I.W." Plastertox is a heavy bodied mastic of great viscosity, developed to protect the interior surfaces of exterior walls above grade against the severest exposures.

Plastertox is one of the highest quality dampproofing media possible to manufacture. When applied with a trowel it interlines and insulates the walls with a film $\frac{1}{16}$ to $\frac{1}{8}$ in. in thickness. It points up the orifices in masonry walls, filling all voids and cracks in brick and mortar joints, thus preventing the penetration of dampness and forming a perfect bond to which hard wall plaster may be directly applied.

Plastertox is not recommended for use on ceilings of any kind, nor shall portland cement mortar or concrete be applied over it. Plastering should be started not less than 24 hours after the application of Plastertox.

Refer to Toch Brothers for engineering advice, special supervision, and application service.

Covering Capacity — Per gallon, one coat, approximately 20 sq. ft.



Plastertox Application

Specifications

The interior surfaces of either brick or terra cotta walls, above grade, shall be dampproofed with a thorough trowel coat of "R.I.W." Plastertox as manufactured by and in accordance with the directions of Toch Brothers, New York, N. Y.

All holes and voids in the brick or terra cotta walls shall be carefully filled with portland cement mortar and all joints shall be struck flush previous to the application of "R.I.W." Plastertox. When the walls are dry and free from any foreign matter that will interfere with its penetration and bonding properties, the "R.I.W." Plastertox shall then be thoroughly and uniformly applied with a trowel to the interior of the outside weather-exposed walls of the entire building from grade level to pent house, so that the finished walls present an even black appearance. Cut-outs, wall chases or recesses shall be thoroughly coated with "R.I.W." Plastertox before installing pipes, etc.

Plastering shall be satrted not less than twenty-four hours after the application of "R.I.W." Plastertox to the walls.

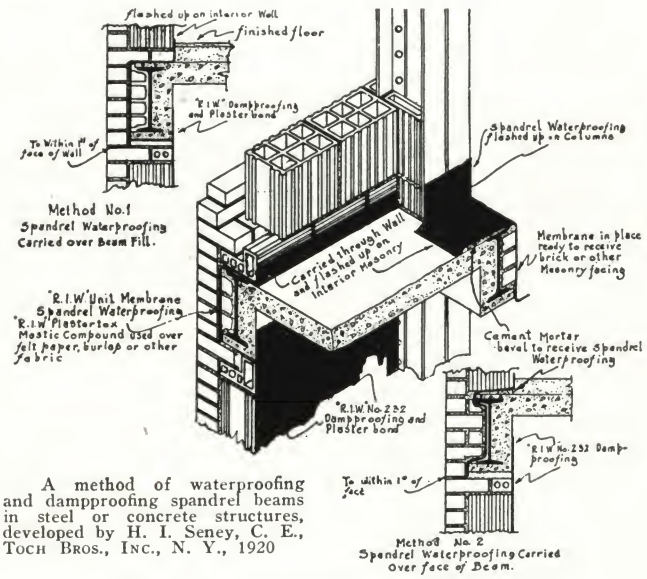
"R.I.W." Spandrel Beam Dampproofing

A Method for Waterproofing Spandrel Beams in Steel and Concrete Structures

Description — The "R.I.W." Spandrel Beam Waterproofing Method was originally invented by Toch Brothers Engineering Department in 1918 when the novel skyscraper architecture presented new dampproofing problems.

Walls of tall modern edifices were backed up with hollow tile or furring blocks and were considerably less solid than the heavy masonry walls of the older wall bearing buildings. Because of the thinness of modern structures wind driven rain and moisture entered the building through the face brick and mortar joints. The most vulnerable place of entry was the point where the beams extended into the exterior wall. Here water pockets formed that made contacts with the ceiling and wall plaster. With the development of set-back structures this condition became aggravated because of the horizontal planes on which the water collected.

The first attempt to remedy this condition was to use masonry materials such as a mortar coat of brick, set in a mortar as a waterproof seal around the spandrel beams. Because of their rigidity, a brittle covering was formed that did not adapt itself to the movement of the structure. In addition, the mortar bed in which the masonry was set absorbed water.



A method of waterproofing and dampproofing spandrel beams in steel or concrete structures, developed by H. I. Seney, C. E., Toch Bros., Inc., N. Y., 1920

"R.I.W." Spandrel Beam Dampproofing

Continued on next page

"R.I.W." DAMPPROOFING AND WATERPROOFING PRODUCTS—(Continued)

Hot mastics were then considered. The great height of the new architecture rendered the mopping of hot material almost impossible to handle due to dripping and spilling down the side walls. The average cold material would not suffice because of sharp breaks and angles to which it could not conform.

The solution of the problem was found to consist in a combination of elastic pliable membrane (felt or fabric) buttered on both sides with mastic "R.I.W." Plastertox.

The membrane is so placed as to seal the joints back of the tile or brick around the spandrel beams. The spandrel beam waterproof film surely prevents the penetration of water and moisture, and protects the structure and decorative features.

In the use of "R.I.W." Spandrel Beam Flashing, no loss of bricklayer's time results, as all the required materials are prepared on the job in advance of the masons so that the "R.I.W." Membrane may be speedily installed. Refer to Toch Brothers for engineering advice, special supervision, and application service.

Specifications

The exterior face of all exposed beams shall be dampproofed by the "R.I.W." Membrane Method of Spandrel Beam dampproofing in accordance with the directions of Toch Brothers, New York, N. Y.

Method No. 1—When the beam surfaces are ready and free from any foreign matter same shall then receive a layer of tarred felt paper, treated fabric or 7 oz. open mesh untreated burlap, cut to convenient lengths, the face of which shall receive a trowel coat of "R.I.W." Mastic Dampproofing ("R.I.W." Plastertox) which shall be applied uniformly and thoroughly. This treated felt or fabric shall be smoothly placed over the spandrel beam surfaces so that no wrinkles show and shall be lapped at joints not less than three inches, and wherever necessary apply "R.I.W." Plastertox (Mastic) Dampproofing to portions abraded in placing the Spandrel Dampproofing Membrane.

Method No. 2—The face of the steel or concrete beam surfaces, when ready, shall receive a trowel coat of "R.I.W." Mastic Dampproofing, which shall be applied uniformly and thoroughly. Upon this, a layer of tarred felt paper, treated fabric or 7 oz. open mesh untreated burlap, cut to convenient lengths, shall be smoothly placed so that no wrinkles show and shall be lapped at joints not less than 3 inches. The felt paper or fabric shall receive, in turn, a heavy coat of Toch Brothers "R.I.W." Plastertox (Mastic) Dampproofing. The "R.I.W." Membrane Spandrel System shall be carried down the face of the beam filling or beam for depth of same and out on the course of brick below the bottom of the beam to within one inch of the face of brick.

Preparation of Surfaces—The surfaces to which the "R.I.W." Spandrel Dampproofing is to be applied should be finished sufficiently smooth so that no sharp edges protrude. The membrane shall extend over a bevel of cement mortar (placed over the top of the beam surfaces by the mason contractor), and the membrane shall be carried over same, extending through the entire wall and carried sufficiently beyond same to lap or bond in with the "R.I.W." Dampproofing and Plaster Bond which is to be applied to the interior of the exterior walls. The dampproofing contractor installing this method shall take precautions to see that the Spandrel Dampproofing Membrane is properly flashed up on all walls, columns, etc.

"R.I.W." Toxloxpore

A Colorless Dampproofing for Exterior Surfaces

Description—Toxloxpore is a colorless dampproofing liquid used to arrest dampness in buildings already erected, and to reduce the efflorescence that usually accompanies moisture penetration.

It combines integrally with the masonry surface, adheres to the lining of cavities and thoroughly seals the voids. By sealing and filling the minute pinholes in brick and stone, Toxloxpore assures a completely dampproofed building. Unaffected by the alkaline salts inherent in masonry or by rapid changes of temperature, and adaptable at all times to physical changes of the masonry material, Toxloxpore gives a colorless protective film; one that affords the maximum resistance to moisture over the longest period of time.



Toxloxpore is composed of colorless pigments suspended in a medium of bleached and treated oils. In contrast to films which lie on top of the surface and therefore darken the face of the building, Toxloxpore chemically fills and bonds with the masonry in an integral manner. In consequence, the natural texture and color of facade and the normal appearance of the building is retained.

Toxloxpore reduces efflorescence by keeping moisture out of the masonry. Moisture, in combination with the free lime and soluble salts in masonry, causes efflorescence (saltpeter) to form and disfigure the building. Toxloxpore's minimizing the possibility of efflorescence is important, not only because it saves the masonry from becoming unsightly but also for its preservative value. Efflorescence is the first step that leads to the spalling or soft shaling of the masonry and begins a pregressive deterioration from which the dampproofing function of Toxloxpore will arrest at its inception.

Refer to Toch Brothers for engineering advice, special supervision, and application service.

Covering capacity, per gallon, one coat, approximately 150 sq. ft.

Specifications

The surfaces to be treated shall receive one thorough absorbing treatment of the "R.I.W." Toxloxpore, after which repoint walls wherever necessary and fill all cracks, voids and other openings in the masonry, also thoroughly caulk around window frames and all other openings. After pointing has thoroughly dried and completely set and when the masonry surfaces are dry same shall receive the second thorough absorbing application of "R.I.W." Toxloxpore, applying the material liberally with spray or brush and allowing the surfaces to take up as much as they will absorb.

At least 48 hours shall be allowed to lapse between the first and second application of this material, applying the second coat of Toxloxpore in the same manner as the first coat.

No material shall be applied in damp, foggy or freezing weather, nor directly after a rain storm, nor to new concrete or stucco.

"R.I.W." Marine Cement

For Below Grade Dampproofing of Exterior Foundations

Description—Marine Cement, a full bodied cold dampproofing liquid, applicable at any time of the year, eliminates the cumbersome heating operations which go with the use of hot tar or pitch. The elimination of heating operations cuts out laborious steps and saves much waste of time and labor.

The solvents in Marine Cement evaporate slowly, leaving a tough, tacky film absolutely free from air pockets or pinholes and uniform in thickness. That the coating is uniform in thickness is an important property, because only an evenly bodied film will repel water

Continued on next page

"R.I.W." DAMPPROOFING AND WATERPROOFING PRODUCTS—(Continued)

pressure on under grade walls at every point. It is obvious that thinly coated sections offer less resistance to hydrostatic pressure than heavier ones. Therefore the steady evaporational process, leaving Marine Cement's heavy film uniformly bodied over the entire masonry surface, is the surest guarantee for a perfectly waterproof job.

The basic ingredients in Marine Cement—hydro carbons, gutta percha and treated oils, combined with necessary solvents—are in themselves acid and alkali proof and are so cooked and combined with the vehicle as to present a stable resistant film which will not absorb water. This stable resistant coating, immune to acids and alkalis and always repellent to water, holds the destructive elements back in the soil and away from the masonry. Thus the maximum protection to sub-structural parts is assured.

Marine Cement covers 40% more area per gallon than hot tar or pitch. A gallon of hot material only covers about 15 to 25 square feet per gallon. Marine Cement, being a cold liquid and of uniform temperature with the masonry, will spread 40 sq. ft. per gal. This covering capacity of Marine Cement nets a decided saving in material cost.

Another cost eliminated is the extra mortar coat, frequently specified to protect the below grade film against the abrasive action of filling. Marine Cement renders the coat of mortar unnecessary because its heavy, elastic film is unaffected by the pressure of dirt and stones.

Marine Cement is practically of the same temperature as the surface to which it is applied; therefore none of those quick-drying, hardening actions take place which invariably leave an extremely brittle coating. Its tough, tacky film dries out in an elastic condition that moves flexibly with the contraction and expansion of the structure.

An additional advantage resulting from the permanent tackiness of Marine Cement's film is that labor has ample time to apply membrane fabric. This is a great aid in preventing the wrinkles that occur when membrane is hastily slapped on over large areas. The consequence of using Marine Cement with membrane is a thoroughly bonded, evenly laid coating that will not develop puncturable wrinkles.

Refer to Toch Brothers for engineering advice, special supervision and application service.

Specifications

The foundation walls and footings, etc., shall be dampproofed with "R.I.W." Marine Cement as manufactured by and in accordance with the directions of Toch Brothers, New York, N. Y.

"R.I.W." Marine Cement shall be delivered at the building site ready for use in the original unbroken package.

All holes and voids in the masonry construction shall be carefully filled with portland cement mortar. Rubble stone foundations shall be brought to an even surface with portland cement mortar. When the walls, etc., are ready and dry the Marine Cement shall be applied uniformly and thoroughly in two applications to the footings and to the outside of the foundation walls of the entire building from footings to soil level.

The second application of Marine Cement should be brushed at right angles to the first coat to assure thorough and uniform covering to the surface to which applied.

Back filling shall be started in not more than seven days nor less than one day after the application of the Marine Cement.

Wood Floors and Sleepers—For wood floors laid over concrete the wood sleepers and concrete shall be thoroughly coated with Marine Cement, coating the wood sleepers on all four sides before setting in the concrete and when same are set in place apply a heavy coat of Marine Cement over the entire exposed floor and sleepers previous to laying the finish wood floor.

"R.I.W." Ironized Waterproofing

Prevents Leaks in Surfaces Below Grade of Erected Building

Description—Leaks in buildings already erected require special treatment, differing in character from the incorporation of the ordinary integral powders, pastes and liquids. This is particularly true for below-grade basement walls or floors where it is necessary to restrict all work to interior surfaces. The reasons for this restriction may be of any number—excessive hydrostatic pressure coming in from the outside; improper physical structure of below-grade conditions, etc. Toch Brothers Ironized Waterproofing Method is effective for overcoming this type of condition.

The effectiveness of this method depends on the thoroughness with which the iron powder oxidizes. Toch Brothers pulverized iron compound is *chemically treated to insure complete oxidation.*

Specifications

Mix Toch Brothers Iron Powder with water to a heavy creamy consistency and dampen the interior surface. Then brush the mixture on the dampened surface. The water causes the iron powder to oxidize and, in the process of oxidation, expand. The expansion of the iron powder fills and seals up the pores of the surface and develops a water-resistant film. Apply as a minimum three coats. For the sake of appearance and protection against hydrostatic pressure a mortar coat at least ½ in. in thickness may be troweled on top as a final coat, preferably with a 1:2 mix. This mortar coat will bond perfectly with the iron and restore the natural concrete color.

"R.W.I." No. 110 Stainproof Stone Backing

Protects Stone from Discoloration

Description—"R.I.W." No. 110 Stone Backing Compound seals the back, bed and sides of the stone with a watertight film which is unaffected by the chemicals in masonry.

Moisture is the vehicle that carries the soluble elements in brick and cement mortar in addition to rust from structural steel. Moisture, always present in structures, draws these staining elements through all the masonry. The final result of this action on unprotected stone is an unsightly discoloration of the building. The non-absorbent seal of No. 110 around the stone, being waterproof and permanently elastic, prevents the moisture carrying rust, alkalis and foreign matter, from affecting the stone.

This protection against discoloring agencies is particularly necessary when the heat of the building drives them toward the exterior.

"R.I.W." No. 110 Stone Backing will not become porous and permit absorbent staining actions to occur, to the detriment of the building's appearance. "R.I.W." No. 110 does not contain any solvents that will stain the stone, nor will it develop minute seams, due to the motion of the building. Through such openings, rust blotches, brick dust and alkalis penetrate, disfiguring the stone work.

Preserving the natural beauty of the stone with No. 110 compound is one necessary step to insure the presentable appearance of our fine edifices.

Refer to Toch Brothers for engineering advice, special supervision and application service.

Specifications

All limestone, Bedford stone, granite, marble or any other cut stone, where specified, shall be backed with "R.I.W." No. 110 as manufactured by and in accordance with the directions of Toch Brothers, New York, N. Y.

The top, bed, sides and back—all surfaces in contact with

Continued on next page

"R.I.W." DAMPPROOFING AND WATERPROOFING PRODUCTS—(Continued)

masonry—shall be coated thoroughly with "R.I.W." No. 110 to within one inch of the face to prevent staining and to insure thorough dampproofing.

The surface of the stone shall be dry and free from any foreign matter that would prevent the adhesion of this material.

The coating shall be continuous and even and applied at least twelve to twenty-four hours before setting up the stone. All Lewis holes, anchors and anchor recesses must be thoroughly coated with the "R.I.W." No. 110. After the cut stone is set apply an additional coat of "R.I.W." No. 110 on the backs, being careful that all joints, as well as the stone itself, are thoroughly coated.

"R.I.W." Elastic Caulking and Pointing Compound

For Caulking Window and Door Frames, Pointing Terra Cotta, Stone Joints, etc.—Gun or Hand Application

Description—A waterproof, elastic, non-staining compound which dries hard on the surface while remaining elastic underneath and free to expand and contract with changes of temperature.

It adheres perfectly to wood, steel, masonry or glass and is made in consistency for both hand and caulking gun application.

"R.I.W." Elastic Caulking Compound is furnished regularly in Steel Gray and Caenstone shades. Other shades can be made to order.

Refer to Toch Brothers for engineering advice, special supervision and application service.

Specifications

General—All door and window frames and other surfaces indicated shall be made water-tight and weather-tight with "R.I.W." Elastic Caulking Compound as manufactured by and in accordance with the directions of Toch Brothers, New York, N. Y., and Chicago, Ill.

This compound shall be delivered at the job in the original unbroken package.

Preparation of Surfaces—The space between the frames and the masonry reveal shall be caulked with oakum or similar material in a thorough manner and then pointed up with Elastic Caulking Compound in a color selected by the architect.

Application (Wood Frames)—Remove staff bead from new or old wood frames and fill with hand tool or caulking gun the joint between the frame and masonry on all sides with Elastic Caulking Compound until it protrudes beyond the masonry. The staff bead when replaced shall be pressed into the Elastic Caulking Compound. Where joints are wide and deep caulk with oakum to within ¾ in. of the surface and then fill the joints with "R.I.W." Elastic Caulking Compound.

Application (Steel and Metal Frames)—When metal frames are set in masonry the inside edge of the masonry opening or the frame shall be buttered with Elastic Caulking Compound applied by hand or with a caulking gun and the frame pressed into place and properly secured.

In instances where frames are set, caulk with oakum and force the Elastic Caulking Compound between the frame and the masonry at all points.

Pointing up Stone, Terra Cotta, Brick, etc.—After joints have been cleaned thoroughly and all loose particles removed, they shall be filled with "R.I.W." Elastic Caulking Compound. This compound shall be applied with a pointing tool or knife, working the material thoroughly and forcing it into the joints. The caulking compound shall be flush with the surface when the job is finished.

Integral Waterproofing—"R.I.W." Toxement (Patented)

Integrally Waterproof Concrete Mortar (Powder, Paste or Liquid)

Description—Toxement is an integral waterproofing compound that lubricates the aggregate and corrects the unreliability of labor to properly place and tamp the mix.

The lubrication property of Toxement permits labor to handle the mix easily without the addition of extra water. Pouring, tamping and troweling operations are rendered smooth and efficient.

By retaining the water in the mix longer than it would otherwise remain, Toxement completely hydrates and waterproofs the concrete or cement mortar mix.



A chemical reaction between moisture and lime causes efflorescence. Toxement, in waterproofing the mortar joints, keeps moisture out of the masonry and decreases the probability of efflorescence.

Toxement, because of its colloidal property, tends to prevent external crystallizations on surface walls which make passageway for rain. It therefore reduces efflorescence in two ways—(1) as waterproofing agent and (2) as a minimizer of the action of the soluble salts in the masonry.

Toxement is a colloidal compound insoluble in water. The organic acid ingredients give Toxement its absorbent power. This composition, when added to the cement, affects a slow, steady evaporation of the water content that increases the strength and waterproofing efficiency of concrete with age.

Refer to Toch Brothers for engineering advice, special supervision and application service.

Installations—United States Navy Dry Dock, Norfolk, Va.; Woolworth Building, New York, N. Y.; The Reynolds Tobacco Building, Winston-Salem, N. C.; Department of Commerce Building, Washington, D. C.

Specifications

"R.I.W." Toxement Powder—Hand mixing: Dry sand shall be spread in a layer of even depth on a level, watertight platform and the portland cement spread thereon. Over the portland cement sprinkle "R.I.W." Toxement in the proportion of 1½% to 2% by weight of the cement used and turned until evenly mixed. To this mixture add balance of aggregate.

Machine mixing: Use "R.I.W." Toxement in the proportion of 1½% to 2% by weight of the cement used by simply dumping it into the bag of cement before it is dumped into the hopper, then proceed in the usual manner.

Bonding Grout—All concrete shall be protected against frost. Make tight joints by using a bonding grout made up in the proportion of 5 lb. of Toxement Powder to 1 bag of neat portland cement, then thin down with clean water to the consistency of a thick paint, and apply same over the surface that has been previously dampened *immediately before placing additional concrete or cement mortar.* Do not apply any more of this bonding grout than will remain wet until covered. Joints 24 hours old or more shall be thoroughly broom swept before applying the bonding grout and placing additional concrete

"R.I.W." Toxement Paste—"R.I.W." Toxement Paste shall be used in the proportion of 1½% to 2% by weight of the amount of neat portland cement used, thoroughly mixing the Toxement Paste with the required amount of water for each bag of portland cement used in the mix (this approximates 6 to 7 gal. of water for each bag, 94 lb. of cement), after which the water in which the "R.I.W." Toxement Paste has been added shall be used to gauge the portland cement mix.

In machine mixing, where water is fed direct to the mixer, the water shall be run into the drum and "R.I.W." Toxement Paste, which has been slightly reduced with water, added to same in the proportions above specified, before the sand or other aggregate is dumped in. Then proceed in the usual way.

"R.I.W." Toxement Liquid—Contents of container must be well stirred before using. In general "R.I.W." Toxement Liquid should be added to the gauging water, mixing it in the proportion of approximtaely 1½ pt. to 1 qt. (U. S. measure) to the mixing water required, except in instances hereinafter specified, for each bag of portland cement. In instances where

Continued on next page

"R.I.W." DAMPPROOFING AND WATERPPROOFING PRODUCTS—(Continued)

the water is fed direct to the mixer, water shall be run into the drum and the "R.I.W." Toxement Liquid added in the proportion as hereinbefore specified before sand or other aggregate is dumped in, proceeding in the usual way. Care should be exercised to avoid excessive mixing water, adding only sufficient to make a workable and plastic, but not sloppy, mix.

Bonding Grout—(As described above.)

Brick Mortar—The brick mortar should be of either 1 part cement, 2½ parts sand, or 1 part cement and 3 parts sand, adding the "R.I.W." Toxement Liquid to the mixing water in the proportion of 1 part of Toxement Liquid to 10 or 12 gal. of water, using this mixture to temper the mortar.

Concrete and Other Portland Cement Construction—"R.I.W." Toxement Liquid shall be thoroughly mixed with the gauging water in the proportion of 1½ pt. to 1 qt. (American measure) to required amount of mixing water (about 6 to 6½ gal.) for each bag of portland cement used in the mix, then proceed with the mix and placing of same in the usual manner.

Note: For "R.I.W." Tox-Mix Accelerator and Hardener see description under Cement Floor Treatments.

Membrane Waterproofing—"R.I.W." Marine Cement (Cold Process)

For Waterproofing Exterior of Masonry Walls Below Grade

For a general description of "R.I.W." Marine Cement, see preceding page. On foundation walls Marine Cement may be used with either open mesh untreated burlap or with waterproof felt paper to give a waterproof membrane.

"R.I.W." Self-Healing Bridge Cement (Hot Method)

A Protection for Bridges, Expansion Joints, Below Grade Areas and Surfaces Against Water, Acid Fumes, Alkalis and Extreme Changes in Temperature

Description—Self-Healing Bridge Cement is a black viscous compound which is adhesive, cohesive and elastic. It is a flexible solid material and absolutely unlike all asphalts. This is a manufactured and not a mined product that has been used by representative railroads for over 15 years.

Self-Healing Bridge Cement must be heated, having a dropping point of 160° F. Unlike tar or asphalts, heating does not "kill the product."

Miscellaneous Uses—Self-Healing Bridge Cement is particularly valuable for protecting areas where brittle materials, such as hot tar, pitch and asphalt, are inadequate. Many other practical uses include the following:

(1) As a waterproof coating in shallow foundations, retaining walls, culverts, etc.

(2) On steel work submerged in water, such as transfer bridges, caisson gates, etc.

(3) To make a permanently elastic joint in solid bridge floors, at the line of juncture of the floor and the supporting girder.

(4) To fill in expansion joints in concrete road construction floor slabs and tunnels.

(5) To set glass vault lights with a waterproof seal. Self-Healing Bridge Cement is unaffected by light.

(6) On electric junction boxes for its dielectric value.

(7) To permanently seal the nozzle of gas masks. Here its sealing and fumeproof properties are of great value.



Covering capacity, per gallon, one coat, approximately 20 sq. ft.

Self-Healing Bridge Cement has been used on steel surfaces red-leaded or non-red-leaded without the use of membrane by many of the leading railroads.

Refer to Toch Brothers for engineering advice, special supervision and application service.

Specifications

One-ply Membrane—The surface to be waterproofed shall receive a one-ply membrane composed of one layer of burlap or waterproofed felt paper and two coats of Self-Healing Bridge Cement. The burlap shall be of open mesh, new cloth, weighing about 7 oz. per lineal yard of 40-in. material. The surface to which the membrane is applied must be dry and finished sufficiently smooth so that no sharp edges or stones protrude.

The surfaces shall then be primed with a thorough application of "R.I.W." No. 232 which shall be allowed to set for at least 12 hours (the Self-Healing Bridge Cement can also be applied directly to the surface without priming, providing the surfaces are absolutely dry and free from cement dust, laitance or other matter that might interfere with the proper adhesion of the compound). After the Self-Healing Bridge Cement has been thoroughly heated in the usual form of melting pot a heavy film, at least ⅛ in. thick, shall be swabbed over the surface. Upon this the layer of burlap or waterproof felt paper, cut to convenient lengths, shall be smoothly placed so that no wrinkles show and shall be lapped at joints not less than 2 in. The burlap shall receive in turn a heavy coat of "R.I.W." Self-Healing Bridge Cement. The resulting membrane so formed shall not be less than ⅛ in. thick at any point. Where this membrane is to be covered with concrete it should be first sprinkled over with a thin layer of dry sand and portland cement in the proportion of 1 part of cement to 2 parts of sand.

Two-ply Membrane—Under this requirement a second layer of burlap or waterproof felt paper, cut to convenient lengths, shall be smoothly placed over the second swab coat of Self-Healing Bridge Cement and this in turn shall receive a third coat of Self-Healing Bridge Cement. The resulting membrane so formed shall be not less than $\frac{3}{16}$ in. thick at any point.

"R.I.W." CEMENT TREATMENTS—Cement Floor Hardeners

"R.I.W." Tox-Mix (Clear and Colored)

Chemical Hardener, Accelerator and Waterproofing Agent

Clear Tox-Mix—"R.I.W." Clear Tox-mix is a colorless liquid to be used integrally in portland cement floors, cement mixtures, concrete, stucco, brick mortar, etc. When this solution is used a great increase is obtained in the early tensile and compressive strength of portland cement mixtures, and it renders the resulting concrete or portland cement mortar permanently hard and dense.

"R.I.W." Clear Tox-mix is a collodial basic material, possessing great waterproofing properties for portland cement, enriching the concrete or cement mortar so that it can be finished in less time than usual. It functions through the entire mass, insuring a uniform hardening throughout and a non-dusting surface. Delays in construction caused by



Continued on next page

"R.I.W." CEMENT TREATMENTS—CEMENT FLOOR HARDENERS—(Continued)

freezing weather are eliminated, due to the action of "R.I.W." Clear Tox-mix, resulting in a general speeding up of masonry construction.

In brick mortar work the "R.I.W." Clear Tox-mix is invaluable, as it makes for the speeding of the laying of brick and finishing of the mortar joint immediately, and, therefore, a quick removal of scaffolding or staging.

"R.I.W." Clear Tox-mix accelerates the initial and final set of portland cement construction from two to four and one-half hours, thereby saving time and labor in construction, at the same time producing a mortar or concrete of greater tensile as well as compressive strength which is thoroughly hardened and dustproof on the surface.

The following is an extract from a report rendered by a recognized laboratory.

Average of three specimens, pounds per square inch.

Material	Tensile strength, lb.	Compressive strength, lb.	Days
Clear Tox-mix	467	4486	28
No admixture	432	3523	28
Clear Tox-mix	403	3320	7
No admixture	350	2514	7

Specifications

Contents of container must be well stirred before using. In general "R.I.W." Clear Tox-mix should be added to the gauging water, mixing it in the proportion of approximately 1 qt. (U. S. measure) to the mixing water required, except in instances hereinafter specified, for each bag of portland cement. In instances where the water is fed direct to the mixer, water shall be run into the drum and the "R.I.W." Clear Tox-mix added in the proportion as hereinbefore specified before sand or other aggregate is dumped in, proceeding in the usual way. Care should be exercised to avoid excessive mixing water, adding only sufficient to make a workable and plastic, but not sloppy, mix.

Cement Floors—To Harden and Accelerate Set—The top finish shall be at least 1 in. in thickness and preferably should be made up of 1 part portland cement and 2 parts clear, sharp, gritty sand, and under no circumstances greater than a 1 to 3 mix. Place the mix and float the cement free from hollows or bubbles, work the surface well with a wooden float, then finish with a steel trowel in the usual manner to a smooth, hard finish.

The surfaces should be protected from plaster and cement stains, etc., by covering with stainless paper, placing this paper as soon as the surface is hard enough to prevent injury, and under no circumstances before 24 hours. Over this place a layer of damp sawdust, shavings or clean sand. Same should be kept damp for a period of 5 to 7 days and must not be removed until completion of all work.

Brick Mortar—Same specifications as for Toxement on preceding page.

Concrete and Other Portland Cement Construction—Same specifications as for Toxement on preceding page.

Colored Tox-mix—"R.I.W." Tox-mix Colored Paste, Integral Hardener combines the advantages of a coloring material with a hardening, densifying medium which also possesses certain waterproofing properties. Although not designed especially for dustproofing concrete floors, this material improves the wearing qualities of such floors by reason of its hardening and densifying action. It does not affect the tensile or compressive strength of the cement topping in which it is incorporated but rather increases same. In general, the amount of color required will be about 10% of the amount of neat portland cement used and an equivalent amount of sand should be omitted from the mixture. The depth of shade desired and the color of the cement and aggregates used are determining factors in the amount of color needed to produce a desired shade.

We recommend that a small briquette be made up on the job to obtain the desired color and a careful record made of the proportions used to obtain the shade wanted in view of the variation in shade of the different brands of cement and aggregates. It is important to adapt methods of measurement on the job which will secure the same proportions of the various ingredients as were used in making up the sample tile. When the top finish is applied it may be laid off in sections to resemble tile, and it will be found that the incorporation of "R.I.W." Tox-mix Colored Paste Hardener will make an easier working mixture and one that can be troweled quickly.

The six alkaliproof shades listed herewith are ones for which there is the greatest demand; special shades can be made to order if desired:

No. 6860—Terra cotta
No. 429—Red
No. 106—Brown
No. 505—Willow green
No. 535—Sea green
No. 94—Slate

Specifications

The top finish of all concrete floors indicated shall be colored and hardened integrally with "R.I.W." Tox-mix Colored Paste Hardener as manufactured by and in accordance with the directions of Toch Brothers.

Bonding Coat—Where top finish is to be applied over a concrete slab the surface shall be roughened up sufficiently to provide a mechanical key, then the slab shall be thoroughly cleaned and wet down, after which there shall be a bonding grout made up in the proportion of 5 lbs. of Toch Brothers "R.I.W." Toxement Integral Waterproofing Compound to each bag of portland cement. This mixture shall be reduced to the consistency of a heavy bodied paint with water and then brushed over the entire surface, following immediately with the cement topping; care shall be exercised not to apply more of the bonding grout than will remain wet until covered by the cement topping. If the topping is applied in two coats the undercoat shall be scratched so as to give a key, then the final topping shall be applied with the "R.I.W." Tox-mix Colored Paste Hardener incorporated therein.

Mixing—The proper amount of "R.I.W." Tox-mix Colored Paste Hardener shall be dissolved in water and when thoroughly mixed shall be added to the gauging water, care being taken not to add any more water than is absolutely necessary to make a perfect mix. Where used in a machine mix allow the mixer to revolve ten to twenty revolutions so as to give a uniform and even color; care shall be taken not to mix the mortar too sloppy.

"R.I.W." Tox-mix Colored Paste Hardener shall be mixed integrally in the following proportions, which are approximate, to each bag (approximately 100 lbs.) of cement used:

No. 94—Dark slate ..... 8 lbs.
No. 535—Sea green ..... 10 lbs.
No. 505—Willow green ..... 7 lbs.
No. 106—Brown ..... 10 lbs.
No. 426—Red ..... 10 lbs.
No. 6860—Terra cotta ..... 8 lbs.

A small batch shall be made at the job in order to determine the exact proportions to produce the shade required. In laying the top finish float and trowel in the usual manner. Do not place any more of the colored cement topping than can be finished in one operation.

The top finish shall be at least 1 in. in thickness and preferably should be made up of one part portland cement, two parts of clean, coarse, gritty sand, and under no circumstances greater than a 1:3 mix. All proportions shall be accurately measured and not approximated.

Place the "R.I.W." Colored Tox-mix Paste cement-sand mix top finish on the floor slab in the usual manner. Straight edge to an even surface, float the surface free from hollows, or bubbles. Work the surface well with a wooden float, then finish with a steel trowel in the usual manner to a smooth, dense, and glossy surface. Under no circumstances shall water be sprinkled or otherwise applied to the surface during the troweling.

Protecting the Finished Surface—Surfaces shall be protected from plaster and cement stains and dirt by covering with stainless paper. Over this place a layer of stainless sawdust, shavings or clean sand. This covering should be applied just as soon as the surface is hard enough to prevent injury, and under no circumstances before twenty-four hours. Same should be kept damp for a period of five to seven days and must not be removed until completion of all work. When the protective covering is removed the surface shall be cleaned,

Continued on next page

"R.I.W." CEMENT TREATMENTS—CEMENT FLOOR HARDENERS—(Continued)

using a linseed oil soap. Any stains that may be on the finished surface shall be removed by the use of steel wool, soap and water.

"R.I.W." Metallic Hardener

For Hardening Concrete Floors

Description—"R.I.W." Metallic Hardener is the finest grade of iron compound which is clean, angular and absolutely free from oil or adulterants. The principle of this product is to add an iron content to the topping which gives it a hard, steellike wear-resisting surface.

"R.I.W." Metallic Hardener should be sprinkled over the surface while the floor is being laid.

An ordinary cement floor is porous due to the evaporation of water which occupies a volumetric proportion of the mix. "R.I.W." Metallic Hardener when coming into contact with water will oxidize and expand, assisted by the lime alkali which facilitates and increases the oxidation process. The ratio is 112 to 221, which means that 112 lb. of iron are converted into 221 lb. of oxidized material. This creates an absolutely non-porous, wearproof surface.

Specifications

30 lb. of "R.I.W." Metallic Hardener shall be used to each 100 sq. ft. of floor surface to be hardened. Thoroughly mix with an equal amount of portland cement (by volume), this resulting mixture to be evenly sprinkled or sifted over 100 sq. ft. of floor surface prior to the final troweling. This shall be floated in thoroughly and troweled to a smooth, hard surface. The Metallic Hardener shall not be applied until all surface water has disappeared from the surface.

The mechanic should be cautioned as to the necessity of applying this material at the proper time. If it is applied when the cement topping is too soft the particles of Metallic Hardener will sink into the soft cement, and if left too long will lie on the surface and, therefore, cannot bond properly and will be easily worn off.

"R.I.W." Metallic Hardener is packed in 100-lb. bags.

"R.I.W." Flintox (Colorless)

Chemical Floor Hardener, Preservative and Dust Preventive

Description—Flintox is a chemical floor hardener which preserves floors subject to heavy traffic and keeps them in an oil and dustproof condition.

Flintox is either brushed or mopped in solution over the floor. It can be applied to the concrete while the topping is still damp and green. This eliminates delays in machinery installation in contrast to treatments that cannot be applied until days and sometimes weeks after the floor is cured.

For older floors, Flintox can be brushed on in the evening after closing hours. The floor will be ready for use the next morning without the loss of a single minute of time. This dispenses with the waste of costly shutdowns.

Flintox reacts chemically with cement and precipitates silicious material in the pores of the topping. Its chemical action transforms the loose, soft granules into a hard flintlike surface capable of standing up under the heaviest traffic. The chemical action described utilizes in particular the free lime content in cement.

The resultant hard granite topping being integrally formed will give a permanent service unattainable with surface paint coatings.

In its chemical action Flintox binds together those free loose particles that otherwise would drift in the air as cement dust. This dust preventive function of Flintox is an important operation for those interested in efficient factory conditions.

By hardening the floor into a granitelike mass, the penetration of oils and grease into the floors of concrete is prevented. This facilitates the washing of floors and makes for cleaner, more sanitary surroundings.

Covering capacity per gallon, one coat, approximately 100 to 150 sq. ft.

Specifications

The Flintox crystals shall be mixed in the proportion of 9 lb. of crystals to 5 gal. of water, which gives a full strength solution. This mixture shall be thoroughly stirred until the crystals are completely dissolved. Where two coats are applied to the cement floor surfaces, for the first coat the "R.I.W." Flintox crystals shall be mixed in the proportion of 5 lb. of crystals to 5 gal. of water (preferably warm).

After the surfaces have dried out, which will be about 6 to 12 hours, the "R.I.W." Flintox crystals for the second coat shall be mixed in the proportion of 9 lb. of crystals to 5 gal. of water, which full strength solution shall be applied to the point of complete absorption.

"R.I.W." No. 2626 Cement Filler (Transparent) Patented

For Hardening, Oilproofing and Dustproofing Concrete Floors

Description—A transparent, organic, acid composition of specially selected gums, for use on dry cement floors to render them dustproof, sanitary and oilproof.

"R.I.W." No. 2626 Cement Filler neutralizes the lime inherent in concrete and yields a hard surface on cement floors subjected to severe conditions of service. It prevents crumbling and dusting of extremely porous cement floors. Usually two coats should be applied to give a full wear-resisting, dustproof, oilproof surface where protection without decoration is required.

Covering capacity, per gallon, one coat, approximately 350 sq. ft.

Specifications

The first application to be diluted about 25% with benzol or a mixture of half benzol and half turpentine. (Balance of specifications same as for "R.I.W." Cement Floor Enamel following.)

"R.I.W." Acidproof Filler (Transparent)

Acidproof, Dust Preventive, Binder and Hardner for Concrete Floors

Description—A liquid solution of a pale brown color, slightly darkening the masonry surface to which applied. This material is usually used as a separate surface treatment over concrete floors, walls and other masonry surfaces. It is a complex solution of silicates, which precipitates silica and other materials in a colloid form in the pores of the concrete or portland cement mortar, acting also as a binder for the cement and sand particles, preventing the floors from dusting and rendering same hard to resist abrasive action, at the same time preserving the floors or other masonry surfaces exposed to the action of weak acids or oils.

Covering capacity, per gallon, one coat, approximately 150 sq. ft.

Specifications

All concrete floors or other masonry shall receive two thorough applications of the "R.I.W." Acidproof Cement Filler, allowing 12 to 24 hours between coats; the first coat shall be diluted about one-quarter to one-half its volume with warm water, saturating the floors with the solution from a sprinkling can or with long handled brushes, brushing the solution well into the masonry. The second coat of "R.I.W." Acidproof Filler is to be applied full strength. The "R.I.W." Acidproof Cement Filler may be applied to either wet or dry floors.

Continued on next page

"R.I.W." CEMENT TREATMENTS—CEMENT FLOOR HARDENERS—(Continued)

"R.I.W." Cement Floor Enamel

For Hardening, Oilproofing, Dustproofing and Decorating Dry Concrete Floors

"R.I.W." Cement Floor Enamel is composed of acid resin gums and treated wood oil which neutralize the alkali content in concrete. It is the combination of these elements which binds the cement and sand particles into a hard, firm, elastic surface.

The durability of the product is exceptional because it is at once hard and elastic. Its hardness enables it to resist the abrasive scuff of feet without peeling, and its elasticity gives it the power to stand up under the pound of heels and traffic without cracking.



"R.I.W." Cement Floor Enamel dries out to a non-porous film that has the unusual characteristic of permanently *retaining its gloss*. This property keeps oil, dirt, dust and grease on top of the surface and makes a cement enameled floor as easy to clean as glass. The enamel is waterproof and is unaffected by the alkalis in soap on top of its surface, in the same manner that it is unaffected by alkalis in the concrete below the surface. This enables it to withstand repeated washing without losing its gloss or durability.

Covering capacity, per gallon, one coat, approximately 250 sq. ft.

Colors are as follows:

Cream	Linoleum brown	Antique brown
No. 701—Light stone	Dark red	Napoli green
No. 714—Dust color	Russet	Black
No. 702—Warm gray	No. 711—Dark stone	White
	Dutch blue	

Specifications

All the concrete floors, where directed, shall receive one coat of "R.I.W." Cement Filler, patented, and one coat of high gloss "R.I.W." Cement Floor Enamel, as selected, or a first coat of "R.I.W." Cement Floor Enamel thinned down with approximately 40% pure spirits of turpentine and finished with "R.I.W." Cement Floor Enamel.

Cement Floors—The floors shall be at least 4 to 6 weeks old and absolutely dry. Oil or grease spots shall be cleaned with a mixture of 50% turpentine and 50% benzine and allowed to dry before applying the first or priming coat of material. Allow 24 hours before applying the final coat. The contractor shall guard all floors so treated against all wear and usage for at least 24 hours after the finish coat is applied.

Wood Floors—Where this material is to be used on wood floors the "R.I.W." Cement Floor Enamel should be thinned with 1 qt. of trupentine to each gallon of enamel and applied in an even uniform coat.

The application of the finishing coat is to be made in the consistency as furnished in the container.

"R.I.W." Cement Colors

For the Coloring of Stucco, Concrete and Other Portland Cement Construction

The "R.I.W." Cement Colors for use in portland cement construction are furnished in dry powder form. These alkali-proof colors are of a mineral base and are strong in tinting powder and unaffected by the chemical action of portland cement. When used in portland cement construction such as stucco, cement walks, concrete foundations, statues and posts, etc. Permanent and the richest coloring results are obtained.

In general, the amount of color required will be approximately 10% of the amount of neat portland cement used and an equivalent amount of sand should be omitted from the mixture. The depth of shade desired and color of the cement and aggregates used are determining factors in the amount of color needed to produce the required result and, therefore, it is advisable that the mason make up a small briquette in which the cement color has been incorporated to arrive at the desired color.

Colors are as follows:

No. 165—Light drab	No. 94—Dark slate
No. 163—Oak	No. 137—Spanish tile
No. 35—Bright yellow	No. 6860—Terra cotta
No. 133-B—Pure gray	No. 429—Cherry red
No. 505—Willow green	No. 465—Oxblood red
No. 122—Dutch blue	No. 106—Light brown
No. 535—Sea green	No. 713—Spruce

Specifications

All portland cement construction where called for shall be colored by the thorough incorporation of "R.I.W." Cement colors as manufactured by and in accordance with the directions of Toch Brothers, New York, N. Y.

A pre-determined quantity by volume of color shall be added dry to each bag of cement before mixing other aggregate, after which the sand and aggregate shall be added and thoroughly mixed dry until the entire batch is of uniform color. water shall then be added in the usual way to bring the mortar to the proper consistency.

Dry color shall be sprinkled over the surface prior to troweling the finishing coat and worked in evenly and uniformly. This prevents laitance (excess of lime) crystallizing on the surface and gives a more uniform finish; in sidewalk work the surface shall not be troweled to too smooth a finish.

"R.I.W." Edinburgh Mortar Colors

The Edinburgh Mortar Colors offer the most permanent and strongest alkali-proof mineral colors for mortar joints. They are not affected by heat or cold and are furnished in both dry powder form and in pulp form.

The estimated quantity of the Edinburgh Mortar Color required is approximately 1 bucket of color to 7 or 9 buckets of ready mixed mortar by volume, or the basis of 10% of neat portland cement used, this quantity being regulated by the depth of color or shade desired.

Colors are as follows:

Buff	No. 949—Brown
No. 301—Terra cotta	Olive green
No. 409—Red	Black
No. 110—Moss green	

Specifications

All mortar for laying face brick, cut stone and terra cotta, etc., where required, shall be colored with "R.I.W." Edinburgh Mortar Colors as manufactured by and in accordance with directions of Toch Brothers, New York, N. Y.

The color and ingredients of the mortar shall be mixed in the proportion of one bucket of color to seven to nine buckets of ready mixed mortar by volume, using the exact proportion as directed to give the required colored mortar joint. The Edinburgh color and ingredients in the mortar shall be mixed until thoroughly distributed and the mass is uniform in color and homogeneous. Methods of measurement shall be used, which will secure separate, uniform measurements at all times.

Contractors shall prepare samples of the Edinburgh Mortar Colors selected by the architect and no work shall proceed until the approval of the architect has been given.

"R.I.W." Liquid Konkerit (Patented)

A Decorative Protection for Masonry Areas

The principal function of "R.I.W." Liquid Konkerit is to dampproof and decorate exposed walls of brick, stucco, stone, concrete and other masonry surfaces, copings and the inside of parapets to which no paint has

Continued on next page

"R.I.W." CEMENT TREATMENTS—CEMENT FLOOR HARDENERS—(Continued)

previously been applied, and for repainting old surfaces which have been properly prepared. It is particularly serviceable around seacoast districts. It neutralizes the alkali inherent in portland cement construction and is a thoroughly waterproof, weather-resisting composition. It can be used for the decoration of interior walls and ceilings of brick, concrete or plaster, as well as other masonry, but not to present the penetration of dampness from outside wall surfaces or seal any existing moisture in the structure.

Covering capacity, per gallon, one coat, viz: Liquid Konkerit Primer, approximately 175 sq. ft.; Liquid Konkerit Finish, approximately 200 sq. ft.

Colors are as follows:

Cream	Mentone yellow	Brick red
Caen stone	Light gray	Natural

Specifications

Repoint walls where necessary and fill all cracks and voids around window frames, sills and all other openings with "R.I.W." Elastic Caulking Compound, after which apply to a dry surface one coat of "R.I.W." Liquid Konkerit Primer, following (but not before 24 hours) with the finish coat of "R.I.W." Liquid Konkerit in the color selected.

If the masonry surfaces are very porous, apply two coats of "R.I.W." Liquid Konkerit finish to insure uniformity of finish and appearance.

No paint shall be applied in damp, foggy or freezing weather nor to surfaces which are not perfectly dry.

"R.I.W." TECHNICAL COMPOUNDS AND STEEL PRESERVATIVE PAINTS

"R.I.W." Tockolith (Patented)

For Priming on Iron, Steel and Other Metals

Description—Tockolith is a cement basic paint, gray in color and a most effective priming coat for iron, steel or other metal surfaces, and is a positive protection against corrosive action. This material is unique in that it can be applied over incipient rust without depreciating its protective value. It gives an unexcelled combination for preventing chemical or electrolytic corrosion when used as a priming coat under other "R.I.W." preservative paints. Its demonstrated and proven efficiency has caused its adoption on the steel work of many notable and monumental structures.

Covering capacity, per gallon, one coat, approximately 600 sq. ft.

Specifications

Tockolith priming coat shall be worked into all joints, crevices, etc. Any parts which are to be riveted together on the field shall receive two coats of Tockolith before leaving the shop, the first coat must be perfectly dry before the second is applied. All work shall be painted at least 48 hours before shipment. Erection marks shall be made on the painted surfaces. Painting shall be done with round brushes or applied by spray application. Painting shall not be done in damp or freezing weather except under cover and the steel must be free from frost and moisture when applied. Steel so painted shall be kept under cover until the paint is thoroughly dry.



"R.I.W." No. 49 Damp Resisting Paint

Finishing Coat for Metal Work (Oil Paint)

Description—A high grade elastic exposure paint, furnished in black or dark olive green for use either on exposed or interior metal surfaces. It offers a most effective steel preservative paint and is especially recommended as a finishing coat over a priming coat of "R.I.W." Tockolith.

"R.I.W." No. 49 is resistant to the action of acids and other fumes to which railway bridges and viaducts, tanks, etc., are subjected and where the maximum protection is required.

This material is designed and particularly adapted for extreme exterior as well as interior exposure.

Covering capacity, approximately 700 to 800 sq. ft. per gal., one coat.

Specifications

Same specifications as for Tockolith on this page, excepting where two coats of this material are to be applied the finish coat of "R.I.W." No. 49 shall be dark olive green.

Painting shall be done preferably with round brushes of good quality, or material can be applied by spray application.

"R.I.W." No. 1017 Preservative Paint

For Use on Gas Holders, Tank Cars, Structural Steel and Other Exposed Metal Surfaces

Description—This material is made in ivory, white, red, dark, olive green and black shades, and is designed for use as a priming and finishing coat on steel and other metal surfaces. It is a quick drying china wood oil varnish paint, which is acid-proof and alkali-proof and rust inhibitive.

This material is capable of withstanding successfully exposure conditions in both tropical and temperate climatic conditions.

Covering capacity, per gallon, one coat, approximately 400 sq. ft.



Specifications

Same specifications as for Tockolith on this page excepting where two coats of this material are to be applied the finish coat shall be of color other than the first coat or of shade as directed.

Painting shall be done with round brushes of good quality, or material can be applied by spray application.

"R.I.W." No. 110 Damp-Resisting Paint

Field Coat for Structural Steel to Be Encased in Concrete or Other Masonry

Description—A dampproof paint furnished in either black or maroon color. Usually applied over a priming coat of "R.I.W." Tockolith, but two coats may be applied without a primer if desired. Especially adapted for painting structural steel or grillage work which is to be encased in masonry.

This material is resistant to the fumes of acids and alkalis and is also an ideal coating for painting conduits and pipes buried in the ground.

"R.I.W." No. 110 adheres perfectly to concrete and is used widely for painting metal lath to prevent corrosion of metal and staining of plaster.

Covering capacity, one coat, per gal., approximately 400 sq. ft.

Continued on next page

"R.I.W." TECHNICAL COMPOUNDS AND STEEL PRESERVATIVE PAINTS—(Continued)

Specifications

The finishing coat to be used on all structural steel encased in concrete and other masonry, etc., where specified, shall be "R.I.W." No. 110 Damp Resisting Paint as manufactured by and used in accordance with directions of Toch Brothers, New York, N. Y.



This paint shall not be applied to any surface until the steel or metal has been cleaned free from rust scale, dirt, oil and grease and is perfectly dry. No paint shall be applied in damp, foggy or freezing weather, and in instances where two applications of "R.I.W." No. 110 are specified the first coat of this material must be thoroughly dry before the second coat is applied. Painting shall be done with round brushes of good quality, having long bristles, or this material can be applied by spray application.

"R.I.W." Hospital and Laboratory Enamel

An Interior Dampproofing Enamel Which Resists the Action of Gases and Fumes of Acids and Chemicals

Description—A hard usage dampproof enamel for interior exposure and made for service which ordinary enamel cannot give.

Wherever sulphuric acid fumes, sulphuretted hydrogen, lactic acid and other chemical agencies are in the atmosphere the ordinary enamels and paints discolor, disintegrate and separate from the plaster. Toch Brothers Hospital and Laboratory Enamel has been especially formulated to meet these extreme conditions. Its unusual resistance to acids and chemical fumes makes it an ideal material for protecting the walls of dairies, kitchens, hospital buildings, chemical laboratories, garages and industrial chemical plants against the severest exposures.

Toch Brothers Hospital and Laboratory Enamel gives an enduring white film that stays white. The distinguishing feature of not yellowing with age or under heat as ordinary paints and enamels do, is the unique property of the product.

The adherence of spores and fungus growths to walls must be avoided in hospitals where anti-toxic measures are all-important. Hospital and Laboratory Enamel prevents this type of undesirable growth and assures a sanitary protection unobtainable with ordinary paints and enamels.

The waterproof, washable film of Hospital and Laboratory Enamel permits it to be easily cleansed with an ordinary soap and water wash. Its permanent washability is a distinct sanitational advantage.

Covering capacity, per gal., one coat, approximately 300 sq. ft.

Specifications

All surfaces indicated shall be coated with the "R.I.W." Hospital and Laboratory Enamel as manufactured by and in accordance with the directions of Toch Brothers, New York, N. Y.

The first coat of this enamel may be put on with a paint brush; the second and third coats shall be flowed on exactly as a varnish and not brushed out too thoroughly.

Concrete and Other Portland Cement Surfaces—Where Hospital and Laboratory Enamel is applied to concrete or other masonry surfaces same should first be primed with "R.I.W." Liquid Konkerit Primer and after a lapse of at least twenty-four hours apply the first coat of Hospital and Laboratory Enamel, following in not before twenty-four hours with the second coat of this material. This should be allowed to dry twenty-four to forty-eight hours, after which a third coat of Hospital and Laboratory Enamel is to be applied.

New Plaster Wall Surfaces—Plaster wall surfaces not previously painted shall receive a priming coat of "R.I.W." Plaster Primer, following in not before twelve to twenty-four hours with the first, second, and third coats of Hospital and Laboratory Enamel as above specified.

Metal Surfaces—All metal surfaces, after scales, dirt and other foreign substances have been removed shall receive a priming coat of "R.I.W." Tockolith Primer. This material shall be allowed to dry for at least twenty-four hours, then the three coats of Hospital and Laboratory Enamel, as hereinbefore specified, shall be applied.

New Wood Surfaces—After the woodwork has been thoroughly dusted off and all knots and stains shellacked a white lead priming coat shall then be applied. When this priming coat is absolutely dry the first, second and third coat of Hospital and Laboratory Enamel as hereinbefore specified shall be applied.

Old Woodwork—In the case of the application of material to old woodwork, if same is in good condition and of a light color, it can be sandpapered until perfectly smooth and given three coats of the Hospital and Laboratory Enamel as previously specified.

"R.I.W." No. 5700 X-Ray Proof Compound

For Protection Against X-Ray Radiation

Description—"R.I.W." No. 5700 X-Ray Proof Compound is a pure white powder, which is incorporated with the hard wall lime or cement plaster for the prevention of the penetration of rays emanating from the x-ray machine from passing outside the confines of the room to obviate harm to physicians, patients, and hospital attendants from these rays.

For years it was the common procedure to line the walls of x-ray rooms with sheet lead. This method has numerous objections. It is very expensive. Because of the tremendous weight of any considerable lead wall surface, it is often necessary to reinforce portions of the building to take care of the added structural load. Lead is also cumbersome and costly to install. A further disadvantage is that the floors and ceilings are usually overlooked, and secondary radiation often penetrates these surfaces.

Dr. Maximilian Toch spent many years of research on this problem, and in 1923 submitted to the medical profession a material which has since become known as "R.I.W." No. 5700 X-Ray Proof Compound. His first formal address on this subject occurred Dec. 6, 1923, before the American Institute of Chemical Engineers in Washington. The first hospital to install an x-ray machine according to the Toch method was the Blythedale, N. Y., in 1923. Since then it has been successfully used in scores of hospital projects.

Installations—

Columbia-Presbyterian Medical Center, New York, N. Y.
Memorial Hospital, New York, N. Y.
Medical Towers, Newark, N. J.
Presbyterian Hospital, Denver, Colo.
Baptist Hospital, New Orleans, La.
Mary Immaculate Hospital, Jamaica, N. Y.
National Vaudeville Artists Sanitarium, Saranac Lake, N. Y.
Parkway Hospital, N. Y.
Paterson General Hospital, Paterson, N. J.

"R.I.W." X-Ray Proof Compound is equally efficient to lead, easier to install, and decidedly more economical. The ability of a substance to check the penetration of x-rays varies in direct proportion to its atomic weight. Lead is efficient because its atomic weight is high—207. Next comes barium, its weight being 137. Cadmium, zinc and iron follow in that order.

Specifications

All hard wall, patent, or cement mortar plaster of the X-Ray rooms shall have thoroughly incorporated in it "R.I.W."

Continued on next page

"R.I.W." TECHNICAL COMPOUNDS AND STEEL PRESERVATIVE PAINTS—(Continued)

No. 5700 X-Ray Proof Compound as furnished by, and used in accordance with the directions of Toch Brothers, New York, N. Y.

Plaster Construction—All lime plaster (undercoats and finish coats) shall be thoroughly mixed in the proportion of two pails of lime plaster with one pail of Toch Brothers' "R.I.W." No. 5700 X-Ray Proof Compound. The "R.I.W." No. 5700 Compound shall be slowly and thoroughly incorporated with the lime plaster, and this mixture shall be applied in the usual way.

Concrete and Cement Construction—All concrete or cement mortar construction shall be composed of one part portland cement, one part Toch Brothers' "R.I.W." No. 5700 X-Ray Proof Compound and two parts of clean, sharp sand. (In the case of concrete mixes, it shall be the foregoing mix in addition to the amount of stone or gravel required.)

Application—X-Ray Rooms where deep therapy machines are used shall be plastered on both sides, ¾ inch outside and ¾ inch inside with "R.I.W." X-Ray Proof Plaster (giving a protective film of 1½ inches total thickness). The cement floor topping to be laid over concrete base shall be at least 2 inches thick. Where radiographic and fluoroscopic machines are used the inside walls only shall be plastered to a total thickness of ¾ inch.

Walls, ceilings, etc., shall receive one coat of Toch Brothers' "R.I.W." Plaster Primer, followed with two coats of Toch Brothers' "R.I.W." Lead X-Ray Paint.

Doors, and wooden construction of any kind in the room must be covered with ⅛ inch lead and shall be painted with three coats of Toch Brothers' "R.I.W." Lead X-Ray Paint and one coat of Toch Brothers' "R.I.W." Enamel in shade as selected by architect or owner.

"R.I.W." Lead X-Ray Paint

Toch Brothers have also developed a Lead X-Ray Paint. This is not a substitute, but an accessory, to "R.I.W." X-Ray Proof Compound. Since all wooden surfaces must be under any conditions covered with ⅛ in. lead, added ray-proof qualities are obtained at a slight additional cost over ordinary wall paints. The paints may also be applied to woodwork, doors and floors, three coats giving very considerable protective qualities.

Specifications

Refer to specifications for No. 5700 X-Ray Proof Compound.

"R.I.W." Toxbro Wood Filler and Floor Preservative

For Preserving and Dustproofing Wood Floor Surfaces

Description—"R.I.W." Toxbro Wood Filler and Floor Preservative is a material of a light straw color for application to wood floors or other wood surfaces. It binds the wood fibres together, prevents the grain of the wood from raising and insures a smooth, yet not slippery, surface, and prevents slivering, splintering, cracking and checking.



"R.I.W." Toxbro Wood Filler and Floor Preservative is a dustproofer, and also renders the treated surfaces more resistant to traffic and other abrasive action. It is thoroughly waterproof and elastic. This material is also highly recommended for use on wood floors in schools, gymnasiums, factories, stores, showrooms, homes and on the wood decks of vessels as well as other similar surfaces.

Covering capacity per gal. one coat, approximately 400 sq. ft.

Specifications

The surfaces of all wooden floors indicated after scraping or otherwise cleaning, shall be given one application of "R.I.W." Toxbro Wood Filler and Floor Preservative as manufactured by, and in accordance with the directions of Toch Brothers, New York, N. Y.

Before applying the "R.I.W." Toxbro Wood Filler and Floor Preservative, be sure that the floor is free from oil, grease or other foreign matter that would interfere with the penetration of this material, after which, one thorough application of the "R.I.W." Toxbro should be made, brushing the material well into the surface.

A small amount of a mixture of 1 part turpentine and 1 part benzine in the proportion of a pint to a quart may be added to the gallon of "R.I.W." Toxbro.

This floor preservative may be flushed on the surface, brushing it over the floor with a long-handled, wide, soft-sweeping brush, allowing the floor to absorb the "R.I.W." Toxbro for a few minutes. After which any surplus material that has not been absorbed by the wood should be brushed or mopped up. The wood floor surface can then be burnished or polished using clean burlap or carpet fastened to a weighted block (or with an electric polishing machine) until a sheen is obtained. (Where the wood floor is very absorbent or where heavy traffic conditions will exist, two applications of the Toxbro Wood Filler and Floor Preservative may be made, in which case, at least 6 to 12 hours should be allowed to elapse between the first and second applications of material.)

"R.I.W." Plaster Primer

For Newly Plastered Hard Wall Surfaces

Description—A white liquid priming coat, of semi-opaque character, for direct application to newly plastered, hard wall surfaces. "R.I.W." Plaster Primer is also suitable for priming gypsum, wall board, and other similar surfaces. This material overcomes the alkalinity of unpainted plaster walls and makes unnecessary the use of sizing materials such as glue, ceiling varnish or similar preparations and is far more efficient and effective than these materials.

"R.I.W." Plaster Primer fulfills the most exacting requirements of a priming coat on plaster walls and ceiling surfaces, etc., and provides an excellent foundation for succeeding coats of enamel or paint. "R.I.W." Plaster Primer can be tinted to any desired shade with a good grade of color in oil. A small amount of pure spirits of turpentine may be added in the proportion of one pint to the gallon of "R.I.W." Plaster Primer. When applying "R.I.W." Plaster Primer, the painter should observe the character of the wall surface and apply the material more liberally where the absorption is greater.

Covering capacity, per gal., one coat, approximately 400 sq. ft.

Specifications

All hard wall plaster and other surfaces indicated shall be given a thorough priming coat of "R.I.W." Plastic Primer as manufactured by and in accordance with the directions of Toch Brothers, New York, N. Y.

Preparation of Surface—All cracks shall be cut out and repointed after the walls and ceilings have been cleaned so that nothing will interfere with the penetration or adhesion of the priming coat. After the surfaces are dry the "R.I.W." Plaster Primer shall be applied with a good bristle wall brush, brushing the material uniformly over the surface. Where absorption is greater the "R.I.W." Plaster Primer shall be applied more liberally so that the finished surface will be even and uniform. Allow the material to set for at least twenty-four to forty-eight hours before applying any finishing coats of paints or enamels. No paint shall be applied to a wet or damp surface, nor to surfaces which are not free from foreign matter which would interfere with the proper treatment of the surfaces indicated.

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THE TRUSCON LABORATORIES

Integral Waterproofings, Dampproofings, Floor Hardeners

DETROIT, MICH.

OFFICES AND BRANCHES

ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
CHICAGO, ILL.
CLEVELAND, OHIO
COLUMBUS, OHIO
GRAND RAPIDS, MICH.
HOUSTON, TEX.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
LOS ANGELES, CAL.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
MONTREAL, QUE.
NEW YORK, N. Y.
NORFOLK, VA.
OKLAHOMA CITY, OKLA.
PHILADELPHIA, PA.
PITTSBURGH, PA.
PORTLAND, ORE.
RICHMOND, VA.
ST. LOUIS, MO.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
SYRACUSE, N. Y.
TOLEDO, OHIO
TORONTO, ONT.
YOUNGSTOWN, OHIO
WASHINGTON, D. C.

Products

INTEGRAL WATERPROOFINGS for concrete and portland cement mortars.

DAMPPROOFINGS.

CEMENT FLOOR HARDENERS.

ANTI-FREEZE MIXTURES.

For our pages on Paints and Varnishes, see Manufacturers' Index.



TRADE-MARK

Truscon Integral Waterproofing (Paste Form)

Definition—An integral compound for producing thoroughly waterproof concrete or cement mortar. It is adapted to waterproofing concrete construction of various kinds—foundations, reservoirs, tunnels, dams, cisterns, etc. Also used for waterproofing old brick, concrete and stone structures through the agency of a cement plaster coat into which the waterproofing is introduced. Truscon Integral Waterproofing (Paste) is also used for producing waterproof cement stucco and cement mortar.

How Used—Truscon Integral Waterproofing is incorporated into the concrete or cement mortar by being added directly to the mix. Since the waterproofing is in paste form, it diffuses readily throughout the mix, providing uniform distribution of the waterproofing.

Advantages—(1) *Water repellent;* kills capillary absorption of moisture into concrete or cement plaster. Since "plugging the pores" of cement is physically impossible, the repellent feature of Truscon Integral Waterproofing is the most practical and scientific method of waterproofing.

(2) *Easy to use*—added directly to the mix from the drum.

(3) *High concentration and freedom from useless filler*—it is all waterproofing—contains no clay, lime or such material.

(4) *Plasticizes concrete*—and minimizes segregation. Concrete containing Truscon Integral Waterproofing requires less water, hence avoids "sloppy" mixes.

(5) *In paste form*—a form most easily mixed with wet concrete or cement mortar batches. This insures even distribution of the waterproofing.

(6) *Inert*—does not react chemically with cement; hence does not lower the strength of the concrete.

(7) *High concentration*—all waterproofing—hence low cost per yard.

(8) *Contains no soluble salts to rust reinforcing steel.*

(9) *Lubricates the mix* by cutting the "skin strength" of water—producing a concrete which "chutes" easily to the forms; produces a more dense and compact concrete. In the case of cement mortar or stucco, "lubrication" makes these materials of creamy consistency and much easier to apply. Avoids mottling of surface of cement stucco.

(10) *Insoluble in water*—hence can not be washed out of the concrete or affected by time or weathering. This is an important point because so many of the waterproofings on the market will dissolve in water.

(11) *Proved by years of use* in the world's most famous structures.

Specifications for Waterproofing Mass Concrete

Estimate 7 lb. of Truscon Integral Waterproofing (Paste) to the cubic yard of concrete. Applicable to concrete foundations, reservoirs, tunnels, cisterns, swimming pools, etc.

Method—Water tightness shall be secured by the addition of Truscon Integral Waterproofing (Paste) concentrated, added directly to the mix in the skip; proportions as directed below.

Ingredients and Proportions for Concrete—The concrete composing the structure shall consist of 1 part of cement, 2 parts of sand and 4 parts of stone (1:2:4) properly graded in size from coarse to fine.

A measuring cup is furnished with each drum of Truscon Waterproofing Paste. Add one Truscon Measuring Cup per bag of cement to the mix in the skip.

Placing—All concrete shall be placed in one continuous operation, each pouring being properly spaded. In cases where joints are unavoidable, care shall be taken to clean and roughen the old surface, and have it thoroughly wet and slush coated immediately before placing additional concrete.

Specifications for Waterproof Cement Plaster Coat

Estimate 6¾ lb. of Truscon Integral Waterproofing (Paste) to the 100 sq. ft. of ¾-in. plaster applied to the walls, and 18 lb. of paste to the 100 sq. ft. of 2-in. finish applied to the floor. Applicable to reservoirs, swimming pools, cisterns and similar forms of masonry construction, whether of brick, stone or concrete.

Method—Water-tightness shall be secured by plastering the interior surface of the structure with a continuous coating of portland cement mortar waterproofed with Truscon Integral Waterproofing (Paste).

Ingredients and Proportions for Waterproofed Plaster Coat—The mortar composing the plaster coat shall consist of 1 part of cement and 2 parts of clean sand (1:2), free from organic matter and uniformly graded.

Preparation—The Waterproof Cement Mortar shall consist of one (1) part of cement to two (2) parts of sand (1:2) to which Truscon Integral Waterproofing (Paste) shall be added in the proportion of two Truscon "Measuring Cups" to the bag of cement. Then add gauging water and mix thoroughly.

Preparation of Surface to be Coated—Before plastering the waterproofed cement mortar onto the hardened concrete, brick or masonry, proper precautions should be taken to insure thorough bonding and keying of the plaster coat to the wall.

Application of Coating to Sides—Immediately after applying a slush coat, the waterproofed plaster shall be applied in 2 coats each ⅜ in. thick as per specifications of the manufacturer, the second coat being applied just before the first has reached its final set.

Application of Floor Coating—Floors shall be prepared and treated with equal care as the walls to insure proper bonding of the mortar, and finished with a waterproofed cement mortar to a thickness of 2 in. Special care must be exercised in joining the wall coating to the floor coating, so that there is a continuous waterproof coating over the entire surface.

Pressure—When moisture is seeping through the walls, proper drainage must be provided during the application and setting of the plaster coat, until such time as the plaster coat has set and is capable of resisting pressure of its own adhesive strength.

Truscon Ferritex

Dampproof wash for cement or concrete surfaces.

A pulverized iron compound, made chemically active, which when used as a brush coat over concrete or porous masonry, plugs the pores and acts as a dampproofing.

It is often desirable to specify Ferritex as a dampproofing for the interior of cellar walls or concrete tanks where a black dampproofing compound would not give service and a waterproof cement plaster coat is found too expensive. It is to be noted, however, that where hydrostatic pressure is encountered Ferritex is not recommended. For such severe conditions, the only remedy is the use of Truscon Integral Waterproofing (Paste) applied in a plaster coat. (See Specification on following page.)

Continued on next page

Specifications for Ferritex

All concrete shall be dampproofed by the application of (1 to 5) thorough brush coats of Trusco Ferritex and water (a porous concrete requires a greater number of brush coats than a dense concrete), as manufactured and recommended by THE TRUSCON LABORATORIES, Detroit, Mich.

Condition of Surface—The surface shall be thoroughly cleaned of dirt, grease and foreign matter.

Application—A practical method of mixing Ferritex with water is to dump 10 lb. of Ferritex in a 10-qt. pail and add just enough water to cover the Ferritex to a depth of about 2 in. The Ferritex stays at the bottom, and in application the brush should be brushed back and forth over this layer of Ferritex under water and then applied to the wall. Use Ferritex freely. Mix only enough Ferritex with water as can be used immediately. Allow 5 or 6 hours in between coats for development, spraying the surface with water frequently in the meantime.

Quantity Required—This depends upon the porosity of the surface, but may be roughly figured at the rate of about 10 lb. to 100 sq. ft.

Truscon Stuccotex

Paint for wet concrete and masonry.

A hydraulic paint for uniforming concrete and masonry surfaces, or for decorating wet or damp stone, brick or concrete surfaces, such as swimming pools, retaining walls, etc., on which oil paints cannot be successfully used.

Stuccotex is a dry powder which is mixed with water to the right consistency and brushed onto the surface after that surface has been thoroughly saturated with water.

Stuccotex does not flake or crumble off.

Covering Capacity—125 sq. ft. per gal., 2 coats.

Specifications for Stuccotex

All wet surfaces shall be given 2 coats of Truscon Stuccotex, as manufactured by THE TRUSCON LABORATORIES, Detroit.

Condition of Surface—Surfaces to be treated with Stuccotex shall be free of all loose particles, paint, cold water paint, size, oil, grease or any other foreign matter which would retard or prevent direct contact of Stuccotex with the surface.

Preparation—Mix Stuccotex thoroughly with water in the proportion of 10 lb. (1 gal.) of dry powder with 3 qt. of water for first coat. (Second coat use 2½ qt. water to 10 lb. Stuccotex.) Mix only enough for immediate use. Any Stuccotex that has been mixed longer than two hours shall be thrown away.

Application—To the *water saturated* surface (not merely wet, but saturated) apply the first coat of Stuccotex, brushing same carefully into the pores. After the first coat has set about 12 hours, thoroughly saturate surface and apply a second coat.

Caution: Keep Stuccotex surface wet—during very warm or dry weather, spray the surface for several days while painting. Keep Stuccotex container dry and tightly covered.

Truscon Plaster Bond

A black compound for dampproofing interiors of exposed masonry walls. Plaster Bond remains flexible and tacky, providing a permanent bond for a scratch coat of plaster troweled directly onto it, thus eliminating furring and lathing. Plaster Bond is not recommended for use on ceilings.

Covering Capacity—About 80 sq. ft. per gal., 1 coat.

Specifications for Plaster Bond

The inside surface of all exposed walls of the entire building shall be given 1 uniform application of Truscon Plaster Bond as manufactured by THE TRUSCON LABORATORIES, Detroit.

The coating shall be perfectly continuous over the entire surface. In cases where the Plaster Bond cannot be run continuously back of the floor construction, it shall be applied back on the ceiling for at least 12 in. from the wall.

Special care shall be taken to coat all portions of the wall where there is any cutting out to permit the passage of pipes subsequent to the application of the Plaster Bond. All portions of the wall which are particularly absorbent shall be given a retouch coat, so that the entire area will have an even, uniform appearance.

The plaster shall not be applied until 24 hours after the wall has been coated with Truscon Plaster Bond.

Caution: Not Recommended on Ceilings. Especially adapted for dampproofing interiors of brick, block, and roughened concrete walls. If the concrete is smooth, the surface must be mechanically roughened to protect bond against normal shrinkage of plaster.

Truscon Foundation Coat

A black coating furnished ready for use (no heating) for dampproofing masonry walls below grade. Apply with a large mop or brush. More economical and satisfactory than coal tar, or pitch.

Covering Capacity—80 sq. ft. per gal., 1 coat.

Specifications for Foundation Coat

General—The outside surface of all foundation walls shall be given 2 uniform applications of Truscon Foundation Coat as manufactured by THE TRUSCON LABORATORIES, Detroit, Mich.

Condition of Surface—The surface shall be thoroughly dry and free from any adhering earth or foreign matter so as to insure the thorough penetration and bond of the Foundation Coat.

Application of First Coat—Truscon Foundation Coat shall be applied over the dry masonry surface with a large brush or mop, exercising special care to insure a uniform continuous coat. Allow 24 hours for drying time and apply second coat in one continuous application.

Truscon Foundation Coat shall be allowed to dry for at least 12 hours before being backfilled.

Truscon Temperite

Quick set and antifreeze for concrete and cement mortar.

Specifications for Using Temperite

Truscon Temperite, manufactured by THE TRUSCON LABORATORIES, Detroit, Mich., shall be used in concrete or cement mortar as directed below:

If Temperite Liquid—Thin in the proportion of 1 gal. liquid to 10 gal. water. Use this mixture of Temperite and water in place of clear water for gauging the mixture of cement and aggregate.

If Temperite Dry Concentrated—Throw 2 lb. of Temperite Dry Concentrated into the mixer for every bag of cement, turning the mixer over a sufficient number of times to insure a thorough solution and distribution of Temperite.

Truscon Super-Por-Seal Transparent Dampproofing

A transparent coating for protecting and dampproofing exterior masonry walls above grade. May be applied by brush or spray. Super-Por-Seal is also suitable for use on unexposed sides of cut stone to prevent penetration of moisture and resulting discoloration.

Covering Capacity—80 sq. ft. per gal., 2 coats.

Truscon StoneTex Concrete Paint

The nationally known lime-resistant masonry coating for protecting and dampproofing exterior brick, stone, stucco or concrete. Furnished in white and 10 standard shades. Applied with a brush or spray. Prevents cold and moisture from filtering through masonry walls and avoids disintegration of concrete. Renovates and beautifies masonry buildings.

Covering Capacity—About 100 sq. ft. to gal., 2 coats.

Truscon Floor Hardeners

Truscon Ferricon (Metallic)—See Truscon Ferricon below.

Metallic—Truscon Floor Hardener is a metallic hardener designed for giving floors in factories, warehouses and such places greater resistance to wear. Forms a dense, hard finish. Especially applicable to new cement floors, or to floors which need resurfacing.

Quantity required: 30 lb. to each 100 sq. ft.

Chemical Dry—Agatex Crystals, a chemical hardener for cement floors, furnished in dry form. Dissolved in water and applied with a brush or broom.

Quantity required: about 1 lb. to each 50 sq. ft.

Chemical Liquid—Agatex Liquid, a chemical hardener furnished in highly concentrated form for stopping dusting and crumbling of cement floors. Applied with a brush, broom or similar convenient instrument.

Quantity required: about 1 gal. to each 100 sq. ft.

Truscon Ferricon

A "super" floor hardener of the metallic type—that is, a hardener embodying the full wear-resisting qualities of Truscon Metallic Floor Hardener, together with the new product, Truscon Zilicon. The presence of Zilicon in metallic floor hardener provides a concrete of greater strength and tends to increase its resistance to acid and alkali. Zilicon imparts marked plasticity and workability to the floor topping. Truscon Ferricon produces one of the hardest, toughest and most wear-resisting cement floor surfaces it is possible to obtain.

Quantity required: 30 lb. to the 100 sq. ft. of surface. Dusted on same as regular Truscon Floor Hardener.

Specifications

For complete specifications on Truscon waterproofings and dampproofings, ask for a copy of "Truscon Architects' Specifications Book 'A.'"

THE VORTEX MANUFACTURING CO.

Pre-plastering Treatments

1978 West 77th Street

CLEVELAND, OHIO

PAR-LOCK APPLIERS IN ALL PRINCIPAL CITIES

Products

PAR-LOCK PLASTER KEY.

DENS-TECT WALL TREATMENT.

GUN APPLIED DAMPPROOFING and WATERPROOFING.

General

THE VORTEX MANUFACTURING CO. is the owner of the Par-Lock and Dens-tect processes, furnishes equipment especially designed for those applications and manufactures all asphalt materials. The Par-Lock Appliers operate under license agreement with THE VORTEX MANUFACTURING CO., insuring application of correct material in accordance with manufacturer's specifications.

Materials

The asphalt compounds used are manufactured under strict supervision and laboratory tests are made of each batch.

Lake and native asphalts are the base of all the Par-Lock and Dens-tect compounds, insuring long life without decomposition. Each of the various asphalt compounds is formulated to best meet the requirements of the particular phase of construction work on which it is used.

Equipment

All asphalt is applied through a patented equipment especially designed to handle heavy bodied asphalts, insuring greater protection. Exclusive devices have been developed for use in conjunction with the asphalt gun for the application of the Par-Lock key and Dens-tect aggregate.

Application

In contrast with brush or trowel applications that are made with lateral motions, Par-Lock is applied with force at right angles to the surface, and the high air pressure at the nozzle maintains an air impact which drives the material into the pores of concrete and plugs up the cracks and crevices common to all masonry.

Responsibility

The license agreement between THE VORTEX MANUFACTURING CO. and each Par-Lock Applier insures the use of materials specifically compounded for each respective phase of waterproofing and dampproofing. It also assures application in accordance with proven specifications, the fruit of experience on a wide variety of work throughout the whole country, covering a period of fifteen years.

THE PAR-LOCK PLASTER KEY

The Par-Lock Plaster Key provides an efficient mechanical key and includes a superior dampproofing.

Par-Lock PLASTER KEY
Registered U. S. Pat. Off.

The asphalt itself has an adhesive strength that exceeds its tensile strength and it has sufficient ductility to meet the most extreme requirements of the work.

This adhesive principle is the basic factor in the success of every type of Par-Lock application, the surfaces being built out with grit or other materials as may be called for in the various Par-Lock specifications.

The Par-Lock Plaster Key insures permanent plastering by:

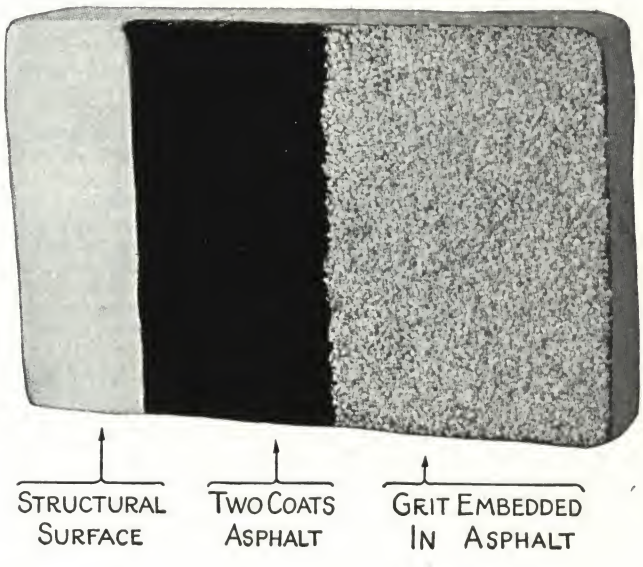
(1) Dampproofing the structural surface back of the plaster.

(2) Providing a key or clutch with a strength many times in excess of the requirements imposed by the weight of the plaster.

(3) Preventing the breakdown of the plaster crystal by reactions which sometimes result from contact between the concrete structural surface and the plaster.

(4) Adjusting the difference in the expansion and contraction between the plaster material and the structural surface.

(5) Overcoming insufficient, excessive or irregular suction in the structural body.



Continued on next page

Field of Use

Par-Lock is recommended as preparation for the following surfaces when plastered direct—(1) concrete slab ceilings, (2) tile and concrete joist ceilings, (3) concrete beams, columns and stair soffits, (4) interior of exterior walls.

Specification

All (architect to indicate surfaces here) within the building receiving plaster finish direct are to be prepared for plastering with Par-Lock Specification Form "B," of THE VORTEX MANUFACTURING Co., Cleveland, Ohio.

The surfaces receiving Par-Lock are to be turned over to the Par-Lock Applier clean and free from dirt, oil and other foreign matter and with all large projections removed and all holes and masonry joints pointed up in a workmanlike manner, in proper condition to receive the Par-Lock Application.

Note: Any plastering materials may be used over the specification, except plasters made of portland cement mortar or putty gauged with portland cement. When Keene's cement is used, it is to be applied over gypsum brown mortar, or gypsum wood fiber plaster used directly over the Par-Lock Key.

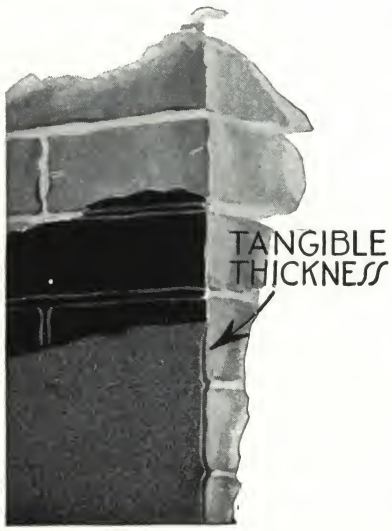
DENS-TECT, A WALL TREATMENT OF TANGIBLE THICKNESS THAT SUPPLANTS FURRING

Dens-tect is a gun-applied wall treatment that offers an impervious coating of tangible thickness. It fills every joint in the masonry and is built out to afford a lasting resistance to moisture.

The Dens-tect system comprises a gun applied priming coat of asphalt, followed by a coating of asphalt and a finely graded aggregate thoroughly mixed at the nozzle, building itself into a dense, protective coating of substantial thickness.

Dens-tect comes to the architect with a long history of intensive laboratory development and many actual installations.

The air driven application of Dens-tect is six to eight times the thickness of film dampproofing. Application under high air pressure makes possible the building up of a uniform, tangible thickness of mastic coating over all the irregularities of a rough, masonry surface.



In the application of Dens-tect, the introduction of the fine aggregate into the asphalt stream at high velocity produces an impact that drives it into all minor cracks and crevices. common to all masonry.

Specification

The interior of all exterior walls above grade, to be plastered direct, shall first receive application of Dens-tect applied in accordance with the Par-Lock Dens-tect specification of THE VORTEX MANUFACTURING Co., Cleveland, Ohio.

The surfaces receiving Dens-tect are to be turned over to the Par-Lock Applier clean and free from dirt, oil and other foreign matter and with all large projections removed and all holes and masonry joints pointed up in a workmanlike manner, in proper condition to receive the Dens-tect application.

Note: Any plastering materials may be used over this specification, except plasters made of portland cement mortar or putty gauged with portland cement. When Keene's cement is used, it is to be applied over gypsum brown mortar or gypsum wood fiber plaster, used directly over the Dens-tect key.

GUN APPLIED DAMPPROOFING AND WATERPROOFING

Par-Lock Appliers, with carefully prepared and tested materials, with specially designed equipment and experienced operatives under supervision of trained engineers, render complete service on all types of dampproofing and waterproofing required in building construction, including the following:

Dampproofing of masonry walls to be plastered direct.
Dampproofing back of furring.
Dampproofing Surfaces to be finished with portland cement or tile.
Spandrel beam waterproofing.
Membrane waterproofing for basement walls.
Floor footings, swimming pools, etc.
Foundation waterproofing for exteriors below grade.
Dampproofing walls to be insulated with corkboard.
Gun applied protective coatings on cold storage interiors.
Protective coatings for brine spray decks.

PAR-LOCK APPLIERS IN ALL PRINCIPAL CITIES

Consult the Par-Lock Appliers, they will furnish estimates and expert advice on your problems.

Complete file sets of specifications sent on request. A communication to us will put you in touch with the nearest applier.

WESTERN WATERPROOFING COMPANY

Waterproofing and Dampproofing Contractors

MISSOURI CORPORATION
ST. LOUIS, MO., Syndicate Trust Building
PHILADELPHIA, PA., Liberty Trust Building
CHARLOTTE, N. C., First National Bank Building
CINCINNATI, OHIO, Dixie Terminal Building

MICHIGAN CORPORATION
DETROIT, MICH., Penobscot Building
CLEVELAND, OHIO, Builders Exchange Building
COLUMBUS, OHIO, Joyce Realty Building
PITTSBURGH, PA., Union Trust Building
MONTREAL, QUE., Mayor Building
TORONTO, ONT., 120 Yorkville Avenue

NEW YORK CORPORATION
NEW YORK, N. Y., 342 Madison Avenue
BOSTON, MASS., 82 West Dedham Street
BUFFALO, N. Y., 316 Jackson Building
NEWARK, N. J., Military Park Building

Concrete Must Be Thoroughly Waterproofed to Insure Dryness and Permanence

Concrete's inherent porosity is its outstanding drawback. No matter how carefully are its proportioning, mixing and placing controlled, concrete always contains an appreciable percentage of "voids." This porosity is responsible for two serious defects: leakage and disintegration.

In basements, tunnels, pits and other structures below grade the danger of leakage with the resultant damage to goods, machinery, etc., is always present. Waterproofing all walls and floors below grade is effective and inexpensive protection against underground water and dampness and permanent insurance against bursting water mains and other accidents resulting in the presence of unusual water.

Absorption of water with alternate wetting and drying, as well as temperature changes, cause expansion and contraction which result in minute cracks. As these minute cracks develop, absorption increases, soluble elements in the concrete are affected, reinforcing steel is corroded, frost action starts, disintegration definitely sets in, the structure is weakened and complete failure is not impossible. Damp concrete exposed to frost chips off due to the disruptive force of water freezing. Unfortunately, the first stages are deep seated and seldom noticeable until the damage becomes serious.

Disintegration may be repaired, the concrete restored and further disintegration forestalled. Disintegration of concrete may be prevented by proper treatment immediately upon completion.

The WESTERN WATERPROOFING COMPANY'S experience in waterproofing and dampproofing masonry structures and in restoring disintegrated concrete has proven that each problem must be treated as a separate study. This company believes that best results can only be guaranteed if the work is done by experienced workmen under expert supervision. It therefore offers its services as waterproofing and dampproofing engineers and contractors, under a strict guarantee of complete satisfaction. It sells no materials.

Western Waterproofing Methods

Leakage may be permanently prevented in new structures and cured in existing buildings by waterproofing with materials and methods developed and perfected by the WESTERN WATERPROOFING COMPANY. They have waterproofed all walls, floor slabs, etc., in thousands of structures throughout the country and their work has stood the test of time.

Each problem requires varied and individual treatment but, as a basic material, IRONITE gives the most satisfactory and lasting results. IRONITE is finely pulverized iron combined with chemicals. Applied with water the iron swells and completely seals the pores of the concrete. Advantage is taken of the very defect it is sought to cure—porosity and its accompanying suction. Other materials are used when required.

Prevention of disintegration is primarily a problem in waterproofing.

The application of IRONITE is repeated until the pores are completely and permanently waterproof, dampproof and proof against disintegration. The bond between the waterproofing and the structure is so perfect that it will resist *any* hydrostatic pressure the structure is capable of withstanding.

Specifications

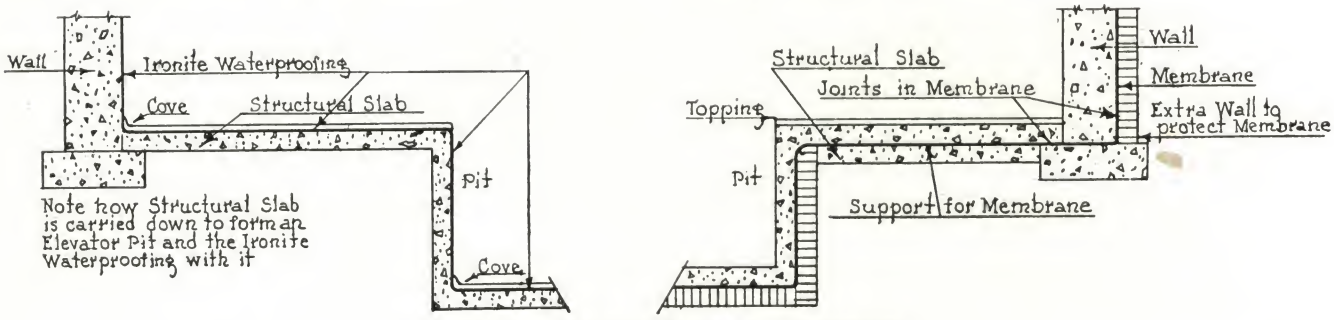
It is our preference to write a separate specification for each specific job. As a general specification the following may be used:

All surfaces to be waterproofed, comprising in general the interior surfaces of all walls and floor slabs in contact with earth, all pits, trenches and other depressions, all columns and interior division walls which penetrate the floor, together with such surfaces as may be hereinafter mentioned or indicated upon the drawings, shall be waterproofed by the WESTERN WATERPROOFING COMPANY (address of nearest office), and fully guaranteed by them, for a test period of two years. Walls shall be left with a brush [float] [steel troweled] finish. Cement floor finish over floor waterproofing is to be provided by this [mason] contractor. Necessary pumping shall be provided by the general [foundation] contractor.

Reminders

The following points are essential to a completely satisfactory waterproofing job. They are given here merely as reminders.

Have you provided continuous, accessible interior waterproofing?



Comparison Showing Saving in Construction

Continued on next page



Park Square Building, Boston, Mass.
DENSMORE & LE CLEAR, Architects



National Press Club, Washington, D. C.
RAPP & RAPP, Architects

Basements of above buildings waterproofed by Western Waterproofing Company

Are your walls and floors reinforced against water pressure?

Are your basement floor slabs keyed into the walls?

Are your boiler pits and flues insulated against excessive heat?

Have you insured against unusual conditions in the adjoining areas—a broken water main—a clogged sewer?

Have you specified that the waterproofing be completed before interior partitions, machinery, or other obstructions are placed?

Are specially designed expansion joints required?

Are watertight construction joints provided?

The Resto-crete System for the Repair of Disintegrated Concrete

This system consists of cutting out all defective concrete, waterproofing with IRONITE, which provides a perfect bond, building up to the original surface, again waterproofing with IRONITE, and, where necessary, adding a final coating to match the original surface. By this system concrete can be completely restored to its normal condition and appearance.

The illustrations of the Packard Building, restored by our Resto-crete System, show disintegration that can take place without being suspected. In this building there were practically no surface indications of the underlying damage. Restored by the Resto-crete System, this building is as good as ever, and disintegration has been permanently stopped.

Resto-crete results are absolutely guaranteed.

Other Work

WESTERN WATERPROOFING COMPANY is also prepared to undertake and guarantee the results of the following:

Waterproofing—Swimming pools, reservoirs, dams, retaining walls, etc.

Prevention of Absorption—In fuel oil tanks, gasoline and light oil tanks, molasses tanks, pickling vats, unusual oil containers, etc.

Protection—Of floors and walls of packing houses, soap factories, tanneries, dairies, etc., against the action of soaps, greases, fats, tannery liquids, dairy acids, etc.

Western Waterproofing Company's Services

We maintain in all parts of the United States, experienced waterproofing and Resto-crete crews, each under the supervision of expert engineers. Work can therefore be undertaken anywhere expeditiously and at a minimum cost. Our offices will be glad to assist in solving any of the problems relating to waterproofing, dampproofing, or the prevention or restoration of concrete disintegration. In requesting advice by mail, please give fullest possible particulars.

Catalogue giving additional data will be sent upon request.



Left:

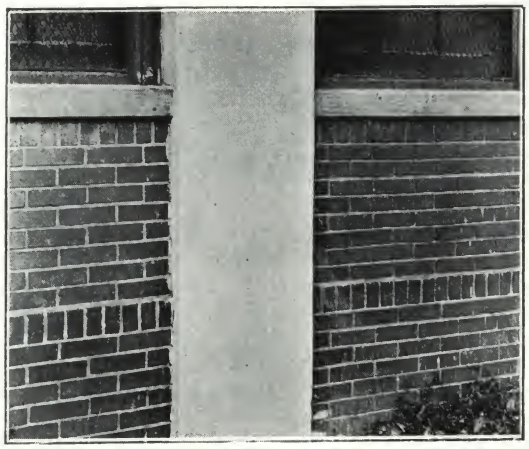
Before Treatment—Column of Disintegrated Concrete

This condition was hidden as hair line cracks only were visible at the surface

Right:

After Treatment

Neat, clean and now permanent result obtained by the Resto-crete System



Disintegrated Column in Packard Motor Car Co. Plant, Detroit, Mich., Repaired with Resto-crete System

Representative Contracts

New York Corporation

Keith Memorial Theatre, Boston, Thomas W. Lamb, Archt.
Park Square Building, Boston, Densmore & Le Clear, Archts.
Biltmore Hotel, Providence, R. I., Warren & Wetmore, Archts.
Railroad Stations of Springfield, Mass. and Erie, Pa., Felheimer & Wagner, Archts.
Half Moon Hotel, Coney Island, George B. Post, Archt.
Savoy Plaza Hotel, New York, McKim, Mead & White, Archts.
National City Banks, Walker & Gillette, Archts.
City National Bank, Bridgeport, Conn., Dennison & Hirons, Archts.
Schools (several), New Jersey, Gilbert & Betelle, Archts.
Y. W. C. A. Bldg., Boston, Shepard & Stearns, Archts.
Harvard University Tunnels, Cambridge, Mass., Densmore, Le Clear & Robbins, Archts.

Michigan Corporation

Ford Administration Bldg., Detroit, Albert Kahn, Archt.
J. L. Hudson Store, Detroit, Smith, Hinchman & Grylls, Archts.
Michigan Bell Telephone, Main Exchange, Smith, Hinchman & Grylls, Archts.
Edsel Ford Residences, Albert Kahn, Archt.
Wilson Theatre, Smith, Hinchman & Grylls, Archts.
Fordson High School, Vanleyen, Schilling, Keough, Archts.
Highland Park Public Library, Frank Eurich, Archt.
Fox Theatre, C. Howard Crane, Archt.
Book Building, Louis Kamper, Archt.
Berkey & Gay Furniture Company, Grand Rapids, Mich., Lockwood, Greene, Engrs.

Missouri Corporation

Power Plant, Hunlock Creek, Pa., Stone & Webster, Contrs.
Insurance Co. of North America, Philadelphia, Pa., Irwin & Leighton, Contrs.
Federal Reserve Bank, St. Louis, Mo., Westlake Construction Co., Contrs.
Scranton Times Bldg., Scranton, Pa., Dwight P. Robinson, Contrs.
Ben Franklin Hotel, Philadelphia, Pa., John N. Gill Co., Contrs.
Liberty Trust Co. Bldg., Philadelphia, Pa., Irwin & Leighton, Contrs.
Atlanta Biltmore Hotel, Atlanta, Ga., Starrett Bros., Contrs.
Jefferson Standard Life Bldg. Greensboro, N. C., George A. Fuller Construction Co., Contrs.
Nashville Trust Company, Nashville, Tenn., Foster & Creighton, Contrs
Riverside & Springfield Junior High Schools, Jacksonville, Fla., O. P. Woodcock, Contr.

THE WATERPROOFING COMPANY

345 East 33rd Street, NEW YORK, N. Y. 65 Albany Street, BOSTON, MASS.

Product and Services

Manufacturers of "Cow Bay" Waterproof Cement.

Engineers and Contractors for Waterproofing, making a specialty of Cement Waterproofing. We contract for the waterproofing of basements, subways, reservoirs, vaults, tunnels, swimming pools, etc., guaranteeing a positive and permanent waterproofing of all kinds of masonry construction.

Designers and builders of Reinforced Concrete Construction.

THE WATERPROOFING CO. ESTABLISHED 1909 NEW YORK BOSTON COW BAY WATERPROOF CEMENT

TRADE-MARK
Reg. U. S. Patent Office

Experience

The Waterproofing Company introduced and perfected cement waterproofing. During the past 26 years this company has successfully completed thousands of difficult contracts in every section of North America, and have gone as far afield as Japan.

Advantages of "Cow Bay" Cement Waterproofing

No extra excavation nor supporting walls required. Walls are left with a neat finish; no furring and plastering being necessary. Floor coating serves both as waterproof seal and floor finish. "Cow Bay" waterproof coating is as hard as the best portland cement finish; placed beneath grillages and column bases without danger of settlement.

Difficult Waterproofing Job Successfully Handled

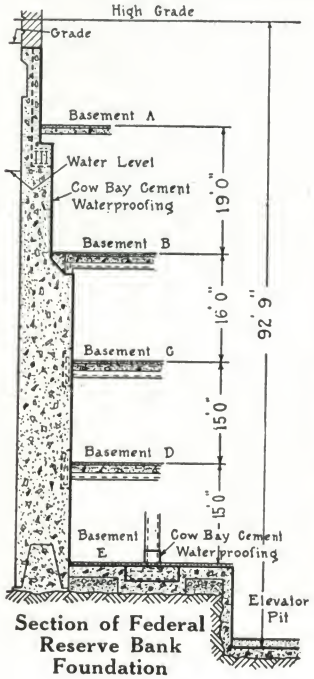
The foundations of the Federal Reserve bank building, the deepest in New York, presented a most difficult waterproofing problem. These foundations were successfully waterproofed by us.

"Cow Bay" Waterproofing Specifications

Material—All interior surfaces of all exterior walls and upper surface of concrete floor slab throughout basement (or subbasement), elevator pits, machinery foundations, trenches, etc., as shown on plans, shall be waterproofed with "Cow Bay" Waterproof Cement, applied by The Waterproofing Company.

Workmanship—All surfaces, before application of waterproof coating, shall be thoroughly chipped and cleaned, and coating applied not later than 24 hours after surface has been so prepared. A perfect bond must be secured with underlying masonry. Wall waterproofing shall be ⅝-in. thickness, applied in two coats. The floor work shall be 1 in. in thickness and is to serve as a wearing surface as well as a waterproof coating. All waterproofing shall be floated and troweled to a smooth and even finish free from imperfections.

Guarantee—The Waterproofing Company shall furnish written guarantee that all coating placed by them will be waterproof; that during a period of 2 years after completion of the work, they will promptly repair any leaks appearing through their waterproofing which are not due to causes beyond the waterproofer's control.



Section of Federal Reserve Bank Foundation

A Few Important Waterproofing Contracts

New York, N. Y.

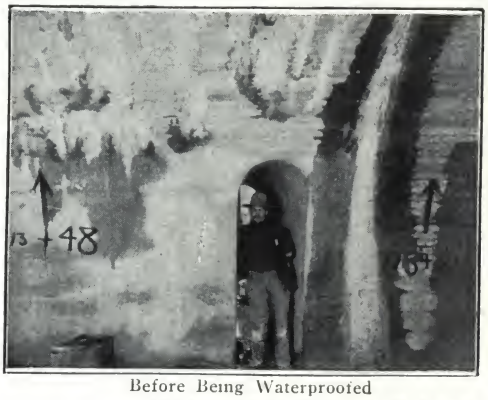
New York Telephone Co., Washington, Barclay, West and Vesey Sts., McKenzie, Voorhees & Gmelin
City Bank Farmers Trust Co. Building, Cross & Cross
Irving Trust Building, 1 Wall St., Voorhees, Gmelin & Walker
Federal Reserve Bank, York & Sawyer
New Equitable Trust Building, Trowbridge & Livingston
Chase National Bank, Graham, Anderson, Probst & White
Bank of New York and Trust Co., B. W. Morris
New York Hospital, Coolidge, Shepley, Bulfinch & Abbott
Columbia-Presbyterian Hospital, James Gamble Rogers
Woolworth Building, Cass Gilbert
Hudson Terminal Building, Clinton & Russell
American Telephone & Telegraph Co., Welles Bosworth
Stock Exchange, Trowbridge & Livingston
Equitable Society Building, Starrett & Van Vleck
Seaman's Church Institute, Warren & Wetmore
Savoy-Plaza Hotel, McKim, Mead & White
Allerton Hotels, 38th, 55th and 57th Sts., Murgatroyd & Ogden
Church of the Heavenly Rest, B. G. Goodhue Associates
Museum of the City of New York, Joseph H. Freedlander

Boston, Mass.

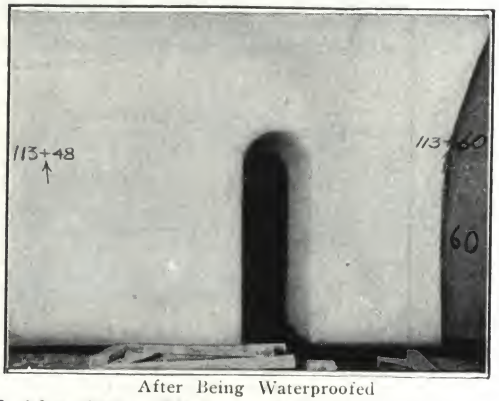
Harvard University—Fogg Art Museum, Straus Dormitory, McKinlock Dormitory, Chemical Laboratory, Law School, Medical School, Gymnasium, Lowell House, Dunster House; Coolidge, Shepley, Bulfinch & Abbott, Architects
Harvard School of Business, McKim, Mead & White
Federal Reserve Bank, R. Clipston Sturgis
National Shawmut Bank, Parker, Thomas & Rice
Old Colony Trust Company, Coolidge & Shattuck
John Hancock Building, Parker, Thomas & Rice
Sears, Roebuck & Co., Nimmons, Carr & Wright
United Shoe Machinery Co. Building, Parker, Thomas & Rice
Faulkner Hospital, Oscar A. Thayer
State Armory, Norwood, Mass., McLaughlin & Burr

Miscellaneous

Convention Hall, Atlantic City, N. J., Lockwood, Greene & Co., Inc.
Mitsui Bank, Tokyo, Japan, Trowbridge & Livingston
Bamberger Department Store, Newark, N. J., Jarvis Hunt
Royal Bank of Canada, Montreal, Can., York & Sawyer and S. G. Davenport, Associate
Ohio Bell Telephone Bldg., Cleveland, Hubbell & Benes Co.
Miners Bank Building, Wilkes-Barre, Pa., W. L. Stoddart
Oliver Office Building, Pittsburgh, Pa., D. H. Burnham & Co.
7 Telephone Buildings in various cities, John T. Windrim
55 Telephone Buildings, Voorhees, Gmelin & Walker



Before Being Waterproofed



After Being Waterproofed

Pennsylvania Tunnels Before and After Being Waterproofed with "Cow Bay" Waterproof Cement

SUPERIOR CLEANING AND WATERPROOFING COMPANY

Mason Contractors Specializing in Cleaning and Repairing Stone, Brick, Terra Cotta and Marble Structures

TELEPHONE
STONE 3853

43 East Avenue
ROCHESTER, N. Y.

BRANCH OFFICES

ALBANY, N. Y., 11 North Pearl Street
Telephone 3-5851

SCRANTON, PA., 428 Coal Exchange
Telephone 6569

"Superior" Service

The SUPERIOR CLEANING COMPANY has specialized for over 20 years in cleaning new and old buildings; repairing stone, brick, terra cotta and marble structures; as well as cleaning, repairing and resetting interior marble and stone by the use of modern electrical devices. Exterior caulking and waterproofing as well as dampproofing of interiors are also important features of our service that meets the approval of architects and owners everywhere.

"Superior" Processes

Chilled Steam Blast Cleaning—This process is approved by many of the largest stone and marble companies in the country and is certified by the A. C. Nielsen Company, Neutral Engineers of Chicago, Ill., who made an impartial investigation in collaboration with owners, architects and engineers.

This system employs a finely divided spray of chilled steam and water projected against the building at a very high velocity. This spray enters the minute surface depressions and dissolves, dislodges and washes away grime, dust, soot and all extraneous surface matter that has been deposited on the building exterior.

The result is a natural weathered appearance, the stone retaining its natural surface and original color tone free from surface roughening, dulled arrises and carvings, or dead bleached tone.

This method is suitable also for cleaning down new stonework. New stone cleaned with chilled steam blast usually has a greater apparent range of color tone and texture than when hand cleaned, because it rids the pores of stone dust and dirt accumulated in cutting and setting.

Sand Blast Cleaning—We use this process also and recommend it primarily for restoring painted masonry to its original newness, matching up old brick structures to new additions and on certain types of masonry structures where our long experience has shown that it gives satisfactory results. Sand blasting is not recommended by us for use on terra cotta, face brick, or any glazed material. On special material where the texture and finish require it other abrasives are employed by us in place of sand.



St. Boniface Church, Rochester, N. Y.
Cleaned, repaired and waterproofed by SUPERIOR CLEANING CO.

Artistic Wood Graining and Cutting

Used for interior wood work and paneling. By this special treatment a beautiful antique finish can be produced. Special designs can be created in the wood such as cutting of portraits and designs. This treatment is an adaptation of the air blasting process using special abrasives for cutting.

"Superior" Structural Steel Cleaning

Before repointing, all rust and scale should be thoroughly removed from structural steel. The most satisfactory method of doing this is the Superior Sand Blasting process. We are prepared to take contracts not only for the cleaning of structural steel but for the repainting as well, using the brush or spray method.

Repairing and Waterproofing of Masonry Structures

We have successfully repaired many structures of stone, brick, terra cotta and marble, and stand ready to prove the efficiency of our methods in this class of work. Back of Superior's highly specialized knowledge of cleaning and repairing stand years of experience in actual building construction.

Rapid Transportation of Equipment Anywhere

All "Superior" equipment is mounted on high speed motor trucks, enabling rapid transportation with economical handling to any location.

Guarantee

All "Superior" work is absolutely guaranteed.

Cleaning is done by the method best suited to the nature of the material to be cleaned, and we guarantee not to injure the surface. The work is accomplished by the latest and best equipment in the hands of skilled, reliable workmen. Waterproofing, repointing and caulking work performed by us is guaranteed to remain watertight for twenty years.

Information and References

Complete information and estimates will be furnished on request. Time will be saved if you can furnish dimensions, plans, or photographs of work desired done; also sample of material to be cleaned.

CONCRETE SURFACE CORPORATION

"Surfacing Concrete for Bond, for Appearance and for Increased Utility"

342 Madison Avenue, NEW YORK, N. Y.
FACTORY AT NEWARK, N. J.
REPRESENTATIVES IN PRINCIPAL CITIES

Foreword

No material is so susceptible of conversion into things of beauty, as well as of utility, as is concrete when it is properly surface-treated. *Johnson Con-Tex* is the tried, proven and accepted standard surfacing treatment for concrete in all its uses.

In the following pages, in brief outline, are data pertaining to *Con-Tex* and its uses. In general, all that is necessary is to specify *Con-Tex* but special information on special subjects will be furnished on request.

LICENSED UNDER PRODUCT AND PROCESS PATENT RIGHTS OF NATHAN C. JOHNSON, IN U.S.A. AND ABROAD

What Con-Tex Does

Con-Tex, in its several forms and usages, makes concrete a new and better medium for construction and for architectural expression. Through the agency of Con-Tex, concrete becomes more than a material of structural utility alone and lends itself to manifold new uses, to better uses and with new advantages in economy.

How Con-Tex Acts

Con-Tex is applied to concrete either by brushing it on forms before concrete is cast and allowing it to dry, or by brushing or spraying it on the fresh surface of concrete, as in top surface work.

During the hardening of the concrete, this Con-Tex keeps the surface layer of cement and sand from setting, so that this surface layer may be easily removed by wire brushing when the body concrete has hardened.

Con-Tex neutralizes and stops the setting action of a surface film of cement only. The action stops entirely at the predetermined depth and there is no partially set material.

This unset material when brushed or washed off leaves a surface of cleanly exposed stone and sand. Con-Tex has no action on concrete that has already hardened.

The labor cost of using Con-Tex, both for applying Con-Tex and for brushing away the unset material, should not exceed 5/8¢ per sq. ft. at the highest. The material cost of Con-Tex depends on the quantity purchased, but should not exceed 2¾¢ per sq. ft., without job overhead or profit.

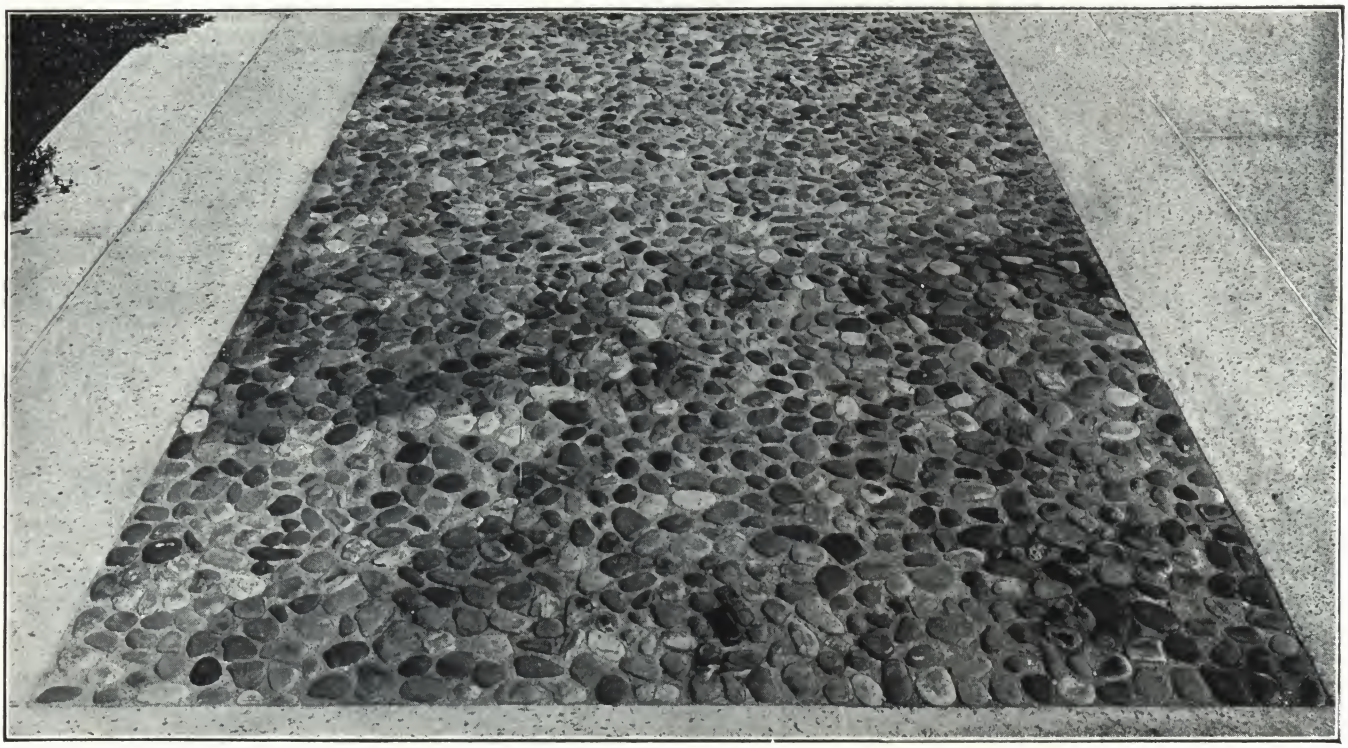
Types of Con-Tex

There are three types of Con-Tex and the following different strengths:

(1) Form Con-Tex, a liquid, varnishlike material—applied to wood, metal or other forms. This is manufactured in four grades or strengths—light, medium, heavy and bonding. All grades dry quickly and when dry are quite impervious to weather.

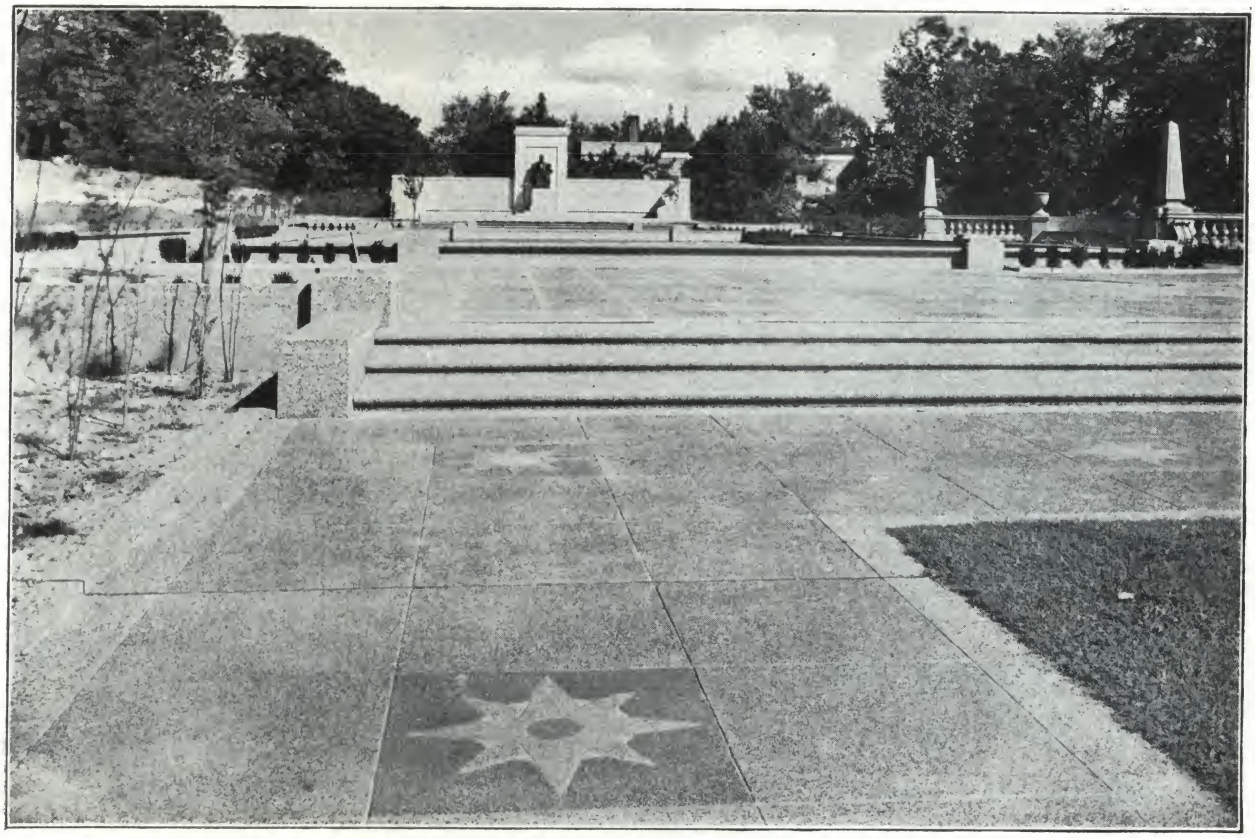
(2) Top Surface Con-Tex, a creamy liquid—applied directly to the surface of freshly placed concrete. This is also manufactured in four grades—light, medium, heavy and bonding. This is used for preparing the surfaces of underslabs to receive topping; for ornamental work on plaza areas, roadways, sidewalks, etc.

(3) Stucco Con-Tex, a creamy liquid. Applied to the surface of freshly troweled stucco to reveal the aggregate and to prevent cracking of the stucco. It also exerts a strongly curative effect on the stucco. Dries slowly and is not impervious to weather. Furnished in one strength only, except for special requirements.



Plaza Areas at Meade Memorial, Washington, D. C.
RAYMOND BURROWES, Constructor — SIMON & SIMON, Architects

Continued on next page



Entrance Detail, Meridian Hill Park Enclosure Wall, Washington, D. C.
DISTRICT PARK DEPARTMENT, Designing Architects HORACE W. PEASLEE, Consulting Architect
FRED W. DREW COMPANY, Constructors

Use of Con-Tex to Secure Architectural Textures on Cast Concrete Surfaces

Architectural textures, varied by the selection of aggregates, are easily produced on concrete poured in forms by coating the forms with Form Con-Tex before the concrete is placed.

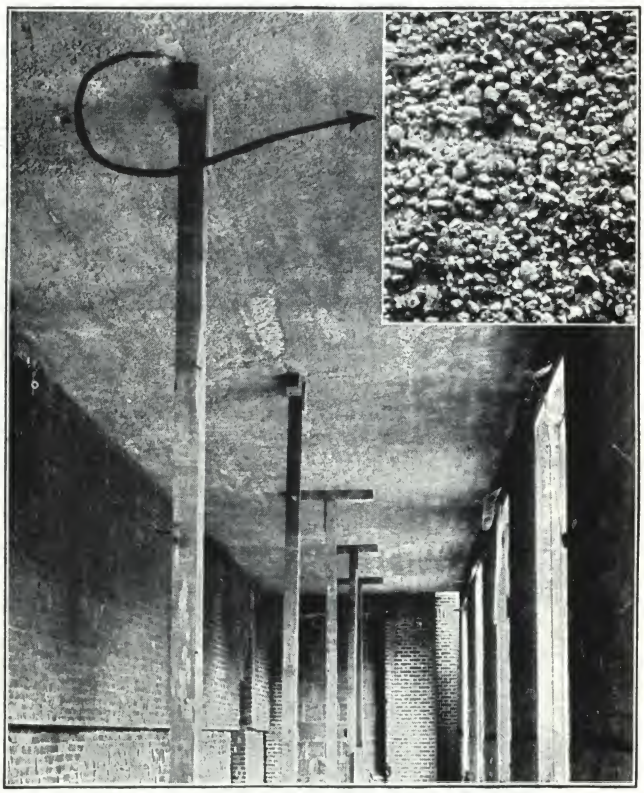
A certain care must be exercised in selecting aggregates for such work, and in placing the concrete. Naturally, fine aggregates produce a more even texture, while coarse aggregates give a more rugged relief. The use of Form Con-Tex removes from the concrete surfaces all trace of the usual dull, uninteresting, flat "form skin" and reveals the colorful aggregates, producing a surface texture of architectural character and permanence.

Send for our Bulletin No. 1, which illustrates and describes the use of Con-Tex to produce architectural textures on form cast concrete.

Con-Tex for Architectural Textures on Plazas, Areas, Driveways, Sidewalks, and other Horizontal Areas

Architectural textures, non-slip surfaces, etc., are easily obtained on horizontal planes by the use of Top Surface Con-Tex, which is sprayed on after the concrete has been finished to a level.

Further information, specifications, etc., may be obtained by writing for our Bulletins Nos. 1 and 4.



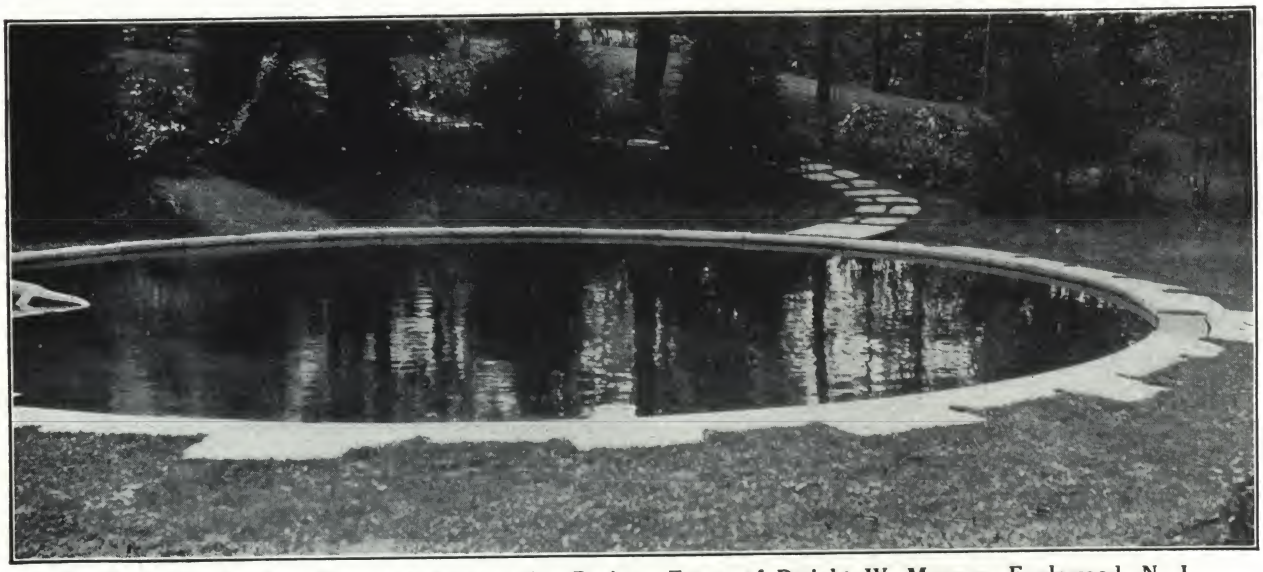
Permanent Plaster Bond on Con-Texed Concrete, Garden City High School, Garden City, L. I.
STARRETT & VAN VLECK, Architects

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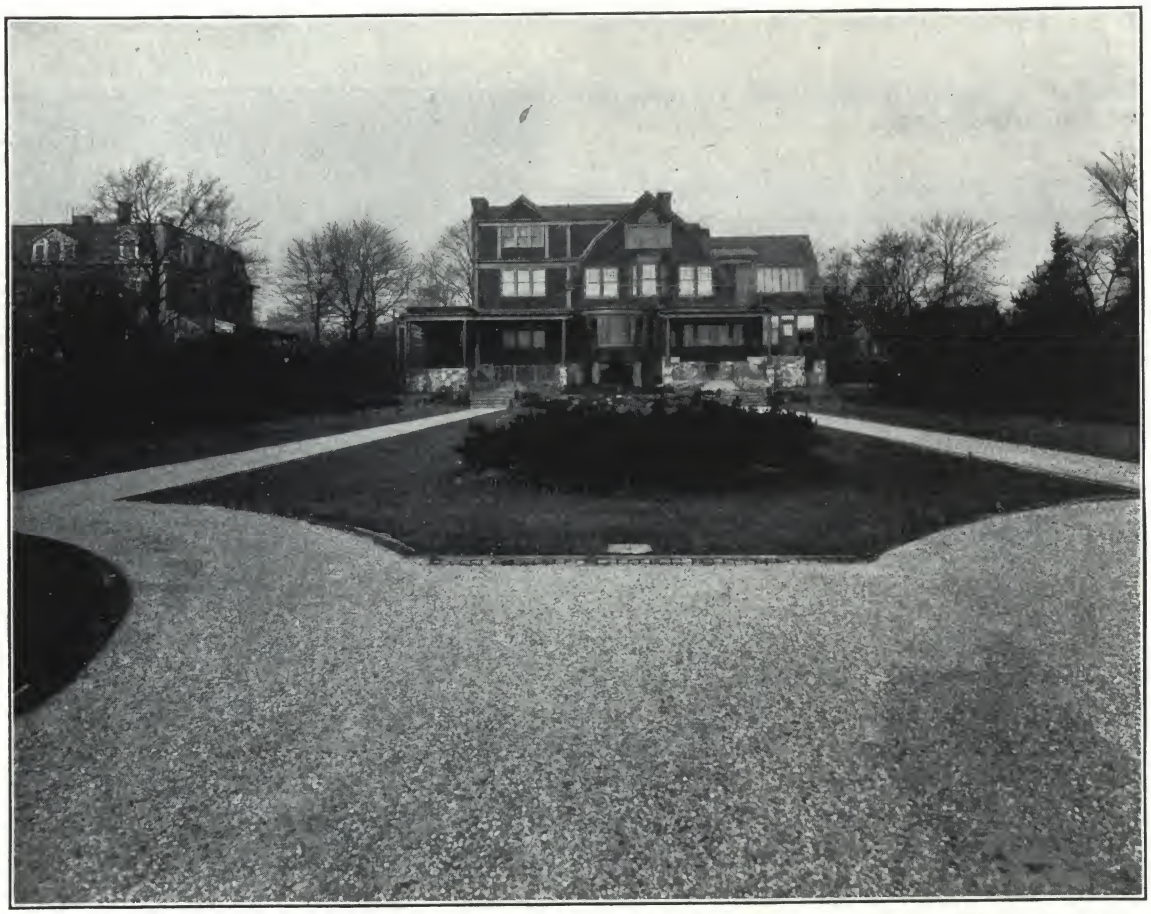
Con-Tex in the Construction of Swimming Pools

The pools pictured below are two of hundreds of examples of the extending use of concrete, *surfaced by Con-Tex,* on fine estates, both in America and abroad.

As is explained in these pages, Con-Tex surfaces concrete by exposing the natural stone that is in concrete. When this is done, concrete as it is commonly known, loses its austerity, and becomes a material of architectural beauty, as well as of new adaptability and new values.



A Swimming Pool of Unique and Attractive Design—Estate of Dwight W. Morrow, Englewood, N. J.
H. Maxwell Ingham, Landscape Engineer
Charles Brucker & Sons, Constructors, Englewood, N. J.



An Architectural (Roadway and Pathway) Surface Obtained by Con-Tex—Estate of George Handy, Englewood, N. J.
Charles Brucker & Sons, Contractors, Englewood, N. J.

Continued on next page

Con-Tex Bonding Surfaces on Concrete

"All cementitious materials will unfailingly bond to clean sand and clean stone." Success in bonding is easy, once this fact is known and recognized, for right beneath the "form skin" of concrete are clean sand and clean stone in quantity, and it only remains to uncover this perfect bonding surface.

Acid washing, thorough hacking of the surfaces, bush hammering and power tooling of various kinds have long been attempted methods of securing a bond surface but usually prove either unpleasant, slow or costly, or have all three disadvantages.

Con-Tex, applied either to the surface of the forms before the concrete is poured, or sprayed on after the slab is placed but not set, provides a method both economical and efficient for all classes of concrete.

When concrete is thus treated with Con-Tex certain "active" elements are slowly fed from the Con-Tex into the surface film of concrete and stop the "set" of a thin surface layer of the concrete. This action is so controlled that it obtains to a definite and predetermined depth and no further. Con-Tex has no effect on hardened concrete.

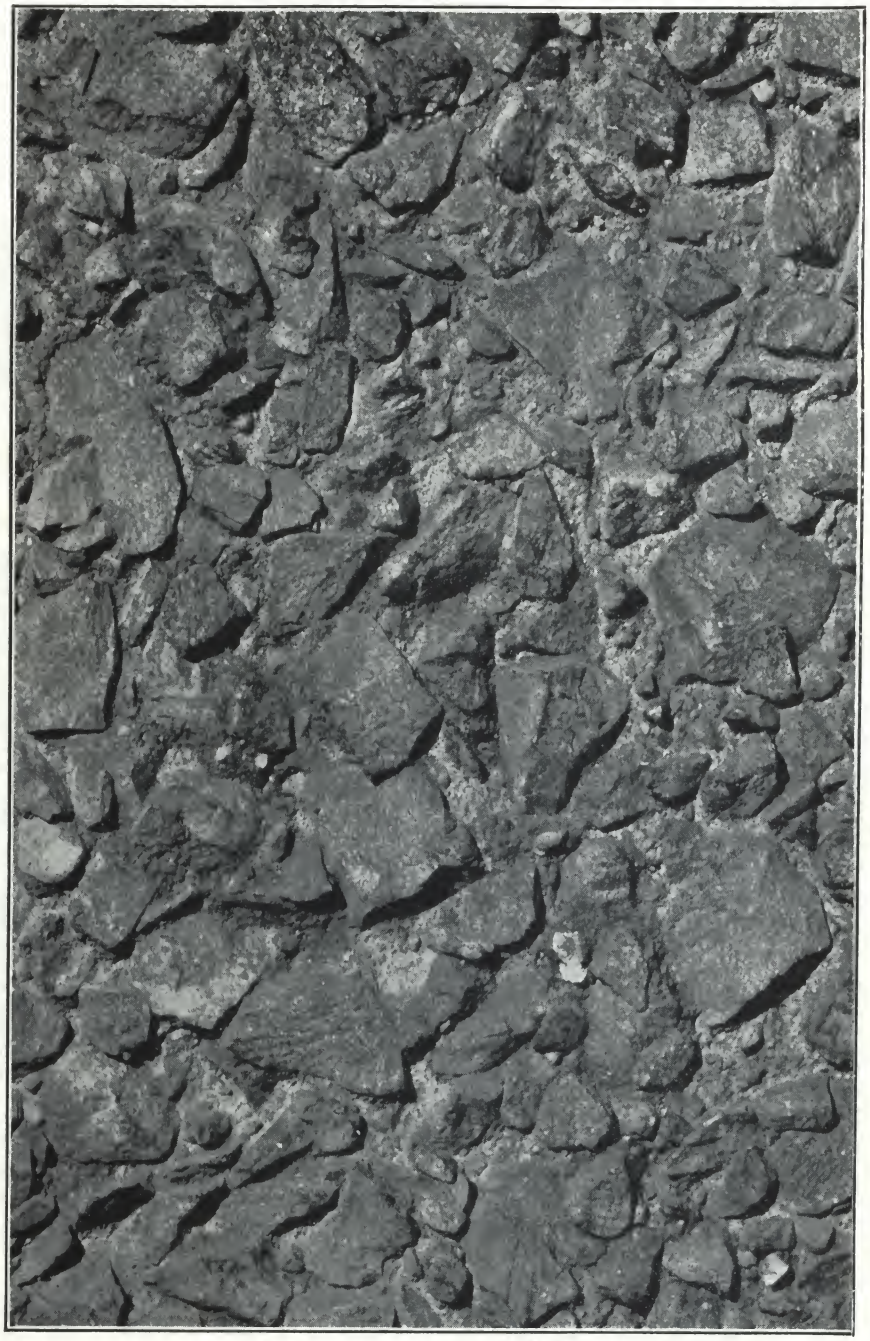
Forms are removed as usual when the mass of concrete has hardened. Then the thin surface film of unset concrete produced through the action of Con-Tex is brushed off with wire brushes, thus exposing or "revealing" the aggregates ordinarily hidden beneath the "form skin." In top surface work the unset film is broomed away with wire brooms.

It is this revealed aggregate surface that constitutes the bonding surface which unites so perfectly with new cement, mortar, plaster or other materials of similar character in a secure and permanent bond of full strength.

This Con-Tex "Interlok Bond" surface provides a sure method for bonding together the various sections of monolithic work, for bonding tile, brick, etc., to vertical walls, bonding stucco to a concrete base, and for bonding the floor finish to the rough slab.

The whole process is simple, economical and sure. Many millions of square feet of concrete surfaces are treated in this way each year and the demand for Con-Tex is constantly increasing.

Send for our Bulletin No. 2 for further details regarding the use of Con-Tex to produce bonding surfaces.



The Bonding Con-Tex "Interlok Bond" Surface—Natural Size—1:2:4 Concrete with Trap Rock

This husky, sure-fire bond surface, giving both mechanical and chemical bond to applied materials, is both easy to produce and low in cost.

Over three million square feet of this bonding surface were produced in 1928. On it may be applied plaster, stucco, waterproofings, brickwork, or any other material with full assurance of a bond that will endure for all time and throughout the entire area

Con-Tex Plaster Bond Surfaces on Concrete

Plastered ceilings—with many thousands of pounds suspended overhead—must be made assuredly secure. With Form Con-Tex Bonding Grade specified, ceilings and walls have a clean stone bond surface which automatically assures lasting satisfaction, because of the true union of the exposed stone surfaces of the concrete with the plaster finishes applied thereafter.

Con-Tex Floor and Other Top Bond Surfaces

Top Surface Con-Tex is sprayed or brushed on after the rough slab has been screeded and before the concrete takes its initial set. After the body of the concrete has set, the loosened surface layer is removed by wire brooms. Bonding the top surface to the slab beneath makes sure a permanent, satisfactory floor and credit may be obtained in most codes for the topping as an integral and permanent part of the slab.

Continued on next page

Con-Texed Roadways and Walks on Small and Large Estates

Con-Tex Surfaced roadways, paths and walks have the appearance of natural stone, plus the stability and permanence of concrete.

Con-Texed roads and walks never crack or peel or scale. They are economical. And in addition to superlative appearance, they give unparalleled non-skid qualities at all seasons of the year.









Permanently Beautiful Stucco Effects Secured Through the Use of Con-Tex

Concrete is structurally excellent, but stucco over concrete, to be permanently satisfactory, must be so thoroughly bonded to a concrete surface as to become an integral part of the concrete. To secure this bond it is absolutely essential that the stucco be allowed to bond (as it will, unfailingly and permanently) to a clean sand and clean stone surface such as is produced by the use of Con-Tex. By this proven method of construction the stucco becomes as permanent as the concrete itself.

Unless such a bond is obtained between the stucco and the concrete, early loosening will result, followed sooner or later by the scaling and peeling of the stucco. But by means of Bonding Con-Tex a full-area bonding surface of clean sand and clean stone is obtained. To this rough, clean-stone Con-Texed surface stucco will bond in a firm and lasting union—so strong that even hammer blows, repeated to the point where stucco and concrete beneath are *pulverized,* will not loosen one material from the other. Write for our Bulletin No. 5.

Revealing Color and Texture in Stucco by Stucco Con-Tex

The possibilities of stucco finishes over concrete, once a bond is furnished by Bonding Con-Tex, are limited only by creative and artistic ability, for another variety—Stucco Con-Tex—comes forward at this point to play its part.

Stucco Con-Tex is sprayed or brushed on the stucco after screeding and floating, to remove an exceedingly thin layer, just sufficient to give a slight reveal to the aggregates which have been incorporated in the stucco.

In this way stucco can have a permanent color, without resort to mortar colors for the sole effect, although mortar colors may be used where desired, and a texture as well.

Revealed stucco over Con-Tex bond-surfaced concrete provides permanent, colorful and architecturally beautiful construction. Our Bulletin No. 5 furnishes further information.

A Few Specific Applications of Con-Tex Bonding Surfaces on Concrete

Brick Veneer and Tile—Con-Tex produces so satisfactory a bond that brick veneer can be bonded to concrete without the use of metal ties.

Tile, when set against or laid on a Con-Texed surface, are permanently locked to the base.

Concrete Steps—Bonding the top surface to the rough cast concrete through the use of Con-Tex eliminates cracking off and peeling away of the finish coat from the structural concrete.

Swimming Pools—When sides and floors of swimming pools are treated with Con-Tex, a sure bond for the tile or mortar or stucco sidewalls and floors results. This has become standard for pool construction.

Pouring Planes to Pouring Planes—Disintegration of concrete at and near pouring planes in such structures as dams, reservoirs, tanks, swimming pools, bridges and every other kind and class of structure, causes serious trouble. Con-Texed surfaces produce non-leaking, permanently tight joints which are both chemically and mechanically an integral part of the mass.

Johnson "Protone"—A Superior Waterproofing

An ideal waterproofing and dampproofing for masonry surfaces.

Note: Not an integral compound.

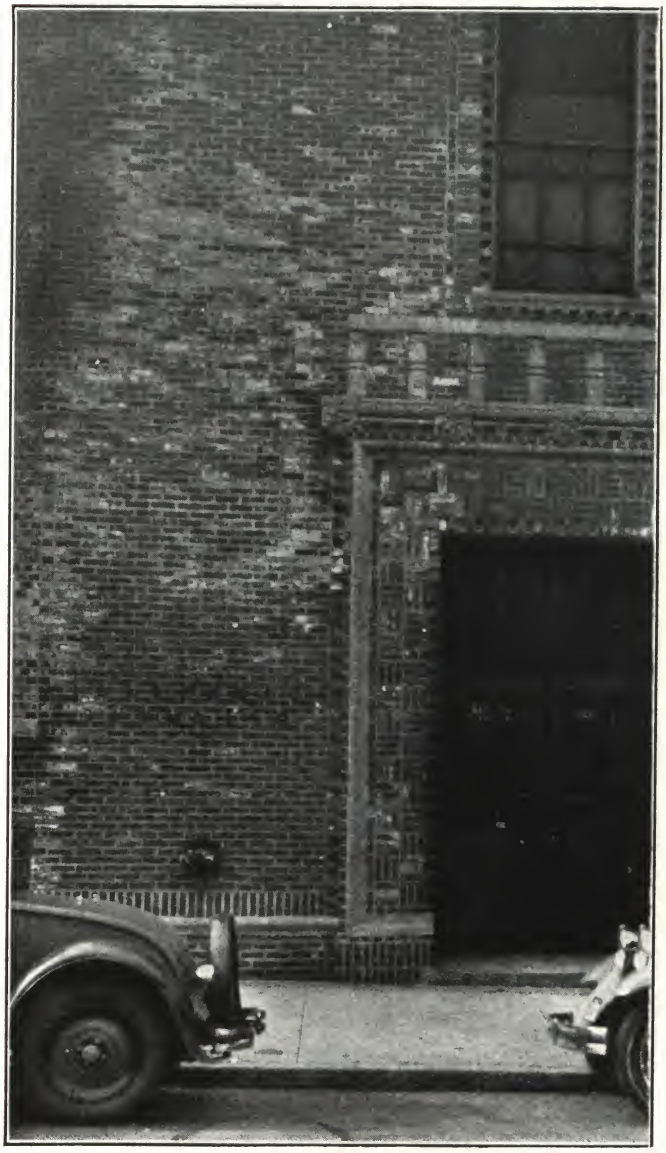
For waterproofing brickwork, stone, stucco, mortar and concrete, and for suppressing of efflorescence on brickwork, "Protone" is unsurpassed.

Waterproofings and dampproofings are an essential in many instances of modern construction.

"Protone" seems to be as nearly ideal for modern requirements as it is possible to imagine.

"Protone" may be applied to existing structures in weather that is hot, or weather that is cold; and the surfaces to which it is applied may be wet, or damp, or dry with almost equal success. Either brush or spray coats may be used. "Protone" penetrates *deeply*—as much as ⅛ in. per coat in dense concrete or mortar, and as much as ¾ to 1 in. in more porous concrete, mortar, stucco or brick, and *the effect is permanent.* "Protone" is colorless and leaves no surface film.

Information regarding "Protone" can be obtained through the Concrete Surface Corporation, 342 Madison Avenue, New York, N. Y.



Efflorescence, Leakage and Destruction of Brick Before Treatment with Johnson "Protone"



Restoration, Watertightness and Prevention of Progressive Destruction After Treatment with Johnson "Protone"

FLOOR AND ROOF CONSTRUCTION SYSTEMS
CONCRETE REINFORCEMENT

Aerocrete Corp. of America....A407
American Cement Tile Mfg. Co....A402
American Roof Truss Co....A338
American Sheet Metal Works....A425
American Steel & Wire Co....A305–309
Arch Roof Construction Co., Inc....A339
Bates Expanded Steel Corp....A346
Blaw-Knox Co. A426
Concrete Engineering Co....A310–311
Concrete Steel Co.—
Concrete Reinforcement A312
Truss Joists A347
Consolidated Expanded Metal Cos....A313
Conver Steel & Wire Co., Inc....A335
Detroit Steel Products Co....A427–440
Eurell, J. B., Co....A387
Federal Cement Tile Co....A403–405
Gabriel Steel Co....A348–349
Goldsmith Metal Lath Co....A314
Grid Flat Slab Corp....A315
Hall-Hodges Co., Inc....A456–457
Hausman Steel Co....A316
Johns-Manville A406
Jones & Laughlin Steel Corp.—
Concrete Reinforcement A317
Junior Beams A350–352
Kalman Steel Co.—
Concrete Reinforcement A318
Truss Joists A353
Keystone Gypsum Fireproofing Corp....A388–389
Lamella Roof Syndicate, Inc....A340–341
Lathrop-Hoge Gypsum Construction Co....A390–391
Macomber Steel Co.—
Truss Joists A354
Roof Trusses A344
Mahon, R. C., Co.—
Floor Forms A319
Steel Roof Decks....A441–454
McClintic-Marshall Co. A355
McKeown Bros. Co....A342–343
Mitchell-Tappen Co. A336
Nailcrete Corp. A408–409
National Naylegrip Co., Inc....A410–411
National Steel Fabric Co., Div. of Pittsburgh Steel Co. A320–322
Pan Metal Roof Deck Co....A455
Porete Mfg. Co....A412–415
Rail Steel Bar Assn....A300–304
Republic Fireproofing Co., Inc....A323
Rivet-Grip Steel Co....A324–327
Robertson, H. H., Co.—
Steel Roof Decks A458–462
Sheet Metal Roofing and Siding....A416–424
Ryerson, Joseph T., & Son Inc....A328–329
Saint Paul Corrugating Co....A463
Structural Gypsum Corp....A392–401
Summerbell Truss Co....A345
Truscon Steel Co.—
Concrete Reinforcement A330–331
Steel Roof Decks....A464
Steel and Truss Joists....A356
Union Steel Products Co....A337
United States Gypsum Co.—
Expanded Metal A334
Roof, Floor and Partition Products....A357–386
Wickwire Spencer Steel Co....A332–333

RAIL STEEL BAR ASSOCIATION

228 North La Salle Street
CHICAGO, ILL.

ASSOCIATED MILLS

BUFFALO STEEL COMPANY, Tonawanda, N. Y.
BURLINGTON STEEL COMPANY, LTD., Hamilton, Ont., Canada
CALUMET STEEL CO., Chicago, Ill.
CANADIAN TUBE & STEEL PRODUCTS, LTD., Montreal, Que., Canada
FRANKLIN STEEL WORKS, Franklin, Pa.
LACLEDE STEEL COMPANY, St. Louis, Mo.
MISSOURI ROLLING MILL CORPORATION, St. Louis, Mo.
POLLAK STEEL COMPANY, Cincinnati, Ohio
WEST VIRGINIA RAIL COMPANY, Huntington, W. Va.
CONNORS STEEL COMPANY, Birmingham, Ala.

AUTHORIZED PRODUCERS OF MARKED AND CERTIFIED RAIL STEEL REINFORCING BARS*

Product

Rail steel reinforcing bars are one standard grade throughout the associated industry (A.S.T.M. Specification A16-14)—the product of standardized manufacture. They are known commercially and technically only by the name "rail steel" and are not to be confused with bars known as "re-rolled" that have no standard specification or manufacture.

THE SYMBOL

identified by a mark (the symbol) rolled on the bar—a permanent mark that cannot be erased or destroyed. This mark is an assurance to the engineer and architect that the bar was rolled in accordance with requirements of this associated industry to meet the standards for rail steel concrete reinforcement bars (Serial Designation A16-14) of the American Society for Testing Materials. This mark also signifies the willingness of the producer to certify to this quality.

The Industry and Its Association

The RAIL STEEL BAR ASSOCIATION is a manufacturers' organization of international scope formed nineteen years ago for the purpose of co-operative research in production methods. This research and exchange of information has developed a standard of uniform quality throughout the associated industry. As a member of other national technical societies and engineering commissions, this association has given extensive co-operation to the development of standards for better reinforced concrete construction.

Marking and Certification

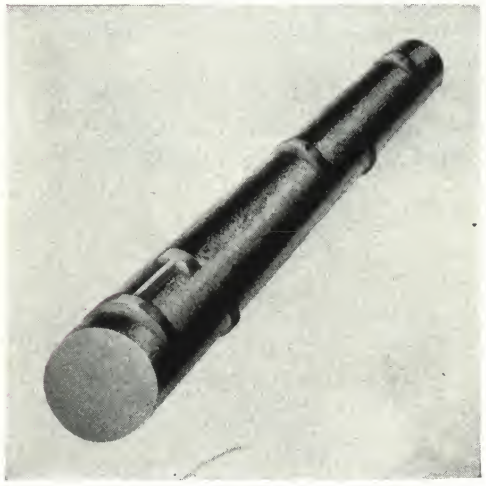
Deformed rail steel reinforcing bars, produced by members of the RAIL STEEL BAR ASSOCIATION, are

Educational Services

"The Story of Rail Steel" is a three reel industrial film showing a modern steel mill, the manufacture of rails, the rolling and fabrication of rail steel bars and the use of these bars in reinforced concrete construction. This film is furnished without charge on application to the education department of the association.

Lectures will be arranged to accompany the showing of this film before society meetings of architects and engineers.

Reference literature, technical bulletins and handbooks on reinforced concrete design and construction are furnished as part of the educational service of this association.





***Photographs of the Two Types of Deformed Rail Steel Reinforcing Bars**

Illustrating the use of the association symbol as a quality label to identify bars rolled by an associated mill

Continued on next page

STANDARD PRODUCTION METHODS

General Process

The process employed by associated rail steel mills consists in reducing heated slit-rail billets into bars of required size. This is identical to the hot rolling process followed generally in the production of all standard concrete reinforcing bars. As a result of research and study each step in this process is scientifically controlled and is standard throughout the associated mills of the industry.

Selecting the Raw Material

Standard tee-section railroad rails, the raw material for rail steel reinforcing bars, are the source of the technical name by which these bars are known throughout the world. Rails are produced originally under rigid requirements governing both physical and chemical qualities and are subject to test both before and during use. They must not only resist wear but must withstand enormous traffic stresses under all extremes of temperature. Rail steel bars, therefore, are produced from a fully tested raw material.

Rails are furnished to the mills under strict requirements governing size, length, uniformity and condition (no frog, switch, guard, curve, bend or twist, or split head rails are permitted) and are again rigidly inspected when delivered to the rail steel mill. An imperfect rail, if used for rolling, would invariably form what is known as a "cobble," would jam or break the rolls, thereby causing serious damage and costly delay. For this reason, only straight, selected sections of rails are retained.

Heating and Rolling

Rails, when needed for rolling, are selected from the previously inspected and assorted stock in lots of one size required to produce bars of diameters and lengths desired and are charged into a furnace of the continuous type where they are slowly and uniformly brought to a proper rolling temperature. Heating is accurately controlled by means of pyrometer observations and a close range of furnace temperatures maintained.

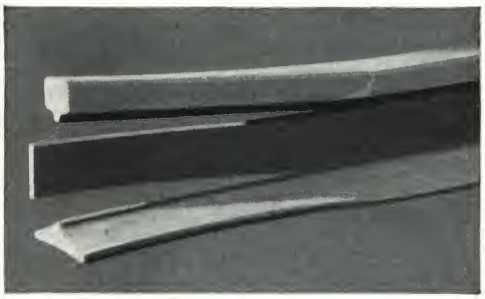
Since the rail is a combination of three parts (head, web and flange), the first operation, after removal from the furnace, is the passing of the hot rail longitudinally through a set of rolls known as "slitters." By this separation are produced the three forms of slit-rail billets, ready for further rolling into bars and shapes of various sizes.

The rolling diagram shown on this page illustrates how the sizes and shapes of finished products conform in general to the size and shape of the original slit-rail billet. The head of the rail becomes the largest billet and furnishes the bars of large diameters. The web furnishes smaller bars, angles, strip and similar products. The flange is well adapted to wider, thinner products, such as angles, tubing and U-bars.

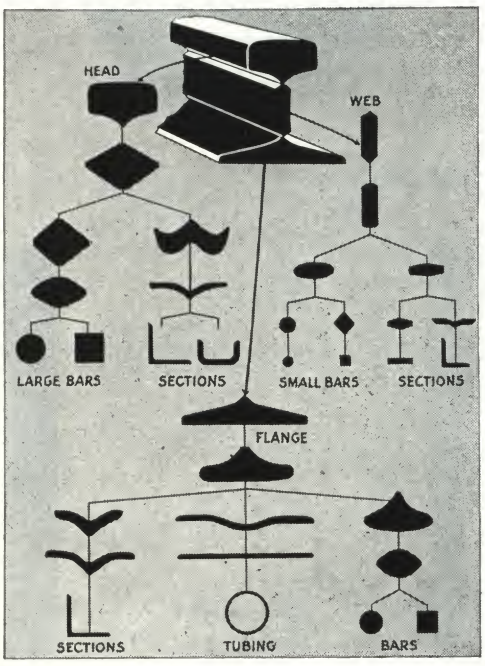
Through separate sets of rolls, the three parts of the rail are gradually reduced by a series of successive passes, each reduction refining the grain and improving the physical quality of the steel. In the last or finishing pass the standard association symbol is rolled on every deformed bar to identify its origin in an associated mill. The effect of rolling in reducing and refining the grain size is illustrated on the following page by the micro-photographs of etched specimens of a rail steel bar and its raw material.

After the last or finishing pass the bars are mechanically conveyed onto long iron grills known as "hot-beds," where they are grouped and subjected to a slow, uniform cooling. The process is known as "group annealing" and produces toughness in the bars. This cooling process, like the heating operation, is an important factor in rolling and its present efficiency has been the result of extended study by the mills.

In each step inspections are made for size and surface defects and at regular intervals check samples are taken for the purpose of physical tests by the mill laboratory.



Partly slit rail showing the method of separating its three parts



Process diagram illustrating the slitting of a rail and reduction to finished products

Fabricating

When the bars have cooled they are removed from the hot-beds, cut to proper lengths and conveyed to the bending or fabricating department of the mill.

Bending is an operation in which care must be used regardless of the toughness of steel. The fabricating equipment must be properly designed with pins of correct bend diameters, and operated at speeds that insure proper "flow" of the metal in the bar. Careful observation of details for correct lengths, angles and other plan dimensions is necessary but in bending any grade of steel, the machines must operate at proper speeds to prevent injury to the metal. Bars should always be shop bent when this is practicable.

The fabricated bars are bundled and tagged for convenient identification at the job and ready for shipment—in many cases within a few hours after the raw material was placed in the heating furnaces. The mill inspector and purchaser's inspector make final tests and approval and the bars, marked and certified with the association quality label, are ready to take a new responsibility as reinforcement in our modern concrete structures.

Continued on next page

PROPERTIES—TESTS AND DESIGN FACTORS

Properties

Two fundamental properties—high strength and toughness—distinguish rail steel bars. It is a well-known metallurgical principle that "working" of steel—by rolling—refines the grain and produces what may be described as a more closely knit structure. A rail steel bar, in addition to the working that has already been given its raw material, receives the additional rolling necessary to reduce the slit-rail billets to bars. The photomicrographs shown below illustrate the effect of this rolling on the grain structure of rail steel and demonstrate how "working," combined with controlled heating and cooling, produce in rail steel bars their two fundamental properties—high strength and toughness.

The average tensile strength of rail steel reinforcing bars is 100,000 lbs. per square inch. The average elastic limit is 64,000 lbs. per square inch which provides, in the design of reinforced concrete, a safety factor of 3.20 based on the unit working stress of 20,000 lbs. per square inch that is customarily permitted for rail steel bars. Balanced with this high elastic limit, the toughness or ductility of rail steel bars permits all fabrication and a maximum of resistance to all deformation that may be caused by structural stress.

Tests and Research

The works managers division of the association, including its metallurgists and production superintendents, sponsor a program of continual research in production methods and meets twice annually to discuss, demonstrate and adopt standards for improvements in process.

In addition to this association production research, many other series of tests and studies have been made independently by government and state engineering bureaus, technical societies and other similar organizations.

These tests, both on bars alone and on structural units of reinforced concrete in which they have been embedded, have demonstrated and recommended as a consideration of importance in design, the high resistance of rail steel bars to impact or other similarly unusual loads that may be imposed on a concrete structure.

In the tests made in 1917 on the Western Newspaper Union Building at Chicago (University of Illinois Bulletin 106), the rail steel reinforcement not only withstood the enormous static test loads applied but, in the subsequent wrecking of that structure, resisted the impact of wrecking apparatus and by necessity were eventually removed with an oxy-acetylene flame.

In a report of the Department of Commerce Building Code Committee (Bulletin BH-9) definite mention as a design consideration is made of the value of high tensile strength reinforcement, such as rail steel, in resisting crack formation in reinforced concrete structures. Recognition of rail steel as a standard grade of concrete reinforcement is emphasized in this report. Conclusions were based on experience of the committee, together with a consideration of tests made by the U. S. Bureau of Standards and other authoritative bodies.

Design Practice

Although there is a definite tendency to favor the use of the higher strength grades, standard practice in design recognizes four standard grades of concrete reinforcement bars: (1) rail steel, (2) hard billet, (3) intermediate billet, and (4) structural billet. In many of our larger cities, however, rail steel, hard and intermediate grades, are assigned a working stress of 20,000 lbs., exceeding that for structural grade from 2,000 to 4,000 lbs. This is direct recognition of the higher elastic limits and the greater factors of safety available by use of these grades. Design practice also recognizes the value of rail steel in resisting crack formation due to temperature stresses and in providing maximum resistance to overloads, both static and impact.

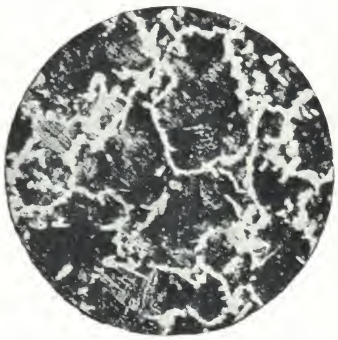


Figure 1

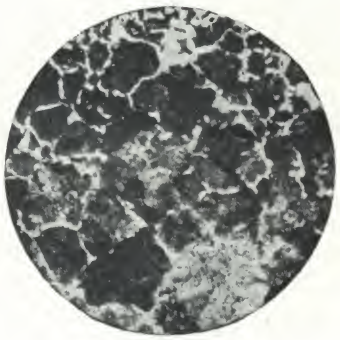


Figure 2

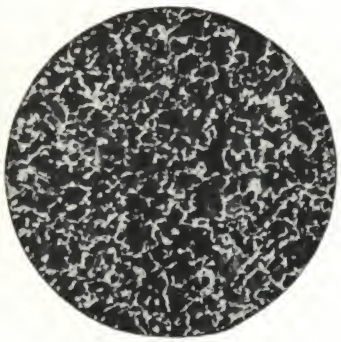


Figure 3

Photomicrographs (magnified 100 times) showing (1) a new rail (2) a rail after railroad service and (3) a rail steel reinforcing bar. The uniform grain structure and the effect of rolling is plainly indicated



AT LEFT

Two stands of rolls in operation on small bar production

AT RIGHT

An automatic bender of the type used for shop fabrication



Continued on next page

SPECIFICATION DATA

Standards

Standards for reinforced concrete construction have reached a high point of uniform development through the activities of nationally recognized organizations, such as the American Concrete Institute, the Hoover Building Code Committee of the Department of Commerce, the National Board of Fire Underwriters and the Joint Committee on Concrete and Reinforced Concrete as well as the several section building code conferences that have adopted uniform standards. All of these standards governing reinforced concrete construction provide for the quality of reinforcement by a specification reading substantially the same as that recommended on this page, with the only exception that this recommendation provides for the use of association identified rail steel.

In addition to A.S.T.M. standards, there are several others by which rail steel may be specified, including those of the Canadian Engineering Standards Association (Serial Designation G-31-1930), Federal Specification 350a (U.S. Government Master Specification) and the Association of American Steel Manufacturers standards for rail steel bars. All these conform, with little exception, to the A.S.T.M. standards.

The RAIL STEEL BAR ASSOCIATION has actively cooperated with national technical societies in the development of the standards that govern reinforced concrete construction.

RECOMMENDED SPECIFICATION:

(a) Reinforcement—All bars for concrete reinforcement shall conform in quality to the requirements of standards of the American Society for Testing Materials for Billet-Steel Concrete Reinforcement Bars (Serial Designation A-15-14) or for Rail Steel Concrete Reinforcement Bars (Serial Designation A-16-14) as rolled and marked by a member of the RAIL STEEL BAR ASSOCIATION.

Note: *By reference to the standards of the American Society for Testing Materials, this brief and technically exact specification for reinforcing bars provides for all quality and inspection requirements. It avoids the confusion of an improperly worded specification containing meaningless names and terms by using a standard form that has been recommended by adoption in the standard building codes of the country. This specification prevents the substitution of grades known as "rerolled" that have no standards. It prevents also attempted substitutions of grades called "rail steel equivalent."*

(b) Fabrication—All bending and fabrication shall be done at the mill by the bar manufacturer or on suitable fabricating equipment in accordance with the established standards of the industry.

Note: *Bars should always be shop bent, when this is practicable.* *See heading, "Fabricating," page 2 of this catalogue.*

AMERICAN SOCIETY FOR TESTING MATERIALS STANDARD SPECIFICATIONS

Rail Steel Concrete Reinforcement Bars (Serial Designation A-16-14)

(1) The specifications cover three classes of rail steel concrete reinforcement bars, namely: plain, deformed, and hot-twisted.

(2) Manufacture—The bars shall be rolled from standard section Tee rails.

(3) Hot-twisted bars shall have one complete twist in a length not over twelve times the thickness of the bar.

(4) Physical Properties and Tests—(a) The bars shall conform to the following minimum requirements as to tensile properties:

Properties Considered	Plain Bars	Deformed and Hot-twisted Bars
Tensile strength, lb. per sq. in.	80,000	80,000
Yield point, lb. per sq. in.....	50,000	50,000
Elongation in 8 in., per cent..	1,200,000 / Tens. str.	1,000,000 / Tens. str.

(b) The yield point shall be determined by the drop of the beam of the testing machine.

(5) (a) For bars over ¾ in. in thickness or diameter, a deduction from the percentages of elongation specified in Section 4 (a) of 0.25 per cent shall be made for each increase of $\frac{1}{8}$ in. of the specified thickness or diameter above ¾ in.

(b) For bars under $\frac{7}{16}$ in. in thickness or diameter, a deduction from the percentages of elongation specified in Section 4 (a) of 0.5 per cent shall be made for each decrease of $\frac{1}{8}$ in. of the specified thickness or diameter below $\frac{7}{16}$ in.

Thickness or Diameter of Bar	Plain Bars	Deformed and Hot-twisted Bars
Under ¾ in.....	180° bend d-3t	180° bend d-4t
¾ in. or over.....	90° bend d-3t	90° bend d-4t

d—Diameter of pin about which the specimen is bent.
t—Thickness or diameter of the specimen.

(6) The test specimen shall bend cold around a pin without cracking on the outside of the bent portion as follows:

(7) (a) Tension and bend test specimens for plain and deformed bars shall be taken from the finished bars, and shall be the full thickness or diameter of bars as rolled; except that the specimens for deformed bars may be machined for a length of at least 9 in., if deemed necessary by the manufacturer to obtain uniform cross-section.

(b) Tension and bend test specimens for hot-twisted bars shall be taken from the finished bars, without further treatment.

(8) (a) One tension and one bend test shall be made from each lot of 10 tons or less of each size of bar rolled from rails varying not more than 10 lb. per yard in nominal weight.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any tension test specimen is less than that specified in Section 4 (a) and any part of the fracture is outside the middle third of the gauge length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

(9) Permissible Variations in Weight—The weight of any lot of bars shall not vary more than 5 per cent from the theoretical weight of that lot.

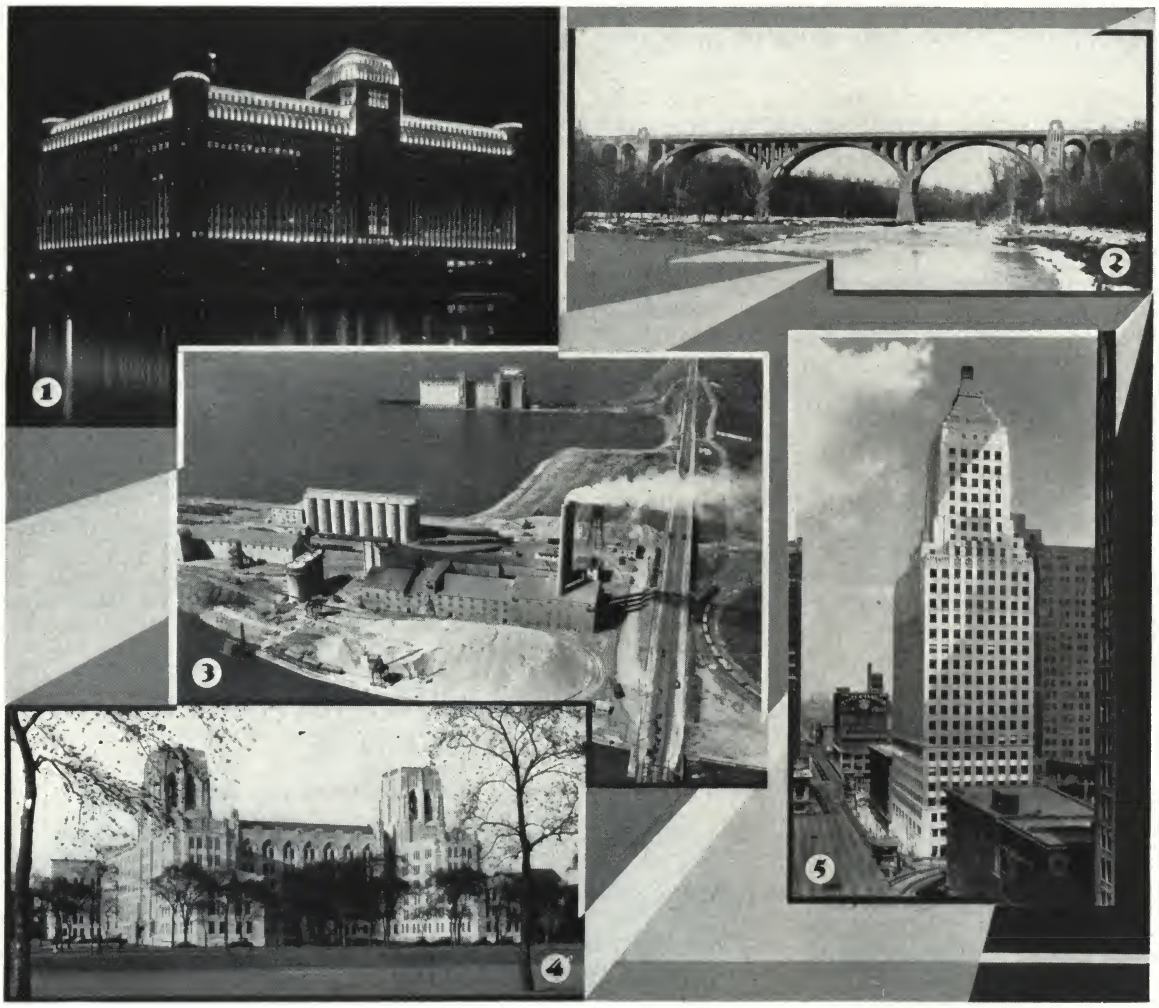
(10) Finish—The finished bars shall be free from injurious defects and shall have a workmanlike finish.

(11) Inspection and Rejections—The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's work which concern the manufacture of the bars ordered. The manufacturer shall afford the inspector free of cost, all reasonable facilities to satisfy him that the bars are being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

(12) Bars which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

Continued on next page

RAIL STEEL IN CONSTRUCTION



Rail steel has a long and successful record of use in reinforced concrete construction. Structures in which it has been used are of every type and size and include many of our finest public buildings, institutions, industrial plants, hydraulic projects, bridges and government structures. Illustrated above are a few examples of projects built in recent years that are outstanding in architectural and engineering importance. They demonstrate the wide and diversified use of rail steel.

(1) The Merchandise Mart in Chicago, the largest building in the world, is a steel frame structure with reinforced concrete foundation and floors using approximately 6000 tons of rail steel bars. Designed for use as a merchandise wholesale center this structure is a combined warehouse and office building carefully planned in every detail.

(2) The Hilliard Road Bridge in Cleveland, one of the longest span reinforced concrete arch bridges in the country, is typical of the use of rail steel in this class of construction.

(3) The Great Lakes Portland Cement Company plant at Buffalo is an example of modern industrial construction reinforced throughout with rail steel. Industrial projects of all types of heavy load design use enormous quantities of rail steel.

(4) The Chicago University Medical Unit is one of the most famous of institutional buildings, not only for its architectural beauty but for its efficient internal arrangement. It is reinforced throughout with rail steel.

(5) The Trustees System Building in Chicago is 30 stories in height and is known generally as the tallest reinforced concrete building in the country. With the exception of a few interior columns, in which structural shapes are used, the building is entirely reinforced concrete. Columns are of the cast iron core type encased in concrete and supplemented with vertical reinforcement. The bar reinforcement used and all other reinforcement was entirely rail steel.

This list might be extended to include many other remarkable structures, such as the largest grain elevator in the world, the largest gypsum plant, the tallest concrete chimney stack and other similar evidences of the universal approval of rail steel reinforcing bars as produced by this associated industry.

AMERICAN STEEL & WIRE COMPANY

Subsidiary of United States Steel Corporation

Triangle Mesh and Electrically Welded Wire Fabric for Concrete Reinforcement

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Products

Triangle Mesh and Electrically Welded Wire Fabrics for Concrete Reinforcement.

For our catalogues on Triangle Mesh, for Stucco Base, Wire Rope, Electrical Wires and Cables, see List of Manufacturers.

Uses

Triangle Mesh and Electrically Welded Wire Fabrics are used for the reinforcing of concrete floor and roof slabs, concrete walls and chimneys, arch construction, beams, columns, dams and retaining walls, water, sewer and culvert pipe, pavements and roadways, river revetment, silos, fireproofing steel framing, bridge floors, reservoirs, monolithic concrete sewers and stucco work.

Advantages of Wire Fabric Reinforcement

(1) Provides even distribution of steel.
(2) Reinforces in every direction.
(3) Tension or carrying members accurately spaced.
(4) Low cost of inspection.
(5) Properly distributes over a large area stresses due to concentrated load.
(6) Due to cold drawing, higher elastic limits and ultimate strengths with same quality of steel.
(7) Continuous action from one end of the structure to the other.
(8) Impossible to leave out or otherwise reduce the necessary steel if specific style number of fabric or area of steel is specified.
(9) Perfect mechanical bond.
(10) Easily handled and stored on the work.
(11) Minimum cost of installation.

Grade of Steel

A reduction of the required sectional area of steel is safely accomplished, within limits, by the use of a higher tensile strength steel. This high tensile strength may be secured by increasing the carbon content or by cold drawing of mild steel.

Cold drawing of mild steel produces a high ultimate strength and yield point, and the proportion of the yield point to the ultimate strength is increased to from 70 to 90%. Since the strength of a reinforced concrete structure, in so far as the reinforcement is concerned, depends on the yield point of the steel, the high yield point of cold drawn wire is of great importance.

Galvanizing

Triangle Mesh Reinforcement is furnished plain on orders unless otherwise specified.

American Electrically Welded Fabric is furnished plain or galvanized as ordered.

In general, the additional cost for galvanized fabric is not justified except in special cases where the steel will be inadequately protected, as in very thin slabs, etc.

Triangle Mesh Woven Wire Concrete Reinforcement

Triangle Mesh Fabric is made from cold drawn mild steel having an ultimate strength of 70,000 to 85,000 lb. per sq. in. The longitudinal members are

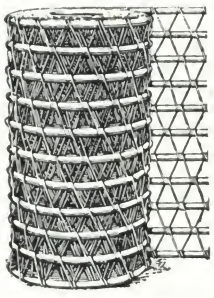


Fig. 1. Triangle Mesh Wire Fabric Reinforcement

spaced 4 in., the diagonal cross wires either 2, 4, or 8 in. It is the only design of wire fabric having cross wires that assist the longitudinals in carrying the load.

Continued on next page

For the light styles of fabric, the longitudinals consist of 1 wire; for the medium styles, 2 wires laid parallel; and for the heavy styles, 3 wires stranded. The sizes of the wires and the number per longitudinal are varied to obtain the desired cross-sectional area of steel per foot of width. Stranded longitudinals are used to reduce the stiffness of the finished product without affecting the tensile strength.

TRIANGLE MESH WOVEN WIRE CONCRETE REINFORCEMENT

Style No.	Number and gauge of wires each, longitudinal, A. S. & W. Co.'s steel wire gauge	Sectional area longitudinals, sq. in. per ft. width	Effective sect. areas, sq. in. per ft. of fabric		Approx. weight, lb. per 100 sq. ft.
			Trans.	Longit.	
Longitudinals Spaced 4 in. Cross Wires No. 14 Gauge, Spaced 4 in.					
032	1—No. 12 gauge	.026	.022	.032	22
040	1—No. 11 gauge	.034	.022	.040	25
049	1—No. 10 gauge	.043	.022	.049	28
058	1—No. 9 gauge	.052	.022	.058	32
068	1—No. 8 gauge	.062	.022	.068	35
080	1—No. 7 gauge	.074	.022	.080	40
093	1—No. 6 gauge	.087	.022	.093	45
107	1—No. 5 gauge	.101	.022	.107	50
126	1—No. 4 gauge	.120	.022	.126	57
146	1—No. 3 gauge	.140	.022	.146	65
153	1—¼ in.	.147	.022	.153	68
168	1—No. 2 gauge	.162	.022	.168	74
180	2—No. 6 gauge	.174	.022	.180	78
208	2—No. 5 gauge	.202	.022	.208	89
245	2—No. 4 gauge	.239	.022	.245	103
267	3—No. 6 gauge	.261	.022	.267	111
287	3—No. 5½ gauge	.281	.022	.287	119
309	3—No. 5 gauge	.303	.022	.309	128
336	3—No. 4½ gauge	.330	.022	.336	138
365	3—No. 4 gauge	.359	.022	.365	149
395	3—No. 3½ gauge	.389	.022	.395	160
Longitudinals Spaced 4 in. Cross Wires No. 14 Gauge, Spaced 8 in.					
036P	1—No. 12 gauge	.026	.009	.036	17
044P	1—No. 11 gauge	.034	.009	.044	20
053P	1—No. 10 gauge	.043	.009	.053	24
062P	1—No. 9 gauge	.052	.009	.062	27
072P	1—No. 8 gauge	.062	.009	.072	31
084P	1—No. 7 gauge	.074	.009	.084	35
097P	1—No. 6 gauge	.087	.009	.097	40
Longitudinals Spaced 4 in. Cross Wires No. 12½ Gauge, Spaced 8 in.					
041R	1—No. 12 gauge	.026	.014	.041	21
049R	1—No. 11 gauge	.034	.014	.049	24
058R	1—No. 10 gauge	.043	.014	.058	28
067R	1—No. 9 gauge	.052	.014	.067	31
077R	1—No. 8 gauge	.062	.014	.077	35
089R	1—No. 7 gauge	.074	.014	.089	40
102R	1—No. 6 gauge	.087	.014	.102	44

Longitudinals Spaced 4 in. Cross Wires Nos. 14 and 12½ Gauge, Spaced 2 in.

(This material is used principally for cement gun work)

Style No.	Number of wires each, longitudinal	Gauge of wires each, longitudinal	Gauge of cross wires	Approx. weight, lb. per 100 sq. ft.
7A	1	**12**	**14**	31
6A	1	**10**	**14**	37
5A	1	**8**	**14**	44
4A	1	**6**	**14**	53
29A	1	**12**	**12½**	42
28A	1	**10**	**12½**	48
27A	1	**8**	**12½**	55
26A	1	**6**	**12½**	64

Rolls: Standard lengths 150, 200 and 300 ft.
Widths: Approximately 16, 20, 24, 28, 32, 36, 40, 44, 48, 52 and 56 in.
Finish: Plain or galvanized.
Tensile strength: Standard, 70,000 to 85,000 lb. per sq. in.

Electrically Welded Wire Fabric Reinforcement

A square or rectangular mesh made from cold drawn steel wire electrically welded at the intersections of the transverse and longitudinal wires. Various combinations of spacings and sizes of wires can be furnished.

This material combines the same high quality of material and service that has given Triangle Mesh reinforcement its enviable reputation.

When embedded in concrete, this mesh yields the maximum of its steel strength.

AMERICAN ELECTRICALLY WELDED FABRIC

Spacing of wires, in.		Gauge number		Sect. area, sq. in. per ft.		Weight per 100 sq. ft., lb.
Longit.	Trans.	Longit.	Trans.	Longit.	Trans.	
2	16	1	7	.377	.018	140
2	16	2	8	.325	.015	119
2	16	3	8	.280	.015	104
2	16	4	9	.239	.013	89
2	16	5	10	.202	.011	75
2	16	6	10	.174	.011	65
2	16	7	11	.148	.009	55
3	16	1	7	.252	.018	96
3	16	2	8	.216	.015	83
3	16	3	8	.187	.015	72
3	16	4	9	.159	.013	61
3	16	5	10	.135	.011	52
3	16	6	10	.116	.011	45
3	16	7	11	.098	.009	38
3	16	8	12	.082	.007	32
4	16	3	8	.140	.015	56
4	16	4	9	.120	.013	48
4	16	5	10	.101	.011	40
4	16	6	10	.087	.011	35
4	16	7	11	.074	.009	30
4	12	8	12	.062	.009	26
4	12	9	12	.052	.009	22
4	12	10	12	.043	.009	19
4	12	12	12	.026	.009	13
4	12	5	5	.101	.034	48
4	12	6	6	.087	.029	42
4	12	7	7	.074	.025	35
4	12	8	8	.062	.021	30
6	12	0	6	.148	.029	65
6	12	2	2	.108	.054	59
6	12	3	3	.093	.047	51
6	12	4	4	.080	.040	44
6	12	5	5	.067	.034	37
6	12	6	6	.058	.029	32
6	12	7	7	.049	.025	27
6	8	12	12	.017	.013	11
6	6	0	0	.148	.148	107
6	6	1	1	.126	.126	91
6	6	2	2	.108	.108	78
6	6	3	3	.093	.093	68
6	6	4	4	.080	.080	58
6	6	5	5	.067	.067	49
6	6	6	6	.058	.058	42
6	6	7	7	.049	.049	36
6	6	8	8	.041	.041	30
6	6	9	9	.035	.035	25
6	6	10	10	.029	.029	21
6	6	12	12	.017	.017	13
4	4	4	4	.120	.120	85
4	4	6	6	.087	.087	62
4	4	8	8	.062	.062	44
4	4	10	10	.043	.043	31
4	4	12	12	.026	.026	19
4	4	14	14	.015	.015	11
3	3	10	10	.057	.057	41
3	3	12	12	.035	.035	25
2	2	10	10	.086	.086	60
2	2	12	12	.052	.052	37
2	2	14	14	.030	.030	21
2	4	12	12	.052	.026	28
2	4	14	14	.030	.015	16

Other styles can be furnished on application.
Rolls: Standard lengths 150, 200 and 300 ft. For No. 2 gauge wires and larger, flat sheets only.
Widths: Multiples of the spacing of longitudinal wires up to a maximum width which varies with the size and spacing of the longitudinals. Approximate maximums 56 to 72 in. for 2-in. spacing, 84 to 96 in. for 3 or 4-in. spacing, and 96 to 120 in. for 6-in. spacing.
Finish: Plain or galvanized.
Tensile Strength: Standard, 60,000 to 70,000 lb. per sq. in.; 70,000 to 80,000 lb. furnished when ordered.
Weights—All above weights are based on a width of 60 in. measured from center to center of the outside or selvage longitudinal wires.

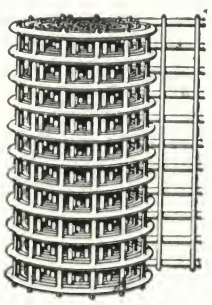


Fig. 2. Electrically Welded Wire Fabric Reinforcement

Continued on next page

AREA OF STEEL AND THICKNESS OF SLAB REQUIRED FOR GIVEN SPANS AND LOADS

Bending moment=$WL^2 \div 12$. Center of steel ¾ in. above bottom of slab.
Reinforcement in each case is sufficient for the live load shown plus the weight of the concrete slab. Any dead load of the floor exclusive of the concrete slab should be considered as part of the live load shown here.

Maximum stresses: Steel=18,000 lb., Concrete=700 lb.

Note: If not restricted by building code to a stress in the steel of 18,000 lb., a stress of 20,000 lb. can safely be used for wire mesh reinforcement. For a steel stress of 20,000 lb. reduce the areas of steel shown in the table by 10%.

After hundreds of tests of actual slabs made by the Testing Laboratory of Columbia University, the City of New York prepared a code covering slabs having spans of 8 ft. or less and decided on the use of an empirical formula that is equivalent to assuming a working stress in the steel in the standard formula for reinforced concrete design of approximately 32,000 lb. per sq. in. Millions of square feet of reinforced concrete floors have been built in accordance with this New York code. See second page following for complete tables New York Code.

Live load per sq. ft. lb.	Span of slab, center to center of supports, ft.-in.																					
	4-0	4-6	5-0	5-6	6-0	6-6	7-0	7-6	8-0	8-6	9-0	9-6	10-0	10-6	11-0	11-6	12-0	12-6	13-0	13-6	14-0	14-6
	Floor slab thickness and area of steel in sq. in. per foot width of slab required for spans and loads indicated																					
30	3" .027	3" .035	3" .043	3" .053	3" .064	3" .075	3" .086	3" .100	3" .116	3" .132	3" .148	3" .166	3½" .163	3½" .180	3½" .198	3½" .218	4" .216	4" .235	4" .255	4½" .255	4½" .276	4½" .297
40	3" .032	3" .040	3" .050	3" .061	3" .074	3" .087	3" .101	3" .117	3" .135	3" .153	3" .172	3½" .168	3½" .187	3½" .206	4" .205	4" .224	4" .245	4½" .245	4½" .266	4½" .288	5" .289	5" .311
50	4" .028	4" .035	4" .044	4" .054	4" .064	4" .076	4" .089	4" .102	4" .117	4" .133	4" .150	4" .168	4" .187	4" .208	4" .229	4" .251	4½" .250	4½" .273	4½" .295	5" .296	5" .320	5" .343
60	4" .030	4" .039	4" .049	4" .059	4" .071	4" .083	4" .098	4" .113	4" .130	4" .148	4" .166	4" .186	4" .207	4" .229	4" .253	4½" .251	4½" .275	4½" .300	5" .299	5" .324	5½" .326	5½" .351
80	4" .037	4" .047	4" .059	4" .071	4" .085	4" .100	4" .117	4" .135	4" .155	4" .176	4" .198	4" .223	4" .248	4½" .246	4½" .272	4½" .298	5" .297	5" .324	5½" .325	5½" .353	5½" .380	6" .382
100	4" .042	4" .054	4" .068	4" .083	4" .099	4" .117	4" .137	4" .158	4" .180	4" .205	4" .231	4" .259	4½" .257	4½" .285	5" .285	5" .313	5" .343	5½" .342	5½" .369	6" .373	6" .405	
125	4" .050	4" .064	4" .080	4" .097	4" .116	4" .137	4" .160	4" .185	4" .213	4" .242	4½" .241	4½" .270	4½" .302	5" .301	5" .333	5½" .333	5½" .365	6" .365	6" .399			
150	4" .058	4" .073	4" .092	4" .112	4" .135	4" .159	4" .185	4" .214	4" .245	4½" .246	4½" .277	5" .278	5" .310	5" .344	5½" .345	5½" .379	6" .382	6" .417				
175	4" .066	4" .083	4" .104	4" .127	4" .152	4" .180	4" .210	4" .243	4½" .244	4½" .278	5" .280	5" .314	5½" .317	5½" .352	6" .356	6" .391						
200	4" .073	4" .093	4" .116	4" .141	4" .170	4" .200	4" .234	4½" .237	4½" .272	5" .276	5" .312	5½" .316	5½" .352	6" .357	6" .394							
250	4" .088	4" .112	4" .140	4" .172	4" .205	4" .243	4½" .245	4½" .288	5" .292	5" .333	5½" .338	5½" .379	6" .386									
300	4" .103	4" .132	4" .165	4" .202	4" .242	4½" .249	4½" .292	5" .299	5" .343	5½" .350	6" .359	6" .403										

See tables on preceding page for styles of Triangle Mesh and American Electrically Welded Fabric that will give required areas.

Wire Fabric Reinforced Slabs

Supporting the Mesh Reinforcement—The correct location of the reinforcing mesh in the top portion of slabs over concrete beams can be easily and cheaply obtained by means of precast concrete blocks as shown in Fig. 3.

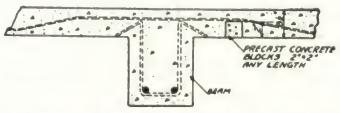


Fig. 3. Inexpensive Method of Supporting Wire Mesh Reinforcement Over Concrete Beams

Blocks should have a height about 1¼ or 1½ in. less than the full thickness of the slab. The length may be any convenient amount such as 1 or 2 ft. or such lengths as are readily formed by breaking long strips of the blocks. The mesh should be supported for at least one-third of its width. These blocks will stay in approximately correct position without any means of attachment to the reinforcing mesh or to the forms.

For short spans (about 8 ft. or less) these blocks will be required on one side only of the beams. For spans greater than 8 ft., use blocks on both sides.

Detailing Widths of Mesh—For estimating purposes where accuracy is unnecessary, provided the estimate is on the safe side, it is permissible to assume that the mesh required will equal in square feet the actual area of the floor slab. As a matter of fact, the amount of mesh needed will be less than that, and at the same time a more efficient and more economical layout is possible. In the first place, a 2-in. lap along the sides of the sheets of wire mesh reinforcement is sufficient to develop the full strength of the reinforcement; more

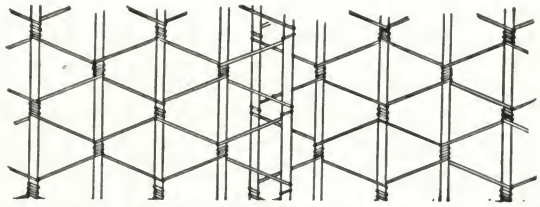


Fig. 4. Triangle Mesh Reinforcement As It Actually Appears with a Side Lap of 2 in.

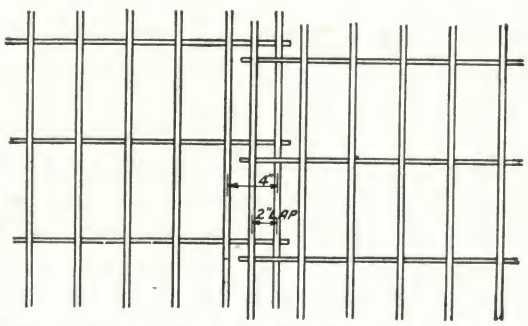


Fig. 5. Electrically Welded Fabric As It Actually Appears with a Side Lap of 2 in.

Continued on next page

than that is a waste of material. This 2-in. lap means a lap of the outside (or selvage) longitudinal wires and should not be assumed for those forms of mesh having a zigzag selvage edge.

A suggested detail for the amount and location of wire mesh reinforcement is shown in Fig. 6. Providing a short strip of light weight fabric is placed near the top of the slab over the girders with the main longitudinal wires at right angles to the direction of the girders, it is not only unnecessary but a waste of material to require that the main reinforcement of the slabs entirely cover the space between and over the girders. The distance between the center line of the girder and the edge of the reinforcing fabric can be any amount up to about 20 in. without reducing the strength of the structure.

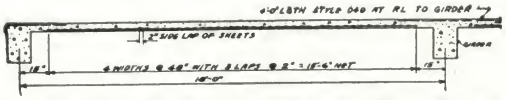


Fig. 6. Detailing Widths of Mesh and Showing Extra Strip of Mesh Over the Girders

Other Uses of Wire Mesh Reinforcement

Concrete Joist Floors—Fig. 7 shows a typical section of such a floor. Here is a 2 or 3-in. slab having a clear span between the supporting ribs of 20 in., that must not only act as part of the compression portion of the beams and resist temperature stresses, but in addition act as a support of the loads that may come upon the floor.

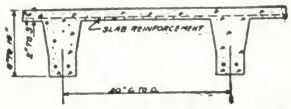


Fig. 7. Typical Section of Concrete Joist Floor

The most efficient type of reinforcement to take care of these various stresses is a fabricated mesh made from cold drawn high elastic limit wire with comparatively close spacing of members. The wire fabric specified should provide a minimum ratio of reinforcement area to concrete area of .0016, and under no consideration should shrinkage reinforcement members be spaced over two times the slab thickness.

Top Layer of Concrete Finished Floors—It is often desirable for construction reasons to leave the ¾ or 1-in. top dressing until after the main part of the slab is completely hardened. In this case the slab should be thoroughly cleaned before applying the final course, and this course should be reinforced with wire mesh reinforcement to prevent destructive cracks.

Specify Style 032 Triangle Mesh or 4x4-in. mesh No. 12 by No. 12 gauge wire Electrically Welded wire fabric.

Basement and Other Floors that Rest Upon the Ground—As conditions vary with each job, it is impossible to make any definite suggestions regarding the proper weight of fabric to use, but millions of square feet of Style 049 Triangle Mesh have been successfully used for this purpose. Where heavy loads and questionable fill-foundations occur, it will be economy to use heavier mesh, such, for instance, as Style 153 Triangle Mesh or an equivalent weight of Electrically Welded wire fabric having spacings of wires that do not exceed 6 in.

Flat Slab Beamless Floors—Wire fabric reinforcement has been successfully used for this type of construction. It can be furnished in rolls or flat sheets.

This material is most desirable and it is highly recommended.

Cement Gun Work—Gunite (trade-name) is concrete applied by the cement gun process, which produces probably the densest and, therefore, the most waterproof concrete available by present known methods.

Gunite reinforced with wire fabric reinforcement has repaired successfully old crumbling bridge piers, tunnel linings and sea walls; old steel bridges, tanks and trusses; leaky reservoirs and irrigation ditches; even wooden structures that have been damaged by fire have been restored to usefulness by this method. And repair work is by no means the most important class of work produced. All kinds of new construction, especially those requiring waterproof qualities with light resulting weight, can be successfully executed.

Fireproofing of Steel Framing—Wrap all steel columns, girders and beams with Triangle Mesh, Style 032, or Electrically Welded fabric, 4x4-in. mesh, all No. 12 gauge wires.

Concrete Chimneys—Style 153 Triangle Mesh is standard for the circumferential reinforcement.

Stucco Reinforcement—See page B1887.

Concrete Sewers—The close spacing of members of Triangle Mesh is largely responsible for the successful results obtained with precast sewer pipe. The weight of fabric varies with the diameter of pipe, thickness of shell and depth of fill.

Concrete Driveways, Streets and Highways—Wire fabric reinforcement is essential to prevent destructive cracks. The purpose of the reinforcement is to increase the structural strength of the concrete slab and also to bind it together as a unit. The high tensile strength and the close spacing of members of a wire fabric show decided advantages for these purposes. The weight of wire fabric used in pavement has varied on account of varying conditions, but the average practice calls for 35 to 50 lb. per 100 sq. ft.

Suggested Specifications for Pavements—Reinforcement shall consist of steel wire fabric manufactured from cold drawn wire, finished members of which shall develop an ultimate tensile strength of at least 70,000 lb. per sq. in. and which shall bend cold 180° around a pin the diameter of which is equal to diameter of wire specimen without cracking on outside of bent portion.

All reinforcement shall be free from excessive rust, scale, paint or coating of any character which will tend to prevent proper bonding of the concrete.

The fabric reinforcement shall weigh not less than 40 lb. per 100 sq. ft.

The main or heavier wires of fabric shall be spaced not more than 6 in. apart. The secondary or lighter wires of fabric shall be spaced not more than 12 in. apart.

Continued on next page

SLAB REINFORCEMENT, NEW YORK CITY CODE

For clear spans up to 8 ft. supported between structural steel beams only

STANDARD STYLES AMERICAN STEEL & WIRE COMPANY WIRE FABRIC REQUIRED FOR VARIOUS LOADS

TOTAL LOAD PER SQ. FT. INCLUDING WEIGHT OF SLAB		SPAN															
		4′ 0″	4′ 3″	4′ 6″	4′ 9″	5′ 0″	5′ 3″	5′ 6″	5′ 9″	6′ 0″	6′ 3″	6′ 6″	6′ 9″	7′ 0″	7′ 3″	7′ 6″	7′ 9″	8′ 0″
Electric Welded Reinforcement—4-in. Cinder Concrete Slabs, 1-2-5 Mixture																		
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	4 x 16	3 x 12	3 x 12
100 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	8 & 12
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	4 x 16	3 x 16	4 x 16
125 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	8 & 12	6 & 10	7 & 11
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16
150 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	7 & 11
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	4 x 16
175 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	5 & 10	5 & 10	6 & 10
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	2 x 16	3 x 16
200 lb..	Gauge wire.....	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	5 & 10	5 & 10	7 & 11	4 & 9	4 & 9
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	2 x 16	3 x 16
225 lb..	Gauge wire.....	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	4 & 9	5 & 10	3 & 8	4 & 9	6 & 10	3 & 8	3 & 8
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16
250 lb..	Gauge wire.....	9 & 12	8 & 12	8 & 12	7 & 11	6 & 10	6 & 10	7 & 11	5 & 10	6 & 10	5 & 10	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9
	Wire spacing in..	4 x 12	4 x 12	4 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16
275 lb..	Gauge wire.....	8 & 12	8 & 12	7 & 11	6 & 10	6 & 10	7 & 11	6 & 10	6 & 10	5 & 10	5 & 10	3 & 8	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9
	Wire spacing in..	4 x 12	4 x 16	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	4 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16
300 lb..	Gauge wire.....	8 & 12	7 & 11	7 & 11	6 & 10	7 & 11	5 & 10	6 & 10	5 & 10	3 & 8	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	4 & 9
	Wire spacing in..	4 x 16	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	4 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
325 lb..	Gauge wire.....	7 & 11	7 & 11	6 & 10	7 & 11	5 & 10	6 & 10	5 & 10	3 & 8	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8
	Wire spacing in..	4 x 16	3 x 12	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16
350 lb..	Gauge wire.....	7 & 11	8 & 12	6 & 10	5 & 10	6 & 10	4 & 9	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	3 & 8
	Wire spacing in..	4 x 16	4 x 16	3 x 16	3 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
375 lb..	Gauge wire.....	7 & 11	6 & 10	7 & 11	6 & 10	4 & 9	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	3 & 8	3 & 8
	Wire spacing in..	3 x 12	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
400 lb..	Gauge wire.....	8 & 12	7 & 11	5 & 10	6 & 10	5 & 10	3 & 8	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	2 & 8	2 & 8	2 & 8
	Wire spacing in..	4 x 16	3 x 16	4 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
425 lb..	Gauge wire.....	6 & 10	7 & 11	4 & 9	4 & 9	5 & 10	4 & 9	4 & 9	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	3 & 8	2 & 8	2 & 8	1 & 7
	Wire spacing in..	3 x 16	4 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
450 lb..	Gauge wire.....	7 & 11	5 & 10	4 & 9	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	4 & 9	4 & 9	4 & 9	4 & 9	3 & 8	3 & 8	2 & 8	2 & 8	1 & 7
Electric Welded Reinforcement—4-in. Stone Concrete Slabs, 1-2-4 Mixture																		
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16
100 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	8 & 12	8 & 12	8 & 12	7 & 11	7 & 11
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	3 x 12
125 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	8 & 12
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16
150 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	8 & 12	7 & 11	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16
175 lb..	Gauge wire.....	10 & 12	10 & 12	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	6 & 10
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	4 x 16
200 lb..	Gauge wire.....	10 & 12	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	6 & 10	5 & 10	5 & 10
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16
225 lb..	Gauge wire.....	10 & 12	9 & 12	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	4 & 9	5 & 10	3 & 8	4 & 9	4 & 9
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 12	4 x 16	3 x 12	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16
250 lb..	Gauge wire.....	10 & 12	9 & 12	8 & 12	8 & 12	7 & 11	8 & 12	6 & 10	7 & 11	5 & 10	6 & 10	6 & 10	5 & 10	5 & 10	7 & 11	4 & 9	6 & 10	6 & 10
	Wire spacing in..	4 x 12	4 x 12	4 x 12	4 x 16	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16
275 lb..	Gauge wire.....	9 & 12	8 & 12	8 & 12	7 & 11	7 & 11	6 & 10	7 & 11	5 & 10	6 & 10	4 & 9	5 & 10	3 & 8	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9
	Wire spacing in..	4 x 12	4 x 12	4 x 16	4 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	2 x 16	2 x 16	3 x 16	2 x 16
300 lb..	Gauge wire.....	9 & 12	8 & 12	7 & 11	7 & 11	6 & 10	7 & 11	7 & 11	6 & 10	4 & 9	5 & 10	3 & 8	4 & 9	6 & 10	6 & 10	3 & 8	5 & 10	4 & 9
	Wire spacing in..	4 x 12	4 x 16	4 x 16	3 x 12	4 x 16	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16
325 lb..	Gauge wire.....	8 & 12	7 & 11	7 & 11	8 & 12	6 & 10	5 & 10	6 & 10	4 & 9	5 & 10	3 & 8	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	4 & 9
	Wire spacing in..	4 x 12	4 x 16	3 x 12	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16
350 lb..	Gauge wire.....	8 & 12	7 & 11	8 & 12	6 & 10	7 & 11	6 & 10	6 & 10	5 & 10	3 & 8	4 & 9	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	3 & 8	3 & 8
	Wire spacing in..	4 x 16	4 x 16	3 x 12	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	4 x 16	3 x 16	3 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
375 lb..	Gauge wire.....	7 & 11	7 & 11	8 & 12	7 & 11	5 & 10	6 & 10	5 & 10	3 & 8	4 & 9	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8
	Wire spacing in..	4 x 16	3 x 12	3 x 16	4 x 16	3 x 16	4 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
400 lb..	Gauge wire.....	7 & 11	8 & 12	7 & 11	5 & 10	6 & 10	4 & 9	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	3 & 8	3 & 8	3 & 8
	Wire spacing in..	4 x 16	4 x 16	3 x 16	3 x 16	3 x 16	3 x 16	2 x 16	3 x 16	2 x 16	3 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
425 lb..	Gauge wire.....	7 & 11	6 & 10	7 & 11	6 & 10	6 & 10	5 & 10	7 & 11	4 & 9	6 & 10	3 & 8	5 & 10	2 & 8	4 & 9	3 & 8	3 & 8	3 & 8	2 & 8
	Wire spacing in..	3 x 12	4 x 16	4 x 16	3 x 16	3 x 16	4 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16	2 x 16
450 lb..	Gauge wire.....	8 & 12	6 & 10	5 & 10	6 & 10	5 & 10	3 & 8	7 & 11	6 & 10	3 & 8	5 & 10	4 & 9	4 & 9	4 & 9	3 & 8	3 & 8	2 & 8	2 & 8

Triangle Mesh Reinforcement—4-in. Cinder Concrete Slabs, 1-2-5 Mixture																		
100 lb.		053P	053P	053P	053P	053P	053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	084P	097P
125 lb.		053P	053P	053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	097P	097P	097P	107	107
150 lb.		053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	097P	097P	107	107	126	126	126
175 lb.		053P	053P	053P	062P	072P	072P	084P	084P	097P	097P	107	107	126	126	146	146	146
200 lb.		053P	062P	062P	072P	072P	084P	084P	097P	107	107	126	126	146	146	153	168	168
225 lb.		062P	062P	072P	072P	084P	097P	097P	107	107	126	126	146	146	153	168	180	208
250 lb.		062P	072P	072P	084P	097P	097P	107	126	126	146	146	153	168	180	180	208	208
275 lb.		072P	072P	084P	097P	097P	107	126	126	146	146	153	168	180	208	208	245	245
300 lb.		072P	084P	084P	097P	107	126	126	146	146	153	168	180	208	208	245	245	267
325 lb.		084P	084P	097P	107	107	126	146	146	153	168	180	208	208	245	245	267	287
350 lb.		084P	097P	097P	107	126	126	146	153	168	180	208	208	245	245	267	287	287
375 lb.		084P	097P	107	126	126	146	153	168	180	208	208	245	245	267	287	309	309
400 lb.		097P	107	107	126	146	146	168	180	208	208	245	245	267	287	287	309	336
425 lb.		097P	107	126	126	146	153	168	208	208	245	245	267	267	287	309	336	365
450 lb.		107	107	126	146	153	168	180	208	245	245	245	267	287	309	336	365	395
Triangle Mesh Reinforcement—4-in. Stone Concrete Slabs, 1-2-4 Mixture or Equal																		
100 lb.		053P	053P	053P	053P	053P	053P	053P	053P	053P	053P	062P	062P	062P	072P	072P	072P	084P
125 lb.		053P	053P	053P	053P	053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	097P	097P	097P
150 lb.		053P	053P	053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	097P	097P	107	107	126
175 lb.		053P	053P	053P	053P	062P	062P	072P	072P	084P	084P	097P	097P	107	107	126	126	146
200 lb.		053P	053P	053P	062P	062P	072P	084P	084P	097P	097P	107	107	126	126	146	146	146
225 lb.		053P	053P	062P	072P	072P	084P	084P	097P	097P	107	126	126	126	146	146	153	168
250 lb.		053P	062P	072P	072P	084P	084P	097P	107	107	126	126	146	146	153	168	168	180
275 lb.		062P	072P	072P	084P	097P	097P	107	107	126	126	146	146	153	168	180	208	208
300 lb.		062P	072P	084P	084P	097P	097P	107	126	126	146	146	153	168	180	208	208	245
325 lb.		072P	072P	084P	097P	107	107	126	126	146	146	168	168	180	208	208	245	245
350 lb.		072P	084P	097P	097P	107	126	126	146	146	153	168	180	208	208	245	245	267
375 lb.		084P	084P	097P	107	126	126	146	146	153	168	180	208	208	245	245	267	287
400 lb.		084P	097P	097P	107	126	126	146	153	168	180	208	208	245	245	267	287	287
425 lb.		084P	097P	107	126	126	146	153	168	180	208	208	245	245	267	267	287	309
450 lb.		097P	097P	107	126	146	146	153	168	208	208	245	245	267	267	287	309	336

CONCRETE ENGINEERING COMPANY

Meyer Steelforms, Ceco Reinforcing Bars and Fireproofing Materials

GENERAL OFFICES
OMAHA, NEB.

SALES OFFICES AND WAREHOUSES

CHICAGO (Downtown), Trustees System Building
CHICAGO (Cicero), 1926 So. 52nd Avenue
CLEVELAND, 1900 Euclid Avenue
DALLAS, Construction Industries Building
DES MOINES, Hubbell Building
DETROIT, Guaranty Trust Building
HOUSTON, 2814 Pease Avenue
KANSAS CITY, Walsix Building
LOS ANGELES, 1450 Mirasol Street
MILWAUKEE, Bartlett Building
MINNEAPOLIS, Builders Exchange Building
OKLAHOMA CITY, 502 Franklin Building
OMAHA, 1141 No. 11th Street
ST. LOUIS, Louderman Building
SAN ANTONIO, Builders Exchange Building
SAN FRANCISCO, 1280 Indiana Street

Products

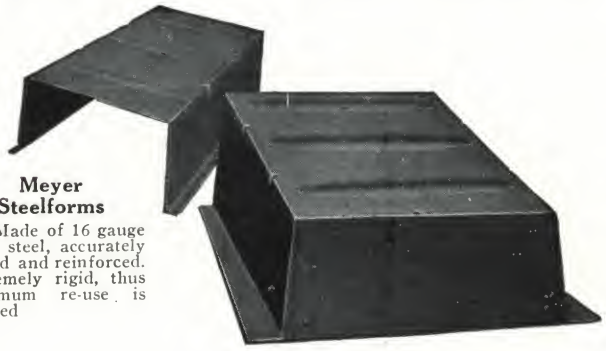
CECO REINFORCING BARS; MEYER REMOVABLE FLANGE TYPE AND ADJUSTABLE STEELFORMS for concrete joist floor construction; CECO EXPANDED METAL LATH; CECO RIB LATH; CECO HOOK HANGERS; CECO TRIANGLE FABRIC and WELDED FABRIC.

Also manufacturers of Round Column Forms, Column Spirals, Bar Chairs and Spacers, Road Strip, Furring Channels, Corner Beads, Base Beads; Meyer Adjustable Shores and Column Clamps.

Ceco AND MEYER PRODUCTS

Description of Meyer Steelform Construction

Meyer Steelform Construction is a standard system that represents the highest type of concrete joist floor construction in present day use. It consists of rows of heavy gauge removable steel forms, separated by reinforced concrete joists, and covered by a thin slab of concrete. Metal lath furring beneath provides a flat ceiling for plastering.



Meyer Steelforms

Made of 16 gauge sheet steel, accurately shaped and reinforced. Extremely rigid, thus maximum re-use is secured

Meyer Steelform Construction is most economical for buildings with lighter loads and longer spans, such as apartments and hotels, residences, schools, hospitals, office buildings, garages, light manufacturing buildings, etc. In this class of structure, dead weight of construction is a considerable factor in total load, so that the saving in dead load effected by Meyer Steelform Construction affords considerable cost saving.

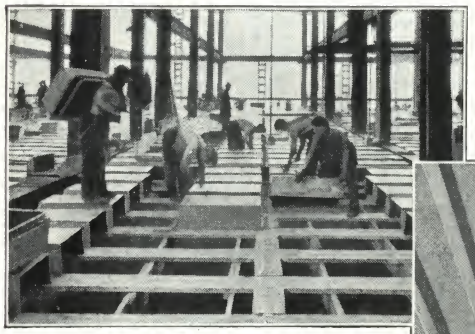
Meyer Steelforms are handled on a rental basis only. Ordinarily, the labor of installing and removing the steelforms by our skilled workmen is included with the rental charge. The economy in the re-use of Meyer Steelforms, on a rental basis, is readily apparent.

In building the formwork for the concrete joist floor, Meyer Steelforms are used as a mould for the joists and the intervening slabs; the load being carried by the joists in one direction to the supports. Continuous joists are produced by lapping the Intermediate Steelforms, and the ends of the rows of Intermediate Steelforms are closed with Endforms.

Ceco Reinforcing Bars

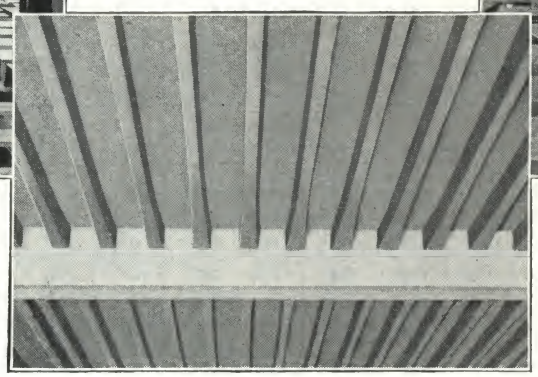
Rolled only from new billet steel. The deformations or lugs are placed at right angles to the axis of the bar, thus assuring maximum bonding value.





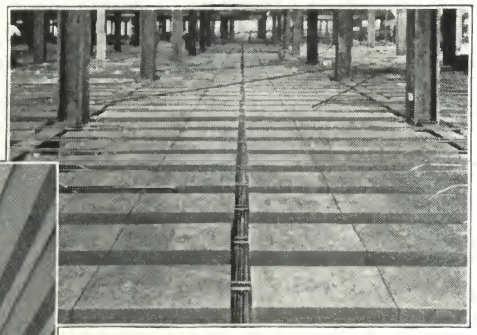
Placing Meyer Steelforms

Note the simple open wood centering required—a feature that saves time, labor and materials



View of Open Ceiling

Illustrating the clean cut, attractive results of concrete joist floor construction



Meyer Steelforms in Place

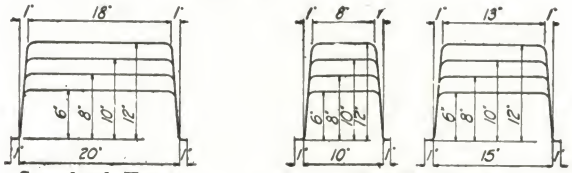
Ready for placing of concrete. Results like this, delivered on time, save money all along the line

The Original Removable Steelforms for Concrete Joist Floor Construction

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Meyer 20-in. Wide Flange Type Steelforms

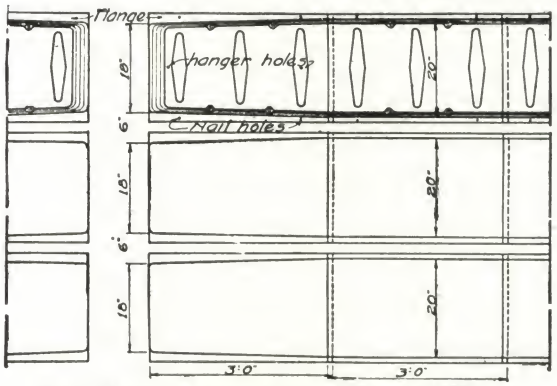
Meyer Standard Intermediate Steelforms furnished in 1, 2 and 3-ft. lengths. Meyer Special Intermediate Steelforms furnished only in 3-ft. lengths. Meyer Straight Endforms furnished only in 1-ft. length, 10, 15 and 20 in. wide.



Standard Types **Special Types**

Single Tapered Endforms—Furnished in 3-ft. length, 6, 8, 10, 12 and 14 in. high and 20 in. wide at open end. Forms taper from 20-in. width at open end to 18-in. width at closed end. (See detail.)

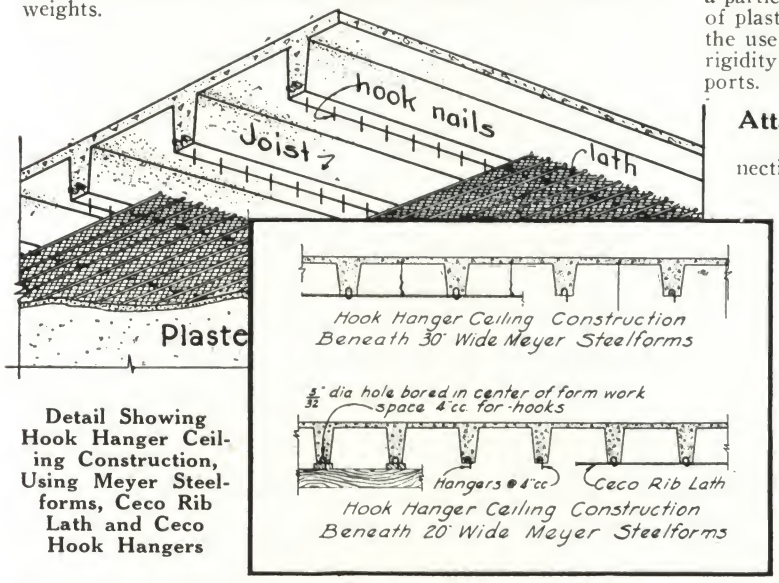
Double Tapered Endforms—Furnished same sizes as single tapered except there is a reduction in depth of steelform of 3 in. from open end to closed end for forming "T" on beam.



Plan Showing Application of Tapered Flange Type Endforms

Ceco Flat Lath

Furnished painted or from copper iron alloy or pure iron sheets in following weights per sq. yd.: 3.4, 3.0, 2.5 and 2.2 lb. Also furnished cut from galvanized sheets in 3.4 and 2.5-lb. weights.



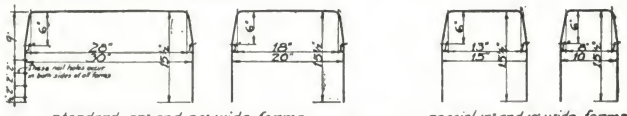
Detail Showing Hook Hanger Ceiling Construction, Using Meyer Steelforms, Ceco Rib Lath and Ceco Hook Hangers

Ceco Hook Hanger Ceiling Construction

Hook hanger ceiling construction involves the use of special Ceco Hook Hangers and a rib lath when used in connection with 20-in. wide Steelform Construction. When used in connection with 30-in. wide Steelform Construction the use of 10 gauge galvanized wire hangers and ¾-in. furring channels is also necessary to assure maximum rigidity. This construction provides a most economical lath ceiling, is strong and rigid, but must be brought up tight against bottom of joists. The elimination of channels, hangers and pencil rods effects an economy in material and labor.

Meyer 30-in. Wide Adjustable Type Steelforms

Meyer Adjustable Steelforms are made 30 in. wide and 16 in. in total height. There are no horizontal nailing flanges and the Steelforms are nailed to the sides of the wood joist soffits instead of on top of same.

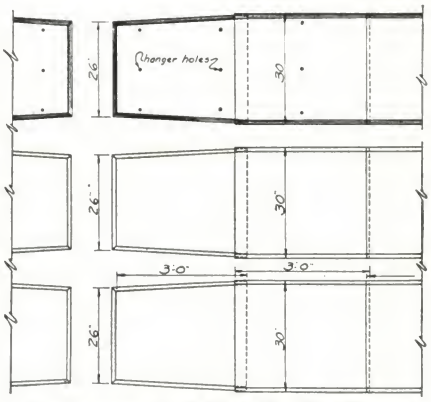


Plan Showing Application of Meyer 30-in. Wide Adjustable Steelforms

Of 14 gauge metal and without stiffening impressions of any kind, Meyer Adjustable Steelforms are rendered absolutely unyielding and rigid by the use of small angles riveted to the underside of the form. Thus joists neat and clean-cut in appearance and of uniform width are produced.

Meyer Adjustable Steelforms are particularly recommended for open ceiling work. The neat and clean-cut appearance of the joists, their uniform width and alignment, spacing of the joists at about 3 ft. on centers, are all pleasing to the eye and produce a workmanlike job.

Sizes of Meyer 30-in. Wide Adjustable Steelforms—Standard Intermediates are furnished 30 in. wide and in 1, 2 and 3-ft. lengths. Special intermediates 20, 15 and 10 in. wide. Straight Endforms are 1 ft. long. Tapered Endforms are 3 ft. long.



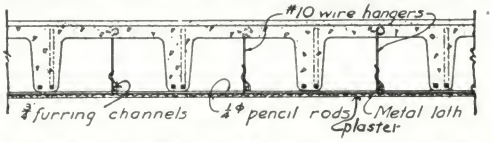
Application of Adjustable Steelforms

Ceco 3/8-in. Rib Lath

Furnished painted or from copper iron alloy or pure iron sheets in 4.0, 3.5 and 3.0-lb. weights. The "U" shaped ribs ⅜ in. high and spaced 4 in. apart running lengthwise of the sheet make a particularly economical base and reinforcement for many kinds of plaster work. The ribs give the sheets extra strength, making the use of furring channels and rods unnecessary. This added rigidity permits wider than the ordinary studs or channel supports. The sheets are erected with flat side out.

Attached Ceilings

Our standard attached ceiling constructions used in connection with 20 and 30-in. wide Steelform Construction involve the use of galvanized wire hangers, steel furring channels, ¼-in. round steel pencil rods and metal lath.



Attached Ceiling Construction with 20-in. Wide Meyer Steelforms

Note: The use of Ceco Rib Lath spanning 24 in. on centers between the furring channels instead of the ¼-in. round pencil rods and flat lath is equally recommended.

This construction may be brought up tight against the bottom of the joists or suspended as much as 6 in. The ceiling is erected after the removal of the Steelforms, and can be leveled up, straight and true, despite any variation in the level of the floor construction without filling out with plaster afterwards. The concrete and plaster do not come in contact.

This type of ceiling construction may be dropped a short distance below the bottom of the joists in order to conceal automatic sprinkler pipes or other conduits.

Ceco Welded and Triangle Fabric

Ceco Triangle Fabric is furnished in sheets or rolls. Plain or galvanized. Ideal reinforcement for thin slab over Meyer Steelforms.

Ceco Electrically Welded Fabric is furnished plain or galvanized in sheets or rolls. Made from cold drawn steel with high breaking strength. A superior product for concrete road reinforcement.

Warehouses located at strategic centers make immediate shipments of Ceco and Meyer Products to the building or construction site.

CONCRETE STEEL COMPANY

2 Park Avenue, NEW YORK, N. Y.

SALES OFFICES

CHICAGO, ILL. PHILADELPHIA, PA. PITTSBURGH, PA. ST. PAUL, MINN. BIRMINGHAM, ALA.
DETROIT, MICH. BOSTON, MASS. SYRACUSE, N. Y. WASHINGTON, D. C. MILWAUKEE, WIS.

WAREHOUSES AND FABRICATING WORKS

CHICAGO, ILL. YOUNGSTOWN, OHIO PHILADELPHIA, PA. NEW YORK, N. Y. BOSTON, MASS.
BIRMINGHAM, ALA. ST. PAUL, MINN. DETROIT, MICH.

Products

CONCRETE REINFORCEMENT BARS; COLLAPSIBLE SPIRALS for column reinforcement; CONCRETE INSERTS; CURB BARS; CONCRETE REINFORCEMENT DEVICES, including SUPPORTING, SPACING and TYING DEVICES for holding bars in place in forms; WIRE DEVICES; WIRE SOFFIT CLIPS; WALL ANCHORS and TIES; EXPANDED METAL LATH (Plain and Self-furring); EXPANDED METAL REINFORCEMENT; HOT ROLLED and COLD FORMED CHANNELS; CORNER BEADS; RIB LATH.

Also Safety Stair Treads.

For Havemeyer Steel Joist, see Manufacturers' Index.

Engineering Departments

Experienced and efficient engineering departments are maintained in our district sales offices. This organization, which includes the highest grade of engineering talent in its line, will lend every assistance in connection with all concrete reinforcement problems.

Havemeyer Concrete Reinforcement Bars

These deformed bars (Figs. 1 and 2) are rolled in square, round and flat sections, with the deformations running longitudinally and entering directly into the tensile strength of the bar, no metal being used for the mechanical bond only.

At all points they have constant uniform area of cross



Fig. 1. Round



Fig. 2. Square

section exactly equal to the cross-sectional area of a plain bar of same size.

As the projections and depressions are rolled longitudinally, there are no sharp angles to start a fracture when bar is bent. Tests prove the very superior bending qualities of Havemeyer bars.

Weights and areas of Havemeyer flats are the same as those for plain flats of same size. This bar is a most economical type of reinforcement for sewers, silos, etc. Flats not carried in stock.

Specifications for Steel—Havemeyer bars are rolled to any desired standard specification from new billet steel at mills which do not re-roll rails. This eliminates all possibility of substitution of inferior metal.

Shop Bending and Fabricating—Our warehouses are equipped for accurately bending and fabricating bars. This service eliminates a bending gang and bending machines on the job. Our warehouse charges for bending are less than it would cost the contractor if he did the work himself. Furthermore, shop bending assures the architect that every bar is bent accurately.

Fabricated units can be made up in our warehouses by using Havemeyer Beam-Saddles, Bar-Tys, etc. This assures proper spacing and placing of bars.

Collapsible Spirals

Wire is accurately coiled to proper diameter and correctly spaced with a rigid spacer. Shipped collapsed, ready to be opened up and placed in the forms.

Concrete Inserts

Dayton Adjustable-Inserts—Malleable iron, cast in one piece with keyhole slot for adjustment.

Havemeyer "Y" Socket-Inserts—Highest grade malleable iron. Broad nailing base with four *nailing* holes insures against displacement.

Havemeyer Slotted-Inserts—Pressed steel. Placed end to end, unlimited adjustment obtainable.

Havemeyer Curb Bars

We make round nose and angle nose curb bars for curb edge protection, stair nosings and platform edges.

Havemeyer Devices for Supporting, Spacing and Tying Bars in Forms

Consist of Bar-Tys, Hy-Chairs, Ty-Chairs, Easel-Chairs, Securo Bar-Spacers, Beam-Saddle and Separators.

These devices offer many decided advantages. The designer knows that every bar is exactly in its intended position. The bars are held rigidly and at the correct distance apart; they are also kept at proper distance above the forms.

Wire Devices

Soffit clips; hanger wire, straight, cut and bent; toggle hangers, etc.

Our wire shops are prepared to manufacture, on short notice, any type of wire device required for the installation of suspended ceilings or for securing lath. Tie wire staples, etc., carried in stock.

Security Anchor and Wall-Tys

For bonding brick veneer, stone, terra cotta and tile wainscoting to walls, etc.; for suspending metal lath ceilings and for holding floor sleepers, screeds, nailing strips, etc.

Havemeyer Expanded Metal

Complete information furnished on request.

Havemeyer Furring

Hot rolled channels, angles and flats.
Cold rolled channels, ¾, 1, 1½ and 2 in.

Havemeyer Corner Beads

Expanded, wing, rail and bull nose types. Lengths, 6, 7, 8, 9, 10 and 12 ft.

Havemeyer Base Beads

Expansion, plain and curved point.

Havemeyer Metal Lath

Is made in flat expanded, flat rib, ⅜-in. rib, ¾-in. rib and perforated sheet.

Weights as follows:
Flat Expanded, Painted—2.2, 2.5, 3 and 3.4 lb. per sq. yd.
Flat Expanded, Galvanized—2.5 and 3.4 lb. per sq. yd.
Flat Rib, Painted—2.75, 3.0, 3.4 and 4.0 lb. per sq. yd.
Flat Rib, Galvanized—3.6 lb. per sq. yd.
⅜-in. Rib, Painted—2.75, 3.0, 3.4 and 4.0 lb. per sq. yd.
¾-in. Rib—46, 56 and 74 lb. per 100 sq. ft.
Perforated Sheet—4.5 lb. per sq. yd.

Wire Mesh

Both triangle and electric weld in plain and galvanized, all standard weights and areas.

Catalogue

Complete descriptive catalogue on request.

THE CONSOLIDATED EXPANDED METAL COMPANIES

Steelcrete Building, WHEELING, W. VA.

SALES OFFICES AND WAREHOUSES

BOSTON, MASS., 137 Washington Street, Somerville
BUFFALO, N. Y., 2 Ganson Street
CHICAGO, ILL., 2531 Arthington Street
PITTSBURGH, PA., 6626 Hamilton Avenue
CLEVELAND, OHIO, 13107 St. Clair Avenue
NEW YORK, N. Y., 103 Park Avenue
PHILADELPHIA, PA., 1075 Germantown Avenue
DETROIT, MICH., 4015 Michigan Avenue

FOREIGN SALES OFFICE, 152 West 42nd Street, NEW YORK, N. Y.

Product

STEELCRETE CONCRETE REINFORCING MESH, a diamond mesh fabric furnished in large, flat sheets.

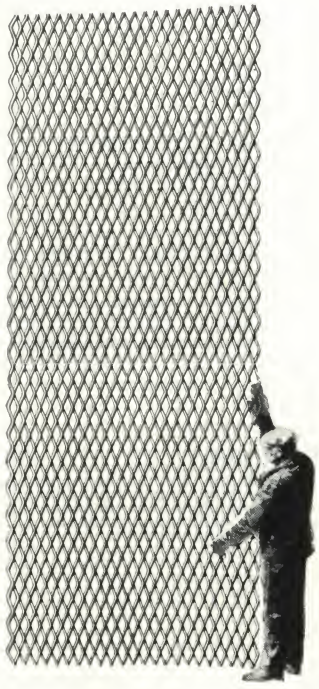
For Steelcrete Industrial Mesh and Accessories for construction of door and window guards and protective panels, and Steelcrete Armor Mat Reinforcing for bank vault construction, see Manufacturers' Index.

Specifications

"The Steelcrete Mesh shall be laid on the forms with long way of the diamond meshes extending in a direction transversely to supporting beams. The separate sheets shall be lapped one mesh on the side and one mesh on the end, and wired together at a sufficient number of points for the purpose of holding sheets in position while depositing the concrete."

Steelcrete Reinforcing Mesh

Steelcrete Reinforcing Mesh is a diamond mesh fabric, cold drawn from a solid steel plate and has a guaranteed elastic limit 60% higher than commercial medium steel. In the process of manufacture every strand is tested against flaws and other weaknesses, assuring a uniform mesh of high elastic limit. Steelcrete Mesh is free from mechanical and welded joints, the fabric being one solid sheet.



Steelcrete Mesh provides two-way reinforcement as well as the diagonal reinforcement, not ordinarily taken care of. It is furnished in large, flat sheets, suitable to all types of construction, easy to handle and costs less "in place" than materials having considerably lower reinforcing values. Steelcrete Mesh is especially adapted for use in tunnels, tanks, sewers, culverts, retaining walls and concrete floor laid on the ground.

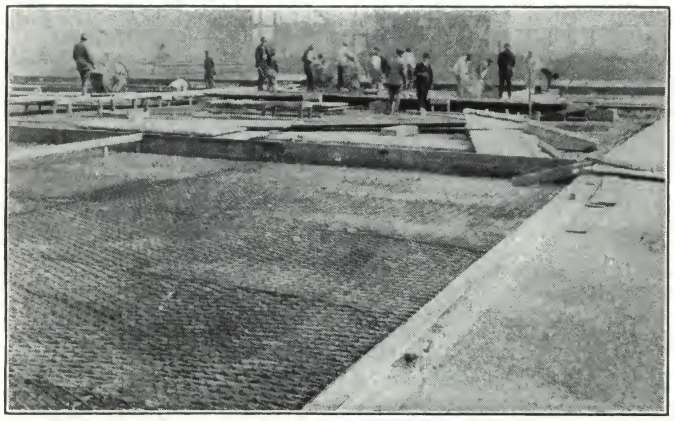
Steelcrete Service

Plans may be forwarded to any Branch Office or the Main Office for designs or estimates and will receive prompt attention.

STANDARDS FOR "STEELCRETE" EXPANDED METAL

Designation of mesh	Effective sectional area sq. in. per ft. width	Approx. weight per sq. ft., lb.	Standard width of sheets, ft.-in.	Sq. ft. in a standard sheet of various lengths				Sheets in a standard bundle
				8 ft.	10 ft.	12 ft.	16 ft.	
3-13-075	.075	.25	6-4	50.67	63.33	76.00	101.33	10
3-13- 10	.10	.34	7-0	56.00	70.00	84.00	112.00	7
3-13-125	.125	.42	5-8	45.33	56.67	68.00	90.67	7
3- 9- 15	.15	.51	7-0	56.00	70.00	84.00	112.00	5
3- 9-175	.175	.60	6-0	48.00	60.00	72.00	96.00	5
3- 9- 20	.20	.68	5-3	42.00	52.50	63.00	84.00	5
3- 9- 25	.25	.85	4-2½	33.67	42.08	50.50	67.33	5
3- 9- 30	.30	1.02	7-0	56.00	70.00	84.00	112.00	2
3- 9- 35	.35	1.19	6-0	48.00	60.00	72.00	96.00	2
3- 4- 40	.40	1.36	4-7	36.67		55.00	73.33	2
3- 4- 45	.45	1.53	4-1	32.67		49.00	65.33	2
3- 4- 50	.50	1.70	7-4	58.67		88.00	117.33	2
3- 4- 55	.55	1.87	6-8	53.33		80.00	106.67	2
3- 4- 60	.60	2.04	6-1½	49.00		73.50	98.00	2
Beam Wrapper	.059	.20	0 6	4 00				15

Note: All the above sizes are furnished in a standard diamond 8-in. length and approximately 3-in. width. All sizes are furnished in stock lengths 8, 12 and 16 ft. In addition, all sizes from 3-13-075 to 3-9-35, inclusive, are furnished in stock lengths of 10 ft.



Steelcrete Mesh Used in Reinforcing the Spruce Street Pier, Camden, N. J.

THE GOLDSMITH METAL LATH CO.

Manufacturers of the Shurebond Unit System of Concrete Joist Construction

GENERAL OFFICE AND FACTORY

CINCINNATI, OHIO

Products

THE SHUREBOND UNIT SYSTEM of METAL TILE.

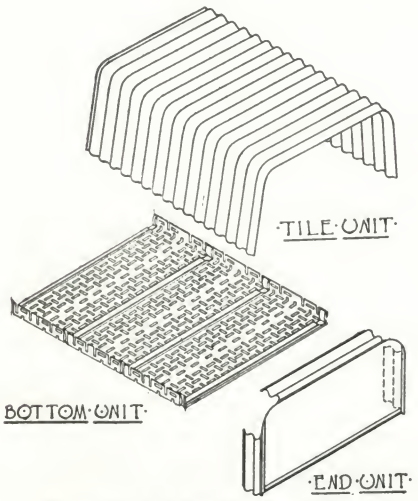
For our page on Metal Lath, Inserts, Furring Channels, etc., see Manufacturers' Index.

Services

Catalogues, specifications, dead loads, concrete quantities, instructions for placing and installing, and other information on request.

The Shurebond Unit System (Patented)

A system of concrete joist construction which can be used with a reinforced concrete or structural steel frame, or with bearing walls. It incorporates the metal tile which act as moulds for forming the concrete joists and top slabs, and the metal lath for the ceilings under the slabs. Particularly adapted to long spans. The type of slab construction to use for hotels, office and commercial buildings, loft buildings, school and institutional buildings, apartment buildings, garages, etc.



Shurebond Tile, End and Lath Bottom Units

Shurebond lath bottom units are tacked to the forms.

Shurebond tile units are placed in lath bottom units—no nailing.

Shurebond end units wedge on tile units—no nailing

Advantages of the Shurebond Unit System

Flexibility—The Shurebond Unit System can be furnished in any width or depth to meet any design that an architect or engineer considers economical, including any degree or length of tapered end tile, beveled end tile, or end tile that are both tapered and beveled.

Strength and Rigidity—Special analysis, heat-treated steel used for the Shurebond Tile Units, eliminates sags and bends without planking while under construction.

Permanency—The design and heavy weight of the metal lath used for the Shurebond Lath Bottom Units, provide a plastering base and reinforcement which will endure during the life of the building itself. The design of the lath insures a perfect bond with the plaster.

Economy—(a) Less dead load to carry a given live load, which reduces the size of the girders, columns and foundations, and saves steel, concrete and forming.

(b) The simplest and most economical type of wood forming can be used, namely, the open or skeleton type.

(c) The installation can be handled by one man, no special provisions in the wood forming are required to permit stripping metal tile or metal forms as there are no metal tile or metal forms to be stripped, there are no wire hangers or light iron furring to furnish or to install, and no lath to install after the wood forming is removed.

(d) The Shurebond Lath Bottom Units through their upturned ends become integrally and continuously bonded in the concrete joists, thus eliminating refurring after the wood forms are removed.

(e) Maximum concrete displacement is obtained with Shurebond Metal Tile Units.

(f) The type of lath used in Shurebond Lath Bottom Units reduces the amount of materials required for plastering, with a corresponding reduction in the labor of application.

(g) Economy and simplicity of installing the conduits on the wood forms before the Shurebond Unit System is installed and before the concrete is poured.

(h) No breakage and less storage, hauling and handling.



The American Furniture Mart, Chicago

Over two million square feet of floor area. Shurebond Patented Unit System used throughout—completed and ready for plastering at the rate of one floor per week

Speed of Construction—The use of the Shurebond Unit System results in quicker completion of a building, thereby making it income-producing at an earlier date, and reducing both the carrying charges on the investment and the contractor's overhead.

Hard, Dense Concrete—Honeycombed concrete which results from leakage or absorption is eliminated.

Conformity with Structural Design—Joists of uniform width throughout their entire length are assured, as the Shurebond Tile Units cannot shift or spread while the concrete is being poured.

Shurebond Unit System Sizes

Standard widths—12, 20 and 30 in.

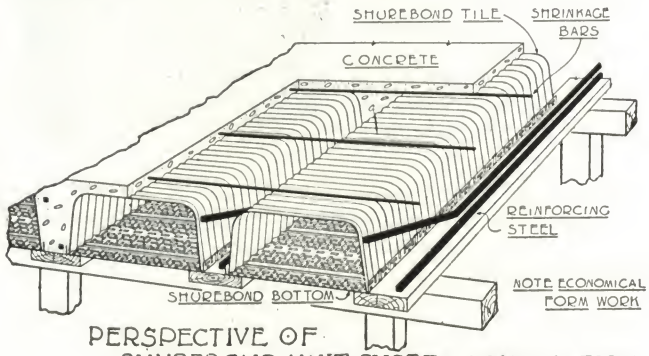
Standard lengths—2 ft. and 1 ft. covering surface.

Standard depths—4 to 16 in., inclusive, varying 1 in.

Other widths and depths can be furnished to meet any design that an architect or engineer considers economical, including any degree or length of beveled or tapered tile units, or both.

References

Millions of square feet of the Shurebond Unit System have been installed in buildings throughout the United States, including the largest buildings in the world.

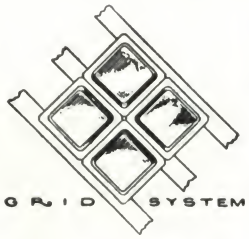


PERSPECTIVE OF SHUREBOND UNIT SYSTEM INSTALLATION

GRID FLAT SLAB CORPORATION

761 Dudley Street, BOSTON, MASS.

Grid System



New and economical flat slab form of construction for floors and roofs, made upon removable steel domes. This method is a two-way rib section of reinforced concrete acting to support a lighter floor slab. By cutting out all useless concrete between the ribs there is considerable concrete and reinforcing steel saved. This saving of concrete and steel cuts the dead weight materially and permits of wider spans and column spacings—bays have been constructed up to 32 ft. square.

Calculations for Grid System—The calculations for the Grid Flat Slab are identical with those of the usual two-way flat slab. Standard specifications for concrete and reinforced concrete for flat slabs apply to Grid Flat Slabs.

These formulas are recommended for use where there are no definite building laws. Where architects or engineers design without set codes, the method taken with usual two-way flat slab designs can be taken with Grid Flat Slab.

Thickness of Slab and Depth of Dome to Be Used—The thickness of the Grid Slab and the depth of the dome required for any structure are determined by the weight to be carried and the span or spacing of the columns. The same method of determining the thickness of the ordinary flat slab should be employed. The rule is that the slab should be $\frac{1}{32}$ of the column span. The depth of the dome plus the thickness of the slab above should usually be at least 1 in. greater than the usual flat slab. The slab should never be less than 2 in. on top of the dome, the depth depending on the concentrated load.

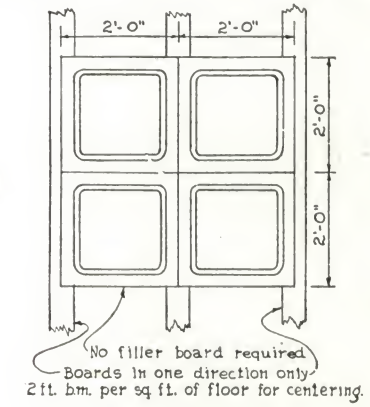
Steel Domes—The size of the removable steel domes is shown in the following illustration. Each 8-in. dome displaces 1½ cu. ft. of concrete.

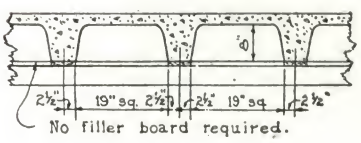
Wood Forms—The domes require support by narrow boards 2 ft. apart extending in *one direction only.* In the majority of designs the bottoms of the plinths are flush with the bottoms of the ribs, thus doing away with the expense and delay of forming dropped panels.

Placing Reinforcing Steel—*Reinforcing steel can not be misplaced or left out.* The steel is placed, one or two bars in the ribs and the steel man can not misplace it or leave it out, by mistake, without it being noticed.

Inserts and Electric Conduit—All inserts and conduits can be placed in the Grid Flat Slab the same as regular slab. Outlet boxes in ribs, large junction boxes in slab. Inserts can be placed as desired and held firmly in place with a small device. Floor drainers, if large, by leaving out a dome—extra concrete will support it.

Pouring of Concrete—The domes are No. 16 gauge steel. The tops are flat and stiff enough to support a runway to wheel concrete to point of placing. Screeds can be placed on domes to assure correct and equal thickness of concrete in placing.



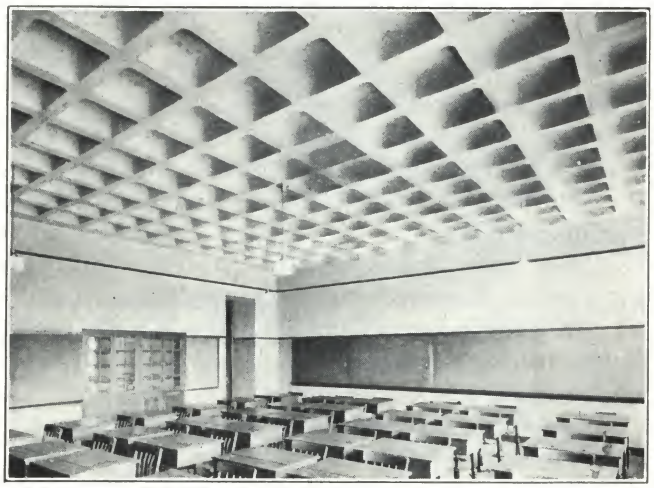


Availability of Steel Domes—The steel domes for the Grid System are available in quantities large enough for any job and can be supplied on short notice.

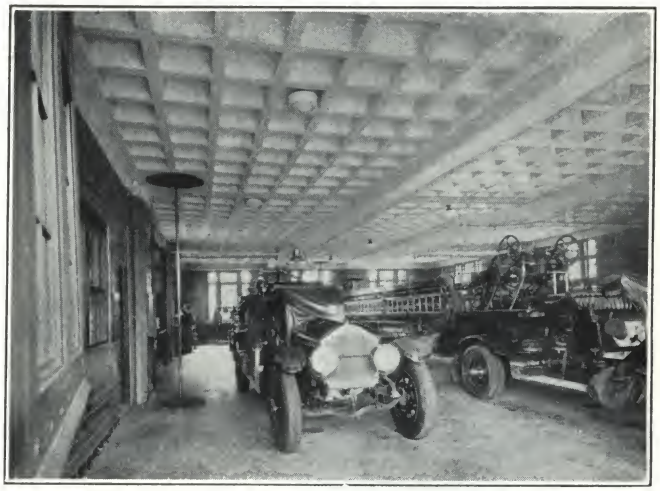
Domes and System Patented—The steel domes for the Grid System as well as the type of construction are patented and patents owned by the GRID FLAT SLAB CORPORATION.

Service

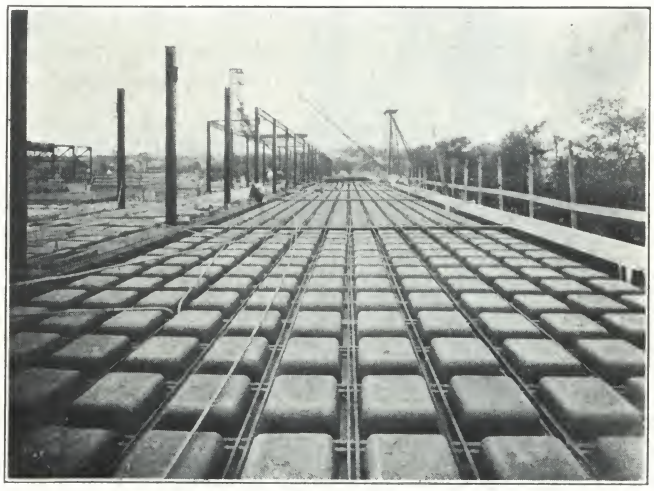
The engineers of GRID FLAT SLAB CORPORATION will act as consulting engineers with architects and engineers on any Grid design and will furnish, place, oil and remove domes.



Brighton High School, Boston, Mass.
O'CONNELL & SHAW, Architects
JOHN J. HARTY, Engineer
Just completed; $1,300,000 approximate cost



Brighton Fire Station, Boston, Mass.
RALPH T. JACKSON, Architect
FAY, SPOFFORD & THORNDYKE, Engineers



Eastern Senior High School, Lynn, Mass.
SANBORN & WEED, Architects
J. R. WORCHESTER & Co., Engineers
Now under construction; $1,500,000 approximate cost

THE HAUSMAN STEEL COMPANY

Concrete Form Contractors

TOLEDO, OHIO

Products and Service

REMOVABLE STEEL FORMS for Concrete Joist Construction; REMOVABLE STEEL FORMS for Flat Slab Concrete FLOORS; STEEL COLUMN MOULDS for Circular Concrete Columns.

Also Heavy Gauge Steel Tile and Steel Forms for any purpose that involves sufficient duplication.

An Engineering Organization that designs or redesigns reinforced concrete structures for most economical construction.

Quotations are made for furnishing forms on a lease-only basis, or erected in place complete.

Concrete Joist Construction

This system is most economical in buildings of light occupancy, such as hotels, apartments, office buildings and schools. Note that steel channel soffits insure uniform width of joists, and spreaders act as chairs for reinforcing steel. Hairpin hangers are supplied for attaching ceiling lath. Forms are 14 gauge material in depths of 6, 8, 10, 12 and 14 in. Joists are 5 in. wide, 25-in. centers.

Not just another pan system but includes centering under pans.



Concrete Joist Construction



Column Mould with Drop Head Ready for Flat Slab Shoring and Panels

Adjustable Circular Column Forms

These forms are used with flared heads in flat slab construction, and without heads in beam and girder construction whenever round columns are desired. Heavy circular steel bands and wedges draw and hold the forms to a true circle. Hausman Column Forms are adjustable in diameters of even inches and to head diameters of every 6 in. from 42 to 72 in. They are adjustable to any height by telescoping of sections.

Write for descriptive literature and valuable data on concrete quantities and design tables.

Flat Slab System

The flat slab system is used where heavy floor load is involved, as in factories, warehouses and the like. Steel panels rest on minimum of wood shoring. No bolts or fastenings are required. Panels are stripped without removing or disturbing shoring. Panels are of 14 gauge sheet steel in sizes readily handled by one man on the job.



Flat Slab Construction

FOUNDED 1850

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

Jones & Laughlin Building, PITTSBURGH, PA.

DISTRICT SALES OFFICES

ATLANTA, GA., 1313-14 Healey Building
Telephone, Walnut 6805

BOSTON, MASS., 131 State Street
Telephone, Hubbard 5151

BUFFALO, N. Y., Liberty Bank Building
Telephone, Washington 0268

CHICAGO, ILL., 111 W. Washington Street
Telephone, Franklin 2522

CINCINNATI, OHIO, Carew Tower
Telephone, Main 2324

CLEVELAND, OHIO, Union Trust Building
Telephone, Main 7866

DALLAS, TEX., Magnolia Building
Telephones, 2-6810, L.D. 700

DENVER, COLO., First National Bank Building
Telephone, Main 2449

DETROIT, MICH., Fisher Building
Telephone, Empire 9010-11-12-13

ERIE, PA., Erie Trust Building
Telephone, C 54146

LOS ANGELES, CAL., 416 Roosevelt Building
Telephone, Vandike 6178

MEMPHIS, TENN., 1 Auction Street
Telephone, 64-836

MILWAUKEE, WIS., 1410 The Bankers' Building
Telephone, Daly 4418

MINNEAPOLIS, MINN., 1030 Rand Tower Building
Telephone, Atlantic 5048

NEW YORK, N. Y., 165 Broadway
Telephone, Cortlandt 7513

PHILADELPHIA, PA., Broad Street Station Building
Telephone, Rittenhouse 0750

PITTSBURGH, PA., Jones & Laughlin Building
Telephone, Court 3240

ST. LOUIS, MO., Boatmen's Bank Building
Telephone, Garfield 4075

SAN FRANCISCO, CAL., Standard Oil Building
Telephone, Douglas 1776

WASHINGTON, D. C., Woodward Building
Telephone, Main 2293

CANADIAN REPRESENTATIVES: JONES & LAUGHLIN STEEL PRODUCTS COMPANY

PITTSBURGH, PA., U. S. A., Jones & Laughlin Building
Telephone, Court 3240

TORONTO, ONT., CANADA, Toronto Daily Star Building
Telephone, Adelaide 0022

WAREHOUSES

CHICAGO, ILL., Telephone, Virginia 1600

CINCINNATI, OHIO, Telephone, Main 2324

MEMPHIS, TENN., Telephone, 64-836

PITTSBURGH, PA., Telephone, Hemlock 1000

DETROIT, MICH., Telephone, Melrose 6650

Products

J & L BARS for Concrete Reinforcement.

Also J & L Structural Shapes and Fabricated Structural Work, Columns, Girders, Trusses, Plate Work, Tanks, Mill and Factory Buildings; J & L Steel Piling; J & L Wire Products.

For J & L Junior Beams, Light Weight Channels for Stair Stringers and other uses, and Tubular Products, see page numbers in Manufacturers' Index.

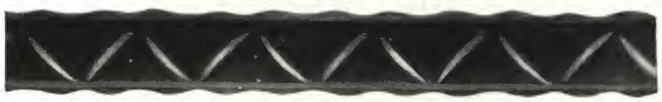
Description—Concrete Reinforcement Bars

J & L Diamond Bars are rolled from new billet steel and are tested to standard specifications. Each has uniform cross section, without offset, carrying the stresses evenly. Ribs are clean cut and accurate, balancing each other in two opposite spirals. The ribs run at angles of 45°, giving maximum areas to resist slipping.

There are no sharp edges or corners, thereby assuring intimate and thorough contact with the concrete. Sizes are easily identified, round sections for the standard round equivalents, gothic sections for the standard square equivalents.



J & L Round Equivalent Deformed



J & L Square Equivalent Deformed

STANDARD SIZES CONCRETE REINFORCEMENT BARS

Size, in.	Area, sq. in.	Weight per ft.
* ¼ round	.049	.167
⅜ round	.110	.376
½ round	.196	.668
½ square	.250	.850
⅝ round	.307	1.043
¾ round	.442	1.502
⅞ round	.601	2.044
1 round	.785	2.670
1 square	1.000	3.400
1⅛ square	1.266	4.303
1¼ square	1.563	5.313

*Furnished in plain round.

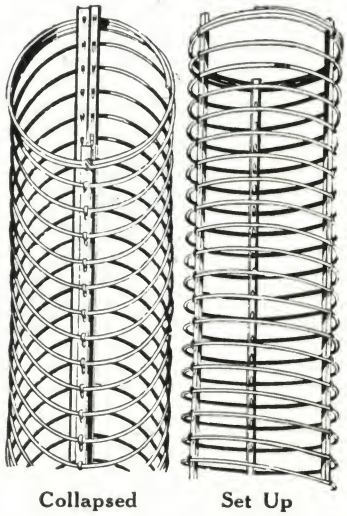
J&L STEEL

Column Spirals

Spirals are fabricated with two or more channel spacers as desired. This permits the spirals to be shipped collapsed ready to set in forms.

STANDARD SIZES SPIRAL WIRE

Size, in., plain round	Area, sq. in.	Wt., per ft., lb.
¼	.049	.167
⅜	.110	.376
½	.196	.668
⅝	.307	1.043



Collapsed Set Up

A complete stock of standard sizes is carried in both hot rolled and cold drawn wire.

Quick shipment assured.

Warehouse Service

We carry large stocks of reinforcing bars, so that unusual requirements, as well as those of ordinary nature, are taken care of promptly.

We are in a position to cut and bend bars in accordance with bar lists and bending details as submitted.



Bar Bending Bay, J & L Concrete Reinforcement Bar Warehouse, Pittsburgh, Pa.

KALMAN STEEL COMPANY

Manufacturers of Concrete Reinforcement Products

CHICAGO, ILL.

ALBANY, N. Y.
ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
CLEVELAND, OHIO
DALLAS, TEX.
DAYTON, OHIO
DETROIT, MICH.
HOUSTON, TEX.
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NILES, OHIO
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ST. LOUIS, MO.
ST. PAUL, MINN.
SYRACUSE, N. Y.
WASHINGTON, D. C.
YOUNGSTOWN, OHIO

EXPORT OFFICE: NEW YORK, N. Y.

Products

CORRUGATED BARS for concrete reinforcement; complete line of CONCRETE ACCESSORIES including SPACERS, CHAIRS, INSERTS, SLEEPER ANCHORS; ANCHOR SLOT, STEEL TILE; COLUMN FORMS and SPIRALS, WIRE FABRIC.

Also other related products.

For Kalmantruss Joists, Steel Buck and Jamb, Building Products, see Manufacturers' Index.

Engineering Service

Expert engineering service is one of the most valuable features of the KALMAN STEEL COMPANY Service. At all district sales offices expert help is available on matters of estimate, design, and detail of reinforced concrete structures of all types, together with reliable advice concerning the use and purposes of all Kalman products.

Corrugated Bars

Deformed bars of highest grade steel, rolled from new billets, and also from rails, in square and round sections in accordance with the following schedule.

STANDARD SIZES CORRUGATED BARS

Round			Square		
Size, in.	Net area, sq. in.	Weight per ft., lb.	Size, in.	Net area, sq. in.	Weight per ft., lb.
¼	.05	.17	½	.25	.86
⅜	.11	.38	1	1.00	3.44
½	.20	.68	1⅛	1.27	4.35
⅝	.31	1.06	1¼	1.56	5.37
¾	.44	1.52			
⅞	.60	2.07			
1	.79	2.70			



Round and Square Corrugated Bars

Removable Tile

Kalman Removable Steel Tile is used in forming reinforced concrete ribbed slabs in buildings. Because of the large investment involved, the tile is leased instead of sold to the contractor and is erected by our field organization, the Corr Service Erection Co.

Kalman Removable Steel Tile actually saves time, labor, and money. The tile is kept in perfect condition, cleaned, and re-formed after every job. Complete information can be had on request.

Anchor Slot

Kalman Anchor Slot and Anchors conform to all requirements of modern building practice and embody features of strength and simplicity that make them highly desirable from all standpoints—economy, ease of installation and dependable performance. A positive bond between concrete surfaces and masonry veneers, face brick, stone, or terra cotta is provided. Kalman Anchor Slot is made of 24 gauge galvanized steel to essentially a T-section. It insures a uniform and sufficient thickness of the concrete ledges against which anchors exert their pull. A tight veneer anchorage is certain.



Anchor Slot Inserted



Anchor Slot Locked Behind Bearing Ledges

Column Forms

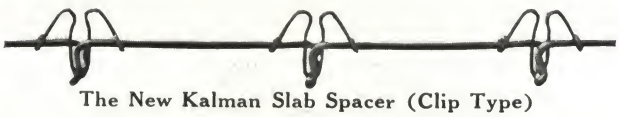
Adjustable metal forms strongly and simply made. They produce true round columns with accurate and graceful profiles where the flared head merges with the shaft. Kalman Column Forms are furnished to contractors on a lease and erection basis.



Column Form

Bar Supports and Spacers

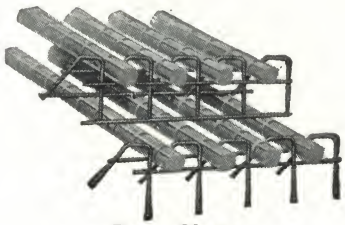
Kalman offers a complete line of bar supports and spacers to aid in the accurate and economical setting of reinforcing steel. These products include the new Kalman High Chair (for use with either tees or bars), beam chairs, rib chairs, bar chairs, beam bolsters, bar clips, and several types of slab spacers.



The New Kalman Slab Spacer (Clip Type)

Other Products

In addition to the line of bar supports and spacers, Kalman offers the new screed chair, adjustable and hanger inserts and sleeper anchors. Write for bulletins on various products.



Beam Chairs



Sleeper Anchor

THE R. C. MAHON COMPANY

Manufacturers of Permanent Steel Floor Forms

DETROIT, MICH.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

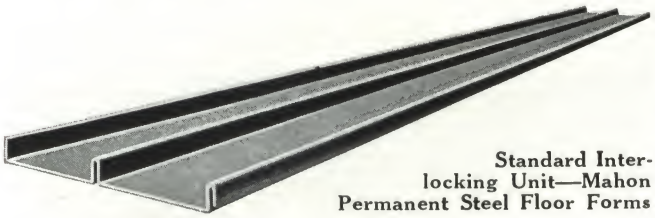
Product

MAHON PERMANENT STEEL FLOOR FORMS.

For Mahon Steel Roof Deck, Kalamein and Tin Clad Doors, Rolling Steel Doors and Cast Iron Roof Sumps, see page numbers in Manufacturers' Index.

Mahon Permanent Steel Floor Forms

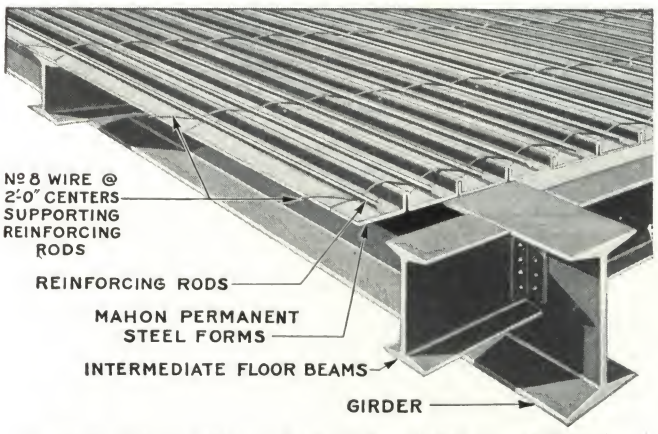
Rolled from 18 and 20-gauge tight-coated, galvanized copper bearing steel, this interlocking form provides a unique system of rapid construction for multiple story buildings where concrete floors are employed. Mahon continuous, interlocking, permanent floor forms are furnished in any length up to 12 ft. 4 in. and can be easily and quickly placed.



Standard Interlocking Unit—Mahon Permanent Steel Floor Forms

Economy

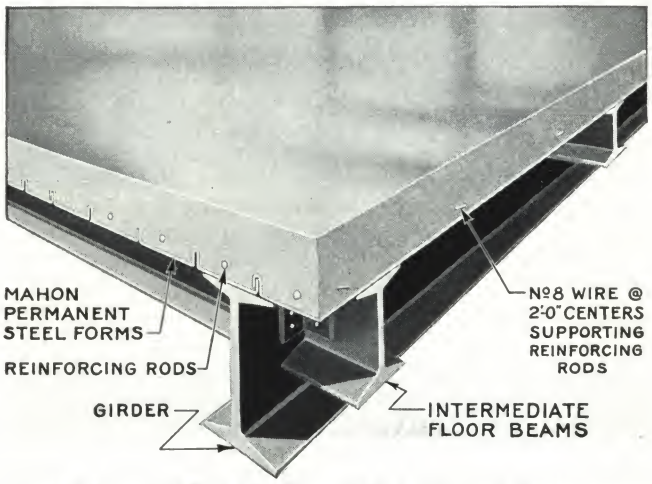
Through the elimination of costly wood form work and all shoring, this system of floor construction offers a tremendous saving in time, material and labor. The absence of shoring between floors permits other trades to proceed without interference. All floors may be poured at one time, with no dripping or seepage through forms, and there is no shoring or form work to remove after the concrete has set.



Cross Section of Mahon Interlocking Steel Forms Showing Application and Position of Reinforcing Rods

Appearance

Mahon Interlocking Steel Floor Forms are permanent—presenting a smooth ceiling surface easy to keep clean and pleasing in appearance. For every type of commercial or industrial building, the Mahon system of floor construction may be used to a decided advantage.



Cross Section of Finished Floor Slab in Typical Construction with Mahon Permanent Interlocking Steel Floor Forms

ENGINEERING DATA

Total live and dead load, lb.	Reinforcing steel		Maximum beam spacing	
	3½-in. slab	4-in. slab	20 gauge	18 gauge
100	¼" Ø	¼" Ø	5' c to c	6' c to c
125	¼" Ø	¼" Ø	5' c to c	6' c to c
150	¼" Ø	¼" Ø	5' c to c	6' c to c
175	5/16" Ø	5/16" Ø	5' c to c	6' c to c
200	5/16" Ø	5/16" Ø	5' c to c	6' c to c
250	3/8" Ø	5/16" Ø	5' c to c	6' c to c



Ceiling Effect at the Standard Chevrolet Sales, Lansing, Mich., Where Mahon Permanent Steel Floor Forms Were Used for a Multiple Story Garage Building

NATIONAL STEEL FABRIC COMPANY

DIVISION OF PITTSBURGH STEEL COMPANY

Manufacturer of National Reinforcing (Welded Wire Fabrics) and Steeltex

GENERAL OFFICES

902 Union Trust Building, PITTSBURGH, PA.

For Branch Offices, see Our Other Section. For Steeltex Lath, see Manufacturers' Index

NATIONAL REINFORCING (WELDED WIRE FABRIC)



NATIONAL REINFORCING is especially designed for concrete reinforcing in all types of construction. It is the same as Steeltex, but without the waterproof fibrous backing.

Embedded in the concrete, NATIONAL REINFORCING resists the internal stresses caused when wet concrete is setting, and prevents the spread of cracks. Slabs are held intact.

General Information

NATIONAL REINFORCING is an electrically-welded wire fabric furnished in various gauges and spacings of wires. The material is fabricated by machines which accurately space and assemble the wires into fabric form by electrically welding all longitudinal and transverse members at their intersections. The steel wire, of which NATIONAL REINFORCING is made, has high tensile strength, together with elastic and ductile properties of such a character as to render it especially suitable for the reinforcement of concrete. It is furnished in plain or galvanized finish and shipped in rolls or sheets. Standard sizes stocked.



Cross Section of Weld

Illustrates the "fusing" together of longitudinal and transverse members of National Reinforcing

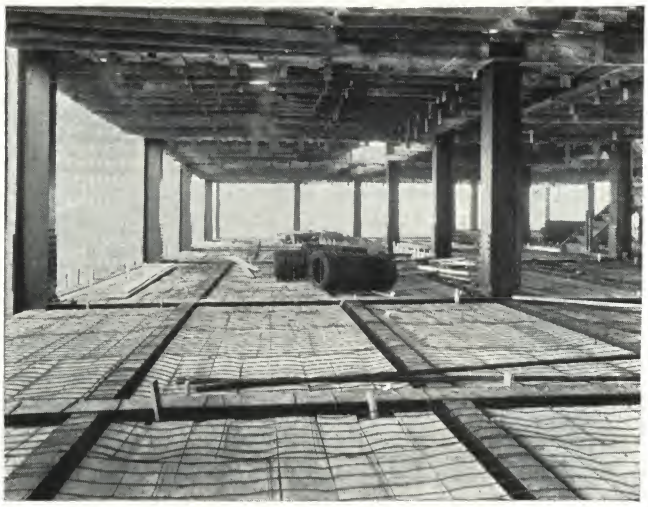
For Temperature Reinforcement—NATIONAL REINFORCING is used extensively for temperature reinforcement in the top or finish layer of cement or composition floors in office and other buildings. NATIONAL REINFORCING adds strength, promotes long service, prevents cracks and spalling.

For Beams and Columns—NATIONAL REINFORCING in the proper styles is readily adapted to thin layers of concrete and to the shapes and extensive areas of such work. (See typical illustration in opposite column.)

For Floor Slabs—NATIONAL REINFORCING provides superior reinforcing efficiency when used in reinforced concrete floor slab construction by insuring correct spacing of steel members and proper distribution throughout the slab. There are standard styles of NATIONAL REINFORCING to meet the requirements of the various types of floor slab construction.

How to Specify

Welded wire fabric is no longer considered as merely steel reinforcement. The specifications of NATIONAL REINFORCING (welded wire fabric) is a positive assurance of exact cross sectional area of steel with all members accurately spaced. Exhaustive tests and experience gained from thousands of jobs under all conditions, have made it possible to quickly select the proper style of NATIONAL REINFORCING. Specification of a definite style of NATIONAL REINFORCING should designate the spacing and gauge for both the longitudinal and transverse members. Call or wire for recommended styles and complete table.

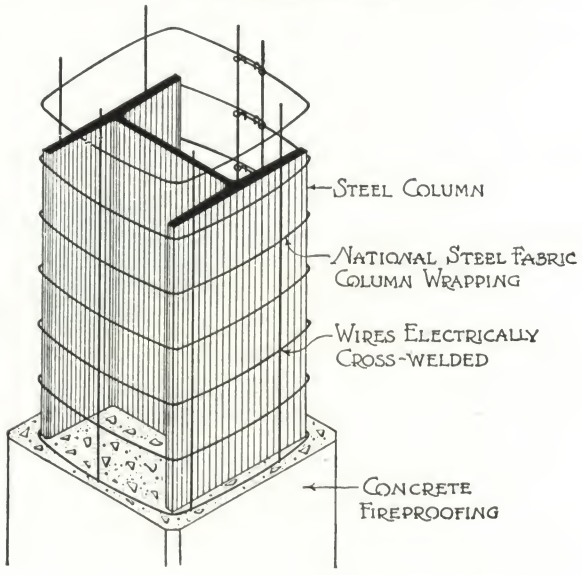


National Reinforcing (Welded Wire Fabric) in Place Ready for Concrete Pouring



American Furniture Mart, Chicago, Ill.

240,000 sq. ft. of National Reinforcing used in this large building



Continued on next page

STEELTEX FLOOR LATH



The use of concrete and gypsum for floors and roofs in combination with steel joists and light weight beams has enjoyed a remarkable increase during the past few years since this system has proven its structural value, fire resisting qualities, economy, and speed in erection.

STEELTEX Floor Lath has been scientifically developed for this class of construction and has done much to stimulate the increased demands for economical, safe, and practical floor systems by virtue of the component parts of STEELTEX, providing a solid water-resisting backing and the necessary amount of steel for reinforcing.

These outstanding dual features combined in one product and placed on the joists or beams in one operation prove very economical.

STEELTEX Flóor Lath is manufactured and shipped in rolls 125 ft. long and 4 ft. wide (500 sq. ft.), which permits its being rolled out across the top flanges or chords to the desired length and then cut.

The reinforcing element of STEELTEX Floor Lath, which consists of a 3x4-in. mesh with No. 12 gauge galvanized cold drawn steel wires, electrically welded at the intersection, giving .035 sq. in. of steel area per ft. of slab width, is automatically embedded in the concrete to a predetermined depth by means of a crimp in the tie wire which holds the reinforcing to the backing.



STEELTEX is unrolled over the joists and cut to length; it is then attached to an end or anchored joist, drawn taut by the stretching device at the opposite end joist, and fastened by clips or wedges to intermediate joists



STEELTEX in an unbroken stretch of 212 ft., Douglas County Home, Omaha, Neb.



Concrete is poured directly onto STEELTEX. The heavy corded backing assures against loss of concrete through dropping and permits slabs of predesigned strength. The galvanized wire mesh is automatically embedded in the slab as the concrete is poured

General Specification

Concrete floors so specified and designated shall be poured on STEELTEX Floor Lath, manufactured by the NATIONAL STEEL FABRIC COMPANY of Pittsburgh, Pa. STEELTEX Floor Lath shall be installed over the steel joists in accordance with the manufacturer's directions as outlined in their bulletin, "Directions for installing STEELTEX for Floors."

Specifications—Steeltex Floor Lath over Steel Joists—Place over steel floor joists of the rolled section or bar type, STEELTEX Floor Lath, which is furnished in rolls. It shall be placed in full lengths across entire floor system, from the outer or bearing walls of the building, and fastened in place to floor joists with special clips or wedges provided.

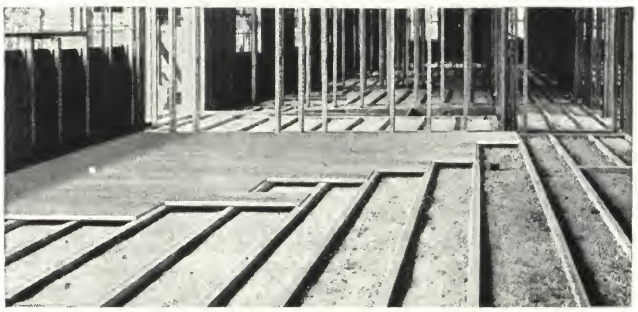
Before installing STEELTEX Floor Lath, the joists of either the rolled section or bar type shall be rigidly bridged at distances not to exceed 6 ft. The end joists parallel with walls shall be securely anchored to the walls or structural members at distances of 3 ft. by 1x⅛-in. strap or ⅜-in. round steel bars. Block out the bottom flange of end joists to prevent tipping. When anchoring is not possible, use spreaders or struts of wood or steel on not less than 6-ft. centers between the webs of the five end joists on each panel. The spreaders or struts must be stiff enough to give truss action to the end joists thus connected. At least each third intermediate joist shall be attached at its ends to wall or supporting member.



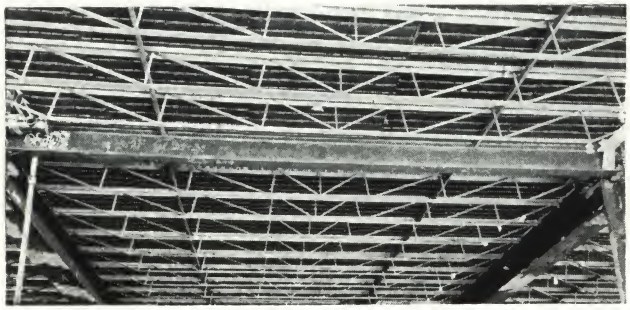
STEELTEX Floor Lath was used throughout in the New Mariner Tower at Milwaukee, shown above during course of construction

STEELTEX Floor Lath shall be attached at end of anchor joists by clips or wedges furnished by the NATIONAL STEEL FABRIC COMPANY, using at least one clip per ft. of width. STEELTEX shall be stretched taut longitudinally across the joists by a STEELTEX stretcher. Where joists are spaced less than 16 in. on center, use at least one clip every 4 ft. on intermediate joists. Where joists are spaced over 16 in., use two wedges or clips per 4-ft. roll width. Side joints of STEELTEX shall be lapped at least 2 in. Longitudinal joints shall be lapped at least 1 ft. directly over a joist.

Where finished wood floors are specified, wood floor sleepers 1⅝x2⅝ in. sized exactly in depth shall be placed over STEELTEX spaced 16 in. on center, supported at each steel joist with STEELTEX sheet metal sleeper chair, chair to be attached to floor sleepers in their proper location before putting in place. STEELTEX wire mesh supports are hung over the wood sleepers and hooked under the reinforcing wires of STEELTEX Floor Lath so as to insure positive alignment of sleepers and embedment of reinforcing.



Finished concrete floor slab—ready for wood flooring which is nailed to wood sleepers



View looking up at the underside of a STEELTEX floor panel. Note rigid bridging between joists

Continued on next page

STEELTEX FLOOR LATH—(Continued)



STEELTEX Floor Lath, by virtue of its superior dual features (combined reinforcing and form) is recognized as an outstanding product on which to pour thin concrete and gypsum floors and roofs. Its solid backing eliminates any temporary forming and supports and, together with the reinforcing element, permits the pouring of a slab of predetermined strength.

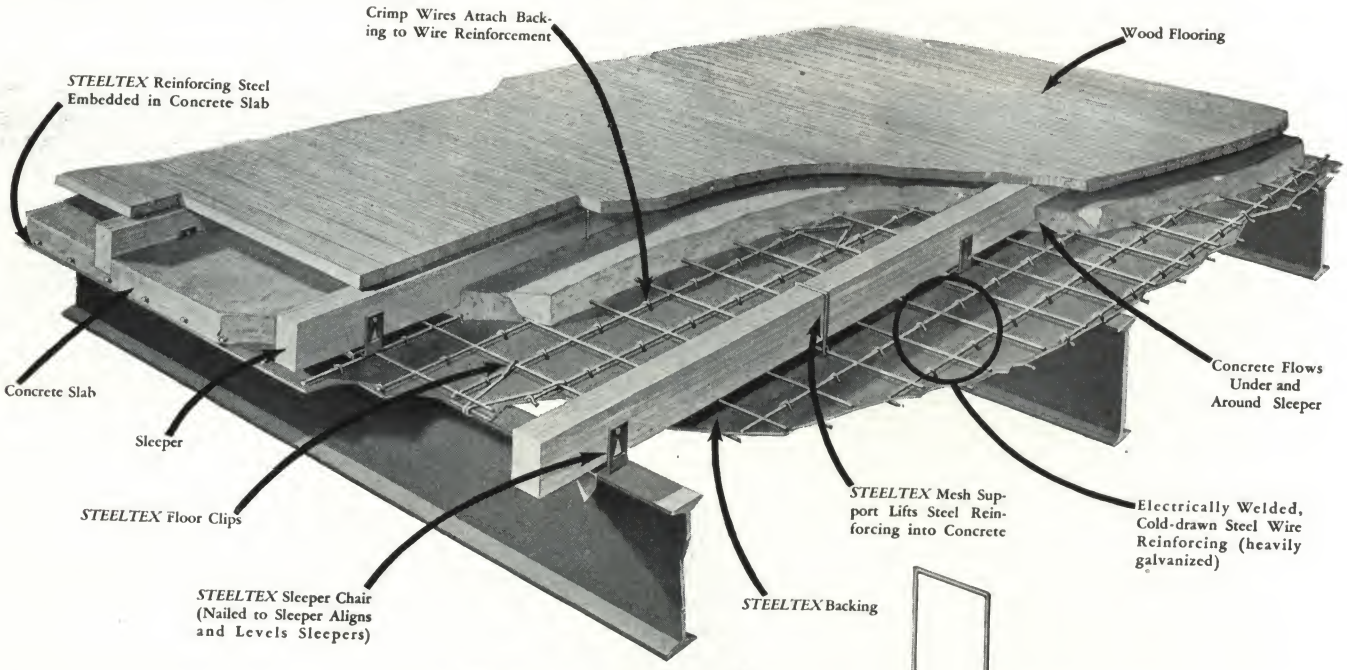
When a wood floor is desired over concrete it is advantageous to use the complete STEELTEX Floor System which comprises (1) STEELTEX Floor Lath, (2) STEELTEX Sleeper Chairs, and (3) STEELTEX Mesh Supports.

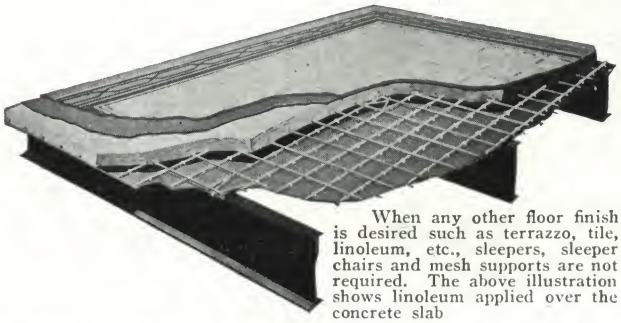
STEELTEX Floor Lath is placed over the light weight steel beams or steel joists, then the sleeper chairs are placed on each steel member 16 in. on center, the sleepers then properly leveled and aligned by setting them in the sleeper chairs.

The design of the STEELTEX Sleeper Chair assures positive alignment and allows a ¾-in. flow of concrete beneath the sleeper, thus providing a fire stop.

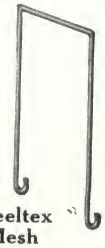
The object of the mesh support (which is fastened around the sleeper and hooked to the steel wire reinforcing of STEELTEX) is to eliminate tendency of sag without necessity of stretching and to lift the steel mesh up into the slab while pouring is taking place.

When the concrete has set the sleepers are thoroughly bonded in, ready for the wood flooring to be nailed on, and tendency for squeaky floors is consequently eliminated.





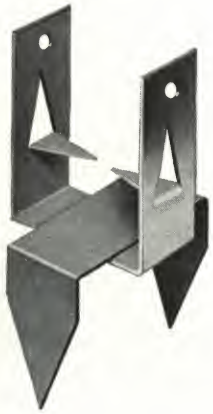
When any other floor finish is desired such as terrazzo, tile, linoleum, etc., sleepers, sleeper chairs and mesh supports are not required. The above illustration shows linoleum applied over the concrete slab



Steeltex Mesh Support

Steeltex Sleeper Chair

STEELTEX Sleeper Chairs are easily and quickly placed in position. The Sleeper rests on the Chairs and is held and nailed in place so that the concrete flows under and around



it. The pointed ends of the STEELTEX Sleeper Chair puncture the STEELTEX backing. When pressed back against the under side of the beam top flange, these ends hold the Sleeper Chairs securely in place.

TABLE OF SAFE LOADS FOR CONCRETE FLOOR SLABS USING STEELTEX FOR FLOORS

Values in Table Are Total Safe Loads in Pounds per Sq. Ft. Uniformly Distributed, Including Slab

Span of slab in inches	2-in. slab Weight 25 lb. per sq. ft.	2½-in. slab Weight 31 lb. per sq. ft.	3-in. slab Weight 38 lb. per sq. ft.	3½-in. slab Weight 44 lb. per sq. ft.
18	436	586	736	886
20	353	475	597	718
22	292	392	494	594
24	245	330	415	499
26	209	281	353	426
*28	180	242	305	366
*30	157	211	266	319
*32	139	186	234	281
*34	123	165	207	248
*36	109	146	184	222

*Rigid bridging must be used in accordance with Steel Joist Institute Specifications.

Notes:

1. For partial continuity, i.e. $M = \frac{W1^2}{10}$ take 5/6 of loads in table.
2. For simply supported, i.e. $M = \frac{W1^2}{8}$ take 2/3 of loads in table.

For stress in steel other than 20,000, loads are directly proportional to stress, thus for 16,000, take 16/20 of load in table, for 18,000 take 18/20 of load in tables, etc.

REPUBLIC FIREPROOFING COMPANY, INC.

Slagblok Fireproof Floor Construction

31 Union Square, NEW YORK, N. Y.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

REPUBLIC SLAGBLOK FLOOR SYSTEM, consisting of Slagblok Units and Steel Bar Reinforcement for stone concrete fireproof floor construction.

Experience

We have furnished the material and service for the floor construction of more than 1500 buildings.

Engineering Service

Our engineers will appreciate the opportunity to co-operate with architects and consulting engineers as to the design and application of the Slagblok System. Estimates of cost gladly furnished. Working drawings for construction furnished with sale of Slagblok and reinforcement.

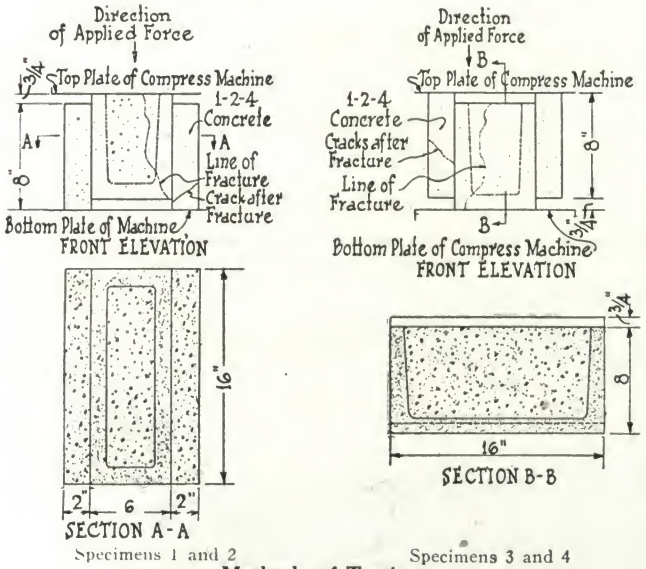
System

The Republic Slagblok Floor System is designed according to established engineering practice. It is a system of floor construction using strength-increasing void-producing Slagblok units. It provides a soundproof fireproof floor having the maximum strength with the minimum dead weight and depth. Every element going into the Slagblok floors is of structural value, therefore the design is inherently economical.

Slagblok Units—These units are made of slag concrete in our shops under a special process by patented machinery and treated to have high compressive and bonding value. Every possible precaution is taken to insure an absolutely even and dependable product.

The unit is not a mere void producer; it is a properly designed compression unit, bonding perfectly with ribs and beams of material for which it has absolute affinity. It is legitimately used for stress in construction.

Bond Test—A bond test made by Haller Testing Laboratories proved perfect results as follows:



Specimens 1 and 2 Specimens 3 and 4

Methods of Testing

REPUBLIC SLAGBLOK BOND TEST

Test made by The Haller Testing Laboratories, Plainfield, N. J. Specimen 6 in. Republic Slagblok and poured 1:2:4 concrete. Age: Slagblok 28 days, concrete 14 days. Date of test: September 15, 1927

Identification	Specimen No. 1	Specimen No. 2	Specimen No. 3	Specimen No. 4
Bond area.....sq. in.	229.0	229 0	229 0	229.0
Maximum test load....lb	78,500	57,500	86,000	62 000
Strength....lb. per sq. in	*342.8	*251.0	*375.5	*270.7

*Note that the figures do not indicate the maximum bond stresses between the Slagblok and the poured concrete sides, but represent the existing bond stresses at the time when the specimens failed. As will be noted from the sketches, no cleavage whatsoever took place between the Slagblok and the poured concrete even for these extraordinarily high bond stresses.

On account of failure of the specimens in the poured concrete (see line of fracture in sketches) caused by combined moment and shear stresses, the maximum bond stresses could not be determined from these tests.

Structural Features—Slagblok construction saves structural steel or reinforced concrete framing. It offers the minimum depth of floor—resulting in reduced story heights or increased ceiling heights. It is recommended for any usual flat slab span.

Slagblok floor construction provides an equal section for compression to resist both positive and negative moments.

Slagblok units are completely closed when in place, preventing concrete entering the voids. Consequently, a minimum of concrete is used in construction and the dead weight of the Slagblok slabs is fixed irrespective of the consistency of the concrete poured into the ribs.

Slagblok ceilings do not warp or spring and plaster has a solid masonry base for application. They are also practically uniform in texture and color so that the plaster after application is even in color and highly satisfactory for decoration.

There is no metal to rust and disintegrate with Slagblok floors.

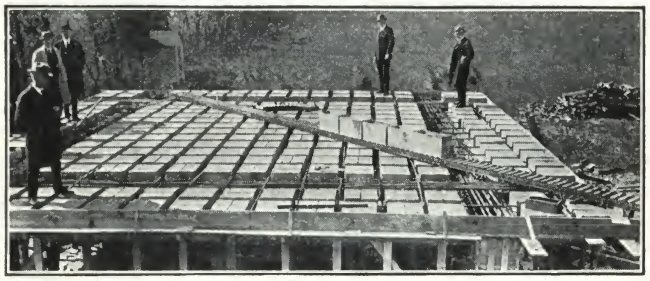
Load Deflection Test—This test was made by Columbia University Testing Laboratories, New York (illustrations below). The results were exceptional. The test panel was subjected to a maximum load corresponding to a uniformly distributed load of 840 lb. per sq. ft. at which load shear failure was produced adjacent to the supporting girders. Complete official report gladly sent on request.

Approval

Slagblok construction has been approved by the building departments of New York, N. Y. (all boroughs); Washington, D. C.; Boston, Mass.; Hartford, New Haven and Bridgeport, Conn.; Albany, Syracuse and Rochester, N. Y.; Newark, N. J., and many others.

References

PROJECT	LOCATION	ARCHITECT
Waldorf-Astoria Hotel	New York, N. Y.	Schultze & Weaver
The Fuller Tower	New York, N. Y.	Walker & Gillette
City Bank-Farmers Trust Bldg.	New York, N. Y.	Cross & Cross
One Beekman Place Apartments	New York, N. Y.	Sloan & Robertson
Spence School	New York, N. Y.	John Russell Pope
Astor Apartments	New York, N. Y.	Charles A. Platt
Adelphi Academy	Garden City, N. Y.	McKim, Mead & White



Arrangement of Slagblok and Reinforcement Before Pouring Concrete



The Test Panel Supporting a Load Corresponding to Approximately 800 Lb. per Sq. Ft.

Republic Slagblok Floor Test

Panel 31 ft. square over all, 22 ft. square inside of supporting girders. Slagblok units 8x16x16—20 in. on centers with 4-in. reinforced concrete ribs in two directions. No concrete top. Total test load 840 lb. per sq. ft. at failure.

THE RIVET-GRIP STEEL CO.

RG Steel Deck Floor Construction

2404 Prospect Avenue, CLEVELAND, OHIO

SALES REPRESENTATIVES

BOSTON, MASS., Leo I. Bruce, 7 Wood Street
BUFFALO, N. Y., Kenmore Builders Supply Co.
CHICAGO, ILL., Hugh J. Baker & Co.
CINCINNATI, OHIO, Hugh J. Baker & Co.
COLUMBUS, OHIO, Ben Tom Supply Co.
DAYTON, OHIO, Hugh J. Baker & Co.
DECATUR, ILL., Hugh J. Baker & Co.
DENVER, COLO., Frederick G. Anderson, 170 Virginia Avenue
DES MOINES, IOWA, Des Moines Stair Co.
DETROIT, MICH., Capitol Steel Corporation
EVANSVILLE, IND., Hugh J. Baker & Co.
FORT WAYNE, IND., Hugh J. Baker & Co.
INDIANAPOLIS, IND., Hugh J. Baker & Co.
LANSING, MICH., Capitol Steel Corporation
LITTLE ROCK, ARK., Arkansas Foundry Co.
LOS ANGELES, CALIF., H. B. Miller, 5480 E. Slauson Avenue
MILWAUKEE, WIS., A. F. Wagner Architectural Iron Works
MINNEAPOLIS, MINN., The Hustad Company
NEW YORK, N. Y., The Fireproof Products Company
PHILADELPHIA, PA., American Steel Engineering Company
PITTSBURGH, PA., Electric Welding Co.
PORTLAND, ORE., E. R. Pelton, 449 Kirby Street
ST. LOUIS, MO., Harry C. Uhlenhaut, 2144 Railway Exchange Bldg.
SALT LAKE CITY, UTAH, Chas. F. Porter Co.
SAN FRANCISCO, CALIF., W. H. London, 74 Montgomery Street
SCRANTON, PA., John J. Weiss, 723½ Crown Avenue
STAUNTON, VA., P. F. Kennedy, P. O. Box 123
TOLEDO, OHIO, Hausman Steel Company

For RG T-Bar Joists and Nailer Joists and Rivet-Grip System of Bank Vault Reinforcement, see Manufacturers' Index

RG STEEL DECK FLOOR CONSTRUCTION

(Patents Pending)

An amazing low dead weight construction for floors and roofs—weighing only 6 lb. per sq. ft. including steel joists and steel decking—ideal for many storied buildings, apartments, hotels, schools, etc., or for building alterations where an addition of one or more floors may be had without overloading existing beams or columns.

The general make-up of the entire system is conducive to exceptional rigidity, one of the features being the concrete bridging beam in the center of every floor panel. This beam is integral with the top slab and runs at right angles with the steel joists and encases the top chords of the steel joists.

The interlocked steel deck retains the water in the concrete mix, preventing evaporation downwards, thus helping to produce an extremely high strength slab. In addition, the top surface of the slab can be tamped, thus giving a better, harder wearing surface than can be obtained in ordinary monolithic finishes.

Note the saving in dead weight of RG Steel Deck Construction as against other types of floors, as shown in table opposite.

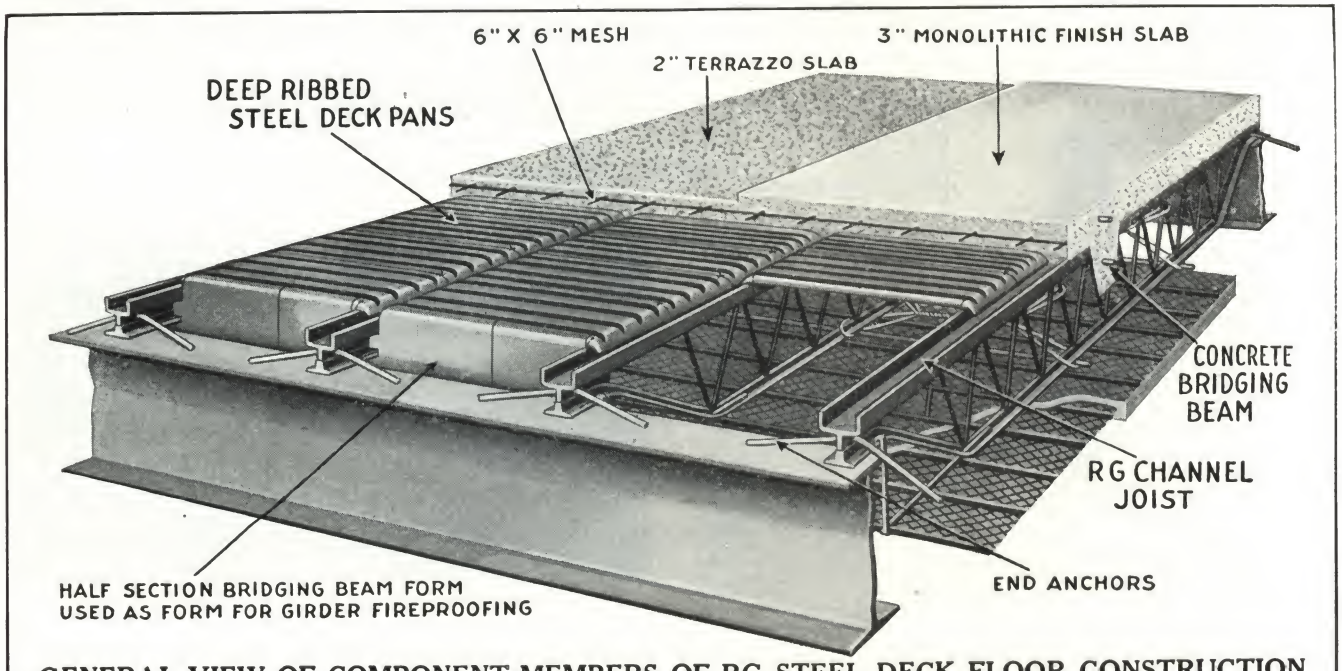
Complete engineering data and other information on installations of this system will be cheerfully furnished upon request.

COMPARATIVE WEIGHTS—VARIOUS TYPES OF FLOORS

Weight of floors in lbs. per sq. ft. including plaster ceiling, and cement fill and finish

Type of floor	Thickness of cement fill and finish			Maximum saving in favor of RG steel deck construction
	4 in.	3 in.	2 in.	
RG Steel Deck 10-in. depth. Monolithic finished slab of thickness shown	64	52	40	——
Concrete rib and slab 10 in. steel tile. Monolithic finished slab of thickness shown	91	79	73 (2½-in. slab)	27 to 33 lbs. per sq. ft.
Tile arch 12 in. deep plus fill and finish of thickness shown	102	90	78	38 lbs. per sq. ft.
Solid slab 4 in. thick on fireproofed beams 5 ft. on centers	83	——	——	43 lbs. per sq. ft.
Concrete rib and slab with 10 in. clay tile fillers. Monolithic finished slab of thickness shown	110	98	86	46 lbs. per sq. ft.

Note: Weights for various floor constructions computed from standard Engineering Data.



GENERAL VIEW OF COMPONENT MEMBERS OF RG STEEL DECK FLOOR CONSTRUCTION

Continued on next page

Component Features of RG Steel Deck Construction

(1) Extremely rigid steel joists—made up with a rolled channel for the top chord, a substantial tee for the bottom chord, and heavy web, welded by high pressure electric resistance welding—producing by far the most rigid type joist made.

(2) Ribbed, solid plate steel decking interlocking with the top chord channels of steel joists—providing an immediate rigid work deck.

(3) An integral cross bridging of concrete at midspan of every panel producing an unsurpassed rigidity of construction.

(4) Drop aprons along the perimeter of every panel, rigidity anchoring the concrete topping to the structural steel framework.

(5) Monolithic finish floor full thickness over steel deck, adequately reinforced and anchored at every steel joist top chord channel, steel deck ribs and steel framing—producing a cement floor *as near crackless* as modern engineering science can devise.

Field Operation

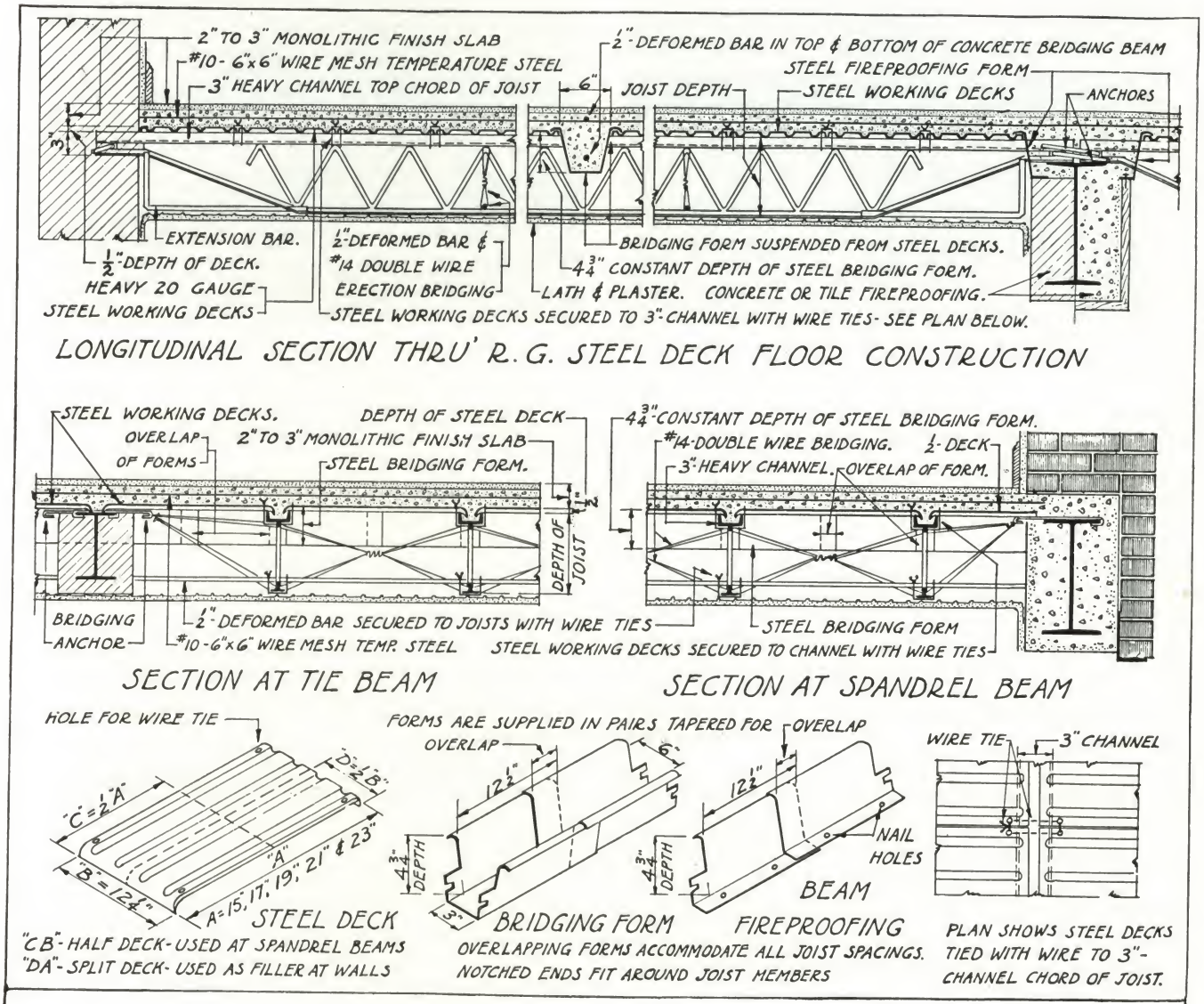
The steel joists and steel deck pans are made in two of the best equipped plants of the country, to exact details, *ready to install immediately the steel skeleton is erected:*

(1) When the joists are erected, temporary bridging in the form of transverse rods and double No. 14 gauge galvanized wire bridging is provided at the third points of the joists for proper centering only.

(2) The steel deck pans are set, interlocking into the trough of the joist channels, and wired to the channels.

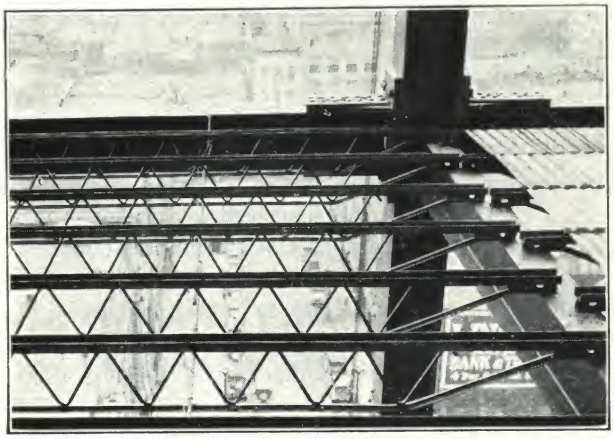
(3) At the center of each floor panel special metal bridging forms are hung from the deck pans.

(4) At all girders and beams special drop apron metal forms are set, hung from the deck pans.



TYPICAL DETAILS RG STEEL DECK CONSTRUCTION

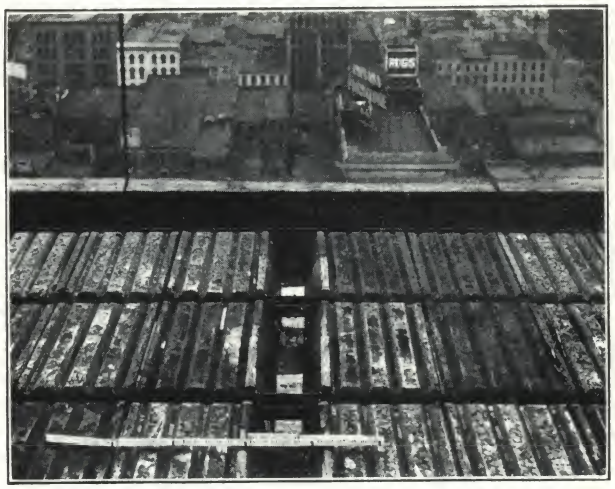
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RG Channel Joists and Erection Bridging in Position Ready for Steel Deck Pans



Workmen Placing Steel Deck Pans and Apron Forms



Steel Deck Pans and Bridging Forms in Position



View of Underside of RG Steel Deck Construction After Pouring Concrete

Note the continuous beam form and the absence of excessive drip or flowing of concrete

Installing RG Steel Deck Construction in the Twenty-three Story Lincoln National Bank & Trust Company Building, Fort Wayne, Indiana

Features of RG Steel Deck Construction

Extreme Lightness of the Structural Floor—Weighs only 6 lb. per sq. ft.

Extreme Rigidity—The concrete bridging beams at the center of every floor panel and the concrete haunches at all steel beams provide a degree of rigidity of floors not obtainable in other types of light floor construction.

Soundness of Finished Floor—The solid interlocked steel deck retains the water of the finishing concrete, preventing evaporation downwards and producing an extremely high strength slab.

Rapidity of Erection—The steel joists and deck can be placed immediately the structural steel is riveted, thus supplying a rigid working floor and protective covering without the use of plank or other temporary decking.

Ideal for Skyscraper Buildings

A structural floor, weighing only 6 lb. per sq. ft., will save a minimum of 30 lb. per sq. ft. or approximately 5 tons per panel per floor in a typical skyscraper construction, as against other standard types of floors—with a consequent saving of structural steel and foundation costs.

A rigid steel deck immediately available for the mechanical trades to proceed with their installations—saving a minimum of three to four days per floor.

A monolithic finish floor with ample haunches at steel beams and girders and concrete transverse bracing beams—furnishes a rigidity of construction for wind bracing and produces a finished floor that is unsurpassed by any other standard construction.

Continued on next page

Example of Use of Table

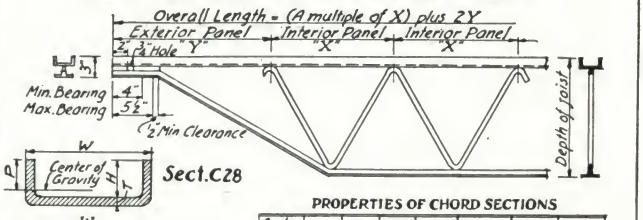
To determine the required type and spacing of joists for an apartment house with 60 lb. live load, 2-in. monolithic finished slab, a uniform allowance of 15 lb. per sq. ft. dead load for partitions and standard metal lath and plastered ceiling we obtain total loads as follows:

Live load	60 lb.
Concrete fill and finish	24 lb.
Partitions	15 lb.
Ceiling lath and plaster	10 lb.
RG Steel Deck and Joists	6 lb.
Total load to be carried by the joists	115 lb.

Assuming girders carrying the joists 19 ft. 8 in. center to center, the net clear span in feet for the joists is 19 ft. Reference to the table below shows that a Type 12C4 joist spaced at 23 in. on centers on a clear span of 19 ft. is good for a total load of 117 lb. This joist is therefore the proper one to use under the conditions stated, and should be indicated on the plans thus—12C4—23 in. on centers.

Note: Loads above the heavy horizontal lines are limited by shear.

RG STEEL CHANNEL JOISTS
Dimensions and Properties



PROPERTIES OF CHORD SECTIONS

Section No.	W	T	H	P	Area	I	r
421	2¼"	5/32"	11/32"	.175"	.391	.0066	.130
422	2¼"	13/64"	13/64"	.180"	.492	.009	.138
423	2¼"	9/64"	½"	.205"	.582	.018	.178
424	2¼"	13/64"	½"	.222"	.723	.025	.186
425	2½"	¼"	½"	.227"	.876	.031	.187
426	2½"	¼"	¾"	.305"	1.023	.074	.268
C28	3⅛"	5/32"	1 3/32"	1.012"	.917	.150	.405
H29	3"	11/64"	1¼"	.970"	1.190	.200	.410

JOIST DIMENSIONS AND PROPERTIES

Joist Type	Joist Depth	Top Chord Section	Bottom Chord Section	Web	"X"	Exterior Panel Lengths Are Made in The Following Variable "Y" Dimensions And With These Suffix Letters A	B	C	D	E	F
8C1	8¾"	C28	421	3/8"	9"	1'-2½"	1'-4"	1'-5½"			
10C2	10¾"	C28	421	7/16"	11⅞"	1'-4⅝"	1'-6⅜"	1'-7⅝"	1'-9⅜"		
10C3	10¾"	C28	422	7/16"	11⅞"	1'-4⅝"	1'-6⅜"	1'-7⅝"	1'-9⅜"		
10C4	10¾"	C28	423	½"	11¼"	1'-4¾"	1'-6¼"	1'-7¾"	1'-9¼"		
12C3	12¾"	C28	422	½"	13⅝"	1'-7⅛"	1'-8⅝"	1'-10⅛"	1'-11⅝"	2'-1⅛"	
12C4	12¾"	C28	423	½"	13⅝"	1'-7⅛"	1'-8⅝"	1'-10⅛"	1'-11⅝"	2'-1⅛"	
12C5	12¾"	C28	424	½"	13⅝"	1'-7⅛"	1'-8⅝"	1'-10⅛"	1'-11⅝"	2'-1⅛"	
12H6	12½"	H29	425	9/16"	13⅜"	1'-6⅞"	1'-8⅜"	1'-9⅞"	1'-11⅜"	2'-0⅞"	
14C5	14½"	C28	424	9/16"	15¾"	1'-9¼"	1'-10¾"	2'-0¼"	2'-1¾"	2'-3¼"	2'-4¾"
14H6	14½"	H29	425	9/16	15¾"	1'-9¼"	1'-10¾"	2'-0¼"	2'-1¾"	2'-3¼"	2'-4¾"
14H7	14½"	H29	426	5/8"	15¼"	1'-8¾"	1'-10¼"	1'-11¾"	2'-1¼"	2'-2¾"	
16H6	16½"	H29	425	5/8"	17⅛"	1'-11⅜"	2'-0⅞"	2'-2⅜"	2'-3⅞"	2'-5⅜"	2'-6⅞"
16H7	16½"	H29	426	5/8"	17⅛"	1'-11⅜"	2'-0⅞"	2'-2⅜"	2'-3⅞"	2'-5⅜"	2'-6⅞"

NOMENCLATURE: The Complete Nomenclature of Joist is Determined By Combining The "Joist Type" № of Interior X Panels And The Proper Suffix Letter to Indicate The Exterior Panel "Y" Length.

EXAMPLE: 12C5-08C Represents Joist Type 12C5 With 8 Interior Panels And Exterior Panels of C Length Making an Overall Dimension of 12'-9¼".

USING MAXIMUM STRESSES OF 15000 # PER SQ. IN. IN COMPRESSION 18000 # PER SQ. IN. IN TENSION
LOADS ABOVE HEAVY LINE LIMITED BY SHEAR
ALL LOADS ARE COMPUTED FOR THE CLEAR SPAN. DEDUCT WIDTH OF SUPPORTING BEAM FLANGES TO DETERMINE CLEAR SPAN.

TOTAL LOAD AS GIVEN IN TABLE SHOULD INCLUDE
——— # LIVE LOAD
——— # CONC. FILL & FINISH
——— # PARTITIONS
——— # CEILING LATH & PLASTER
6 # R.G. STEEL DECK & JOISTS
——— # TOTAL

R.G. STEEL CHANNEL JOISTS.

TOTAL SAFE LOADS

IN POUNDS PER SQ FOOT UNIFORMLY DISTRIBUTED
DESIGNED IN ACCORDANCE WITH THE
AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS

EXTRA JOISTS SHOULD BE PLACED UNDER PARTITIONS PARALLEL TO JOISTS. IF IT IS IMPRACTICAL TO DO THIS ON ACCOUNT OF IRREGULAR LAYOUT OF PARTITIONS, THEN AN ADDITIONAL DEAD LOAD ALLOWANCE, USUALLY 10 TO 15# PER SQ. FT. SHOULD BE INCLUDED IN THE TOTAL LOAD CARRIED BY JOISTS.

WHEN THERE IS A CHOICE BETWEEN TWO OR THREE JOISTS FOR A PARTICULAR SPAN THE DEEPER JOIST IS MORE ECONOMICAL. BETWEEN TWO JOISTS OF EQUAL DEPTH CHOOSE THE ONE WHICH PERMITS THE WIDER SPACING.

JOIST TYPE	8C1	10C2	10C3	10C4	12C3	12C4	12C5	12H6	14C5	14H6	14H7	16H6	16H7
SPACING	12" C.C.												
CLEAR SPAN IN FEET 6'-0"	698												
8'-0"	523												
9'-0"	445												
10'-0"	360	407	400	533									
11'-0"	297	370	364	484									
12'-0"	250	314	333	444	419	408	407	534					
13'-0"	218	267	308	399	387	377	376	493					
14'-0"	184	231	286	343	345	350	349	457	445	434	561		
15'-0"	160	201	253	299	300	327	325	427	416	406	524		
16'-0"	141	177	222	263	263	306	305	400	390	380	492	506	454
17'-0"		156	197	233	233	280	287	377	367	358	463	475	427
18'-0"		140	176	208	208	250	271	356	346	338	437	449	403
19'-0"		125	158	186	187	225	257	330	319	321	416	425	382
20'-0"		113	142	168	169	202	244	297	288	305	390	399	363
21'-0"					153	183	227	270	261	290	354	362	346
22'-0"					139	167	207	246	238	276	322	330	329
23'-0"					128	153	189	225	218	265	295	302	316
24'-0"					117	141	173	207	200	244	271	277	303
25'-0"									184	225	250	256	289
26'-0"									170	208	231	236	270
27'-0"									158	195	214	219	251
28'-0"									147	180	199	204	233
29'-0"												190	217
30'-0"												177	203
SPACING	17" C.C.												
CLEAR SPAN IN FEET 6'-0"	492												
8'-0"	368												
9'-0"	313												
10'-0"	254	286	282	376									
11'-0"	209	240	236	341									
12'-0"	176	201	235	313	295	288	287	376					
13'-0"	150	188	217	281	273	266	265	348					
14'-0"	129	163	201	242	243	246	246	322	314	306	396		
15'-0"	113	142	178	211	211	230	229	301	293	286	369		
16'-0"	99	125	156	185	185	216	215	282	275	268	347	357	320
17'-0"		110	139	164	164	197	202	266	258	252	326	335	300
18'-0"		99	124	147	147	176	191	251	244	238	308	316	284
19'-0"		88	111	131	132	158	181	235	225	226	292	300	268
20'-0"		80	100	118	119	142	172	209	205	215	275	282	254
21'-0"					108	129	160	190	184	204	250	255	244
22'-0"					98	118	146	173	168	194	227	232	231
23'-0"					90	108	133	159	154	187	208	213	221
24'-0"					83	99	122	146	141	172	191	202	212
25'-0"									130	159	176	180	203
26'-0"									120	147	163	166	190
27'-0"									111	136	151	154	177
28'-0"									104	127	140	144	164
29'-0"												134	153
30'-0"												125	143
SPACING	19" C.C.												
CLEAR SPAN IN FEET 6'-0"	442												
8'-0"	331												
9'-0"	282												
10'-0"	228	258	253	338									
11'-0"	188	214	210	306									
12'-0"	158	199	211	281	265	258	258	358					
13'-0"	135	169	195	252	245	239	238	312					
14'-0"	117	146	181	217	218	222	221	289	282	275	355		
15'-0"	102	127	160	189	190	207	206	270	264	257	332		
16'-0"	89	112	141	167	167	194	193	253	247	241	312	321	287
17'-0"		99	125	148	148	177	182	239	232	227	293	301	269
18'-0"		89	112	132	132	158	172	225	219	214	277	284	254
19'-0"		79	100	118	118	143	163	209	202	205	262	269	241
20'-0"		72	90	106	107	128	155	188	182	195	247	252	229
21'-0"					97	116	144	171	165	184	224	229	218
22'-0"					88	106	131	156	151	175	204	209	208
23'-0"					81	97	120	142	138	168	187	191	199
24'-0"					74	89	110	131	127	154	172	175	191
25'-0"									117	142	158	164	183
26'-0"									108	132	146	149	171
27'-0"									100	122	135	139	159
28'-0"									93	114	126	129	148
29'-0"												120	138
30'-0"												112	129
SPACING	21" C.C.												
CLEAR SPAN IN FEET 6'-0"	399												
8'-0"	299												
9'-0"	254												
10'-0"	206	233	229	304									
11'-0"	170	212	208	276									
12'-0"	143	179	190	254	239	233	232	305					
13'-0"	122	153	176	228	221	215	215	282					
14'-0"	105	132	163	196	197	200	200	261	254	248	321		
15'-0"	92	115	146	171	172	187	186	244	236	232	299		
16'-0"	81	101	127	150	150	175	174	229	223	217	281	289	259
17'-0"		89	113	133	133	160	164	215	210	205	265	272	243
18'-0"		80	101	119	119	145	155	204	198	193	250	257	229
19'-0"		71	90	106	107	129	147	189	183	184	236	243	217
20'-0"		65	81	96	97	115	139	170	165	174	223	228	206
21'-0"					87	105	130	154	149	166	202	207	197
22'-0"					79	95	118	141	136	158	184	189	188
23'-0"					73	87	108	129	125	152	169	173	180
24'-0"					67	81	99	118	114	139	155	158	172
25'-0"									105	129	143	146	165
26'-0"									97	119	132	135	154
27'-0"									90	110	122	125	143
28'-0"									84	103	114	117	133
29'-0"												109	124
30'-0"												101	116
SPACING	23" C.C.												
CLEAR SPAN IN FEET 6'-0"	363												
8'-0"	272												
9'-0"	232												
10'-0"	188	212	208	278									
11'-0"	155	193	190	252									
12'-0"	130	164	174	231	218	213	212	278					
13'-0"	111	139	161	208	201	196	196	257					
14'-0"	96	120	149	179	180	182	182	238	232	226	292		
15'-0"	83	105	132	156	156	170	169	222	217	211	273		
16'-0"	73	92	116	137	137	159	159	208	203	198	256	264	236
17'-0"		81	103	121	121	146	150	196	191	187	241	247	221
18'-0"		73	92	108	108	130	141	185	180	176	228	234	209
19'-0"		65	82	97	97	117	134	172	166	167	215	221	198
20'-0"		59	74	87	88	105	121	155	150	159	203	208	188
21'-0"					80	95	118	141	136	151	184	188	179
22'-0"					72	87	108	128	124	144	168	172	171
23'-0"					67	80	98	117	114	138	154	157	165
24'-0"					61	73	90	108	104	127	141	144	157
25'-0"									96	117	130	133	151
26'-0"									89	108	120	123	141
27'-0"									82	101	112	114	131
28'-0"									77	94	104	108	121
29'-0"												99	113
30'-0"												92	106
SPACING	25" C.C.												
CLEAR SPAN IN FEET 6'-0"	336												
8'-0"	252												
9'-0"	214												
10'-0"	173	196	192	256									
11'-0"	145	178	175	235									
12'-0"	120	151	160	214	201	197	196	257					
13'-0"	102	128	148	198	186	181	181	237					
14'-0"	89	111	138	165	166	168	168	220	214	209	270		
15'-0"	77	97	122	144	144	157	156	205	200	195	252		
16'-0"	68	85	107	126	127	147	147	193	187	183	237	244	218
17'-0"		75	95	112	112	135	138	181	177	172	223	229	204
18'-0"		67	85	100	100	120	130	171	166	163	210	216	193
19'-0"		60	76	89	90	108	124	159	153	154	199	204	183
20'-0"		54	68	81	81	97	117	143	138	147	188	194	174
21'-0"					74	88	109	130	126	140	170	174	165
22'-0"					67	80	99	118	114	133	155	159	158
23'-0"					62	74	91	108	105	128	142	145	151
24'-0"					56	68	83	99	96	117	130	133	145
25'-0"									89	108	120	123	139
26'-0"									82	100	111	113	130
27'-0"									76	93	103	105	121
28'-0"									71	87	96	98	112
29'-0"												91	105
30'-0"												85	98

ESTABLISHED 1842

JOSEPH T. RYERSON & SON INC.

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CONCRETE REINFORCING MATERIALS, including: Plain and Deformed Reinforcing Bars, Triangle Wire Mesh, Electrically Welded Rectangular Mesh, Column Spirals, Continuous Wire Mesh Stirrups, Beam Wrapping, Fabricated Units, Road Center Strips, Wire Rods, Wire, Furring Channels and Angles, Miscellaneous Reinforcing Accessories, such as Bar Chairs, Bar Spacers, Bar Ties, Inserts, etc.

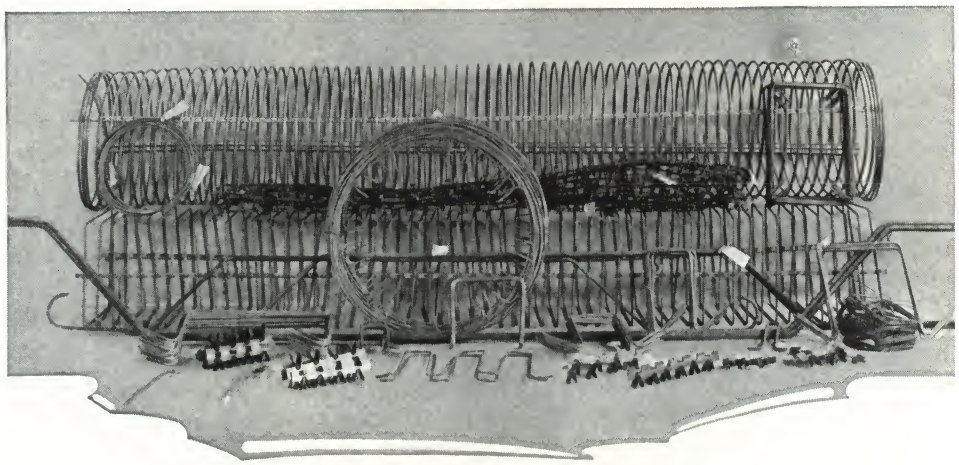
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SAFETY TREADS and PLATES, including: Mason Safety Treads, Firmtread Floor Plates and Treads, Sheet Steel Subtreads and Risers.

IRON and STEEL PRODUCTS, including: Bars, Bar Shapes, Structurals, Rails, Plates, Sheets, Boiler Tubes and Fittings, Shafting, Chain, Rivets, Bolts, Nails, Refined Iron, Alloy Steel, Tool Steel, etc.

CAISSON RINGS.

SMALL TOOLS.



A Few Ryerson Reinforcing Products

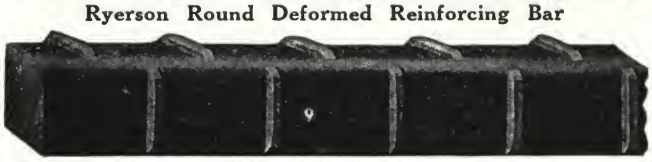
Bars

At our nine warehouse plants located throughout the country, we carry a complete stock of plain and deformed bars, both round and square. These bars are rolled from new billet stock, conforming to standard specifications of the American Society for Testing Materials, Serial Designation A-15-14. Bars, of intermediate and hard grade, are carried in stock in lengths up to 60 ft.

Round deformed bars are carried in the following diameters: ⅜, ½, ⅝, ¾, ⅞ and 1 in. Square deformed bars are carried in the following sizes: ½, 1, 1⅛ and 1¼ in.



Ryerson Round Deformed Reinforcing Bar



Ryerson Square Deformed Reinforcing Bar

Bending and Fabricating

We have the most up-to-date machinery and other equipment for fabricating, and can bend bars to any shape required for beam, joist and slab rods, stirrups, ties, hoops, etc.

Spirals and Continuous Hooping

On our spiral machines we manufacture spirals for round columns, continuous uniform hooping for square and rectangular columns, and continuous single unit stirrups for beams and girders. Spirals are made from new first quality wire rod in sizes from ¼ to ⅝ in., inclusive.

Both round and square hooping can be collapsed for shipment.

Triangle Wire Mesh Reinforcement

We always carry on hand a large stock of triangle wire mesh for slab reinforcement. This material is carried in rolls in standard gauges and sizes of mesh and can be shipped at once. Electrically welded rectangular mesh is also in stock, or can be shipped direct from factory.

Road Strips and Highway Construction Material

We furnish completely fabricated material for reinforcing roads, culverts and bridges, including metal road strips and all necessary reinforcing fabrics, supports and spacers.

Accessories

In addition to bars and spirals, we carry complete stocks of all accessories such as beam, joist and slab bar spacers, bar and screed chairs, bar ties, wire, etc., also wire fabric and expanded metal for reinforcing roadways and for floor slabs, concrete pipe, etc., angles, channels

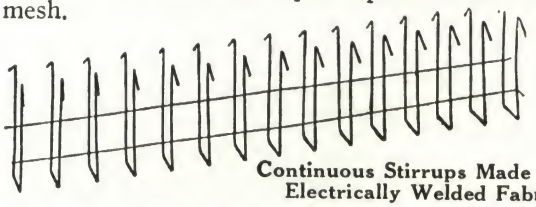
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and pencil rods for suspended ceilings, furring and similar purposes.

Continuous Wire Mesh Stirrups

Continuous wire mesh stirrups are formed on our specially constructed power machines, thus insuring accurate bending and perfect alignment. Continuous stirrups save time and money in the job, eliminating slow and tedious hand tying of bars and individual stirrups. Over 30,000 of these continuous stirrups were used in the construction of the Palmer House in Chicago.

We are also equipped to furnish beam wrapping, step reinforcement and other special pieces formed from wire mesh.



Continuous Stirrups Made from Electrically Welded Fabric

Ryex Expanded Metal Reinforcing

We are prepared to furnish, from stock, expanded metal in meshes varying from ½x1¼ in. to 3x8 in. and in a wide range of standard sizes. Special meshes and sizes delivered promptly, direct from the factory.

Metal Lath, Plastering Channels, etc.

We are in a position to furnish all the steel requirements for plastering. This service includes expanded metal lath, rib lath, scotch lath, corner bead, bullnose corner bead, picture mould, curved point base screed, base grounds, hot rolled channels, cold formed channels, pencil rods, angles, tees, flats, wire, etc.



¾-in. Rib Lath
Deep ribs and strong mesh eliminate the need of wood forms

Immediate deliveries from our warehouse stocks or direct from factories in Chicago and the East.

Caisson Rings

We manufacture caisson rings rolled from flat bars with lugs formed by bending bar at right angles and punched for bolts.

We also make rings from standard channels with flanges of channels turned in. These rings have lugs made by welding bars at right angles to ends of channels. All welds are tested with a heavy sledge.

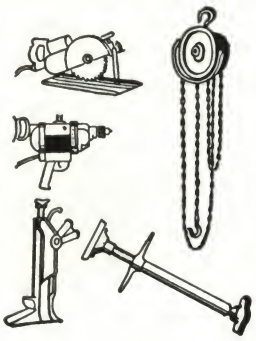


Shipping Bay in a Ryerson Plant
Reinforcing materials ready for loading

Channel rings are lighter, but more rigid than equivalent rings made from flat bars.

Small Tools

Prompt service on all the hundred and one small tools needed for construction work is another feature of our complete service to builders. Every tool is backed by the Ryerson Guarantee. If you haven't our tool catalogue and price list, write and we will mail them at once.



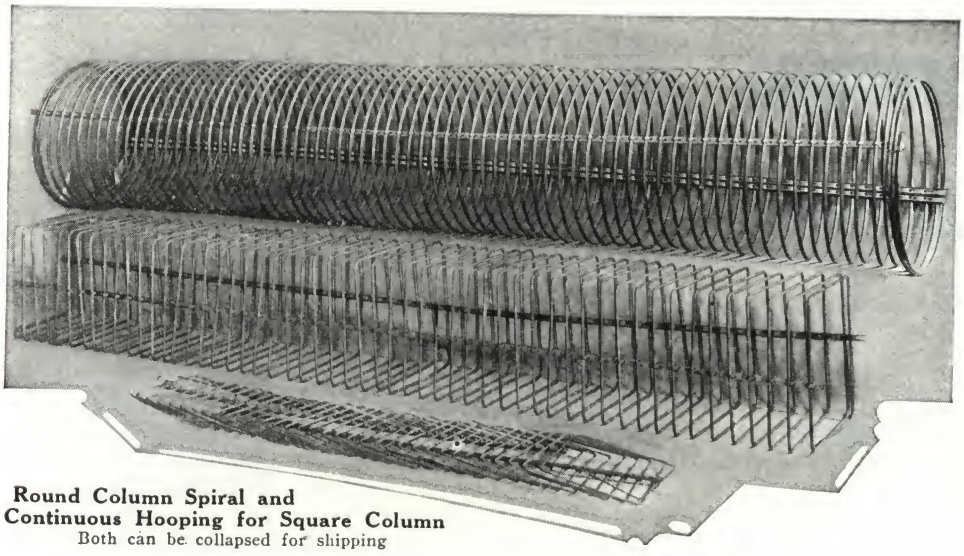
Portable electric saws, electric drills, trench braces, jacks, hoists, furnaces, reamers, rivet forges, riveting hammers, electric hammers, clamps, grinders, punches, shears, drift pins, etc., are a few of the items available.

Delivery

Our large stocks of bars and other material enable us to make exceptionally quick delivery on reinforcing material—all cut, bent, bundled and tagged ready for the forms. By use of special aluminum tags with stamped, raised letters and numerals, the identification marks showing the location in the building of each bundle can not be obliterated. These tags are not subject to rust. Specially designed 40-ft. trailers for tractors, with steel adjustable skids, enable us to haul the longest material and unload with a minimum of effort and without distortion or damage to the material. All of our Steel-Service Plants have private switch tracks connecting with trunk line railroads, affording exceptional service on freight shipments.



This Tag Identifies Each Piece



Round Column Spiral and Continuous Hooping for Square Column
Both can be collapsed for shipping

Ryerson Steel-Service

In addition to reinforcing materials we carry all kinds of steel products at each of our plants, thus giving the contractor a convenient source upon which to draw for such other steel as he may require on a job.

Bars	Babbitt
Shapes	Wire
Structurals	Turnbuckles
Rails	Corrugated roofing and siding
Shafting	Stair treads
Plates	Firmtread plates
Sheets	Boiler tubes and fittings
Rivets	Refined iron, etc.
Bolts	
Chain	

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Permanent Building Products Including Concrete Reinforcements and Forms

YOUNGSTOWN, OHIO

Offices and Warehouses in Principal Cities—For list see our pages on Steel Windows

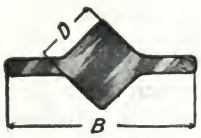
Products

KAHN TRUSSED BARS; RIB BARS; WELDED STEEL FABRIC; COLLAPSIBLE COLUMN HOOPING; RIBBED FLORETYLE; LOCKTYLE; SLOTTED INSERTS; ADJUSTABLE INSERTS; TAPPED INSERTS; CURB BARS.

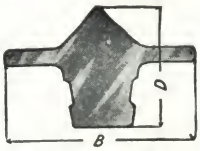
For other Truscon Products, see pages in this edition on Steel Joists, Steeldeck Roofs, Standardized Buildings and Structural Steel, Steel Doors, Steel Windows, Metal Laths and Accessories, as listed in Manufacturers' Index.

Kahn Trussed Bars

The Kahn Trussed Bar for reinforcing concrete consists of a main horizontal bar and rigidly connected diagonal shear members. The cross-section of the bar has two horizontal flanges projecting at opposite sides. These flanges are sheared up at inervals to form the rigidly connected diagonals, making a unit of main bar and shear members. Kahn Trussed Bars save steel, save labor of installing many loose separate bars, because shear members and main bar are handled as one piece, safeguard the structure, and make beams 12% to 30% stronger than where loose stirrups are used.



Section Kahn Trussed Bar



Section Kahn Trussed Bar

D x B, in.	Weight per lineal foot, lb.	Area, sq. in.
½x1½	1.4	0.41
¾x2 3/16	2.7	0.79
1½x2¼	4.8	1.41
1¾x2¾	6.8	2.00
2 x3½	10.2	3 00

Rib Bars

The Rib Bar for reinforcing concrete is a special rolled section of highest grade steel with a series of cross ribs so designed as to secure maximum grip on the concrete. Rib Bars are widely used for reinforcement of concrete slabs and of flat ceiling designs, also as bent bars in beams, vertical bars in columns and for reinforcement in domes, tanks, abutments, walls and concrete subject to tension and compression and to temperature expansion and shrinkage stresses.



Square Rib Bar



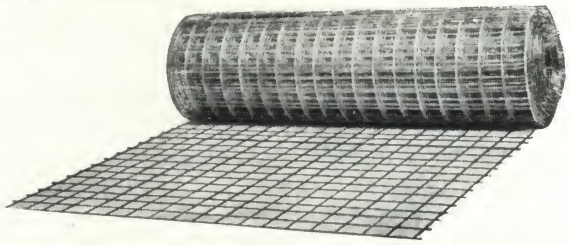
Round Rib Bar

STANDARD SIZES OF RIB BARS

Area, in.	Equivalent to, in.	Weight per lineal foot, lb.
.110	⅜ Round	.379
.196	½ Round	.674
.250	½ Square	.86
307	⅝ Round	1.054
.442	¾ Round	1.517
.601	⅞ Round	2.065
.785	1 Round	2.697
1 000	1 Square	3.46
1.266	1⅛ Square	4.38
1.563	1¼ Square	5 41

Welded Steel Fabric

Truscon Welded Steel Fabric comes in rolls made with 8 and 15-in. core, and each roll contains from 100 to 300 ft., weighing approximately 300 to 500 lb., depending on style. Finished in Plain or Galvanized Fabric as specified. All mesh with main members spaced 4 in. on centers—maximum width 72 in. All mesh with main members spaced 6 in. on centers—maximum width 114 in.

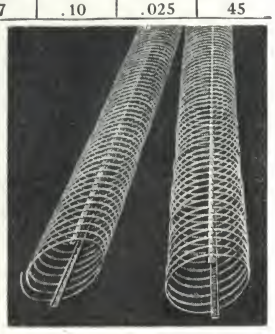


TRUSCON WELDED STEEL FABRIC—STANDARD SIZES IN ROLLS

Style	Spacing		Gauge of wire		Sec. area, sq. in. per lin.		Wt. per 100 sq. ft., lb.
	Longitudinal	Transverse	Longitudinal	Transverse	Longitudinal	Transverse	
4x 4 14/14	4	4	14	14	.015	.015	11
4x 4 13/13	4	4	13	13	.020	.020	14
4x 4 12/12	4	4	12	12	.026	.026	19
4x 4 10/10	4	4	10	10	.043	.043	31
4x 4 8/ 8	4	4	8	8	.062	.062	44
4x 4 7/ 7	4	4	7	7	.074	.074	53
4x 4 6/ 6	4	4	6	6	.087	.087	62
4x 4 4/ 4	4	4	4	4	.120	.120	85
4x 8 13/13	4	8	13	13	.020	.010	11
4x 8 12/14	4	8	12	14	.026	.008	12
4x 8 12/12	4	8	12	12	.026	.013	14
4x 8 11/12	4	8	11	12	.034	.013	17
4x 8 10/12	4	8	10	12	.043	013	20
4x 8 9/12	4	8	9	12	.052	.013	23
4x 8 8/12	4	8	8	12	.062	.013	27
4x 8 7/11	4	8	7	11	.074	.017	33
4x12 12/12	4	12	12	12	.026	.009	13
4x12 11/12	4	12	11	12	.034	.009	16
4x12 10/12	4	12	10	12	.043	.009	19
4x12 9/12	4	12	9	12	.052	.009	22
4x12 8/12	4	12	8	12	.062	.009	26
4x12 7/11	4	12	7	11	.074	.011	31
4x12 6/10	4	12	6	10	.087	.014	37
4x12 5/10	4	12	5	10	.101	.014	42
4x12 4/ 9	4	12	4	9	.120	.017	49
4x16 7/11	4	16	7	11	.074	.008	30
4x16 6/10	4	16	6	10	.087	.011	35
4x16 5/10	4	16	5	10	.101	.011	40
4x16 4/ 9	4	16	4	9	.120	.013	48
135-10	6	6	10	10	.029	.029	21
162-8	6	6	8	8	.041	.041	30
177-10	6	12	7	10	.049	.014	23
177-9	6	12	7	9	.049	.017	24
177-7	6	12	7	7	.049	.025	27
192-10	6	12	6	10	.058	.014	27
192-6	6	6	6	6	.058	.058	42
192-6	6	12	6	6	.058	.029	32
207-10	6	12	5	10	.067	.014	30
207-9	6	12	5	9	.067	.017	31
207-7	6	12	5	7	.067	.025	34
207-5	6	6	5	5	.067	.067	49
225-10	6	12	4	10	.08	.014	35
225-9	6	12	4	9	.08	.017	36
225-7	6	12	4	7	.08	.025	38
225-4	6	6	4	4	.08	.08	58
250-10	6	12	¼	10	.10	.014	41
250-9	6	12	¼	9	.10	.017	42
250-7	6	12	¼	7	.10	.025	45

Column Hooping, Collapsible

Truscon Collapsible Column Hooping, for reinforcing concrete columns, is shipped in the form of flat, circular coils of exact diameter and accurately spaced by means of special spacers. These coils spring automatically into a complete hooped column. Rib Bars are ordinarily used as vertical reinforcement in conjunction with Column Hooping.



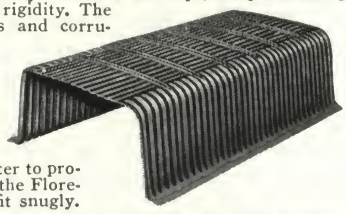
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Truscon Floretyle Construction

Truscon Floretyle Construction consists of rows of specially formed steel Floretyles separated by reinforced concrete joists and covered with a thin layer of concrete. The Floretyles act merely as fillers, eliminating the dead weight of large masses of concrete and producing a light floor of great rigidity. The light weight saves not only in the floor itself but in the supporting framework and foundations. This makes possible flat ceilings of long span without any objectionable intermediate beams. The hollow spaces in the tyle assure soundproofness. Simple, inexpensive centering is required.



Ribbed Floretyle—Ribbed Steel Floretyles used in this construction are manufactured in powerful presses operated with multiple dies which insure accuracy and uniformity. Across the tops, deep stiffening ribs give the Floretyles exceptional rigidity. The corrugated sides, rounded corners and corrugated flanges along the bottom edge add to the stiffness and prevent deformation.

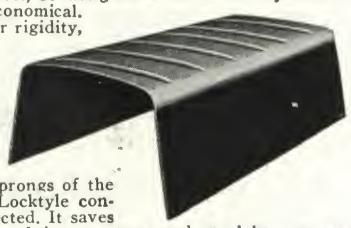


Properties of Ribbed Steel Floretyle—*Standard Heights:* 4, 6, 8, 10, 12, 14 in.
Standard Lengths: Nominal, 2 ft. 2 in. and 1 ft. 1 in.

Actual length is about 1 in. greater to provide for end lap. End caps to close the Floretyle furnished in all heights, and fit snugly.



Removable Floretyle—In buildings comprised of several typical floors laid out in oblong panels, with long spans and not requiring a plastered ceiling, Truscon Floretyle construction with removable Floretyles will often be found very economical. Truscon Removable Steel Floretyles are made of 16-gauge steel, so designed as to be readily removable, extremely sturdy and very economical. The ribs across the top add to their rigidity, eliminating the necessity of excessive crowning. Truscon Removable Floretyles are furnished either with straight sides as shown or with a ⅜-in. flange along the bottom edge.



Truscon Locktyle System—Truscon Locktyle consists of deep-ribbed steel Floretyle whose flanges are locked into the prongs of the ribs of Truscon Locktyle Lath. Locktyle construction is easily and speedily erected. It saves in concrete and plastering costs and insures true and straight concrete joists with positive attachment of the ceiling in reinforced concrete construction. Truscon Locktyle Lath is furnished in rolls 100 ft. long, 2 ft. wide. It consists of ribs ⅜ in. high, spaced 4.8 in. center to center, with a diamond mesh between the ribs.



Placing Floretyles in Locktyle Construction
Inset shows close-up of lath prong

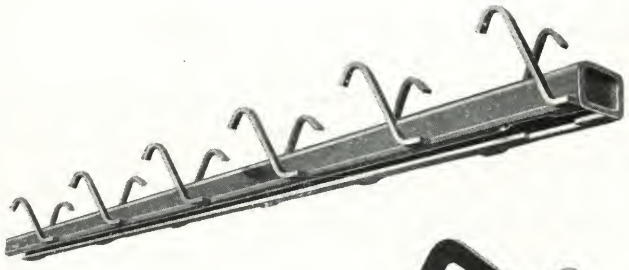
Truscon Wydespan Construction

Truscon Wydespan Construction requires less concrete and less wasteful timber centering than other types of reinforced concrete systems. With Wydespan Forms the joist spacing is approximately 4 ft. or 5 ft. and a top slab of only 2½ in. is recommended. Comparative estimates indicate that Wydespan Forms show a tremendous saving over other types of forms. An alternate design in Wydespan is the best argument for its use.



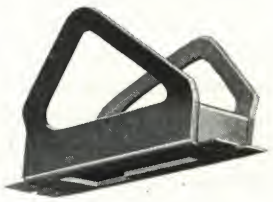
Truscon Slotted Inserts

Truscon Slotted Inserts are attached to the forms and are completely embedded in the concrete construction. Only the narrow slot flush with the concrete is seen in the completed work. The bolt can be moved along this slot to any location, allowing wide variation in position. Truscon Slotted Inserts are used with equal success in ceilings, slabs, beams or columns. The anchors are integral with the insert and occur every 6 in. on each side. Being a part of the bearing flanges they transfer the load on the insert directly into the concrete. A continuous insert of any desired length is obtained by removing end caps and butting inserts end to end.



Truscon Adjustable Inserts

Truscon Adjustable Inserts are made of pressed steel, and have the same simple method of application to concrete and adjustment for bolts as the slotted inserts, but without their wide range of adjustability. Made to carry ½, ⅝ and ¾-in. bolts.





Truscon Tapped Inserts

Truscon Tapped Inserts are made from pressed steel of highest quality, and furnished tapped for ½, ⅝ and ¾-in. bolts. Particularly adapted for work where arrangement has been determined before start of construction. Where required, this type of insert can be furnished tapped for ⅜ or ½-in. pipes as well as for ⅜-in. standard bolts.

DIMENSIONS OF TRUSCON ADJUSTABLE INSERTS (INCHES)

Size	A	B	C	D	E	G
½	2⅜	¾	⅞	1 3/16	1 5/16	3
⅝	2⅝	1	1⅛	1	1⅞	4
¾	2¾	1	1¼	1 3/16	1 11/16	5

Truscon Curb Bars and Edge Protectors

Truscon Curb Bars embody the following distinctive features:

(1) Ample width and thickness of plate exposed to wear.

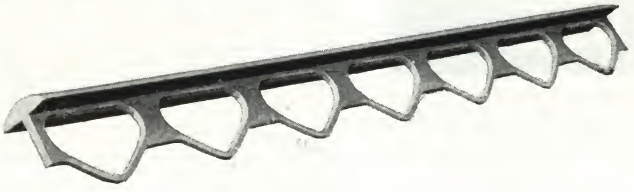
(2) Edges of plate beveled to prevent any possibility of feather edge forming at junction of concrete and plate.

(3) Plate surrounds and protects the corner without splitting the concrete into two portions.

(4) Absolute anchorage to the concrete.

(5) Unit of plate and anchors, both formed from the same section of steel.

Truscon Edge Protectors are similar to Truscon Curb Bars except that they provide a 1-in. protecting edge instead of 1⅝-in. Both Truscon Curb Bars and Truscon Edge Protectors are furnished in standard lengths of 6, 8, 10 and 12 ft.



Continued on next page

WICKWIRE SPENCER STEEL COMPANY

GENERAL OFFICES
41 East Forty-second Street, NEW YORK, N. Y.
OFFICES AND WAREHOUSES
WORCESTER, MASS. BUFFALO, N. Y. CLEVELAND, OHIO CHICAGO, ILL. SAN FRANCISCO, CAL. LOS ANGELES, CAL. SEATTLE, WASH. PORTLAND, ORE. TULSA, OKLA.

Products

CLINTON ELECTRICALLY WELDED WIRE FABRIC for Concrete Reinforcement.

Also WIRE ROPE and FITTINGS.

For our pages on Wire and Iron Fences and Gates, Woven Wire Lath, and Metal Grilles, see Manufacturers' Index.

Clinton Electrically Welded Wire Fabric

Scope of Use—Clinton Electrically Welded Wire Fabric, a mesh reinforcement, is especially satisfactory for floors, walls, roads, sidewalks, sewers, reservoirs, levees and all forms of slab construction work.

When used to strengthen floor slabs the large longitudinal wires are located in the line of greatest tension. The transverse, or secondary members, arranged at right angles to them, afford a most efficient means of distributing concentrated loads in a direction perpendicular to the main reinforcing members.

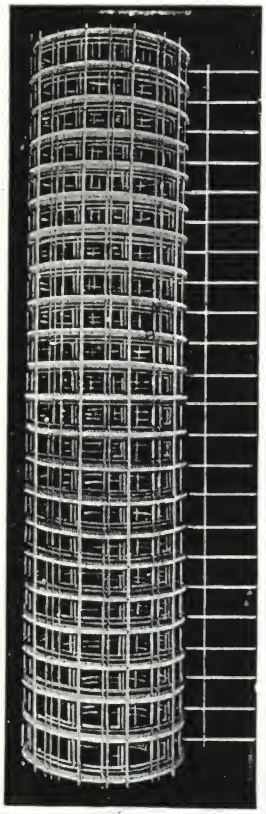
Because of its efficient lateral, as well as longitudinal strength, Clinton Welded Wire Fabric prevents cracking due to changes in temperature.

Material—It is a rectangular wire mesh with its points of intersection securely welded by a patented electrical process. It is furnished in virtually any size of wire.

The fabric is manufactured from a special grade of high quality steel wire possessing such strength, elasticity and ductility as to render it ideally suited to structural use. The wire possesses an average ultimate strength of 65,000 to 75,000 lb.

Finish—Clinton Electrically Welded Fabric is furnished either in plain steel or galvanized.

Economy and Accuracy of Installation—The fabric is delivered in rolls and may be laid in continuous sheets up to 200 ft. in length, or may be furnished in sheets of desired length. There are no weak points, no lapped ends, no waste. Great quantities can be laid quickly and accurately by unskilled labor, with the assurance that every strand is in its proper position. This renders it the simplest, safest, most economical reinforcing material for all forms of slab construction.



Roll of Clinton Electrically Welded Wire, 48-in. Width
Shipped also in sheets if desired

SLAB REINFORCEMENT UNDER NEW YORK, N. Y., CODE

Sectional area of steel reinforcement required, square inches per foot in width, for concrete arches of various spans based on Clinton Electrically Welded Fabric

Total load in lb. per sq. ft. including weight of slab	Spans, in feet and inches																
	4–0	4–3	4–6	4–9	5–0	5–3	5–6	5–9	6–0	6–3	6–6	6–9	7–0	7–3	7–6	7–9	8–0
4-inch Cinder Concrete Slab, 1-2-5 Mixture																	
100	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.074	.087
125	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.087	.101	.101
150	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.120
175	.043	.043	.043	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140
200	.043	.052	.052	.062	.062	.074	.074	.087	.101	.101	.120	.120	.140	.140	.147	.162	.162
225	.052	.052	.062	.062	.074	.087	.087	.101	.101	.120	.120	.140	.140	.147	.162	.174	.202
250	.052	.062	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.174	.202	.202
275	.062	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239
300	.062	.074	.074	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259
325	.074	.074	.087	.101	.101	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280
350	.074	.087	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.280
375	.074	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.302	.302
400	.087	.101	.101	.120	.140	.140	.162	.174	.202	.202	.239	.239	.259	.280	.280	.302	.330
425	.087	.101	.120	.120	.140	.147	.162	.202	.202	.239	.239	.259	.259	.280	.302	.330	.359
450	.101	.101	.120	.140	.147	.162	.174	.202	.239	.239	.259	.259	.280	.302	.330	.359	.389
4-inch Stone or Gravel Concrete Slab, 1-2-4 Mixture or Equal																	
100	.043	.043	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.052	.062	.062	.062	.074
125	.043	.043	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.087
150	.043	.043	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120
175	.043	.043	.043	.043	.052	.052	.062	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140
200	.043	.043	.043	.052	.052	.062	.074	.074	.087	.087	.101	.101	.120	.120	.140	.140	.140
225	.043	.043	.052	.062	.062	.074	.074	.087	.087	.101	.120	.120	.120	.140	.140	.147	.162
250	.043	.052	.062	.062	.074	.074	.087	.101	.101	.120	.120	.140	.140	.147	.162	.162	.174
275	.052	.062	.062	.074	.087	.087	.101	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202
300	.052	.062	.074	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239
325	.062	.062	.074	.087	.101	.101	.120	.120	.140	.140	.162	.162	.174	.202	.202	.239	.239
350	.062	.074	.087	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259
375	.074	.074	.087	.101	.120	.120	.140	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280
400	.087	.087	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.280	.280
425	.087	.087	.101	.120	.120	.140	.147	.162	.174	.202	.202	.239	.239	.259	.259	.280	.302
450	.087	.087	.101	.120	.140	.140	.147	.162	.202	.202	.239	.239	.259	.259	.280	.302	.330

Continued on next page

STANDARD SIZES—CLINTON WELDED FABRIC

Style No.	Spacing of wires		Size wires W. & M. gauge		Sec. area of steel per ft. width, sq. in.		Wt., per 100 sq. ft., lb.	Standard rolls	
	Longitud'nl, in.	Transverse, in.	Longitud'nl	Transverse	Longitud'nl	Transverse		Width, in.	Lgth., ft.
*216–28	2	16	2	8	.325	.015	119.4	60	150
*216–38	2	16	3	8	.280	.015	103.6	60	150
*216–49	2	16	4	9	.239	.013	88.5	60	150
*216–510	2	16	5	10	.202	.011	74.6	60	150
*216–610	2	16	6	10	.174	.011	64.7	60	200
*316–28	3	16	2	8	.217	.015	82.6	84	150
*316–38	3	16	3	8	.187	.015	72.0	84	150
*316–49	3	16	4	9	.160	.013	61.4	84	150
*316–510	3	16	5	10	.135	.011	51.8	84	150
*316–610	3	16	6	10	.116	.011	45.1	84	200
*416–38	4	16	3	8	.140	.015	56.1	84	150
*416–49	4	16	4	9	.120	.013	47.9	84	150
*416–510	4	16	5	10	.101	.011	40.4	84	200
*416–610	4	16	6	10	.087	.011	35.2	84	200
*416–711	4	16	7	11	.074	.009	29.7	84	200
*412–812	4	12	8	12	.062	.009	25.5	84	200
*412–912	4	12	9	12	.052	.009	21.8	84	200
*412–1012	4	12	10	12	.043	.009	18.6	100	300
*412–1212	4	12	12	12	.026	.009	12.6	100	400
412–55	4	12	5	5	.101	.034	48.4	72	200
412–66	4	12	6	6	.087	.029	41.6	72	200
412–77	4	12	7	7	.074	.025	35.4	72	200
412–88	4	12	8	8	.062	.021	29.6	72	200
*59–1212	5	9	12	12	.021	.012	11.8	100	400
612–06	6	12	0	6	.148	.029	65.3	72	†
612–33	6	12	3	3	.093	.047	51.2	72	200
612–44	6	12	4	4	.080	.040	43.8	72	200
612–55	6	12	5	5	.067	.034	37.0	72	200
612–66	6	12	6	6	.058	.029	31.8	72	200
612–77	6	12	7	7	.049	.025	27.0	72	200
22–1010	2	2	10	10	.086	.086	60.3	56	200
* 22–1212	2	2	12	12	.052	.052	36.8	56	300
44–44	4	4	4	4	.120	.120	85.3	84	150
44–66	4	4	6	6	.087	.087	61.9	84	150
44–88	4	4	8	8	.062	.062	44.1	84	200
66–44	6	6	4	4	.080	.080	57.8	84	200
66–55	6	6	5	5	.067	.067	48.8	84	200
* 66–66	6	6	6	6	.058	.058	42.0	84	200
66–77	6	6	7	7	.049	.049	35.7	84	200
* 66–88	6	6	8	8	.041	.041	30.0	84	200
* 66–1010	6	6	10	10	.029	.029	20.7	96	300

*Denotes sizes ordinarily carried in stock. †Shipped only in flat sheets.

REINFORCED CONCRETE SLAB TABLES

Values in all these tables indicate size of mesh and gauge of wires in Clinton Fabric. Thus, 4x16, 7&11 indicates a fabric having No. 7 gauge longitudinal wires on 4-in. centers welded to No. 11 gauge transverse wires on 16-in. centers.

Reinforcements below and to left of zigzag lines may also be safely used in cinder concrete without exceeding 300 lbs. per sq. in. compression in the concrete. In using cinder concrete, applied loads as given may be increased 3½ lbs. for each inch thickness of slab.

Table I. Applied Load 50 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton Fabric required — Span of slab in feet										
		4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	4 x 16 4&9	4 x 16 3&8	3 x 16 3&8	.....	.....	.....	.....
4½	¾	.....	.....	4 x 12 8&12	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	.....	.....	.....
5	1	.....	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	3 x 16 5&10	2 x 16 4&9	.....	.....
6	1	.....	.....	.....	4 x 16 7&11	4 x 16 6&10	4 x 16 4&9	3 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8
7	1	.....	.....	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8
8	1¼	.....	.....	.....	.....	.....	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 5&10	2 x 1 4&9

Table II. Applied Load 75 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton Fabric required — Span of slab in feet										
		4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	.....	.....	.....	.....	.....
4½	¾	.....	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	.....	.....	.....	.....
5	1	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	.....	.....	.....
6	1	.....	.....	4 x 12 8&12	4 x 16 6&10	5 x 10 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	.....
7	1	.....	.....	.....	4 x 16 7&11	4 x 16 6&10	4 x 16 4&9	3 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8
8	1¼	.....	.....	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8

REINFORCED CONCRETE SLAB TABLES (Continued)

Table III. Applied Load 100 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton Fabric required — Span of slab in feet										
		4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 9&12	4 x 16 7&11	4 x 16 5&10	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 12 9&12	4 x 12 8&12	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....
4½	¾	.....	4 x 12 8&12	4 x 16 6&10	3 x 16 6&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....
5	1	.....	.....	4 x 16 6&10	3 x 16 6&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 2&8	.....	.....	.....
6	1	.....	.....	4 x 16 7&11	4 x 16 5&10	4 x 16 4&9	4 x 16 4&9	3 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....
7	1	.....	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 5&10	2 x 16 3&8	2 x 16 3&8	2 x 16 1&7
8	1¼	.....	.....	.....	.....	4 x 16 5&10	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8

Table IV. Applied Load 125 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton Fabric required — Span of slab in feet										
		4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 8&12	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 5&10	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 7&11	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	.....	.....	.....	.....	.....
5	1	.....	.....	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	.....	.....	.....	.....
6	1	.....	.....	4 x 16 6&10	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....
7	1	.....	.....	.....	4 x 16 5&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	2 x 16 0&6
8	1¼	.....	.....	.....	.....	4 x 16 4&9	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7

Table V. Applied Load 150 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton Fabric required — Span of slab in feet										
		4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4	¾	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 3&8	2 x 16 3&8	.....	.....	.....	.....	.....	.....
4½	¾	.....	4 x 16 7&11	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	.....	.....	.....	.....	.....
5	1	.....	.....	4 x 16 5&10	3 x 16 4&9	3 x 16 3&8	2 x 16 4&9	2 x 16 0&6	.....	.....	.....	.....
6	1	.....	.....	4 x 16 6&10	4 x 16 4&9	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....
7	1	.....	.....	.....	4 x 16 5&10	4 x 16 3&8	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	.....
8	1¼	.....	.....	.....	.....	4 x 16 3&8	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	2 x 16 1&7	2 x 16 0&6

Table VI. Applied Load 200 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton Fabric required — Span of slab in feet										
		4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
4½	¾	4 x 12 8&12	4 x 16 5&10	3 x 16 5&10	3 x 16 3&8	2 x 16 3&8	.....	.....	.....	.....	.....	.....
5	1	.....	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 0&6	.....	.....	.....	.....	.....
6	1	.....	.....	4 x 16 5&10	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 2&8	2 x 16 0&6	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 4&9	2 x 16 5&10	2 x 16 4&9	2 x 16 2&8	2 x 16 1&7	2 x 16 0&6	.....

Table VII. Applied Load 250 Lbs. per Sq. Ft.

Thickness of slab, in.	Concrete below steel, in.	Clinton Fabric required — Span of slab in feet										
		4	5	6	7	8	9	10	11	12	13	14
3½	¾	4 x 16 5&10	3 x 16 4&9	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	¾	4 x 16 6&10	3 x 16 5&10	3 x 16 3&8	.....	.....	.....	.....	.....	.....	.....	.....
4½	¾	4 x 16 7&11	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	.....	.....	.....	.....	.....	.....	.....
5	1	.....	3 x 16 6&10	3 x 16 4&9	2 x 16 4&9	2 x 16 1&7	.....	.....	.....	.....	.....	.....
6	1	.....	.....	3 x 16 5&10	3 x 16 3&8	2 x 16 4&9	2 x 16 2&8	.....	.....	.....	.....	.....
7	1	.....	.....	.....	3 x 16 4&9	2 x 16 5&10	2 x 16 3&8	2 x 16 2&8	.....	.....	.....	.....
8	1¼	.....	.....	.....	.....	3 x 16 3&8	2 x 16 4&9	2 x 16 3&8	2 x 16 1&7	.....	.....	.....

UNITED STATES GYPSUM COMPANY

GENERAL OFFICES

300 West Adams Street, CHICAGO, ILL.

For Sales Offices, see Sweet's Manufacturers' Index for U.S.G. Catalogue on Roof, Floor and Partition Products

ECONO (NORTH WESTERN DIVISION) EXPANDED METAL

Introductory

Econo Expanded Metal is a fabricated diamond mesh steel material of high elasticity. Its diamond shaped meshes range from 3x8 in. down to ½x1¼ in. Engineer and contractor alike find definite advantages in using expanded metal reinforcing for the many forms of concrete slab work of moderate span and load, since the correct amount of reinforcing can be predetermined.

The smaller Econo meshes present an ideal open mesh fabric for the construction of open partitions, window and door guards, elevator enclosures, machine guards, etc., or wherever a rigid open mesh material can be advantageously used.

For Concreting

Econo offers marked advantages over any reinforcing system composed of tied or interlaced units. Some of its many advantages are: (1) Ease and rapidity with which it can be properly placed by unskilled workmen and with less supervision. (2) Lightens the designer's responsibility, because the correct amount of steel is determined at the time of manufacture, and cannot be altered by careless or ignorant workmen. (3) Provides a perfect bond, minimizing shocks, concentrated loading, etc., as stresses are evenly distributed over entire area. (4) Large, convenient size sheets, which lie flat without stretching.

The more popular reinforcing uses are for floor and roof slabs of moderate span and load, retaining walls, loading platforms, porch floors, culverts, sea walls, reservoirs, small bridges, tanks, foundations, columns, vaults, fireproofing, beam wrapping, etc.

"Designing Data," our helpful manual covering the use of Econo for reinforced concrete construction, is available to engineers and contractors gratis.

For Open Partitions, Industrial Uses, etc.

Because of its high visibility and great rigidity, Econo is used extensively in practically every industry. It is particularly adaptable for the making of Open Partitions, Window and Door Guards, Machine Guards, etc. Its moderate cost, efficiency, durability and the ease with which it can be bent and formed commend it for this wide range of service.

In the construction of Open Partitions, Econo can be satisfactorily erected with regular angle iron or Red Top (Econo) Partition Bar and Accessories. Neat, lasting Window and Door Guards are easily constructed with the aid of Red Top (Econo) Frame Bar and Accessories. The Bar furnishes a continuous edging to which hinges and clips can be attached. Form-fitting, space-saving Machine (belt and gear) Guards are a present-day necessity and are within reach of all plant owners. They can be readily fabricated with Econo Mesh and angle iron.

Among its many present uses in the various industries are: Skylight guards, conveyor enclosures, elevator shaft and cage enclosures, fire door guards, mill trucks, trays and baskets, open shelving, ventilating fan enclosures, refuse burners, live stock pens, filter screens, dehydrators, truck body enclosures, stairway enclosures, brake shoe binder.

Practically every one of the special uses for which Econo can be advantageously employed can be satisfactorily designed and fabricated by capable shop mechanics or plant maintenance men.

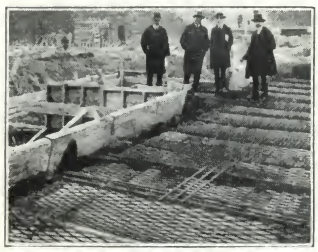
The UNITED STATES GYPSUM COMPANY does not manufacture partitions, guards, etc. Its interest is confined to the distribution of the necessary materials for their construction, together with any advisory service that can be rendered. Names of reliable fabricators will also be furnished to those who prefer to have their safety and industrial devices built for them. Interesting descriptive literature on the many industrial uses for Econo is also available.

STOCK SIZES AND WEIGHTS OF ECONO EXPANDED METAL

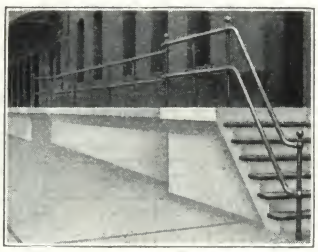
Style number	Size of mesh, in.	U. S. standard gauge, No.	Weight per sq. ft., lbs.	Sectional area per foot width, sq. in.	Standard size of sheets: Width, ft. in.	Standard size of sheets: Length, ft.
Meshes for Reinforcing Concrete						
06–3	3 x8	16	.20	.06	6 0	8 and 12
08–3	3 x8	16	.27	.08	6 0	8 and 12
10–3	3 x8	13	.34	.10	4 0	8, 10, and 12
125–3	3 x8	13	.42	.125	5 6	8, 10, and 12
15–3	3 x8	10	.51	.15	7 0	8, 10, and 12
176–3	3 x8	10	.60	.176	6 0	8, 10, and 12
20–3	3 x8	10	.68	.20	5 6	8, 10, and 12
25–3	3 x8	10	.85	.25	4 3	8, 10, and 12
30–3	3 x8	10	1.02	.30	7 0	8, 10, and 12
35–3	3 x8	10	1.19	.35	6 0	8, 10, and 12
40–3	3 x8	7	1.36	.40	7 0	8, 10, and 12
45–3	3 x8	7	1.53	.45	6 3	8, 10, and 12
50–3	3 x8	7	1.70	.50	5 9	8, 10, and 12
54–3	3 x8	7	1.83	.54	5 6	8, 10, and 12
60–3	3 x8	7	2.04	.60	4 9	8, 10, and 12
65–3	3 x8	7	2.19	.65	4 3	8, 10, and 12
10–2¼	2¼ x6	16	.34	.10	5 0	8 and 12
15–2¼	2¼ x6	13	.51	.15	4 9	8, 10, and 12
Special Meshes for Open Partitions, Industrial Uses, etc.						
06–1½	1½ x3	18	.20	.06	2-9 and 4-0	8 only
12–1½	1½ x3	16	.40	.12	4-3 and 5-8	8 and 12
* 18–1½	1½ x3	13	.60	.18	4 0	8, 10, and 12
375–1½	1½ x3	9	1.28	.375	6 0	8 only
15–¾	¾ x2½	16	.51	.15	7 0	8 and 12
* 24–¾	¾ x2½	13	.80	.24	4 and 6	8, 10, and 12
53–¾	¾ x2½	9	1.80	.53	4 6	8 only
* 20–½	½ x1¼	18	.68	.20	4 0	8 only
24–½	½ x1¼	16	.82	.24	4 and 8	8 only

*These styles bear the "Tested and Inspected" label of the Underwriters' Laboratories.

CONCRETE REINFORCING USES



Roads and Sidewalks

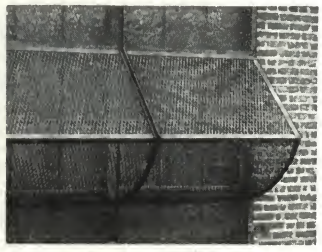


Loading Platforms

INDUSTRIAL USES



Open Partitions



Window Guards

CONVER STEEL & WIRE CO., INC.

Manufacturers of Wire and Flat Steel Products for Building Construction

TELEPHONE
MOTT HAVEN 1600

621-631 East 132nd Street, NEW YORK, N. Y.

Products

WIRE CLIP REINFORCEMENT for Concrete Fireproofing; FORM SPACERS.

Also Reinforcing Bar Cutters and Benders, Steel and Galvanized Mortar Boxes, Special Tools, Bridle Irons, Wall Ties and Ashlar Anchors.

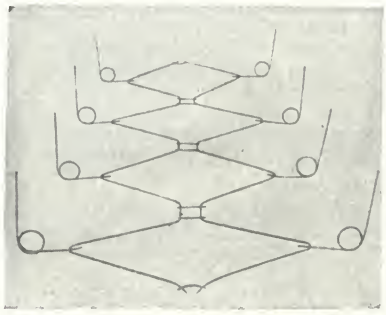
For our page on Ladder Stud; Hangers and Hairpins; Corner Bead; Base Bead, see Manufacturers' Index.

Concrete Soffit Clips and Fireproof Construction

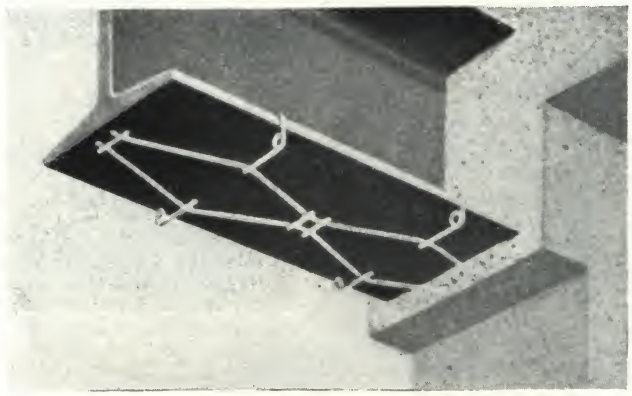
Proper soffit reinforcing is a detail of fireproof construction which is often considered a matter of secondary importance. As a result of vague specifications and lax requirements, the method of covering structural steel with concrete is too frequently left, in an indefinite manner, to the discretion of the general or fireproof contractor and the ultimate results are dependent upon his experience and integrity in this type of construction.

As a soffit reinforcement, no other reinforcing materials have met with greater success than our present well-known line of Reed Expansible, Economy and Master Clips. They are made from high grade steel with all members electrically welded and assure rigidity regardless of size or shape into which a strip may be cut. These clips may be adapted to the most intricate shapes with accurate and exact location.

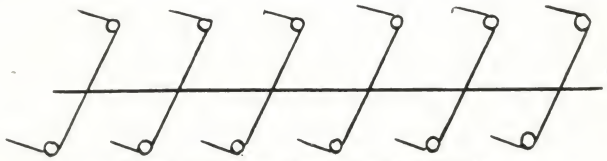
All beams may be wrapped with these clips enabling the contractor to use them with equal facility and economy in fireproofing either buildings or heavy bridge work. Their extensive use has proved them the most efficient and satisfactory on the market for reinforcing these thin protective layers of concrete.



Actual Perspective Photograph Showing Style B Clip Expanded 14 Inches



Illustrating Perfect Soffit Reinforcing Reed Clip on Beam



Reed Clips on Longitudinal Wire

Reed Clips

These clips are welded to a wire 5 ft. 6 in. in length. Fifty lengths or 250 ft. are packed in a bundle. Made in sizes from 3 in. and up. Double length wires are used in sizes over 9 in. For extremely wide flanges three or more longitudinal wires are furnished. Spacing can also be varied to suit special requirements.



Individual Clip

Can be used for Bethlehem, Carnegie or standard sections, also for channels and girders. The very best grade of drawn steel wire is employed in the manufacture of this clip.

The reed clip owes its great advantage to the fact that it can be applied from one end of the beam or girder and worked along its entire length without the mechanic so much as moving from his position at the end of the member. The small loop in clip offsets it from face of flange.

Three Types of Form Spacers

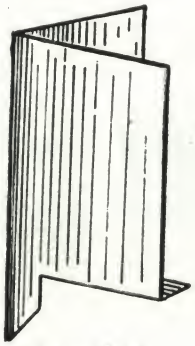
These three types of form spacers have proved themselves a boon to the fireproofer. They keep the forms an even distance away from the flanges of girders and columns and provide a smooth even finish to the job. They are accurate, economical and efficient.

The wire spacers come in all sizes from 1½ to 3 inches, of one gauge of wire only, thereby keeping their cost to a minimum. The slight opening between the parallel wires assures a positive bond and they will not, therefore, pull out of concrete when forms are stripped.

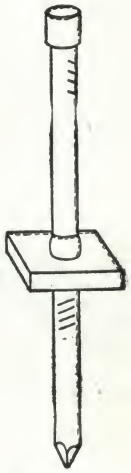
Xact Metal Form Spacers are made of 14-gauge specially treated sheet metal. The sharp wedge at the bottom permits these spacers to be easily driven into the lumber and a small lip prevents it from going beyond the required distance.



Economy Form Spacer



Xact Metal Form Spacer



Economy Form Spacer

MITCHELL-TAPPEN COMPANY

Standardized Metal Caging (S.M.C.)

15 John Street, NEW YORK, N. Y.

REPRESENTATIVES

BALTIMORE, MD., J. Bayward Embick, 813 American Building
BOSTON, MASS., Robert B. Campbell, 49 Ellery Street
CHICAGO, ILL., Quality Building Products Co., 660 Builders Building
CLEVELAND, OHIO, Tomlinson-MacLachlan, Inc., 1601 St. Clair Avenue, N. E.
DETROIT, MICH., E. W. Nicklin Co., General Motors Building
GREENVILLE, S. C., R. P. Sweeny Co.
INDIANAPOLIS, IND., Architectural Engineering Co., 105 Capitol Street
MIAMI, FLA., Brandt-Smith Co., 415 Miami Bank & Trust Building
MINNEAPOLIS, MINN., H. S. Rockwell, 418 Exchange Bank Building
MONTREAL, QUE., C. G. Porter & Co., 215 New Berks Building
PITTSBURGH, PA., Pittsburgh Building Specialties Co., Jones Law Building
SAN FRANCISCO, CALIF., Gates-Tatterson Company, Inc., 346 Calle Building
TORONTO, ONT., H. A. J. Aldington, 43 Adelaide Street, W.
UTICA, N. Y., H. H. Frey, 1612 Holland Avenue

Importance of Standardized Metal Caging

Structural steel, to be properly protected from fire or corrosion, must be covered with approximately 2 in. of concrete.

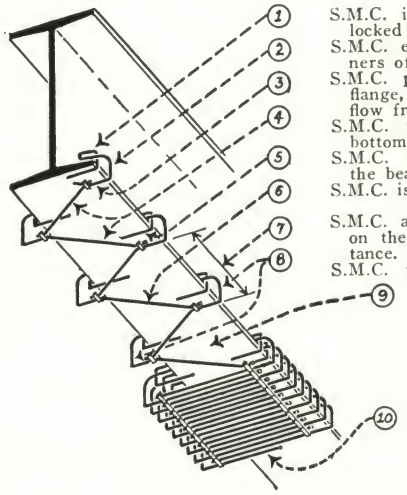
When fire hits the beam soffits, the corners of the soffits, unless properly protected and reinforced, will shatter and crumble off, exposing the steel beams to the full heat of the flames.

Vibration too is liable to cause improperly reinforced soffits to crack. The falling concrete not only leaves the steel unprotected and exposed to corrosion and fire, but also may do serious damage to persons and material underneath.

To use ordinary beam wrapping for soffit reinforcement is more or less a waste of money, *since ordinary beam wrapping does not reach out into the corners which are the weakest parts of the soffits.* For this reason, railroad engineers purposely omitted specifying concrete protection on the underside of steel members. But with the advent of S.M.C. they have specified it on more than 500 bridges.

S.M.C. extends both below and beyond the beam flange, holding the concrete firmly in place regardless of heat, vibration, knocks and cracks. For reliable fireproofing of steel, specify concrete reinforced by S.M.C. It offers, we claim, the best combination obtainable.

Advantages of S.M.C.



1. S.M.C. is securely anchored and locked to the beam flange.
2. S.M.C. extends out into the corners of the soffits.
3. S.M.C. projects below the beam flange, allowing the concrete to flow freely.
4. S.M.C. is entirely clear of the bottom of the beam.
5. S.M.C. is definitely offset from the beam at a fixed distance.
6. S.M.C. is continuously interlocked.
7. S.M.C. automatically spaces itself on the beam at the proper distance.
8. S.M.C. is alternately spaced on the beam.
9. S.M.C. allows the concrete to flow freely. There is nothing to obstruct it.
10. S.M.C. is delivered collapsible and it is easy to handle and apply.

S.M.C. is made from specially drawn No. 12 gauge galvanized wire, electrically welded to eliminate all possibility of its coming apart when applied. When being applied to the beam it automatically takes its proper position both below and beyond the beam flange, spacing itself out on the beam and requiring no further adjustment.

S.M.C. allows the concrete to flow freely to every part of the soffit. With S.M.C. there are no hollow soffits to patch and repair after the forms are pulled.

Standard Soffit Specification

All beam and channel soffits shall be reinforced with a continuous caging made of not less than No. 12 gauge galvanized wire with electrically welded joints and so manufactured that it will, when applied, automatically take a predetermined offset of at least ¾ in. below entire width of beam flange, and also beyond the edge of the lower beam flange, in order to insure proper reinforcement of the corners of the soffits. This reinforcement shall be so designed that it will not dam the flow of concrete and thus form cavities underneath the flange.

Where beams are in excess of 18 in. deep, the haunches shall be reinforced with No. 12 gauge wire running from the lower flange up over the top of the beam and bent over the opposite side. Channels shall be protected with concrete reinforced with material properly designed to meet the above requirements with channels.

On beams of less than 18 in. deep, the reinforcement shall be pulled out or adjusted as it is being applied to the beam in order to insure proper fit, not before.

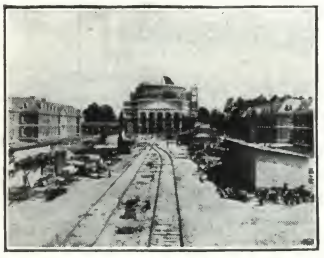




SIZES OF S.M.C. FOR BEAM AND COLUMN FLANGES*

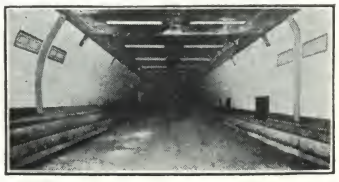
S.M.C. Size	Size of jaw opening, in inches	Sizes of flange			S.M.C. Size	Size of jaw opening, in inches	Sizes of flange		
		Width in inches		Maximum thickness,			Width in inches		Maximum thickness,
		Min.	Max.				Min.	Max.	
A	7⅜x ⅝	3	6¼	9/16	12	16⅜x1⅛	13½	15¼	1 1/16
B	10¼x ⅞	6⅛	9	13/16	12-1	16½x1 9/16	13½	15¼	1½
B-1	10¼x1 9/16	7	9	1½	12-2	16⅜x1 15/16	13½	15¼	1¾
C	13 x ⅞	9	11¾	13/16	12-3	16⅜x2 15/16	13½	15¼	2¼
C-1	13 x1 9/16	9	11¾	1½	13-1	18¼x1 9/16	15¼	17	1½
11	14⅝x1⅛	11¾	13¾	1 1/16	13-2	18¼x1 15/16	15¼	17	1⅞

*FOR CHANNELS—One size Channel material covers all requirements.



Buildings for Duke University, Durham, N. C.
Horace Trumbauer, Architect

Above left
New York Life Insurance Co. Building, New York, N. Y.
Cass Gilbert, Architect

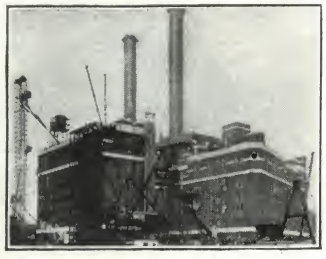


Hudson River Vehicular Tunnel
New York and New Jersey Bridge and Tunnel Commission

Above right
Penobscot Building, Detroit, Mich.
Smith, Hinchman & Grylls, Architects and Engineers



New York Connecting Railway Viaduct, Long Island City, N. Y.



Fourteenth Street East River Power Plant of New York Edison Co.
Thomas E. Murray, Inc., Engineers

Prominent Structures on Which Standardized Metal Caging (S.M.C.) Was Used

UNION STEEL PRODUCTS COMPANY

Beam Wrapping, Bar Spacers, Sleeper Anchors

ALBION, MICH.

BRANCH OFFICES

CHICAGO, ILL., 1148 Builders' Building—Telephone, Randolph 6635 DETROIT, MICH., Penobscot Building—Telephone, Randolph 5500

Products

JOIST BAR SPACERS (Rigid and Snap-in); REED SOFFIT CLIPS (Expansible and Rigid); SLEEPER SPACING ANCHOR.

Also Continuous Welded Chair Stirrup Units, Continuous Hi-Chair, Continuous Anchor Slot, Special Wire Shapes, etc.

Snap-in Joist Bar Spacer

By placing the bar between the supporting spacing wires and stepping on it, the bar snaps into place and is rigidly held there. The bars are perfectly spaced from the sides and from the bottom, and they cannot get out of place. The Snap-in Spacer has three supports directly under each bar. It cannot be crushed or sagged even if you jump down into the joist on the bars.

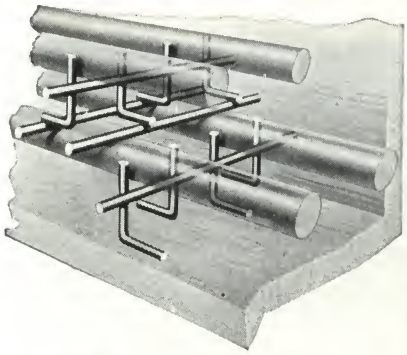


The Snap-in Joist Spacer will not stop the flow of concrete and cause voids. Note the small amount of metal resting on the forms.

Sizes—Made for 4, 5 and 6-in. joists, ¾, 1 and 1½-in. heights.

Continuous Beam Bar Spacers

Made in 5-ft. lengths and cut on the job to fit any width of beam or girder. The 5-ft. strips have supports rigidly welded every 2 in. along its length. These supports project up above the supporting bar so that reinforcing bars are *spaced* as well as *supported.*

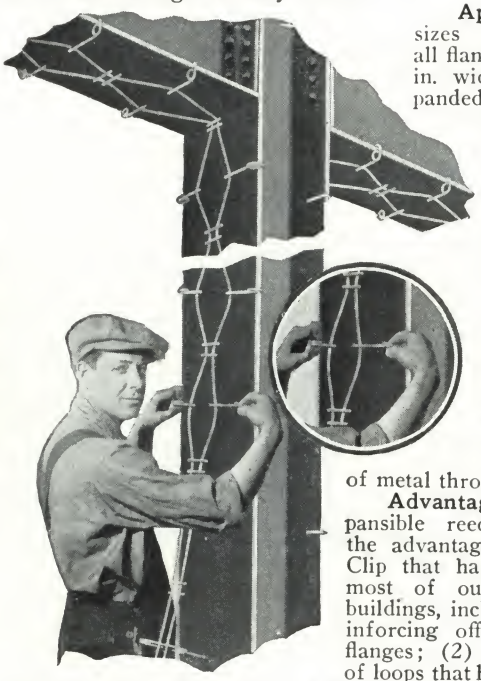


Made of heavy hard steel wire that will support the heaviest bars and a man's weight easily.

Sizes—Bottom beam bar spacer, ¾, 1, 1½ and 2-in. heights, top beam bar spacer, 1, 1½ and 2-in. heights. Stocked in 5-ft. lengths. Cut to any length.

Expansible Reed Clips

Soffit clips are continuous strips adjustable to beam or column flanges of any width.



Application—Two sizes perfectly wrap all flanges from 3 to 18 in. wide. Clip is expanded, as shown, to fit flange width, shortening in greater width to provide more reinforcement per lineal foot. For example, on a 6-in. flange clips are spaced 12 in. apart, on a 16-in. flange they would be spaced but 8-in. apart. Provides an ideal pattern of distribution of metal through fireproofing.

Advantages—The expansible reed clip has all the advantages of the Reed Clip that has been used on most of our biggest steel buildings, including: (1) reinforcing offset 1 in. from flanges; (2) gripping action of loops that holds reinforcing rigidly in place; (3) made in 4-ft. strips; (4) made of No. 12 galvanized hard steel wire; (5) electric welded at every joint.

In addition, the expansible clip (6) reinforces wider flanges more thoroughly; (7) is much easier to handle on the job, and (8) costs less than any other approved form of wrapping.

Sizes—US-1 clips are 4 in. wide and can be expanded to 12-in. US-2 clips are 8 in. wide and can be expanded to 18 in. Stocked by building material dealers everywhere.

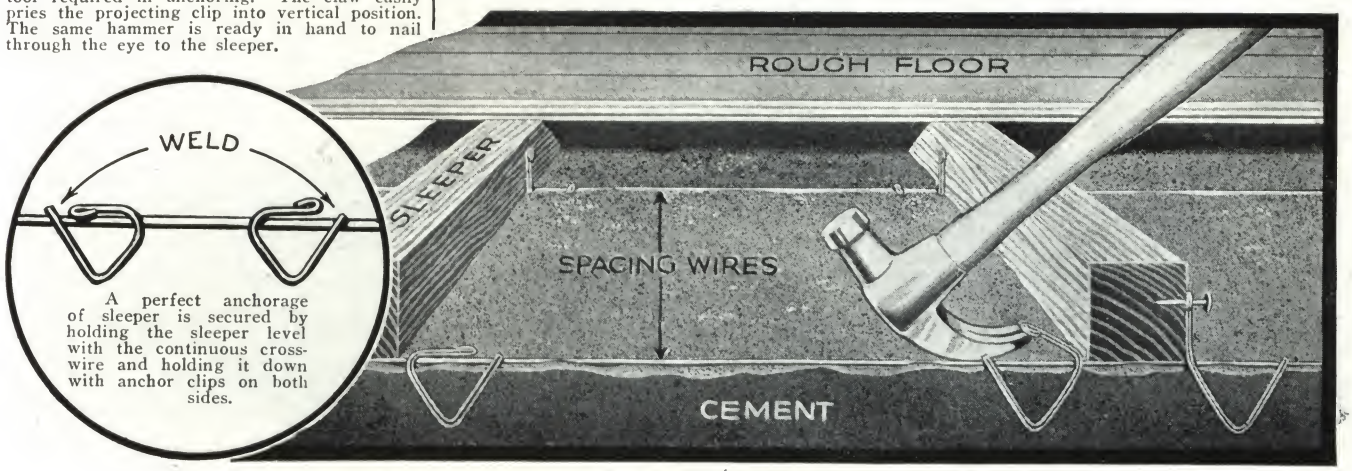
Continuous Sleeper Spacing Anchors

Wherever wood floors are to be laid over concrete these prespaced sleeper anchor strips should be used. They will secure sound floors more economically than any other method.

The "continuous" feature alone of Union Sleeper Anchors made setting anchorages just one-fourth the work of former methods. Four anchor clips spaced and welded to a heavy longitudinal wire made it possible to *place and space all four at once,* accurately, without measuring or using templates. They take the human element out of anchoring sleepers.

Sizes—Made for 2, 3 or 4-in. sleepers, spaced on 12 or 16-in. centers.

The carpenter's claw hammer is the only tool required in anchoring. The claw easily pries the projecting clip into vertical position. The same hammer is ready in hand to nail through the eye to the sleeper.



A perfect anchorage of sleeper is secured by holding the sleeper level with the continuous cross-wire and holding it down with anchor clips on both sides.

This Economical Method of Securing a Uniform Rigid Floor Eliminates Dry Rot and Squeaks

AMERICAN ROOF TRUSS COMPANY

TELEPHONE
FRANKLIN 1720, 1721

Engineers and Constructors of Roof Trusses
228 North La Salle Street, CHICAGO, ILL.

Products

Manufacturers and erectors of AMERICAN WOOD BOWSTRING TRUSSES for public garages, service stations, warehouses, schools, gymnasiums, bowling alleys, aeroplane hangars, grandstands, dance halls, and other buildings requiring clear floor space.

Span and Spacing

Trusses designed for 25 to 150-foot spans. Spacing is usually 16 to 20 feet on centers, depending on length of building.

Height at Center

The standard height at the center on all spans is one-eighth of the length of the truss.

Service, Strength and Safety

Trusses are built on the job by us and erected in place as soon as pilasters are up, completely installed, ready for roof joists, anywhere in the United States, designed according to local building requirements. All trusses guaranteed.

Information Required for Estimates

(1) Number of trusses required.
(2) Span out to out of walls or center of columns.
(3) Spacing between trusses.
(4) Loads. Regular roof load in pounds per square foot. State if any ceiling load. For unusual loading conditions send plan or photostat.
(5) Address of job, nature of building, owner's and architect's names.

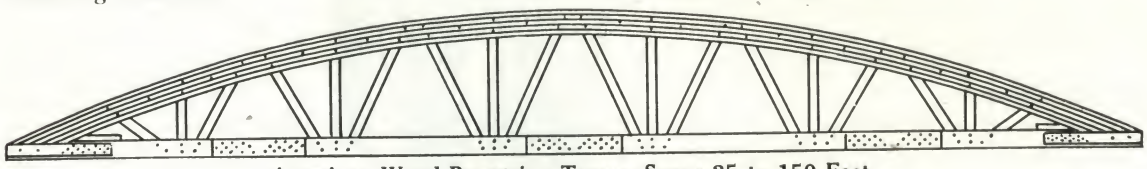
Specifications

Roof trusses shall be American Wood Bowstring trusses furnished by AMERICAN ROOF TRUSS COMPANY, 228 North La Salle Street, Chicago.

Literature

Send for illustrated folder and valuable suggestions covering economical layout and brick saving features.

Our engineers will give fullest co-operation to architects.





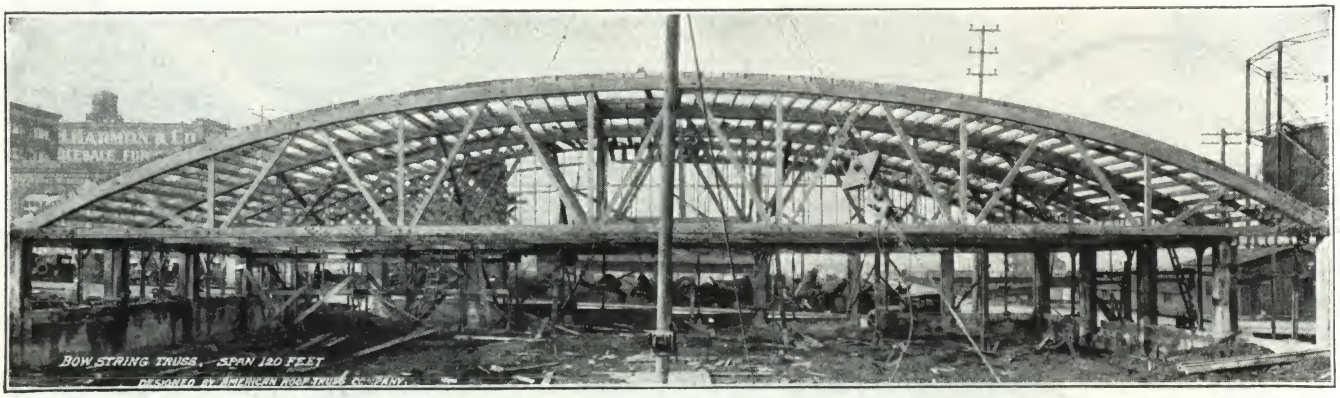
American Wood Bowstring Truss—Spans 25 to 150 Feet



60-foot Span Trusses, Huntington, L. I., N. Y.
D. M. DUSENBERRY, Architect



Typical Factory Installation Using Over 600 American Roof Trusses for Clearing Land Assn.
F. C. FOLTZ & Co., Architects



American Roof Trusses 120 Feet Long, Hickey Motor Co., Tacoma, Wash.
HILL & MOCK, Architects

ARCH ROOF CONSTRUCTION CO., INC.

TELEPHONE
WISCONSIN 5845

Engineers and Contractors
104 West 42nd Street, NEW YORK, N. Y.

Products and Service

Design, Construction and Erection of LONG SPAN ROOF ARCHES for theaters; auditoriums; convention, exhibition and fair buildings; garages; warehouses; factories; airplane and dirigible hangars; gymnasiums; skating rinks; bowling alleys, and all buildings where unobstructed space, maximum light and ventilation are desired.

ARCH ROOF CONSTRUCTION CO., INC., will design arches, supply all materials and do the erection, or ordinary materials can be supplied and erection done by local contractors.

Co-operation is offered to architects, engineers and contractors in planning the most economical and efficient design for particular buildings.

A request will bring additional information.

Construction and Materials

By using straight lengths of the usual structural materials combined with special connections, a practical way has been evolved of applying the arch principle with its beauty and great strength to the economical construction of buildings having spans up to *400 feet* or more, where unobstructed space is desired.

Columns, posts and trusses are eliminated with this construction, and a clear interior giving a maximum amount of light and ventilation obtained.

Strength

Arch roof construction can be of timber or steel or a combination of both. Standard structural shapes and sizes are employed in a patented design with patented connections to produce a roof of unusual strength. It may be fireproof, fire-retarded or non-fireproof.



Dartmouth College Hockey Rink, 120-ft. Span

Advantages of Arch Roof Construction

Maximum strength and long life. Unobstructed light and ventilation. Sidewalls of brick, wood sheathing, sheet iron, canvas, or folding or rolling doors. Full use of all floor space. Economy of material and labor. Temperature economically warm in winter and cool in summer. Reduced fire hazards, ease of controlling fires and low insurance rates. Added dignity, distinction and character to all long span buildings. Can be dismantled and erected with 100% salvage. Adaptable to practically every type, style and size of building.

Types of Arch Roof Construction

Patented Jan. 15, 1924, other patents pending

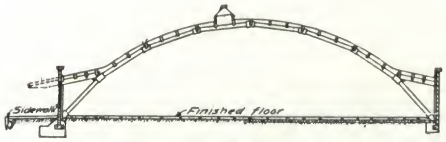


Fig. A. Simplest Type, Built with or without Sidewalk Overhang

Sidewalls may be replaced by doors, rolling shutters or canvas. Unusually high salvage value

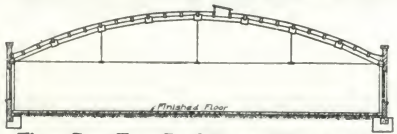


Fig. C. For Buildings Where Tie Rods Are Required

Offers maximum light, air and attractive appearance at minimum cost

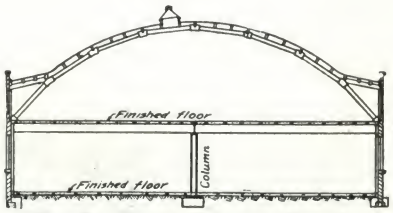


Fig. B. Same Type as Fig. A, Adapted for Two or More Stories

Unobstructed top floor and minimum number of columns below

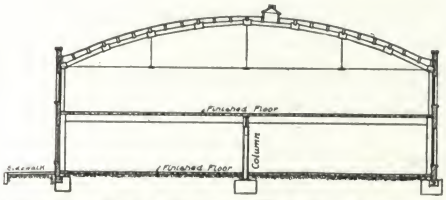


Fig. D. Same Type as Fig. C. Adapted for Two or More Stories

Unobstructed top floor and as many floors below as desired

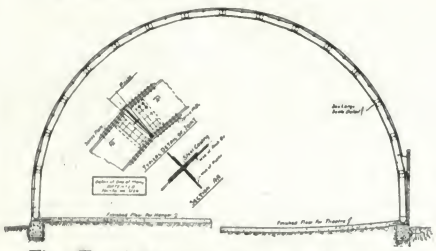


Fig. E. Ideal for Theater Buildings and Dirigible Hangars

The most economical type of framing for buildings of this type. Heights varied to suit

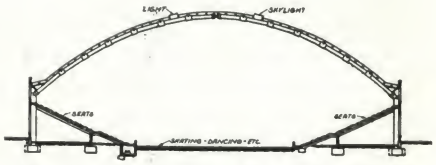
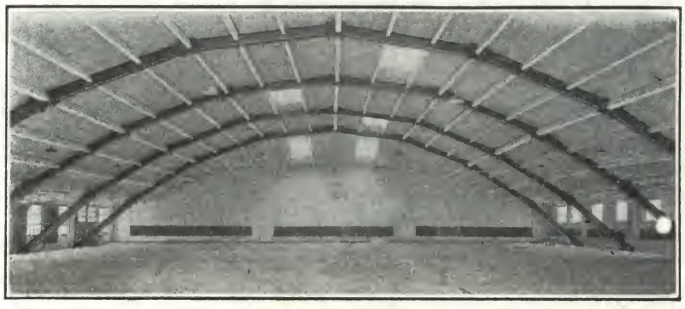
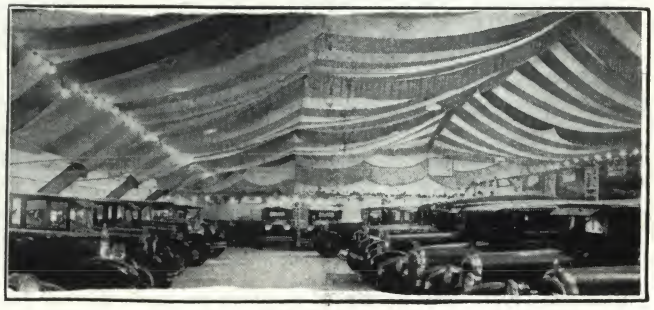


Fig. F. Auditorium, Spans to 400 Ft. or Over

Balcony at ends if desired



100-ft. Span



100-ft. Span

LAMELLA ROOF SYNDICATE, INC.

TELEPHONE
BRYANT 2533

45 West 45th Street
NEW YORK, N. Y.

(Holding Company for Lamella Patents in United States, Canada and Mexico)

AUTHORIZED LICENSEES

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LAMELLA WOVEN ROOF CO., INC.
LAMELLA CONSTRUCTIONS, INC.
BUFFALO, N. Y., 401 Lehigh Valley Terminal
LAMELLA TRUSSLESS ROOFS, INC.
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LAMELLA WOVEN ROOF CO., INC.
INDIANAPOLIS, IND., 1012 East 21st St.
JOHNSON-MAAS CO.
CHICAGO, ILL., 1 North La Salle St.
SUMMERBELL TRUSS CO.
CINCINNATI, OHIO, 125 West McMillan St.
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PORTLAND, ORE., 427 Board of Trade Bldg.
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LAMELLA TRUSSLESS ROOF CO. OF WESTERN CANADA, LTD.
MANILA, P. I., P. O. Box 1693
N. R. BAUGH
HONOLULU, T. H., P. O. Box 2369
J. GRANT MORGAN

Lamella Roof Construction

A Lamella roof structure is of pleasing appearance and insures excellent acoustics—both at moderate cost.

Lamella Units

These range in size from 2x8 to 6x24 in. depending on span and load. Self-locking type of connection takes care of possible shrinkage of wood.

Erection

Erection is a simple assembling operation with standard bolts and special Lamella washers.

A light movable scaffolding is required.

Fire Resisting Qualities

Fire resisting qualities are rated in all localities equal to unprotected steel with open rafters.

They may be raised to slow burning (mill) classification by use of 4 or 6 in. material.

They may be further improved by special lumber treatment or sprinkler installation.

Architectural Qualities

The structural elements of Lamella construction are peculiarly decorative in themselves. Added artistic effects may be obtained by special treatment.

Data Required for Estimates

With inquiries, please give the following information:

(1) Kind of building—auditorium, garage, etc.
(2) Location;
(3) Width;
(4) Length;
(5) Height at which roof starts;
(6) Material of walls;
(7) Thickness of walls;
(8) Parapet or dripover;
(9) Size of piers, if any;
(10) Spacing of piers, if any;
(11) Type of roof (Fig. 4, 5, 6 or 7);
(12) Name and address.

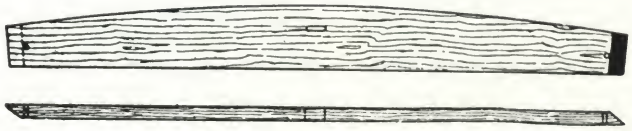


Fig. 1. Lamella Unit

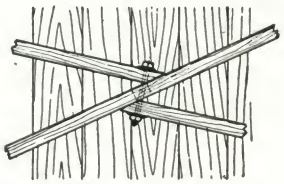


Fig. 2. Common Joint

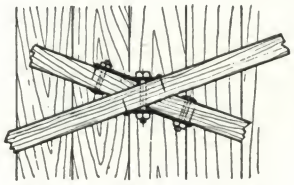


Fig. 3. Special Joint

Steel Lamella Roofs

The Lamella structure may also be built using pressed or structural steel units. Steel Lamella Roofs can economically be fireproofed and are suitable for fireproof buildings of wide spans.

Principal Types of Lamella Roofs

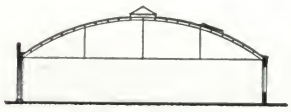


Fig. 4. Tied Segmental Arch

Thrust is taken up by tie rods. Used largely for garages, factories and commercial buildings occupying full lot area and where wide spans with good light and ventilation are essential. The rise is one-sixth, or in exceptional cases one-seventh, of the span

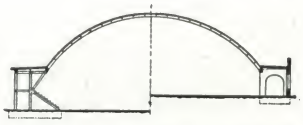


Fig. 5. Buttress Segmental Arch

Thrust is taken up by buttresses, concrete piers or bents. Suitable for auditoriums, gymnasiums, exhibition and various kinds of public buildings where unobstructed clear space and good acoustics are desired. The rise is one-fifth or one-fourth of the span

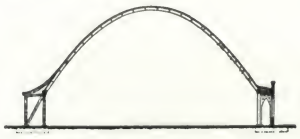


Fig. 6. Parabolic Arch

Thrust is usually taken up by buttresses, bents or the like. Used principally for theaters, casinos, indoor arenas, etc., where unobstructed space, combined with high rise, are the determining factors in design. The rise is one-fourth or one-third of the span

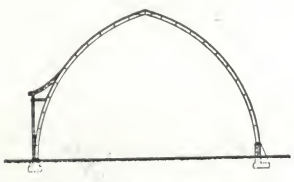
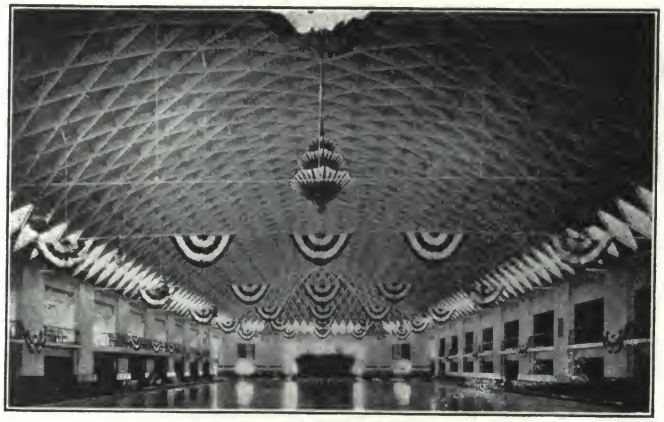


Fig. 7. Gothic Arch

Thrust is taken up by the foundations directly, the floor, or buttresses. Especially suitable for churches, clubhouses and upper story of residences; also for warehouses and barns where merchandise, such as grain, etc., is stored in bulk. The rise is about one-half of the span or greater

Above roof types may be curved down at the ends thereby forming a cloistered roof of four or more sides. All types may be varied and combined to suit almost any required shape or size.

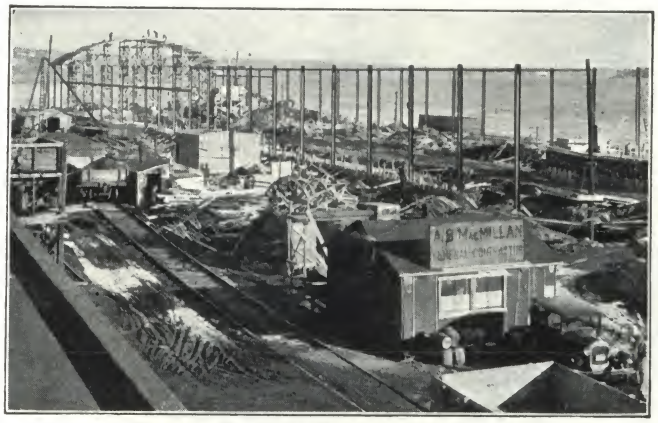
Continued on next page



Casino, Rye Beach, N. Y.
Walker & Gillette, Architects
Matthew Hiller, Jr., Structural Engineer
Westchester County Park Commission, Owner
100-ft. span



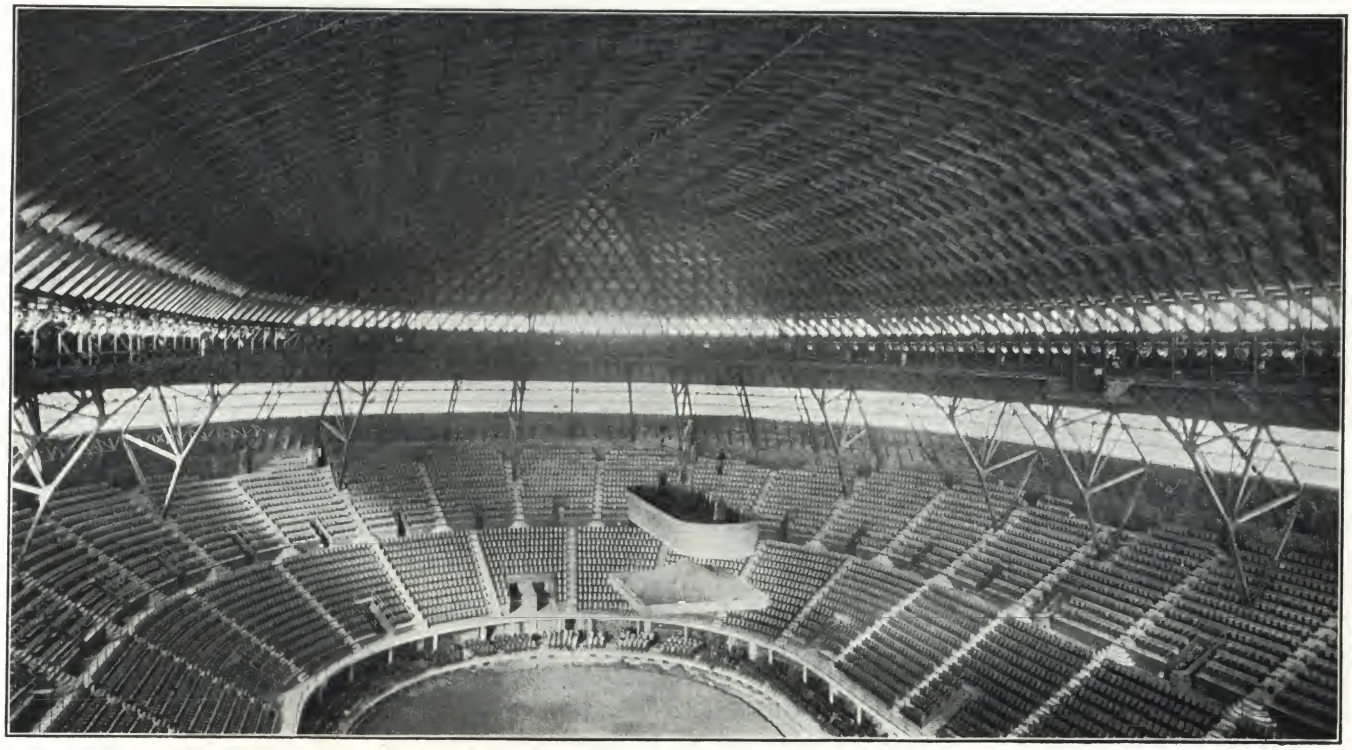
Church of Our Lady of Mount Carmel, Rochester, N. Y.
George F. Lorenz, Architect
Underside of roof lined with Homasote
67-ft. span



Transit Shed, Halifax, N. S., Canada
Halifax Harbor Commission, Owner and Engineer
90-ft. span; 660 ft. long



Auto Display Rooms, Los Angeles, Cal.
F. Eugene Barton, Architect, San Francisco, Cal.
61-ft. span



The Arena, St. Louis, Mo.
Holcombe, Kiewitt, Sohrmann & Hollingsworth, Architects and Engineers
Width of building, 276 ft. Net span of roof, 165 ft. Crown of roof is 135 ft. above floor. Seating capacity more than 20,000

McKEOWN BROS. COMPANY

ESTABLISHED 1894

Builders of Wooden Trusses for Any Condition

5235 South Keeler Avenue
CHICAGO, ILL.
TELEPHONE, VIRGINIA 2010

21 East Fortieth Street
NEW YORK, N. Y.
TELEPHONE, LEXINGTON 10400

Service

McKEOWN BROS. COMPANY is not restricted to the building of any particular type of truss. We build for ordinary roofs, pitched roofs, curved ceilings, ornamental interiors, and for concrete arches.

Ordinary Bowstring Trusses

Built on the job and erected in place by us, or in our factory, they are influenced in the construction by years of experience. The Factory Built truss, in addition, has an upper chord glued to exact curvature and can be shipped in sections or knocked down.

Other Types of Trusses

We have no stock design of any type of truss. We aim to interpret the architect's ideas.

Construction

In building trusses on the site of the job, when possible, we use lumber and material from local yards, otherwise, as in the construction of Factory Built trusses, we use lumber from our own stock. This material is purchased through strict specifications, according to grading and dressing rules. All timbers are bought special for each job.

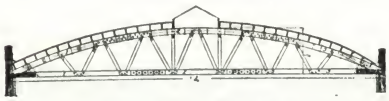
Estimates

It is advisable that plans or sketches be furnished if timber trusses are desired.

For the bowstring, Crescent, etc. trusses the following information is sufficient:

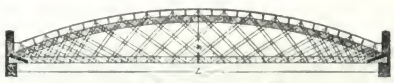
(1) Number of trusses required.
(2) Over-all length of the trusses.
(3) Distance between the trusses, or spacing from center to center.
(4) Load to be carried.
(5) Location of the job.

McKEOWN BROS. COMPANY *furnishes Detail Drawings and Stress Diagrams for check and approval upon receipt of the order for any type of truss.*



Bowstring Trusses

Built to span from 25 to 150 ft. for any spacing and any loading. The material used is never less than 3 in. System of webbing is optional



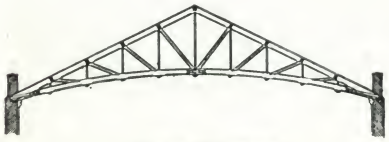
"Lattis-Trusses"

Built of materials having a minimum thickness of 2 in. The interlacing web system furnishes unusual strength and provides for stress reversals



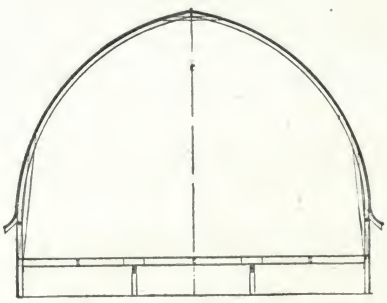
Crescent Trusses

Have a curved upper and lower chord, and are economical trusses for use in buildings where additional headroom is required without increasing wall height



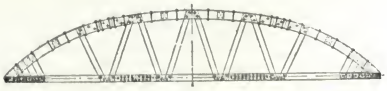
Howe Trusses

For buildings requiring mill type construction roofs, flat or pitched, can be had in ordinary construction, or mill sections and with straight or curved lower chords



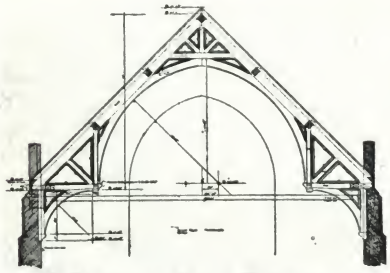
Ribs for Gothic Barns

Furnished with solid sections and built to exact curvatures



Multi-Radii Trusses

For centering of concrete arch bridges and similar structures, highly adaptable where it is not economical to use ordinary centering. Can be knocked down and saved for further use after they have served their purpose as centering



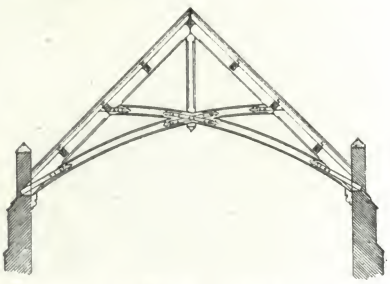
Hammer Beam Trusses with Gothic Arch

This type of truss is used extensively in churches. Can be furnished plain or paneled to suit



Grandstand Trusses

Have a cantilever portion which is the part of the truss projecting over the supporting columns, offering additional protection for the grandstand seats proper and covering the front row boxes. Especially attractive in appearance



Scissors Trusses

With straight or curved braces makes a simple, economical and attractive roof truss for churches, clubs, and residences

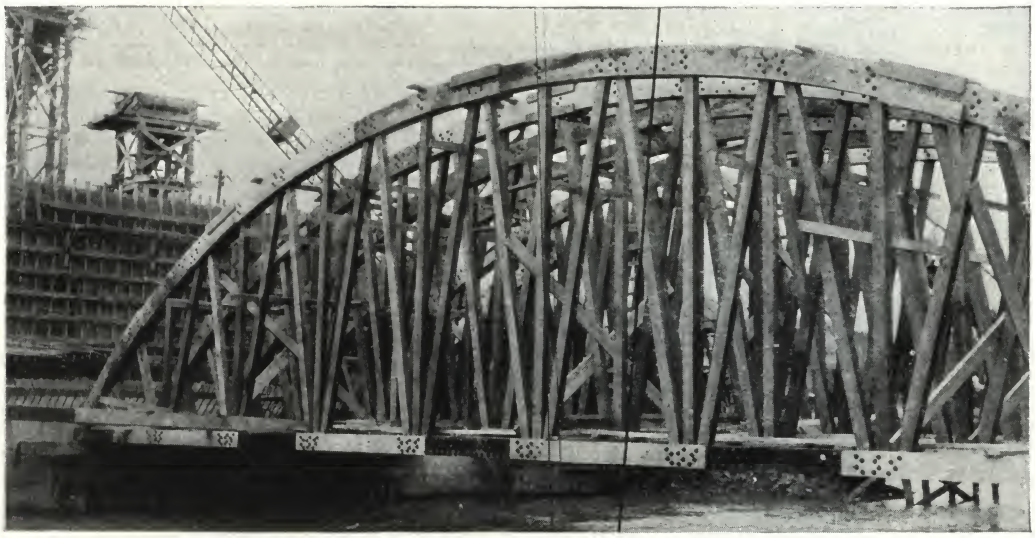
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Scissors Trusses with Curved Braces, St. Thomas' Boy's School, Rockford, Ill.
J. W. Van Der Meer, Architect



Erecting Hammer Beam Trusses with Gothic Arch, Larchmont Avenue Church, Larchmont, N. Y.
Office of John Russell Pope, Architect



Six Bowstring Trusses in Position for Center, Construction of Boundary Channel Bridge, Arlington Memorial Project
McKim, Mead & White, Architects
N. P. Severin Co., Bridge Contractors, Washington, D. C.



Crescent Trusses in Gymnasium of St. John's Military Academy, Delafield, Wis.
Thomas Van Alyea, Architect



St. Peter's Church, Antioch, Ill.
Leo B. Strelka, Architect

THE MACOMBER STEEL COMPANY

Macomber Steel Building Products

901 Belden Avenue, CANTON, OHIO

Products

MACOMBER ROOF TRUSSES and TRUSS BRACING.
"H" COLUMNS and STEEL FRAMING.
STEEL DOORS and STEEL WINDOWS.
STRUCTURAL and REINFORCING STEEL.
For Macomber Bar Joists and Macomber Nailer Joists, see Manufacturers' Index.

Type of Products

Through the use of patented Macomber features, structural building products are manufactured in standard stock sizes for prompt shipment on all orders. These products are readily designed into buildings by architects or engineers. Complete structural layouts for erection purposes are furnished as a part of the service and submitted for approval to the architect or engineer designing the building. Complete stocks of steel windows, metal lath and structural and reinforcing steel round out this service.

Bar Joists for fireproof floor and roof construction; Nailer Joists for semi-fireproof construction; and Vault Reinforcing for banks and financial institutions are covered in separate pages as noted.

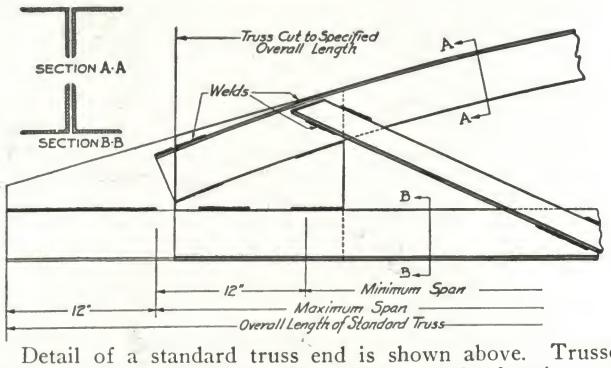
These products and the products covered here are widely used and specified as component parts of practically all types of buildings.

The full use of Macomber Service permits the architect to plan and design industrial buildings to meet the individual needs of his clients at costs competitive with the less desirable "Standard Buildings."

Prompt shipment of Macomber materials and ease in designing with any type of wall and roof construction has resulted in an ever increasing demand for Macomber Products for this field.

Macomber Roof Trusses

The Macomber Roof Truss (U. S. Patent No. 1678738) is essentially a steel roof truss built up with double angle top and bottom chords and fabricated with modern electric arc welding. Loading Tables (A.I.S.C. Specifications) and overall dimensions for stock size curve chord trusses are listed in adjoining tables. "A" type trusses are handled in the same manner. These stock size trusses are designed into buildings as easily as simple beams. The trusses should be spaced to develop their full carrying capacity for maximum efficiency.



Detail of a standard truss end is shown above. Trusses may be cut to specified overall length to suit the framing conditions. Shorter trusses are shipped in one piece. Longer trusses are fabricated, match marked, and knocked down for shipment in sections for ease in handling and erecting on the job. Holes for field connections are reamed to $\frac{1}{64}$ in. clearance in fabricating and fitted with turned bolts. No metal less than ¼ in. in thickness is used.

SAFE LOADING TABLES, STOCK SIZES CL AND CH TRUSSES

A.I.S.C. Specifications



Overall Height—Approx. $\frac{1}{10}$ Max. Span

CL SERIES

Truss symbol	Overall length	Range of spans		Safe load in pounds	
		Min. span	Max. span	@ Min. span	@ Max. span
38-CL	40′ 0″	36′ 0″	38′ 0″	37,000	35,000
40-CL	42′ 0″	38′ 0″	40′ 0″	37,000	35,000
42-CL	44′ 0″	40′ 0″	42′ 0″	37,000	35,000
44-CL	46′ 0″	42′ 0″	44′ 0″	43,300	41,500
46-CL	48′ 0″	44′ 0″	46′ 0″	43,300	41,500
48-CL	50′ 0″	46′ 0″	48′ 0″	43,300	41,500
50-CL	52′ 0″	48′ 0″	50′ 0″	43,300	41,500
52-CL	54′ 0″	50′ 0″	52′ 0″	43,300	41,500
54-CL	56′ 0″	52′ 0″	54′ 0″	49,500	47,600
56-CL	58′ 0″	54′ 0″	56′ 0″	49,500	47,600
58-CL	60′ 0″	56′ 0″	58′ 0″	49,500	47,600
60-CL	62′ 0″	58′ 0″	60′ 0″	49,500	47,600
62-CL	64′ 0″	60′ 0″	62′ 0″	49,500	47,600
64-CL	66′ 0″	62′ 0″	64′ 0″	49,500	47,600
66-CL	68′ 0″	64′ 0″	66′ 0″	49,500	47,600
68-CL	70′ 0″	66′ 0″	68′ 0″	49,500	47,600
70-CL	72′ 0″	68′ 0″	70′ 0″	59,000	57,300
72-CL	74′ 0″	70′ 0″	72′ 0″	59,000	57,300
74-CL	76′ 0″	72′ 0″	74′ 0″	59,000	57,300
76-CL	78′ 0″	74′ 0″	76′ 0″	59,000	57,300
78-CL	80′ 0″	76′ 0″	78′ 0″	59,000	57,300
80-CL	82′ 0″	78′ 0″	80′ 0″	72,600	70,500
82-CL	84′ 0″	80′ 0″	82′ 0″	72,600	70,500
84-CL	86′ 0″	82′ 0″	84′ 0″	72,600	70,500
86-CL	88′ 0″	84′ 0″	86′ 0″	86,400	84,700
88-CL	90′ 0″	86′ 0″	88′ 0″	86,400	84,700
90-CL	92′ 0″	88′ 0″	90′ 0″	86,400	84,700
92-CL	94′ 0″	90′ 0″	92′ 0″	86,400	84,700
94-CL	96′ 0″	92′ 0″	94′ 0″	86,400	84,700
96-CL	98′ 0″	94′ 0″	96′ 0″	86,400	84,700
98-CL	100′ 0″	96′ 0″	98′ 0″	86,400	84,700
100-CL	102′ 0″	98′ 0″	100′ 0″	86,400	84,700
120-CL	122′ 0″	118′ 0″	120′ 0″	108,600	106,500

CH SERIES

Truss symbol	Overall length	Range of spans		Safe load in pounds	
		Min. span	Max span	@ Min. span	@ Max. span
38-CH	40′ 0″	36′ 0″	38′ 0″	42,200	41,500
40-CH	42′ 0″	38′ 0″	40′ 0″	42,200	41,500
42-CH	44′ 0″	40′ 0″	42′ 0″	42,200	41,500
44-CH	46′ 0″	42′ 0″	44′ 0″	49,500	47,600
46-CH	48′ 0″	44′ 0″	46′ 0″	49,500	47,600
48-CH	50′ 0″	46′ 0″	48′ 0″	49,500	47,600
50-CH	52′ 0″	48′ 0″	50′ 0″	49,500	47,600
52-CH	54′ 0″	50′ 0″	52′ 0″	59,600	57,300
54-CH	56′ 0″	52′ 0″	54′ 0″	59,600	57,300
56-CH	58′ 0″	54′ 0″	56′ 0″	59,600	57,300
58-CH	60′ 0″	56′ 0″	58′ 0″	59,600	57,300
60-CH	62′ 0″	58′ 0″	60′ 0″	59,600	57,300
62-CH	64′ 0″	60′ 0″	62′ 0″	73,300	70,500
64-CH	66′ 0″	62′ 0″	64′ 0″	73,300	70,500
66-CH	68′ 0″	64′ 0″	66′ 0″	73,300	70,500
68-CH	70′ 0″	66′ 0″	68′ 0″	73,300	70,500
70-CH	72′ 0″	68′ 0″	70′ 0″	87,300	84,700
72-CH	74′ 0″	70′ 0″	72′ 0″	87,300	84,700
74-CH	76′ 0″	72′ 0″	74′ 0″	87,300	84,700
76-CH	78′ 0″	74′ 0″	76′ 0″	87,300	84,700
78-CH	80′ 0″	76′ 0″	78′ 0″	87,300	84,700
80-CH	82′ 0″	78′ 0″	80′ 0″	87,300	84,700
82-CH	84′ 0″	80′ 0″	82′ 0″	87,300	84,700
84-CH	86′ 0″	82′ 0″	84′ 0″	87,300	84,700
86-CH	88′ 0″	84′ 0″	86′ 0″	108,600	106,500
88-CH	90′ 0″	86′ 0″	88′ 0″	108,600	106,500
90-CH	92′ 0″	88′ 0″	90′ 0″	108,600	106,500
92-CH	94′ 0″	90′ 0″	92′ 0″	108,600	106,500
94-CH	96′ 0″	92′ 0″	94′ 0″	108,600	106,500
96-CH	98′ 0″	94′ 0″	96′ 0″	108,600	106,500
98-CH	100′ 0″	96′ 0″	98′ 0″	108,600	106,500
100-CH	102′ 0″	98′ 0″	100′ 0″	108,600	106,500
120-CH	122′ 0″	118′ 0″	120′ 0″	142,000	140,000

SUMMERBELL TRUSS COMPANY

Wood Roof Trusses

CHICAGO, ILL., One North La Salle Street
NEW YORK, N. Y., 45 West 45th Street
BUFFALO, N. Y., 401 Lehigh Valley Terminal
ST. LOUIS, MO., 418 Olive Street
LOS ANGELES, CAL., 754 East 29th Street
OAKLAND, CAL., 402 Builders Exchange
PORTLAND, ORE., 425 Board of Trade Building
TWIN FALLS, IDAHO, P. O. Box 1052

Products

Manufacturers and erectors of Wood Roof Trusses.

Wood Roof Trusses

Spans designed from 30 to 125 ft. in accordance with best standard engineering practice and to comply with various local ordinances.

Trusses can be erected at the building site anywhere. No delays due to inability in obtaining materials; local lumber yards carry in stock all sizes of materials used in the construction of this truss.

Information Required for Estimates

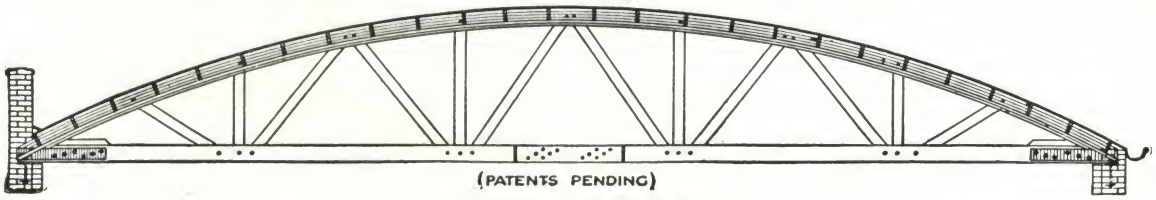
In requesting quotations the following information is necessary:

(1) Number of trusses required. (2) Span out-to-out of building walls. (3) Spacing of trusses. (4) Loads: roof, ceiling or special loadings. (5) Location of building, name of architect and owner's name.

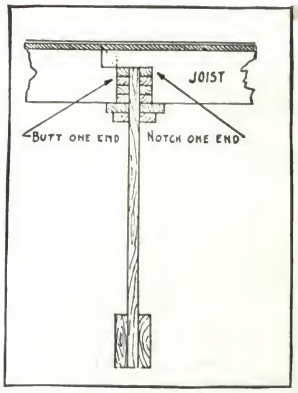
Service

Estimates and details furnished on request.

It is suggested that engineers avail themselves of our engineering service in any design calling for special types of roof trusses.



Summerbell Wood Roof Truss



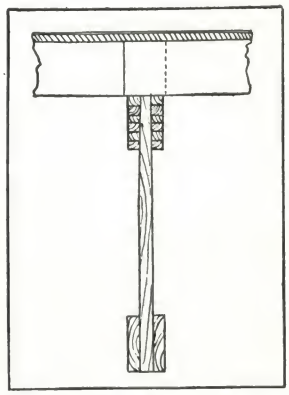
Section Standard Summerbell "Rigid-roof" Construction

Summerbell trusses save several courses of brick wall on all sides of the building in addition to making a rigid roof

Large solid section web members spaced far apart assure maximum light distribution. Heavy laminated top chord and bottom chord of two large solid sections reduce fire hazard. Note that the arch of the top chord is uniform from end to end and that there are no sharp breaks which cause rain to carry gravel to the gutters, or allow tar melted by the sun to run down



80-ft. Span Trusses at Chicago Airport



Section of Ordinary Construction

Roof joists set on top of top chord.

Trusses of this type can be furnished, if desired



70-ft. Span Trusses in Garage, Los Angeles



60-ft. Span Trusses in Factory Building, Winchendon, Mass.

BATES EXPANDED STEEL CORP.

EAST CHICAGO, IND.

Member of the Steel Joist Institute

Product

"Bates-X" Joists.

Description

The "Bates-X" Joist is an expanded one-piece steel truss. In the expansion process, no material is cut from the web of the original section; the web is simply slitted and expanded. The expansion process transforms the web of the I-beam section into an open lattice truss web. The act of expanding increases the depth of the beam and materially increases its strength.

The "Bates-X" Joist functions as a steel truss. Its properties are readily calculable by standard formulae.

Automatic Testing

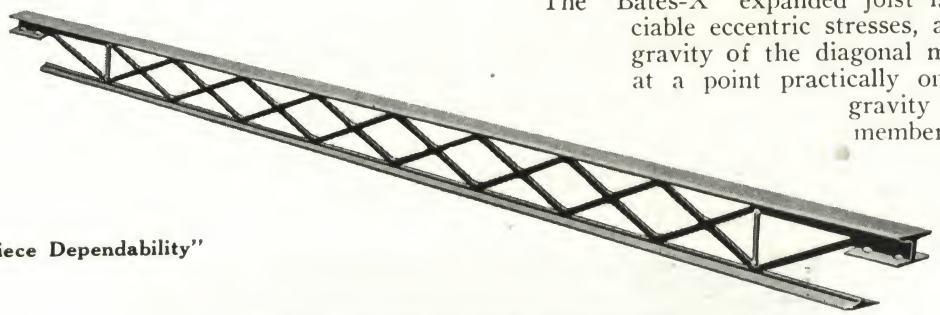
The Bates process of manufacture automatically tests every joist for possibility of defect in either material or workmanship. The human equation in manufacture is eliminated. "Bates-X" Joist strength is uniform.

Advantages

The "Bates-X" Joist lends itself readily to all types of joist floor construction. The open web of the expanded truss is an obvious advantage over a solid web, because it permits piping to be run easily through the joists.

The "Bates-X" (expanded) Joist is a one-piece steel truss. "One-piece Dependability."

The "Bates-X" expanded joist is without appreciable eccentric stresses, as the centers of gravity of the diagonal members intersect at a point practically on the centers of gravity of the chord members.



"One-piece Dependability"

Specifications

General Description—The system of floor construction will use "Bates-X" Joists of the sizes detailed. The joists shall be placed parallel to each other on spacings as detailed, and shall be supported at their ends on either structural beams or on masonry. Concrete shall be poured over the joists to form a slab .... inches thick, supported by .... *(either mesh lath fabric or forms)* .... mesh lath is to be attached to the ceiling side of the joists, and .... inches of ceiling plaster applied.

Bates-X Joists—The joists shall conform to the standards established by the Bates Expanded Steel Corp. and shall be made from structural grade steel expanded. Where the sizes of the joists are not indicated, they shall be in accordance with the manufacturer's tables of safe loads.

Bearings—At least 4 in. of bearing shall be provided where the joists rest on masonry, and at least 3 in. of bearing shall be provided where the joists rest on steel supports.

Bridging—Bridging of a substantial type is to be placed at approximately 8-ft. intervals in the length of the joists. The bridging is to be secured to the flanges of the joists and is to connect each joist to the adjacent joists, employing a crisscross system of bracing. The end joists of each panel are to be suitably anchored so as to hold the end joists in a vertical position.

Note: One type of bridging recommended employs a strut member, which runs across the top of the joists, at right angles to the joists, and is tied to the top flange of each joist, and employs a system of crisscross wire bracing.

Another type of bridging recommended employs box channel members which anchor to the joists so as to act both as compression and tension members.



Steel Lath—The steel lath for the floor shall be ... *(plain or rib)* ... lath weighing .... pounds per square yard. The steel lath for the ceiling shall be .... *(plain or rib, depth of rib)* .... weighing .... pounds per square yard. The lath is to be securely fastened to the joists with Bates lath clips. Rib lath is to be attached with the ribs up.

Temperature Rods—Temperature rods .... inches in diameter are to be placed on .... inch centers.

Note: The use of temperature rods or mesh reinforcing is not universally specified. It is, however, a valuable insurance in certain types of floor finishes to prevent cracks due to expansion and contraction.

Nailing Strips—Where wood floors are called for over the concrete, screed or nailing strips shall be embedded in the concrete slab. The nailing strips shall be 2 in. wide, 1" in. deep (or of greater depth), and shall be held in position by screed chairs or by other suitable means while the concrete is being poured. Screed strips shall be run (preferably at right angles to the joists) on .... inch spacings.

Concrete—Concrete for the floor slabs shall be *(usually)* 1 part cement, *(usually)* 2 parts sand and *(usually)* 4 parts gravel. A comparatively dry mix is recommended to minimize dripping.

Loading Tables

Complete loading tables for "Bates-X" Joists are included in the "Bates-X" Joist general catalogue. The tables are prepared with both 18,000 and 16,000-pound stress values.

CONCRETE STEEL COMPANY

Havemeyer Steel Joist

2 Park Avenue, NEW YORK, N. Y.

For Sales Offices, Warehouses and Fabricating Works, see our other page
For Havemeyer Concrete Reinforcement Bars, Devices, etc., see Manufacturers' Index

Havemeyer Steel Joist

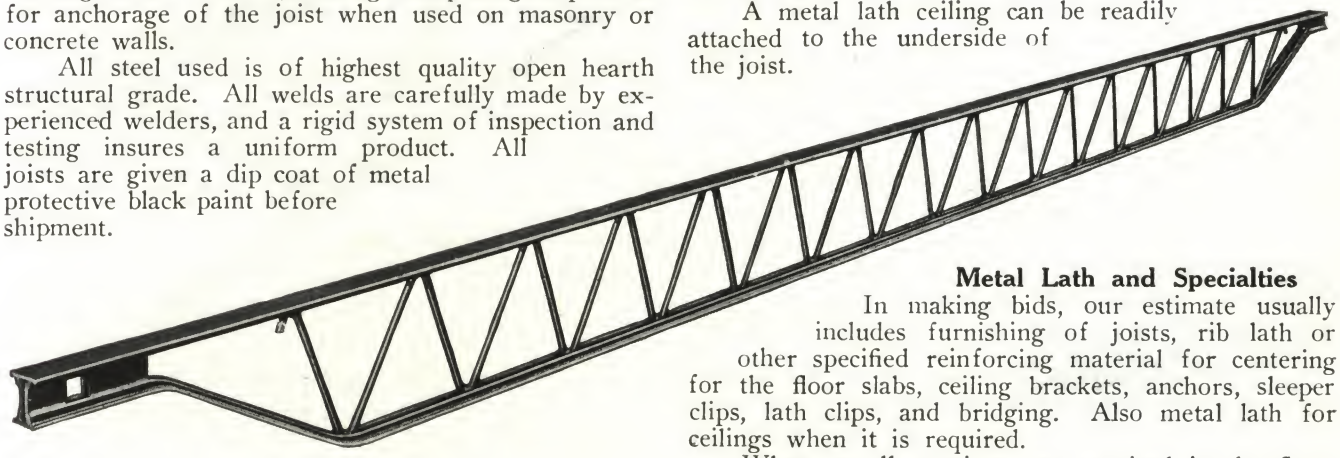
The Havemeyer Steel Joist is a scientifically designed unit, electrically welded, and when used in connection with a concrete floor slab laid on metal lath or similar centering, and metal lath ceiling, makes an economical, fire-resisting construction which can be erected quickly and requires no formwork.

General Description

Havemeyer Steel Joists are made up of two double-stem tee sections, which are used as chord members, and a plain round bar used as a web member.

These members are formed in the shape of a standard Warren truss and electrically welded at all intersections. The ends of the joist are connected by welding to flat sections, leaving an opening to provide for anchorage of the joist when used on masonry or concrete walls.

All steel used is of highest quality open hearth structural grade. All welds are carefully made by experienced welders, and a rigid system of inspection and testing insures a uniform product. All joists are given a dip coat of metal protective black paint before shipment.



General Use of Joists

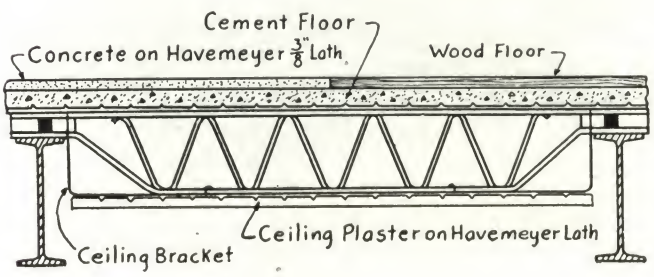
Havemeyer Steel Joists can be used economically on many different types of buildings. Where a building is erected of structural steel columns and girders, joists are used for supporting the floor slabs. As these joists are very simple to erect and are placed on top of the beams or girders, no extra fabricating is necessary.

Havemeyer Steel Joists are also used on structural concrete buildings for carrying the floor slabs, the columns and girders being reinforced concrete. They are used on residence work and are particularly recommended for the first floor, even if the house is to be built of wood frame, and when properly put in place in connection with concrete slabs, they form an effective fire-stop for fires originating in the basement or cellar. The joists are particularly suited for use in such buildings as hospitals, schools, apartment houses, hotels, institutions, garages, etc., built for light loads.

Havemeyer Steel Joists, with open webs, allow space for running pipes, electrical conduits, etc. This has been found of great advantage in most types of buildings.

Joists are made in standard sizes to fit all spans from 4 to 32 ft.

A metal lath ceiling can be readily attached to the underside of the joist.



Metal Lath and Specialties

In making bids, our estimate usually includes furnishing of joists, rib lath or other specified reinforcing material for centering for the floor slabs, ceiling brackets, anchors, sleeper clips, lath clips, and bridging. Also metal lath for ceilings when it is required.

Where small openings are required in the floor, we furnish headers which are easily attached and form a simple method of providing for these conditions.

Shipment

Havemeyer Steel Joists are made in standard units and are carried in stock at our factory in Akron, Ohio, ready for prompt shipment.

Engineering Service

CONCRETE STEEL COMPANY maintains at all its district offices experienced engineers who will be pleased to co-operate with architects, engineers or contractors in planning the uses of Havemeyer Steel Joists. Estimates will be gladly furnished, and where an order is placed with us, complete erection details and full information will be given to the contractor.

Catalogue and Descriptive Literature

Our catalogue and descriptive literature is available to all architects, builders and owners, and will be cheerfully sent on request.

GABRIEL STEEL COMPANY

Manufacturers of Steel Truss Joists

DETROIT, MICH.

Products

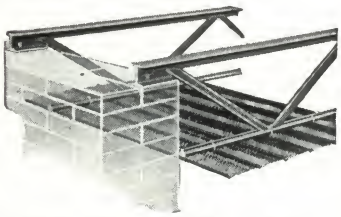
GABRIEL STEEL TRUSS JOISTS.

Also Reinforcing Steel, Slotted, Adjustable and Plug Inserts for Concrete. Complete line of Rolled Steel Building Specialties, including Coal Chutes, Ash Pit Doors, Dome Dampers, Fireplace Ash Dumps, Package Receivers and Garbage Receivers; a complete line of Builders' Equipment, including Scaffold Brackets, Ladder Brackets, Roof Brackets, Fixed and Adjustable Carpenters' and Masons' Horses.

Gabriel Steel Truss Joists

Gabriel Steel Truss Joists are available in two types: "SJ" and "NJ." The "NJ" type being a nailer joist with a wood nailing strip securely embedded in the top chord.

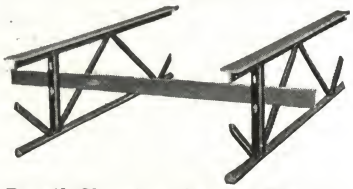
Gabriel Steel Truss Joists are designed and fabricated for each individual job. When completed they form a correctly designed miniature truss. The "SJ" type are made up from various sizes of rail type sections rolled from structural grade new billet steel and split at a scientifically determined point to form the top and bottom chord members. The wide T-shaped section forms the upper chord while the head of the rail forms the bottom chord. The diagonal members are U-shaped pressed steel. These, with the bridging struts (the number depending on the length of the joist) are electrically welded to both the top and bottom chord.



Detail Showing How Bottom Chord of Gabriel Steel Truss Joists Provide Support for Ceiling Lath from Wall to Wall

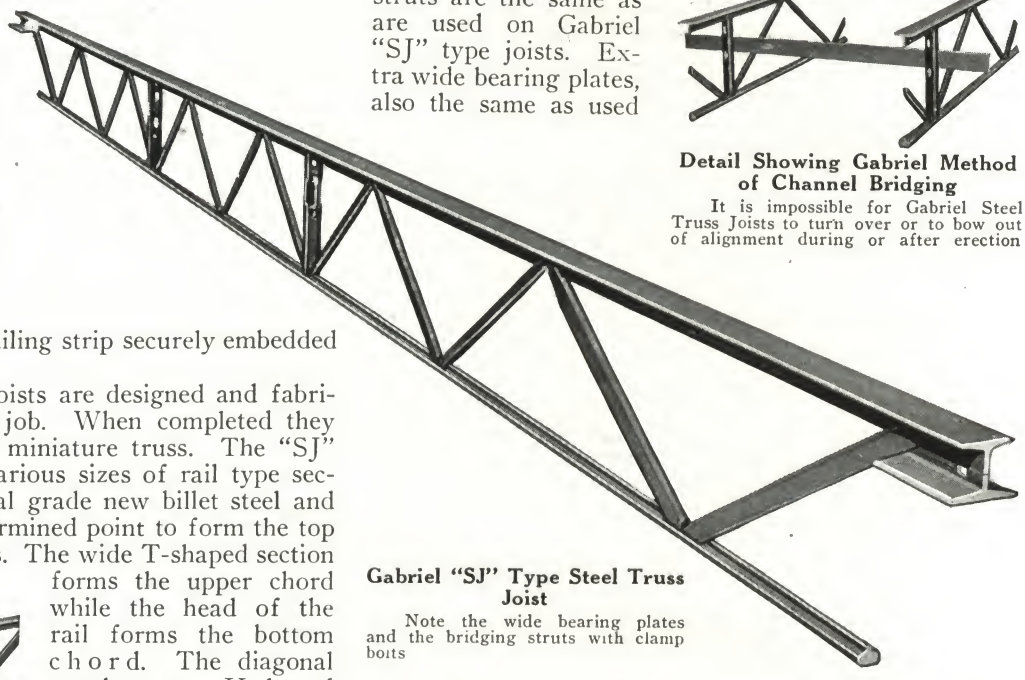
The bearing plates, welded to the top chord at each end, form a solid I-beam section with an exceptionally wide flange at the bottom to facilitate erection. Holes are provided in the web near the end for beam or wall anchors.

The top chord of Gabriel "NJ" type (nailer joist) consists of an equal leg angle, with legs up, and a wood nailing strip which is securely embedded in the "V." The bottom chord consists of a round rod, while the diagonal members and the bridging struts are the same as are used on Gabriel "SJ" type joists. Extra wide bearing plates, also the same as used on Gabriel "SJ" type, are provided with holes in the web near the end for beam or wall anchors.



Detail Showing Gabriel Method of Channel Bridging

It is impossible for Gabriel Steel Truss Joists to turn over or to bow out of alignment during or after erection



Gabriel "SJ" Type Steel Truss Joist

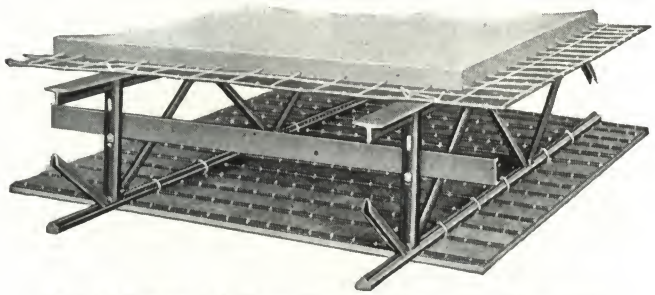
Note the wide bearing plates and the bridging struts with clamp bolts

Advantages

The outstanding advantages of Gabriel Steel Truss Joists, outside the fact that they are correctly designed miniature trusses, are the Gabriel method of channel bridging and the extended bottom chord member. The bottom chord of Gabriel Steel Truss Joists provides a fixed rigid support for ceiling lath from wall to wall. No spare parts or attachments are necessary.



Gabriel System of Floor Construction with Wood Finished Floor Over Concrete on Gabriel "SJ" Type Steel Truss Joists



Gabriel System of Floor Construction with Monolithic Finish Concrete Slab on Gabriel "SJ" Type Steel Truss Joists

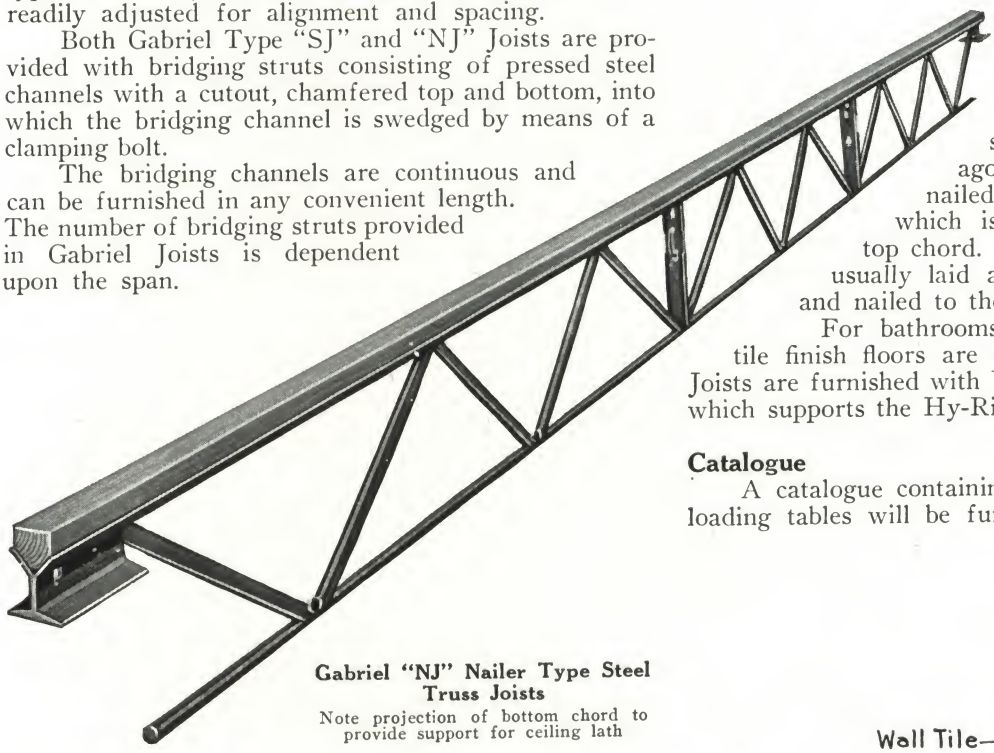
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Bridging

Gabriel system of channel bridging is a feature of great importance. Not only can this type of bridging be installed in one-quarter the time required for many types, but the joists are held more rigid and can be readily adjusted for alignment and spacing.

Both Gabriel Type "SJ" and "NJ" Joists are provided with bridging struts consisting of pressed steel channels with a cutout, chamfered top and bottom, into which the bridging channel is swedged by means of a clamping bolt.

The bridging channels are continuous and can be furnished in any convenient length. The number of bridging struts provided in Gabriel Joists is dependent upon the span.



Gabriel "NJ" Nailer Type Steel Truss Joists
Note projection of bottom chord to provide support for ceiling lath

permitting a continuous concrete slab for fireproof construction. Any steel ceiling lath can be attached to the bottom chord of the joist which provides fixed rigid ceiling support from wall to wall.

Gabriel "NJ" type steel Truss Joists offer advantages in wood floor construction or concrete fill with tile finish floor. In wood floor construction the subflooring is usually laid diagonally across the joists and nailed directly to the nailer strip which is securely embedded in the top chord. The finish wood flooring is usually laid at right angles to the joists and nailed to the subflooring.

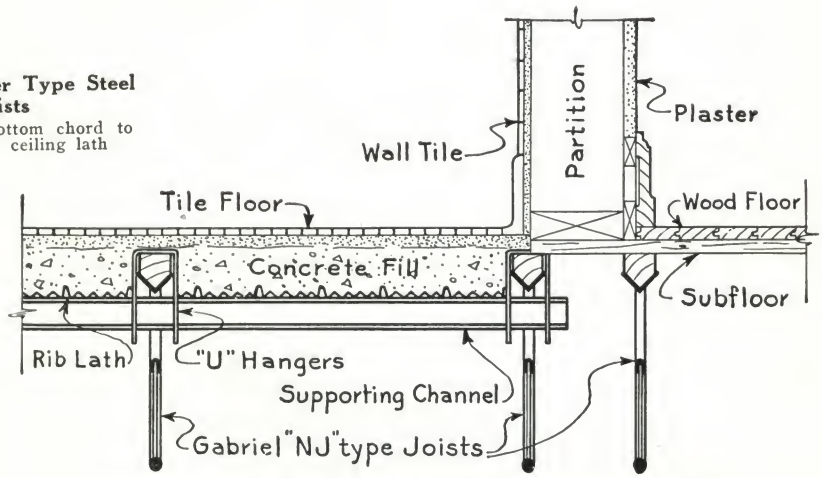
For bathrooms or other conditions where tile finish floors are required Gabriel "NJ" type Joists are furnished with U-hangers to carry a channel which supports the Hy-Rib lath. See detail.

Catalogue

A catalogue containing complete information and loading tables will be furnished on request.

Steel Joist Floor Construction

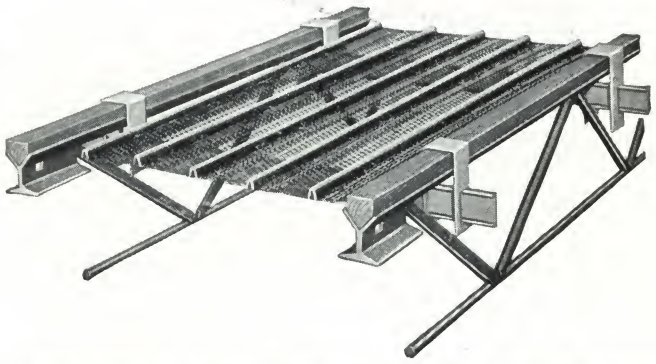
Floor construction with "SJ" type Gabriel Steel Truss Joists is usually a 2 or 3-in. concrete slab over Steeltex or suitable metal lath. Screed clips can be furnished for nailing screeds to run parallel or at right angles to the joists for wood finish floors over concrete. In this case the screed clip acts as a high chair and supports the nailing screed approximately 1 in. above the top of the joists, thereby



Cross Section Showing Gabriel System of Floor Construction
Concrete slab and tile finish floor in one room and wood finish floor in the room adjacent



Gabriel System of Wood Floor Construction with Subflooring Laid Diagonally and Finish Floor Laid at Right Angles Over Gabriel "NJ" Type Steel Truss Joists



Gabriel System of Floor Construction for Concrete Slab with Tile Finish Floor Over Gabriel "NJ" Type Steel Truss Joists

FOUNDED 1850

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

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Telephone, Hubbard 5151

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CHICAGO, ILL., 111 W. Washington Street
Telephone, Franklin 2522

CINCINNATI, OHIO, Carew Tower
Telephone, Main 2324

CLEVELAND, OHIO, Union Trust Building
Telephone, Main 7866

DALLAS, TEX., Magnolia Building
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Telephone, Douglas 1776

WASHINGTON, D. C., Woodward Building
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PITTSBURGH, PA., Telephone, Hemlock 1000

DETROIT, MICH., Telephone, Melrose 6650

Products

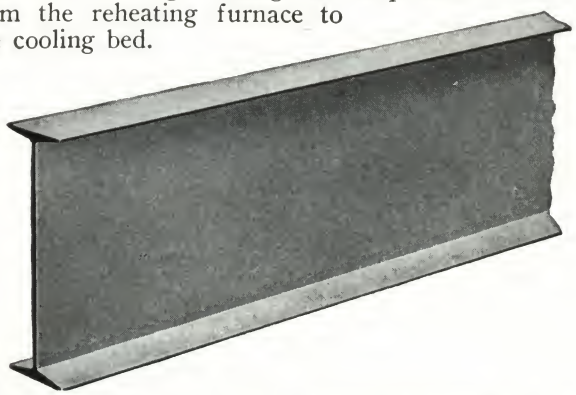
J & L JUNIOR BEAMS.

Also J & L Structural Shapes and Fabricated Structural Work, Columns, Girders, Trusses, Plate Work, Tanks, Mill and Factory Buildings; J & L Steel Piling; J & L Wire Products.

For J & L Bars for Concrete Reinforcement, Light Weight Channels for Stair Stringers and other uses, and Tubular Products, see page numbers in Manufacturers' Index.

Junior Beams—Description

The J & L Junior Beam is a structural steel section made from structural grade, copper-bearing steel, rolled from the billet to the full I-section, in a continuous mill with but slight change in temperature from the reheating furnace to the cooling bed.



The process by which it is possible to obtain a section having the dimensions of the J & L Junior Beam, combined with its very light weight, is the result of advanced engineering and mill practice. After leaving the finishing rolls no straightening is required. There is no warping during cooling and tests show that the internal structure of the Junior Beam is free from stresses.

The function of the J & L Junior Beam as a floor beam is to carry the live and dead floor loads and transfer them to the heavier main carrying members of the framework or to the supporting walls. The success of the Junior Beam is based upon its simplicity of design and ease of installation; its adaptability, durability, light weight, rapidity of erection, and economy.

J&L JUNIOR BEAMS

Rust Resistance

All J & L Junior Beams are rolled of copper-bearing steel, a positive defense against atmospheric corrosion.

Weathering tests made through many years by American Society for Testing Materials have proved the surprising resistance of copper-bearing steel to the inroads of corrosion. The results have indicated that the addition of copper even in small proportions will more than double the useful life of a roofing sheet. Experiments with structural shapes in which the content conforms to standard mill practice for copper-bearing steel have fully confirmed this conclusion.

Corrosion is arrested, and if the surface is painted the paint sticks and does not flake off.

Originators of Junior Beams have been forward looking in supplying the need for light structural shapes. They have also taken care to make them out of the most durable metal, by adding copper content to the steel in the proportions called for by the American Society of Testing Materials.

J & L Service

Jones & Laughlin District Sales Offices are located in all important centers. J & L Engineers familiar with J & L Junior Beams and their uses are available in these offices for advice and assistance.

When you desire to have detailed information in connection with the design of J & L Junior Beams, please ask the nearest office for Bulletin which contains all such data. (See addresses and telephone numbers above.)

The JONES & LAUGHLIN STEEL CORPORATION offers also, the aid of skilled field engineers to service any particular building operation in which Junior Beams are used.

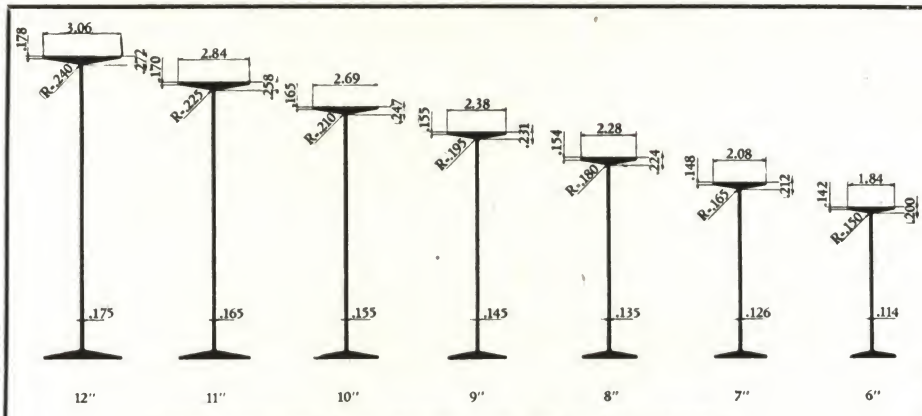
Official Classification of Junior Beams

Junior Beams are extensively used throughout the United States and Canada in floor systems, the carrying capacity of the Junior Beams being based on the same fiber stress as that of standard weight structural steel sections. They have been thoroughly tested for the building commissioners of the larger cities of the country by eminent engineering authorities. As a result of rigid tests conducted by Prof. W. J. Krefeld in the Columbia University Testing Laboratories, Junior Beams were granted structural steel rating in the five boroughs composing New York City. A similar rating was accorded the Junior Beam in Boston in consequence of tests conducted by Prof. H. W. Hayward of the Massachusetts Institute of Technology.

These, together with other tests, have served to confirm and substantiate the conclusion reached by Prof. Milo S. Ketchum after his tests at the University of Illinois that Junior Beams should be classed as structural steel and they are so classified throughout the United States and Canada.

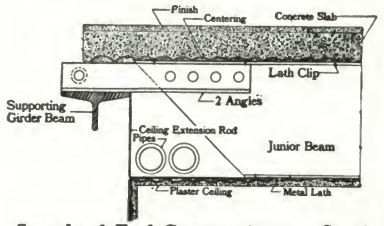
J & L Junior Beams are rated as structural steel by the American Institute of Steel Construction and their properties and dimensions are included in the handbook of information published by the Institute, pages 356-357.

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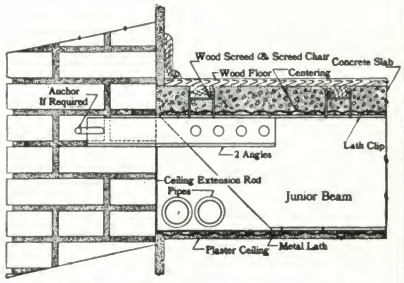


SIZES, WEIGHTS AND PROPERTIES OF JUNIOR BEAMS

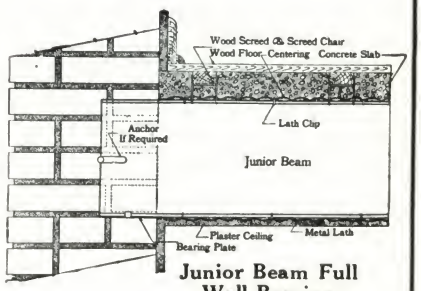
Depth, in.	Weight, lbs. per ft.	Flange width, in.	Web thickness, in.	Area, sq. in.	Radius of gyration		Moment of inertia		Section modulus	
					Hor. axis	Vert. axis	Hor. axis	Vert. axis	Hor. axis	Vert. axis
12	11.74	3.06	0.175	3.45	4.573	0.532	72.21	0.978	12.01	0.638
11	10.23	2.84	.165	3.01	4.200	.498	53.08	.746	9.63	.525
10	8.96	2.69	.155	2.64	3.847	.480	39.01	.608	7.78	.452
9	7.48	2.38	.145	2.20	3.450	.423	26.20	.394	5.81	.332
8	6.54	2.28	.135	1.92	3.116	.423	18.67	.343	4.65	.301
7	5.48	2.08	.126	1.61	2.744	.393	12.13	.248	3.45	.239
6	4.41	1.84	.114	1.30	2.372	.357	7.30	.165	2.42	.179



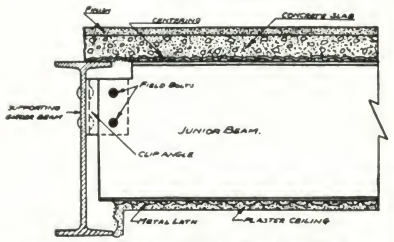
Standard End Connection on Steel



Standard End Connection Wall Bearing



Junior Beam Full Wall Bearing



Junior Beam Clip Angle End Connection

Uses for Junior Beams

Since Junior Beams are essentially hot rolled structural shapes, they afford the building public additional sections for various uses.

Their chief use is as secondary members in floor and roof panels in all classes of buildings. They are being adapted in constantly increasing quantities as purlins and girts for mill buildings, hangars for airplanes and dirigibles, in protection sheds over side walks used during building construction, as monorails, supports for mechanical and conveying equipment.

Junior Beams should not be confused with the various types and designs of steel joists which are now on the market. Occasionally Junior Beams are specified by architects with steel joist alternates and vice versa. This practice is not recommended due to the inherent dissimilarity of the products.

Junior Beams are homogeneous steel I-beams in their original symmetrical form as rolled, and as such can be used in structural design up to their full value, by employing the simplest of engineering formulae and without empirical assumptions.

The adaptability of Junior Beams in floors materially increases the economy of the many systems now used, chiefly due to their simplicity of fabrication, lightness and ease in erection, efficiency and dependability.

Floor and roof systems in which the carrying members consist of rolled steel intermediate beams, or secondary members, are limited in their use only by the character and disposition of the fireproofing.

Due to the fact that building codes vary in their fireproofing requirements, the relative arrangement of steel and fireproofing materials must of necessity vary in different parts of the country.

On the following page are certain suggested floor designs which will meet any building code fireproofing requirements.

Specifications

Architects and engineers should include Junior Beams in the structural steel section of specifications, as they are an integral part of the structural framework of the building, to be supplied by the structural steel contractor. This procedure insures proper co-ordination of design and detail under one engineering control, and also proper timing of arrival of all structural material to the site and erection by the same erector.

The following specifications have been developed with the idea that they will aid designers in properly specifying J & L Junior Beams. Specifications may be used either in whole or in part with absolute confidence; they represent the best thought and standard practice at the present time.

Description—The floor system shall consist of Jones & Laughlin Junior Beams, serving as secondary floor beams, of the sizes and at the spacings shown on drawings. The J & L Junior Beams shall be supported (by standard end connections), (by hangers), (by shelf angles), (on top of structural beams), (on bearing walls). Before shipment all J & L Junior Beams shall be given a coat of oxide paint. Paint with a coal tar base shall not be permitted. If a second coat of paint is to be applied by the erector in the field, mention of it should be made here. Paint that will flow at high temperatures should be barred.

Additional Pieces—An additional J & L Junior Beam shall be used under each partition running parallel with the Junior Beams. For cross partitions, where necessary, due allowance should be made in figuring dead loads.



Erecting J & L Junior Beams with Standard End Connections

Continued on next page

LIVE LOADS

	Corridors	Rooms	Loads
First floor			
Second floor			
Intermediate floors			
Roof			

Bridging—The J & L Junior Beams shall be bridged where lateral support is not otherwise provided at distances not to exceed 6 ft. 10 in. with (tension compression) (tie rod) (12½-gage wire) bridging. Where wire or tie-rod bridging is used the end Junior Beam in each panel shall be fastened to bridging anchors set in outside wall or to parallel structural steel.

Coping—Where tops of Junior Beams are to be level with tops of supporting structural steel, and supported on shelf angles, the tops of Junior Beams shall be coped to allow full bearing on shelf angle.

Clamps—Clamps or tack welds shall be used to fasten bottoms of Junior Beams to top of structural steel when the Junior Beams bear on top of flange of the main carrying members. When tops of Junior Beams are coped, a special clamp shall be used to attach Junior Beams to top flange of main beam.

Wall Plates—Plates shall be used under the ends of Junior Beams resting on bearing walls.

Hangers—Where it is desired to support the Junior Beams by hangers, these hangers shall provide a bearing for the Junior Beams not less than 3 in.

Anchors—Where Junior Beams rest on masonry walls, a ½x8-in. round anchor shall be used in such Junior Beams as the local building code requires or wall ties ¾x12 in. corrugated and galvanized, laid on lath before concreting and anchored in wall.

Screeds—Where wood floors on top of concrete slabs are specified, they shall be nailed to screed or nailing strips, preferably of hardwood, embedded in the slab. Screed strips shall be 2 in. wide by 1½ in. deep (or greater depth) nominal dimensions, and shall be attached to the top of Junior Beams by means of proper chairs. Screed strips shall run (at right angles to the Junior Beams and be spaced .... in. apart) (parallel and on the same centers with the Junior Beams), (diagonally to the Junior Beams). Substitution may be made for the following dependent upon the type of floor system under construction.

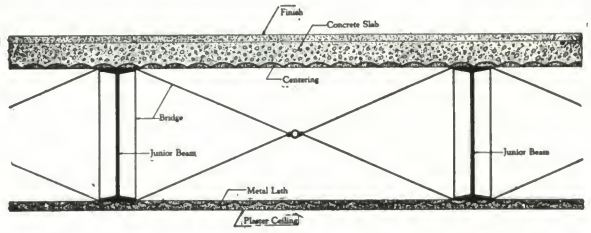
Centering—For specifications for centering on top of the J & L Junior Beams, the designer should refer to details covering same as found in the Junior Beam Bulletin obtainable on request. Lath shall be applied with sheets running at right angles to the Junior Beams. Metal lath shall be securely fastened to the tops of the Junior Beams with lath clips at 12-in. centers, except at ends of sheets where lath clips shall be at 6-in. centers, and applied with a special tool furnished by the manufacturers of the J & L Junior Beams. Lath sheets shall be securely wired together along the side laps midway between Junior Beams. Any approved form of metal lath or backed floor fabric may be used. Any and all clips, ties, or other accessories necessary for the proper application of each particular type of centering shall be used in accordance with these specifications or the specifications of the manufacturer of the respective centering materials. *The writer of the specifications shall define the type and quality of the centering to meet the particular requirements.*

Floor Slabs—Concrete for floor slabs shall be composed of one part cement and a graded mixture consisting of not more than seven parts of fine and coarse aggregate, mixed sufficiently dry to prevent dripping through the metal lath or wire mesh. Where the spacing of Junior Beams is greater than 30 in. a proper reinforcing shall be provided to conform to local building code requirements.

Temperature Rods—When finished floors are made of composition, terrazzo or materials other than wood, temperature rods shall be used, spaced not over 18 in. apart.

Ceiling Lath—Ceiling lath (covered elsewhere under the plastering specifications) shall be firmly wired to pencil rods, which shall be, in turn, securely fastened by means of approved clips, to the lower flanges of the Junior Beams. Where the spacings of the Junior Beams are narrow, flat or ribbed lath may be fastened directly, by means of an approved clip, to the lower flanges of the Junior Beams. Ribbed lath shall be applied so that the ribs are at right angles to the direction of the pencil rods, or, when pencil rods are omitted, to the Junior Beams.

The J & L Lath Clips and Lath Clip Tool can be obtained directly from the manufacturers, fabricators and hardware dealers.

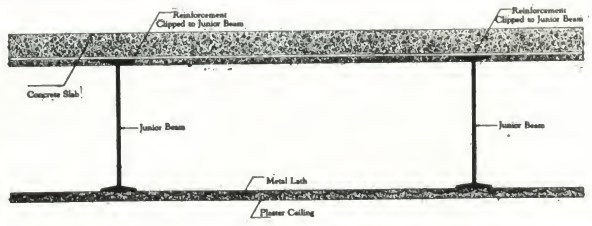


Concrete Slab on Permanent Centering

This is the most common and cheapest arrangement of Junior Beams and companion materials. The top slab consists of concrete poured in place on permanent centering.

The ceiling consists of gypsum or Portland cement plaster on metal lath.

In order to insure ease in application, pencil rods and flat ceiling lath are recommended.

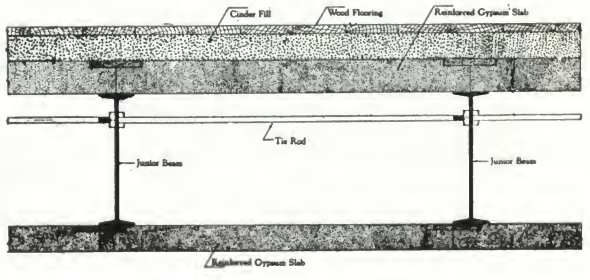


Concrete Slab on Removable Forms

Additional stiffness is obtainable and the beams may be spaced out to the full value of the concrete slabs by this method which is adaptable to tall slender buildings. The top slab is poured in place on wood or metal forms.

The ceiling consists of gypsum or Portland cement plaster on metal lath.

In order to insure ease in application, pencil rods or furring and flat ceiling lath are recommended.



Gypsum Slabs

The lightest common type of floor providing four-hour fire protection to the room above, or below, is obtained by means of precast reinforced gypsum floor and ceiling slabs securely fastened, by various types of clips or hangers, to the Junior Beams.

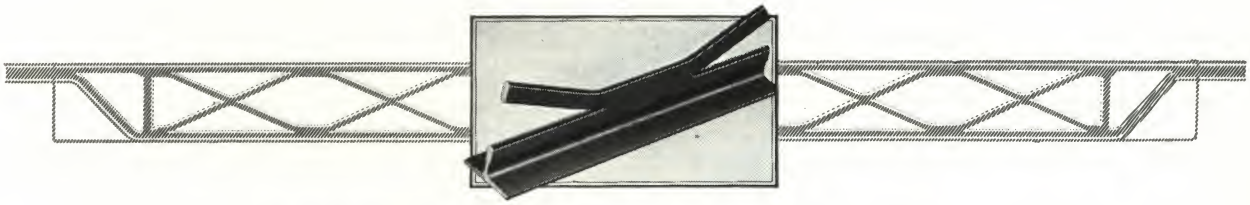
An alternative method to the above is the pouring in place of similar slabs, on removable or permanent centering.

KALMAN STEEL COMPANY

Manufacturers of Kalmantruss Joists

CHICAGO, ILL.

For Other Offices, see our page on Concrete Reinforcement



Kalmantruss Steel Joists in Floors and Roofs for Firesafe Construction

Products

KALMANTRUSS JOISTS, Rigid Bridging, and Accessories.

For Kalman pages on Concrete Reinforcement, Steel Door Frames, and Metal Lath and Lath products, see Manufacturers' Index.

General Description of Kalmantruss Joists

Kalmantruss Joists are light weight double lattice steel trusses made of structural grade new billet steel.

They are produced from small I-beams by a patented process in which the webs are slit and the I-beams rolled out to the required depth at a temperature of 1800° F.

One-piece Structure Insures Safety—The Kalmantruss Joist is not an assembly of individual parts.

Chords and inclined webs are formed from one piece and joints are in all cases capable of developing the full strength of web members.

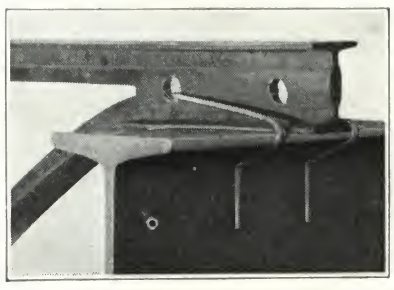
The ends of the truss are additionally strengthened by means of vertical posts electrically arc welded in place.

Positive Strength—Kalmantruss Joists are furnished for spans up to 32 ft. When properly installed and braced, they will carry a uniformly distributed live load greater than twice the rated live load capacity, and at rated capacity deflections will not exceed 1/360 of the span.

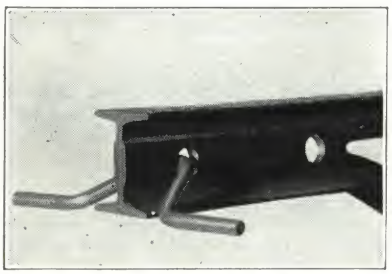
Adaptability—Kalmantruss Joists are particularly adapted for fire resistive floors and roofs of light occupancy buildings such as apartments, hotels, schools, hospitals, office buildings, private residences, etc.

The open webs permit complete concealment of pipes and electric conduits in the depth of floor construction.

Beam Anchors—Joists are attached to steel beams by $\frac{3}{16}$-in. rods looped through holes and clinched around flanges of supporting beams.



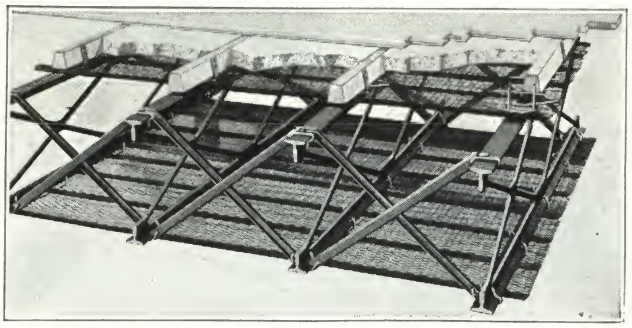
Wall Anchors—Joists are securely held in masonry walls by $\frac{3}{8}$-in. rod anchors inserted in holes as shown.



Kalmantruss Rigid Bridging for Kalmantruss

Rigid Bridging consists of 16 gauge channel members attached to joist flanges by heavy wire clips. This bridging provides substantial cross bracing which acts both in tension and compression to hold joists in vertical position. It assures accurate joist spacing, increases safety during construction, distributes floor loadings and stiffens entire floor construction. Bridging members and connection clips are designed to produce positive action in both tension and compression.

Bridging is furnished in proper lengths and arrives on job ready for installation. Clips fit snugly around joist flanges and produce the essential tightness without dependence upon workmen's skill.



Kalmantruss Rigid Bridging is an exclusive feature of Kalmantruss Joist construction.

Catalogue

Complete catalogue showing details of joist construction, specifications and safe load tables is available upon request.

In addition to Kalmantruss Joists and accessories, KALMAN STEEL COMPANY offers a specially designed Metal Lath for use in floors and ceilings in joist construction.

THE MACOMBER STEEL COMPANY

Macomber Bar Joists and Macomber Nailer Joists

901 Belden Avenue, CANTON, OHIO

For Macomber Steel Building Products, see Manufacturers' Index

Steel Joist Products

Two distinct types of steel joists (U. S. Patents No. 1651032, No. 1614248, No. 1614247, No. 1614249) are manufactured. The Macomber Bar Joist is built up from steel bars and steel plates. It is designed to carry concrete floor decking, and concrete or steel roof decking. The Macomber Nailer Joist is built up from steel bars and steel plates, with a steel angle and wood strip forming the top member of the joist. It is designed for nailing wood flooring and wood roof decking directly to this top member.

Characteristics of Macomber Joists

Both joists are manufactured in a series of standard stock sizes for all spans met with in building construction. Accessories for all framing conditions are handled in the same manner. Prompt shipment is made on all orders. Each joist is fabricated with structural arc welding into a solid structural unit that will withstand the abuse of rough handling. Detailed dimensions of all joists are printed in A. I. A. Catalogs.

The illustrations below show typical details of both joists. The A. I. A. Catalogs contain safe loading tables, complete specifications and designing data. The loading tables show total safe loads in pounds per square foot for various center to center spacings of joists.

Bar Joist Floor and Roof Construction

Concrete Decking—Two to three inches of concrete is poured on corrugated forms (or rib lath) secured to the top bars of the joists. Any type of finish flooring or roofing is laid on top of this slab.

Steel Roof Decking—Corrugated sheets or manufactured steel decking may be used in place of the concrete slab for roof construction. This is secured to the top bars with straps riveted to the sheets or with clips furnished by the decking manufacturer.

Ceiling Construction—A cement or hard finish plaster on metal lath ceiling completes the construction. A ⅜-in. rib lath is usually used with the ribs turned up to act as furring. A metal lath suspended ceiling is used below joists in panels pitched for roof slope or where shallower joists are used for short spans in irregular panels.

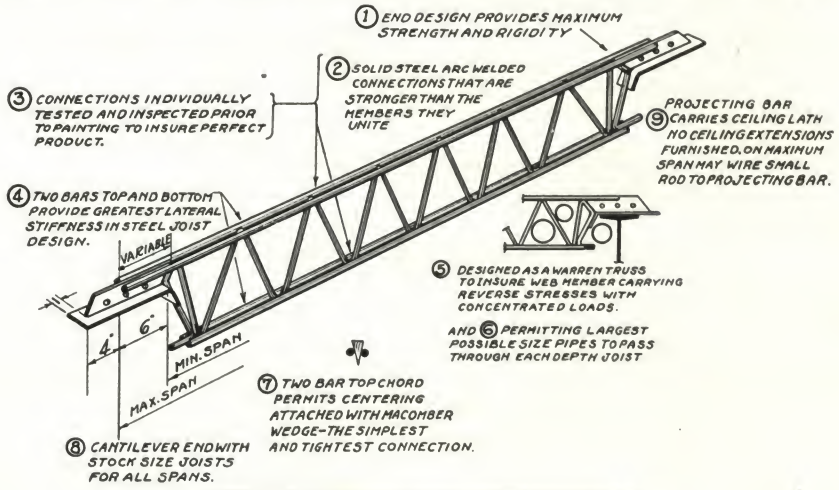
Macomber Bar Joists provide a decidedly economical, fireproof floor and roof construction.

Evidence of the quality of the construction may be found in thousands of fine buildings in all parts of the United States and Canada.

Macomber Nailer Joist Construction

Nailer Joists eliminate the concrete slab that is a component part of bar joist construction. Wood flooring or roof decking is nailed directly to the top member of the joists. In other respects the construction is identical with bar joist construction.

Nailer Joists provide a floor or roof with a high degree of fire resistance when built with metal lath and plaster ceiling. This results in a construction that is firesafe for many conditions at a cost that closely approaches that of ordinary construction. Nailer Joists are frequently used for roofs of otherwise strictly fireproof buildings.



Joist Specifications for Floors and Roofs

Note: The following specifications will fully protect the client's interests and insure good construction. The responsibility for preparing detailed erection plans is properly placed on the manufacturer.

Where indicated in the drawings the floors (and roof) shall be constructed with Macomber Bar Joists (Macomber Nailer Joists) as manufactured by the Macomber Steel Company, Canton, Ohio. Joists shall be provided of the proper size and spacing to carry the specified floor (and roof) loads. The depth of joists shall not exceed the depths indicated for the various floor (or roof) panels. In no case shall joists be spaced over ..... inches c-c in the floor construction (or over ..... inches c-c in the roof construction). Joists shall be provided alongside and parallel to the end walls in the floor (and roof) panels. Extra joists shall be provided as specified under partitions running parallel to and over the joists. Detailed erection plans shall be furnished by the manufacturer showing the location and placing of joists.

The joists shall be placed on the supporting walls and beams in accordance with the erection plans. At least 4 in. of bearing measured along the length of the joists shall be provided on masonry walls and every third joist end anchored to the wall with Macomber End Anchors. At least 2 in. of bearing shall be provided on steel framing and the joist ends clipped to the framing with Macomber Beam Clips.

The end joists in each panel shall be anchored to the parallel wall or beam and all joists braced laterally as indicated in the plans. The anchors and bridging shall be placed at the center, third or quarter points to provide lines of bridging approximately 6 ft. on centers.

Where concrete slabs are specified the slab shall be poured on corrugated forms (or rib lath) secured to the top bars of the joists with Macomber Lath Wedges. Slabs not covered with wood top floor shall be adequately reinforced with wire mesh or steel rods.

Where plastered ceilings are specified a three coat ¾-in. cement or gypsum (hard wall) plaster shall be applied on metal lath. The lath shall be wired to the bottom bars of the joists with the ribs turned up to act as furring. The lath shall be suspended on furring channels to provide a level ceiling where different depth joists are used in irregular panels and under pitched roof panels.

The design of the floor (or roof) and its component parts shall meet requirements of the Steel Joist Institute Specifications.

Note: Where bar joists are to carry a concrete slab, the spacing of joists should not exceed 19 in. for garage floors, 24 in. for office, hotel and residential floors or 30 in. for roofs. The spacing of bar joists for steel roof decking depends on the strength of the decking and should not exceed 5 ft. Nailer joist spacings should not exceed 18 in. in floors or 30 in. in roofs.

McCLINTIC-MARSHALL COMPANY

MAC-MAR DIVISION

MacMar Junior Truss

Morris Building, PHILADELPHIA, PA.

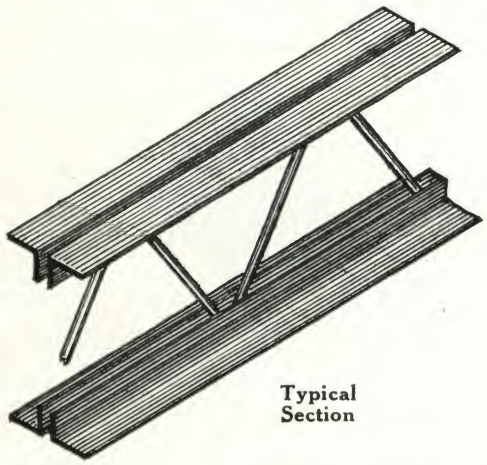
BRANCH OFFICES IN ALL PRINCIPAL CITIES

MacMar Junior Trusses

Without sacrificing the safety, strength and rigidity of the completed structure, McCLINTIC-MARSHALL COMPANY offer MacMar Junior Trusses to meet today's demand for structural economy in floor and roof construction.

The economy of MacMar Junior Trusses results from efficient design based upon a definite understanding of loading conditions; from modern manufacture; and from the ease and simplicity of their erection.

Exhaustive tests indicate that MacMar Junior Trusses combine maximum efficiency and economy for floor and roof construction.



Typical Section

MacMar Junior Trusses are the result of careful research by an organization having more than twenty-five years' experience in design, fabrication and erection of many of the world's most notable steel structures.

Advantages of MacMar Junior Truss

Design—The MacMar is a simple truss of the Warren type, which avoids all indirect and secondary strains. All stresses may be determined by well-known basic engineering methods.

Material—MacMar Junior Trusses are fabricated from standard structural grade steel, having physical and chemical properties according to accepted Standard Specifications.

Fabrication—The MacMar is machine made, with the latest, most improved equipment. The connections of the web bars to the flanges are made by a high pressure resistance electric forging or welding process, employing especially designed machines. The MacMar fabricating process insures dependable uniformity which is of utmost importance.

Flanges—Since the flange width of any structural member determines its lateral stiffness, it is an important factor in the calculation of safe carrying capacity. In MacMar Junior Trusses the width of the flanges may vary to meet the requirements of economical design. Made up of standard rolled angles, the MacMar Junior Truss flange makes possible virtually any combination.

The flat flanges of the MacMar Junior Truss permit the easy installation of any type of floor or ceiling construction most suitable for the condition to be met. The continuous length of the lower chord provides ideal support for the ceiling without the use of special accessories.

Web—The open web of the MacMar Junior Truss allows ample space for the passage of pipes, conduits and other mechanical equipment.

Connections—The end connections are designed to make the MacMar Junior Truss adaptable to any type of construction. Nevertheless manufacturing facilities permit the use of any desired type of connection. These features of the MacMar Junior Truss obtain for it the approval and co-operation of all the building trades.

The MacMar Junior Truss is not a specialty. It is a structural product, designed and fabricated to suit the specific construction need; consequently MacMar Junior Trusses are not carried in stock.

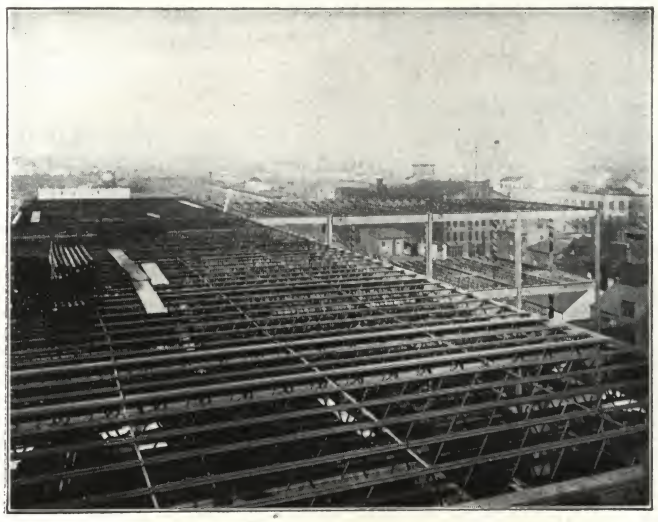
MacMar Organization

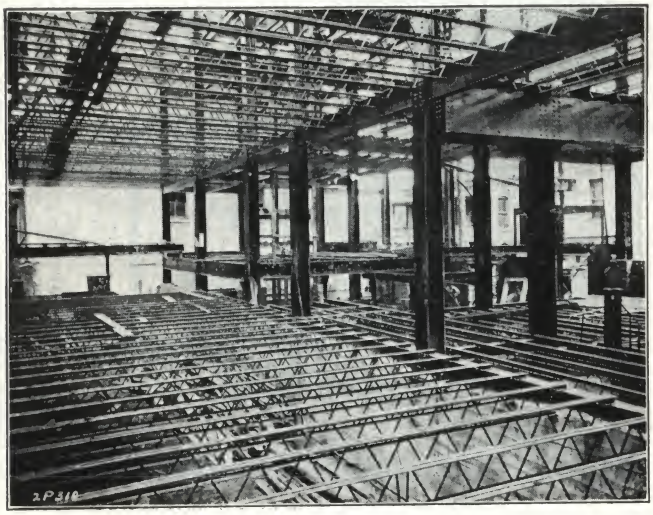
The MacMar Junior Truss not only makes available advantages and economies heretofore impossible, but places at the disposal of builders the facilities of its manufacturers, the McCLINTIC-MARSHALL COMPANY.

Through the designing and drafting departments, through the fabricating plants and through the erection department, the engineering efficiency of the McCLINTIC-MARSHALL COMPANY is universally recognized.

With modern plants located in all sections of the country, with a vast field staff equipped to handle work at any location however remote, and with sales offices in the larger cities capable of estimating and furnishing engineering data promptly for any specific work, the MacMar organization is able to handle any project with speed and efficiency.

Inquiries on the MacMar Junior Truss addressed to any office of the company will receive prompt and cheerful attention.





TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Permanent Building Products Including Steel Joists

YOUNGSTOWN, OHIO

Offices and Warehouses in Principal Cities—For list see our pages on Steel Windows

Products

P-G (Plate Girder) Type Steel Joists.

O-T (Open Truss) Type Steel Joists.

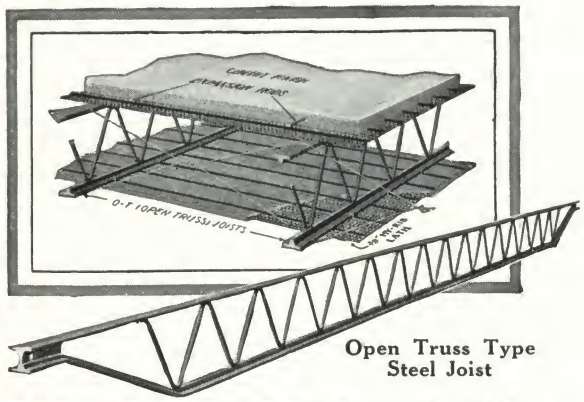
Nailer Steel Joists.

For other Truscon Products, see pages in this edition on Concrete Reinforcing Steel; Steeldeck Roofs; Standardized Buildings and Structural Steel; Steel Doors; Steel Windows; Metal Lath, Steel Channels and Plasterers' Specialties, as listed in Manufacturers' Index.

PRODUCTS OF TRUSCON

A Complete Line of Steel Joists for Every Building Condition

The fireproof floor construction of every building must be individually designed to obtain the most efficient results. One type of steel joist will not satisfactorily meet all conditions. Truscon, therefore, has developed three types of Joists as described below, each possessing certain distinctive advantages for various classes of work. Truscon Engineers will gladly submit detailed recommendations on the proper application of each type.



Open Truss Type Steel Joist

Truscon "O-T" (Open Truss) Type Steel Joists*

The superiority of steel joist construction for economical and fireproof floors is especially well exemplified in Truscon "O-T" (Open Truss) Steel Joists. Their design is based on the best engineering practice and includes many distinctive features.

The top and bottom chords of this Warren truss are wide "tee-shaped" members providing the greatest resistance to buckling strains. The bottom "tee" is continuous to the bearings, where it is welded with web plate and top chord to form a solid I-Beam. The web members are continuous from end to end to positively transmit the stresses. The welding of all joints is done under a method of high pressure electric welding making the most positive connections.

In practical use Truscon "O-T" (Open Truss) Steel Joists are extremely simple to install, insuring utmost speed of erection. The under-slung design of the bearing permits maximum head-room under the supporting girders. The open web allows the passage of pipes and conduits of any number and in any direction.

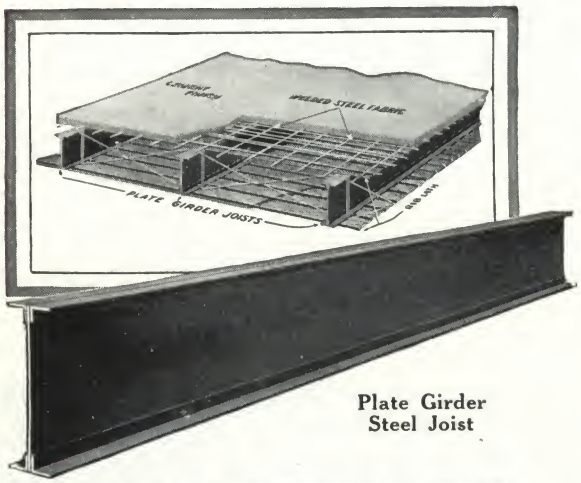


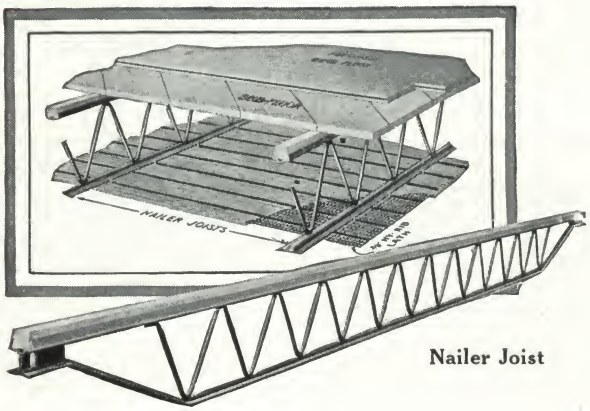
Plate Girder Steel Joist

Truscon "P-G" (Plate Girder) Type Steel Joists*

The Truscon "P-G" (Plate Girder) Steel Joist is a substantial structural steel unit, comparable in design and construction with the plate girders of bridges and buildings.

The flanges are made up of structural steel angles which are welded to the steel web to form a plate girder of enduring strength. The welding is by the high pressure electric system, assuring the perfect union of all parts.

Truscon "P-G" (Plate Girder) Steel Joists are furnished in depths ranging from 6 in. to 14 in., which enables the architect or engineer to meet his particular conditions with the most efficient design. These joists can be easily placed by unskilled labor, the usual construction consisting of a 2-in. concrete slab over the joists and a metal lath and plaster ceiling attached to the bottoms of the joists.



Nailer Joist

Truscon Nailer Steel Joists*

The Truscon Nailer Steel Joist is an Open-Truss Type Joist, the top member of which is formed into a channel which holds a nailing strip. The wood floor is nailed directly to the joists as in ordinary wood joist construction.

Truscon Nailer Joists overcome the two principal weaknesses of wood joists, namely, their combustibility and their tendency to dry out and shrink. Being made of steel, Nailer Joists cannot shrink, and plaster cracks caused by shrinking settlement are therefore reduced to a minimum. The usual unsightly dirt-catching cracks which appear between baseboard and floor when wood joists shrink are also eliminated.

With a metal lath plastered ceiling attached to their lower chords, Nailer Joists provide a construction that is firesafe to a substantial degree and prevents the spread of fire from below.

**Complete catalogue and load tables sent free upon request.*

The Red Book of Building Material

Contracting Division

Fireproofing Specialities

Roof and Floor Constructions



United States Gypsum Company

300 West Adams Street, Chicago

UNITED STATES GYPSUM COMPANY

GENERAL OFFICES

300 West Adams Street, CHICAGO, ILL.

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*Baltimore, Md., 402 Keyser Bldg.
*Buffalo, N. Y., 636 Ellicott Square Bldg.
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Cincinnati, Ohio, 1009 Atlas Bank Bldg.
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Toronto, Ont., Canada, 159 Bay St.

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See Sweet's Manufacturers' Index for:

(1) Standard X Plastering System; Metal Laths and Accessories; Rock-lath; complete line of Red Top Gypsum Plasters: Red Top Finishing Lime; Red Top Exterior Oriental Stucco; Sheetrock (Wall Board).
(2) Econo Expanded Metal.
(3) Insulation Products.
(4) Architectural Acoustics, Noise Abatement and Sound Control.
(5) U.S.G. Paint Products.
(6) Chromite—Sheet Metal Wall Tile.

UNITED STATES GYPSUM COMPANY
CONTRACTING DIVISION

Gypsum Roof Tile, Gypsum Roof Systems, Gypsum Floor Systems, Gypsum Partition Tile, Gypsum Column, Beam and Girder Fireproofing

Experience and Facilities

The UNITED STATES GYPSUM COMPANY is a pioneer in the development of gypsum tile and poured gypsum constructions for fireproof buildings. More than fifteen years ago the company experimented with reinforced gypsum blocks in roof construction in its own plants in an endeavor to increase the insulation value and stop condensation. So successful were these installations that the company decided to offer the roofs to other manufacturers and builders. At present over 100,000,000 sq. ft. of gypsum roofs are in successful use, and many representative firms have standardized on gypsum roofs. A list of installations will be sent on request.

Standardized methods and rigid inspection result in uniform quality. Complete control of every operation, from the mine to the erection of the material in the building, is made possible by the close co-ordination of engineering, manufacturing and contracting service.

The company's twenty-two sales offices—see foreword—located in the important building centers, assure adequate architectural service. The numerous manufacturing plants, strategically located, assure exceptional national distribution facilities.

U S G

TRADE-MARK

Engineering Service

The UNITED STATES GYPSUM COMPANY employs a staff of competent engineers experienced in floor and roof design. To secure the most *practical and economical designs best adapted to the particular type of building,* we strongly recommend consultation with our local sales and service office *at the time the building is designed.* A word to your local U.S.G. representative will place our engineering department promptly at your disposal without obligation.

Erection Service

The UNITED STATES GYPSUM COMPANY maintains a Contracting Division which contracts for the complete construction of gypsum roofs, floors, partitions, and fireproofing. Our crews of experienced field superintendents and workmen are equipped to erect U.S.G. products on any type of building anywhere, including the furnishing and erection of any necessary T-iron or rail subpurlins on either new or alteration work. We also contract for sound insulation treatment.

The employment of our construction organization assures the architect of rapid, continuous progress with the maximum economy and the highest type of workmanship and careful, intelligent supervision. During the past fifteen years the UNITED STATES GYPSUM COMPANY has installed more than fifty million square feet of gypsum roof construction throughout the country on all types of buildings.

Estimates furnished upon request.

GYPSUM—GENERAL TECHNICAL DATA

Gypsum

Chemically, gypsum is hydrous calcium sulphate $CaSO_4(2H_2O)$. It is a widely distributed mineral found in rock formation. The rock gypsum is crushed, ground and then calcined, which drives off a part of the molecular water, forming the hemihydrate or plaster of paris. This product, when mixed with water, takes up or combines with the same amount as was driven off in the calcination process.

Gypsum is one of the most ancient of building materials. The Greeks used gypsum in Pliny's time (23-79 A.D.). The Temple of Apollo at Bassae (470 B.C.) affords an excellent example of the use and permanent structural qualities of gypsum. The Egyptian pyramids contain plaster works of gypsum, executed at least 4,000 years ago.

Structolite

An exclusive UNITED STATES GYPSUM COMPANY product developed in 1916. It consists of calcined gypsum subjected to certain mechanical and chemical treatments which produce a very dense, high grade product named "Structolite" because of its *great structural strength* and *comparative light weight.*

Fireproof

The superior qualities of gypsum as a fireproof building material have been definitely established by numerous tests made by the Underwriters' Laboratories, Inc., and by the bureau of buildings in many of the larger cities.

Note: See the results of the Underwriters' Laboratories Fire and Water Tests in the following reports: Retardant Reports No. 378 (June 22, 1910), No. 1095 (April, 1918), No. 973 (July 17, 1918). Other authentic reports will be furnished on application.

The temperature of the slab (whether of poured or precast gypsum or Structolite) cannot exceed 212° F. except on the surface exposed to the fire. This is due to the fact that the water of crystallization in the gypsum is vaporized during the application of fire to

Continued on next page

it, and as the gypsum slowly calcines, the cellular structure fills with steam. It is this barrier of calcined material which stubbornly resists the progress of the fire.

Light Weight

Gypsum is the lightest of the structural building materials, having approximately 40% of the weight of concrete.

Where used structurally in floor and roof slabs the light weight of gypsum, combined with strength, reflects decided economies in all supporting members including foundations—savings which frequently amount to formidable sums when freight, haul, hoist, erection and interest on the investment are properly considered.

Insulation

Gypsum with its close knit air confining cells has the highest insulating value of any fireproof cementitious structural building material. It thus combines insulation and strength in one homogeneous substance.

Present day efficiency of plant operation demands a non-combustible roof deck which conserves heat in winter, and maintains cool working conditions even in the hottest summer weather. Gypsum roof constructions fulfill this demand at a minimum cost.

Heat losses through gypsum roof decks are minimized, and the temperature at the undersurface of the roof remains practically the same as the interior of the building, regardless of outside temperature. This tends to eliminate condensation or "sweating" and dripping under moist air conditions.

For "Gypsum Insulation Data" see below.

Resistance to Sulphur Gases

As sulphur dioxide gas is commonly encountered in manufacturing plants, power plants, forge shops, foundries, roundhouses, etc., roofs, particularly, are often subjected to very severe acid conditions when in combination with high humidity. Most structural materials are readily and rapidly attacked by sulphur dioxide gas, resulting in disintegration and ultimate failure.

Authentic tests upon reinforced gypsum roof constructions indicate that under continuous subjection to sulphur fumes the gypsum mass actually increases in strength. The steel reinforcing is treated to prevent progressive corrosion.

Conclusive test data will be furnished on application.

GYPSUM INSULATION DATA

Heat Conductivity Coefficients

In order to appreciate fully the superiority of gypsum as an insulator, it is necessary to understand the principle underlying the calculation of heat losses through various materials.

The amount of heat transmitted through a roof is calculated from the following formula, which combines: (1) the admission of heat from the air into the surface of the roof; (2) the transmission of heat through the roof; and (3) the emission of heat from the other surface of the roof into the air.

$$U = \frac{1}{\frac{1}{K1} + \frac{1}{K2} + \frac{X1}{C1} + \frac{X2}{C2} + \frac{X3}{C3} + \text{etc.}}$$

U = B.t.u.'s transmitted per hour per square foot per degree difference in temperature.
K1 = Inside surface coefficient (average).
K2 = Outside surface coefficient with 15 miles per hour wind (average).
X = Thickness of individual material, in inches.
C = Coefficient of conductivity per inch thickness of individual materials, per hour, per sq. ft., per degree difference.

The following table gives the coefficient of K1 and K2 generally used, together with the coefficient C for a number of materials as determined by recognized authorities, as given in A.S.H.&V.E. Guide.

K1—Average	1.34	(B.t.u.'s)
K2—Average	4.02	(B.t.u.'s)
C—Values per inch thickness, except as noted:		
Stone Concrete (1-2-4 Mix)	8.3	(B.t.u.'s)
Cinder Concrete	5.2	(B.t.u.'s)
Pine Plank	1.00	(B.t.u.'s)
Insulite Board	0.34	(B.t.u.'s)
Gypsum Fiber Concrete (Pyrofill)	1.66	(B.t.u.'s)
Sheetrock or Plasterboard (per ⅜ in. thickness)	3.6	(B.t.u.'s)
(Precast) Gypsum Roof Tile	2.4	(B.t.u.'s)
5 Ply Tar and Gravel Roofing	1.325	(B.t.u.'s)

In considering the actual insulating value of a roof it should be borne in mind that with gypsum a homogeneous, structural, fireproof slab is provided.

Heat Saving (Examples)

The following example shows the saving made possible by the use of a 3-in. Sheetrock-Pyrofill roof in place of a 3-in. concrete roof slab.

Assume a building of 100,000 sq. ft. of roof area in which it is necessary to maintain a constant inside temperature of 70° F. twelve hours per day. The lowest outside temperature will be assumed as 0° F. and the number of days requiring heat 210.

The total heat loss through the gypsum roof will be .318 × 100,000 × 70 × 12 = 26,700,000 B.t.u.'s per 12-hour day. The total heat loss per year (210 heating days) is 26,700,000 × 210 = 5,600,000,000 B.t.u.'s.

On the same basis of calculations, the heat loss due to 3-in. concrete roof will be .61 × 100,000 × 70 × 12 × 210 = 10,760,000,000 B.t.u.'s per year (210 heating days). (See table on page 48 for heat transmitted through these roofs.)

The amount of heat saved by the use of gypsum is the difference, or 5,160,000,000 B.t.u.'s assuming that an outside temperature of zero will be constant throughout the 210 days. However, actual tests by heating engineers indicate that the actual saving is about 30% of the above, due to the fact that the average outside temperature during the 210 heating days is considerably above zero.

Therefore the actual saving is 30% of B.t.u.'s 5,160,000,000 = 1,550,000,000 B.t.u.'s.

Fuel Saving (Example)

Assuming the use of a grade of industrial coal producing 8,000 B.t.u's per pound and an efficiency of 70% in the heating plant, the coal saved per year is

$$\frac{1{,}550{,}000{,}000}{8{,}000 \times 2{,}000 \times .70} = 138 \text{ tons of coal}$$

Radiation Saving (Example)

By the same line of reasoning a substantial saving can be effected in the heating equipment. The amount of heat saved per hour by the Sheetrock-Pyrofill roof will be (.61 — .318) × 100,000 × 70° = 2,044,000 B.t.u.'s per hour, at maximum load on heating plant.

A square foot of radiation surface in a steam heating plant operating at a 5-lb. steam pressure will emit 250 B.t.u.'s per hour.

Therefore, the amount of radiation saved is

$$\frac{2{,}044{,}000}{250} = 8{,}176 \text{ sq. ft.}$$

Continued on next page

SHEETROCK-PYROFILL ROOF CONSTRUCTION

Description

Note: For "Gypsum—General Technical Data," see page 1.

Note: For Sheetrock, see Sweet's Manufacturers' Index.

General—Sheetrock-Pyrofill System of Roof construction consists of permanent Sheetrock forms and Pyrofill (Gypsum Fiber Concrete) reinforced with an electrically-welded, galvanized steel fabric supported on subpurlins clipped to the main structural steel purlins. It is sold only completely erected by the Contracting Division of the United States Gypsum Company.

Subpurlins—The subpurlins (either tees or light rail sections) are laid at right angles to main purlins and are spaced approximately 32½ in. on centers, varying slightly, dependent on weight of rail and method of fastening used. (See details, pages 5, 6 and 7).

Sheetrock Forms—On the bottom flanges of the subpurlin are laid panels of Sheetrock mill-made in lengths (maximum 10 ft.) equal to the main purlin spacing. All joints on the undersurface are hidden, and a neat, smooth ceiling results. If a greater degree of insulation or greater sound absorption value is desired, ½ in. Insulite Board may be substituted for the Sheetrock.

Reinforcement—Consists of a continuous electrically-welded galvanized steel fabric (specially made to U.S.G. specifications) made with No. 12 main longitudinal wires 4 in. on centers and No. 14 transverse wires 8 in. on centers having a section area of .026 sq. in. This reinforcement is laid on top of the Sheetrock with the length (longitudinal wires) at right angles to the subpurlins.

Pyrofill—Pyrofill (Gypsum Fiber Concrete) consists of gypsum stucco and water and not to exceed 12½ lb. of fiber (usually wood planer shavings) to 87½ lb. of calcined gypsum. It weighs but 55 lb. per cu. ft.

Over and bonding to the Sheetrock forms, the Pyrofill is poured, completely surrounding the reinforcement, and screeded to the required thickness.

Curbs, etc.—Curbs above and below monitors or sawtooth sash or elsewhere where required may be constructed of Sheetrock-Pyrofill or Pre-cast Gypsum Tile, the latter reinforced when carrying a roof load or retaining drainage fill.

End Walls, etc.—End walls of monitors, sawtooth skylights, "A" frames, etc., may be constructed of Gypsum Pyrobar Curb Tile (3x15x30 in. non-reinforced).

Adaptability

Although Sheetrock-Pyrofill roof construction is particularly adapted to industrial buildings and garages, it is equally adaptable to school buildings, auditoriums, gymnasiums, theaters, hospitals and hotels. Whenever steel framing is used (whether the roof be flat, pitched, monitor, sawtooth, Pond, Aiken, etc.) the inherent values of this gypsum construction may advantageously be employed. (Under certain conditions the construction may be adapted to roofs of wood framing.)

Outstanding Advantages

Fireproof—See page 1.

Light Weight—See page 2. The tables on page 4 indicate the weight of finished slabs and the amount of steel per square foot required for a total load of 45 lb. A careful comparison will show a very worthwhile saving in steel over other constructions.

High Insulation—See insulation data, page 2. In few places is insulation as important a factor as in a roof deck. Here it functions the year around—it promotes comfort and with it efficiency in summer by keeping out the heat of the sun—in winter it materially reduces heat loss. See savings in fuel and radiation given on previous page. Other authentic data on insulation savings applying to any particular installation will be furnished on application.

The Calculated Values for Various Roof Decks

Note: In the table following, the transmission is expressed in B.t.u. per hour, per square foot, per degree difference in temperature. Except as noted, all roof decks are figured with a 5-ply roof covering.

Type of Roof Deck and Covering		
2½-in. Sheetrock-Pyrofill	.35	B.t.u.'s
3-in. Sheetrock-Pyrofill	.318	B.t.u.'s
2½-in. Insulite-Pyrofill	.252	B.t.u.'s
3-in. Insulite-Pyrofill	.238	B.t.u.'s
2-in. Pine Plank	.34	B.t.u.'s
3-in. Stone Concrete	.61	B.t.u.'s
1⅝-in. Cement Tile	.68	B.t.u.'s
Corrugated Sheet Iron (no roof covering)	1.50	B.t.u.'s

Note: For heat conductivity coefficients and formula, see page 2.

Good Interior Appearance—The light color and texture of the paper-finished surface of the Sheetrock, without further finish, is neat and attractive. (The supporting subpurlins are given a shop coat to harmonize with the Sheetrock.)

Note: If the underside of the slab is to be painted or otherwise decorated, such work should not be done until the waterproof roof covering has been applied and the slab is thoroughly dry.

Economical—The simplicity of the construction tends to reduce construction costs. Sheetrock-Pyrofill will be found *very economical* on roof areas of 6,000 sq. ft. or over.

No Maintenance—The maintenance cost of Sheetrock-Pyrofill roof construction is practically nothing. Calcined gypsum is chemically inert. Examinations of steel rods and hooks, embedded for fifteen years in gypsum, have shown no evidence of progressive corrosion.

Economical Construction Suggestions

Length of Span—Usually a span of approximately 8 ft. between main purlins with a 2½-in. slab thickness will be found most economical. Note that no end bay bracing is required.

If channels are used as main purlins on sloping roofs, they should open upwards to permit proper clipping of the subpurlins with our No. 4 purlin clip.

Uniformity of Span—By preserving uniformity of span, the labor costs are reduced and standard lengths of Sheetrock may be used.

Pitch of Roof—While flat roofs require less labor than steep ones, the difference up to 30° pitch is not of sufficient importance to warrant serious consideration. On a roof, however, of 45° or over, it may be necessary to back-form from the top in order to obtain a satisfactory job and this will obviously add to the cost of the roof.

Engineering Service—Our engineering service is always accessible to assist in the greatest economy of design—see page 1.

MASTER SPECIFICATIONS—SHEETROCK-PYROFILL ROOF CONSTRUCTION

Note: Notes are explanatory or advisory only and should not be included in the specifications.

(1 Work Included

Note: Here list the various roof areas to be constructed of Sheetrock-Pyrofill and specify the prescribed live load. If live loads vary, designate the live load applying to the various areas.

(2) Supporting Structural Steel Work

All steel work for the support of the Sheetrock-Pyrofill Roof Construction has been designed not only to carry the prescribed live and dead loads, but to accommodate the most economical installation in accordance with the standard detail of the United States Gypsum Company.

(3) Materials

(3a) General—All Gypsum products shall be as manufactured by the United States Gypsum Company, 300 West Adams Street, Chicago, Ill.

(3b) Subpurlins—Subpurlins shall be steel *(tees) (rails)* of sizes and spacings required or indicated on the structural plans, furnished with a shop coat of paint. Provide all necessary clips *(of types best suited to conditions)* for rigidly securing subpurlins to main purlins, etc.

(3c) Sheetrock Forms—Sheetrock (⅜ in. thick x 32 in. wide) shall be mill-made to exact lengths (maximum 10 ft.) to match the main purlin centering.

Continued on next page

(3d) Reinforcement—Steel reinforcement shall be galvanized electrically-welded steel fabric made to U.S.G. specifications consisting of No. 12 main longitudinal wires 4 in. on centers and No. 14 transverse wires 8 in. on centers having a sectional area of .026 sq. in.

(3e) Pyrofill—Pyrofill shall consist of calcined gypsum and sufficient clean water for proper consistency and not to exceed 12½ lb. of clean soft wood planer shavings to every 87½ lb. of gypsum. It shall be *(mill) (field)* mixed.

(3f) Precast Curb Tile—Where so indicated on plans and details furnish 3-in. thick precast gypsum curb tile, (reinforced when carrying a roof load or retaining drainage fill). For end wall construction where so indicated furnish Pyrobar Curb Tile (3-in. x 15-in. x 30-in. non-reinforced).

(3d) Gypsum Mortar—Gypsum mortar shall consist of one part of unfibered gypsum cement plaster and not to exceed two parts of clean sharp sand.

(4) Erection

(4a) General—All Sheetrock-Pyrofill Roof Construction including all subpurlins *(curbs) (end walls) (saddles) (drainage fill)* etc., shall be completely erected by the Contracting Division of the UNITED STATES GYPSUM COMPANY.

Note: *Sheetrock-Pyrofill Roof Construction is only sold completely erected by the* UNITED STATES GYPSUM COMPANY. *For Erection Service see page 1.*

Roof construction shall be of thickness required on plans and details.

All joints in subpurlins shall be staggered or rigidly tied together. Reinforcement shall be continuous. All roof surfaces shall be screeded smooth and true ready to receive the finished waterproof roof covering.

(4b) Poured Curbs—All curbs so indicated on plans and details shall be constructed of Sheetrock-Pyrofill.

(4c) Tile Curbs—All curbs so indicated on plans and details shall be constructed of precast gypsum curb tile (reinforced when carrying roof load or retaining drainage fill) set in gypsum mortar.

(4d) End Walls, etc.—Construct all *(end walls)* of *(monitors)* *(sawtooth skylights)* *("A" frames)* *(specify)* of Pyrobar Curb Tile set in gypsum mortar.

(4e) Drainage Fill—Provide Pyrofill saddles and drainage pitches to direct roof drainage to *(gutters)* *(drainage outlets)*.

(5) Waterproof Roof Covering

Note: *Provide in the Roofing and Sheet Metal Division of the specifications that the waterproof roof covering shall be applied as soon as possible after the Sheetrock-Pyrofill slab is erected (preferably within twenty days).*

PURLIN SIZES AND WEIGHTS FOR VARIOUS TRUSS AND PURLIN SPACINGS

Based on 45 Lb. per Sq. Ft. Total Load (Live Load—30 Lb.; Slab—12 Lb.; Covering—3 lb.)

Purlin Spacing	Truss Spacing	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	22 ft.	24 ft.
6 ft.	Size and wt. in lb. of member	5″[-6.7	6″[-8.2	7″[-9.8	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	1.12	1.37	1.63	1.63	1.92	2.23	2.55	3.45
	Stress in purlin, lb. per sq. in.	14,290	14,070	13,750	17,850	16,970	16,090	15,300	11,430
	Total deflection, in.	.296	.349	.398	.676	.711	.739	.766	.567
7 ft.	Size and wt. in lb. of member	5″[-6.7	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	10″[-15.3	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	.96	1.17	1.40	1.64	1.91	2.19	2.19	2.96
	Stress in purlin, lb. per sq. in.	16,680	16,420	16,030	15,630	15,230	14,750	17,850	13,320
	Total deflection, in.	.345	.407	.464	.515	.566	.610	.894	.662
8 ft.	Size and wt. in lb. of member	6″[-8.2	7″[-9.8	7″[-9.8	8″I-11.5	9″[-13.4	10″[-15.3	12″[-20.7	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	1.03	1.23	1.23	1.44	1.68	1.91	2.59	2.59
	Stress in purlin, lb. per sq. in.	13,020	13,480	18,100	17,870	17,390	16,860	12,780	15,240
	Total deflection, in.	.225	.286	.525	.588	.646	.697	.532	.756
9 ft.	Size and wt. in lb. of member	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	8″I-18.4	12″[-20.7	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	.91	1.09	1.28	1.49	1.70	2.05	2.30	2.30
	Stress in purlin, lb. per sq. in.	14,650	15,150	15,380	15,430	15,380	17,840	14,380	17,130
	Total deflection, in.	.253	.322	.390	.452	.514	.923	.599	.852
10 ft.	Size and wt. in lb. of member	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	12″[-20.7	12″[-20.7	10″[-25.4
	Wt. of steel in lb. per sq. in. of roof	.82	.98	1.15	1.34	1.53	2.07	2.07	2.54
	Stress in purlin, lb. per sq. in.	16,280	16,850	17,100	17,160	17,070	13,220	15,980	16,650
	Total deflection, in.	.281	.358	.433	.502	.572	.454	.667	.991
11 ft.	Size and wt. in lb. of member	6″[-8.2	7″[-9.8	9″[-13.4	10″[-15.3	8″I-18.4	12″[-20.7	12″[-20.7	12″[-25.
	Wt. of steel in lb. per sq. in. of roof	.75	.89	1.22	1.39	1.67	1.88	1.88	2.27
	Stress in purlin, lb. per sq. in.	17,900	18,000	14,450	14,820	17,660	14,520	17,590	14,330
	Total deflection, in.	.309	.393	.325	.391	.740	.500	.732	.712
12 ft.	Size and wt. in lb. of member	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	12″[-20.7	12″[-20.7	10″[-25.4	12″[-25.
	Wt. of steel in lb. per sq. in. of roof	.82	.96	1.12	1.27	1.73	1.73	2.12	2.06
	Stress in purlin, lb. per sq. in.	14,020	15,080	15,760	16,170	12,830	15,870	16,770	15,630
	Total deflection, in.	.208	.231	.355	.426	.358	.547	.838	.777

For loads other than 45 lb. total, stresses and deflections will be directly proportionate to those shown above.

In no case is the deflection, due to live load only, greater than 1/360 of the span.

RAIL SIZES AND WEIGHTS OF SLABS

Rails spaced 32½″ — 45 Lb. per Sq. Ft. Total Load B.M. = $\frac{1}{10}$ WL; Fiber Stress, 18,000 Lb. per Sq. In.

Span of main purlins	Size of rail, lb.	Weight of rail per sq. ft. of roof, lb.	*Minimum thickness of slab, in.	Weight of slab including rail, lb.
Up to 6′-4″	8	1.00	2½	11.50
6′-4″ to 8′-11″	12	1.50	2½	12.00
8′-11″ to 11′-3″	16	2.00	2½	12.50
11′-3″ to 13′-2″	20	2.50	3	15.00

*Includes thickness of Sheetrock. For other spacing of sub-purlins, or other loads, allowable span will vary inversely as the square root of the spacing or the load. Spans can be increased over those shown by considering the effect of the rail imbedment in the slab. Tests have shown that an 8-lb. rail may be used for spans up to 7 ft.

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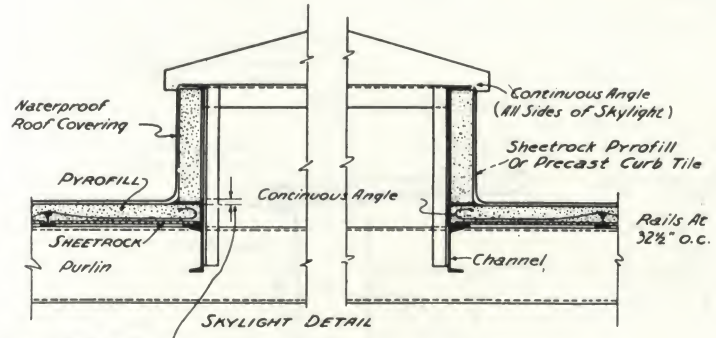


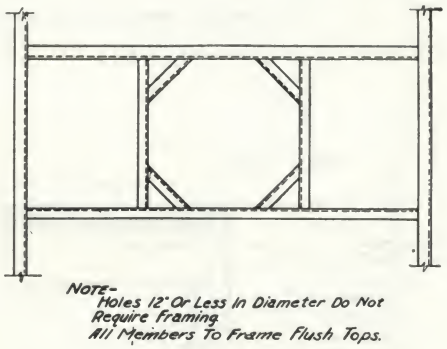
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Jos. C. Llewellyn, Architect
Note good interior appearance

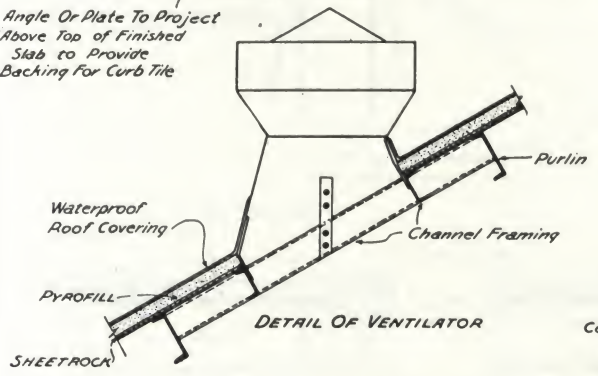


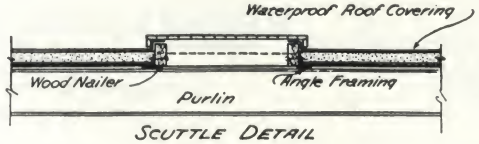
University of Texas, Austin, Tex.
Green, LaRoche & Dahl, Architects
Pouring Sheetrock-Pyrofill roof

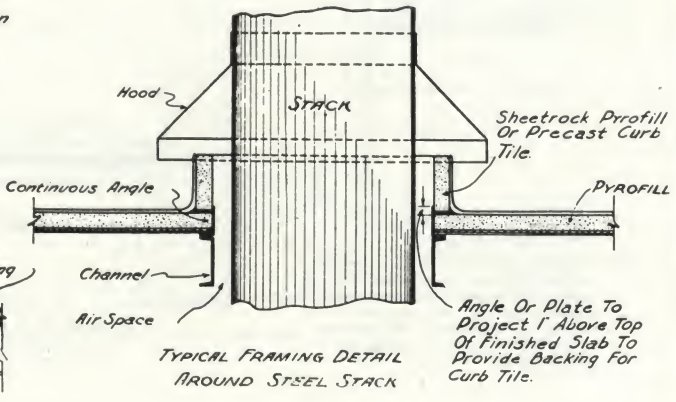
INSTALLATIONS—SHEETROCK-PYROFILL ROOF CONSTRUCTION





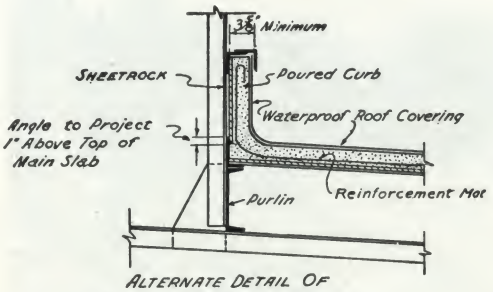




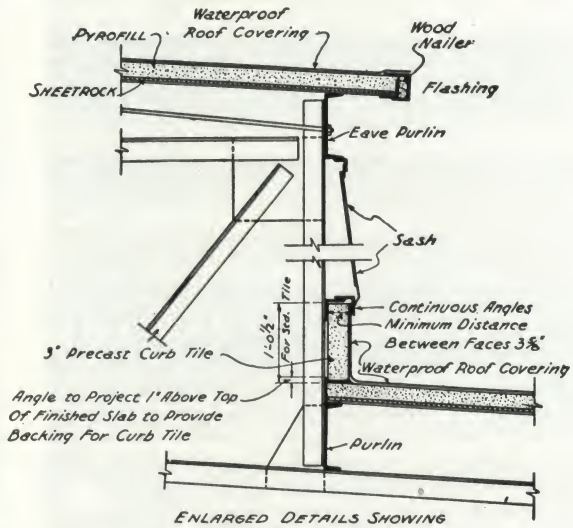


DETAILS—SHEETROCK-PYROFILL ROOF CONSTRUCTION

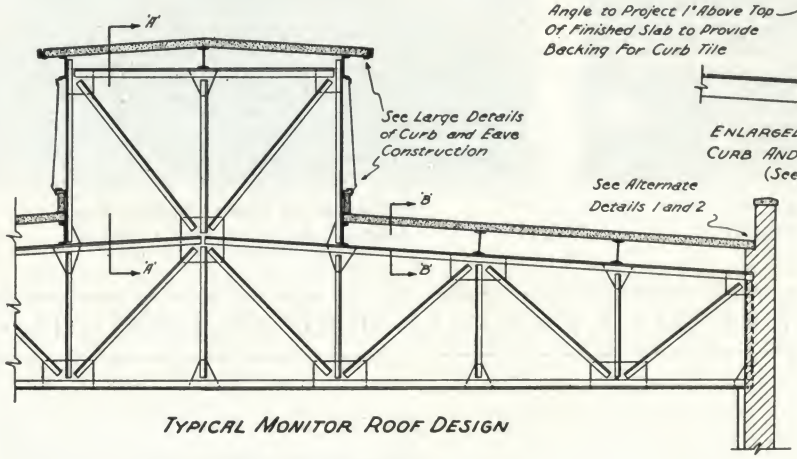
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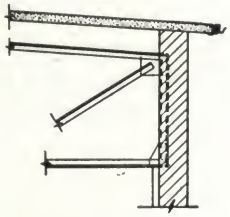
ALTERNATE DETAIL OF POURED CURB CONSTRUCTION



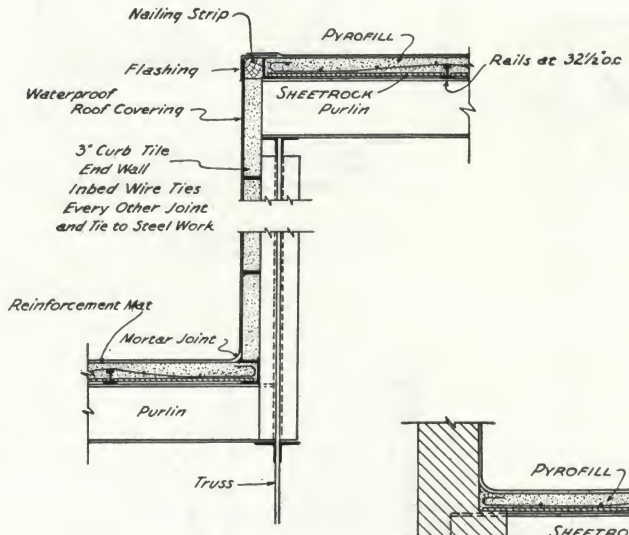
ENLARGED DETAILS SHOWING CURB AND EAVE CONSTRUCTION (See Alternate Detail)



TYPICAL MONITOR ROOF DESIGN

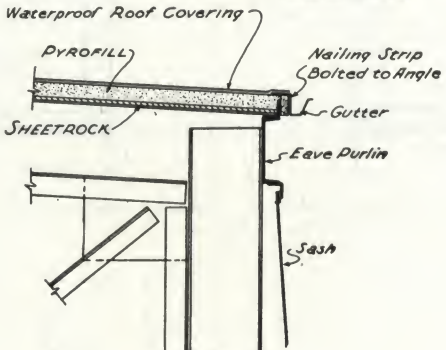


ALTERNATE DETAIL 1
Masonry Wall Extending to Underside of Roof

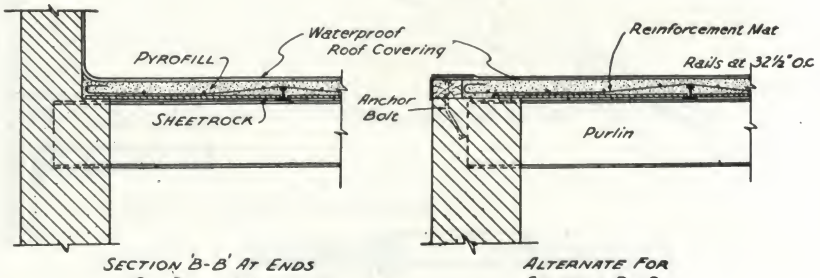


SECTION 'AA' THRU END WALL OF MONITOR

NOTE- This detail used where monitor does not extend full length of building. When monitor does extend full length of building masonry wall may be carried up to monitor roof and end section would appear as shown in section 'B-B'



ALTERNATE DETAIL 2
(All Steel Construction)

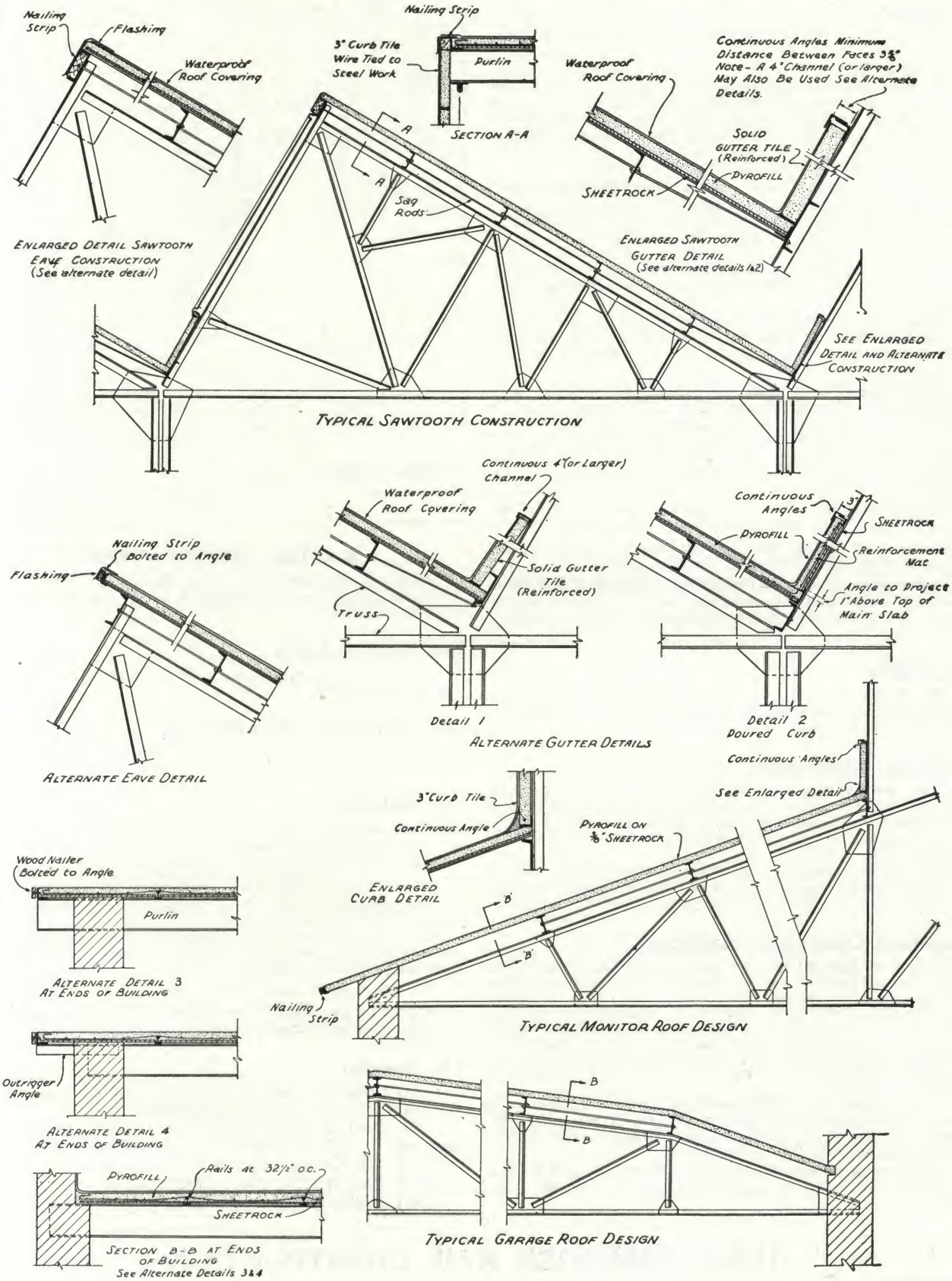


SECTION 'B-B' AT ENDS OF BUILDING

ALTERNATE FOR SECTION B-B

DETAILS—SHEETROCK-PYROFILL ROOF CONSTRUCTION

Continued on next page



DETAILS—SHEETROCK-PYROFILL ROOF CONSTRUCTION

Continued on next page

MARKS T SYSTEM OF ROOF CONSTRUCTION

Description

Note: For "Gypsum—General Technical Data," see page 1.

General—Marks T System of Roof Construction is in general quite similar to Sheetrock-Pyrofill Roof Construction. It consists of permanent Plaster Board forms and Pyrofill reinforced with an electrically welded galvanized steel fabric and supporting steel members clipped to the main structural steel purlins. It is sold only completely erected by the Contracting Division of the UNITED STATES GYPSUM COMPANY.

Subpurlins—Large main tees or light rails span from main purlin to purlin, spaced approximately 32½ in. on centers. They carry the construction loads only, being shipped to the job in stock lengths, so as to form with the use of special U connectors, a continuous support from eave to eave. Small 1x1x⅛-in. cross tees, 2 ft. 8 in. long, are laid (not fastened) on the main tees, to support the ends of the gypsum boards, at 3 ft. intervals.

Plaster Board Forms—Over the flanges of the tees are laid standard sheets of plaster board, 32x36 in. All joints are hidden by the tees. Insulite Board may be substituted for the plaster board.

Reinforcement—Galvanized electrically welded wire reinforcing fabric, of proper width, and cut to the exact length or width of the roof, is laid over the cross tees. The main longitudinal wires, of proper cross-section to support the load in combination with the gypsum, span from main purlin to purlin, spaced 4 in. on center. The transversed wires are spaced 12 in. on center.

Pyrofill—Gypsum Fiber Concrete is used as fully described on page 3 for Sheetrock-Pyrofill Construction.

Curbs, End Walls, etc.—In general, the same as described on page 3 for Sheetrock-Pyrofill Construction.

Combination Sheetrock-Pyrofill and Marks T System—If desired, the small cross tees and plaster board can be used in place of Sheetrock in the standard Sheetrock-Pyrofill Construction.

Adaptability

The Marks T System of Roof Construction is adapted to the same classes and types of buildings as Sheetrock-Pyrofill Construction. See page 3.

Outstanding Advantages

The outstanding advantages given on page 3 applying to Sheetrock-Pyrofill Construction apply likewise to the Marks T Construction. The insulation values given for Sheetrock-Pyrofill Construction are identical with those for the Marks T System.

The Marks T System is especially adapted to rush jobs, as the tees and plaster board are of standard length and sizes and are carried in stock, fabricated, ready for immediate shipments.

Economical Construction Suggestions

Length of Span—Usually a span of approximatey 5½ to 6½ ft. (depending upon the live load) will be found most economical, permitting the use of a 2½-in. slab thickness. Note that no end bay bracing is required. If channels are used as main purlins, on sloping roofs, they should open upwards to permit proper clipping of the subpurlins with our No. 4 purlin clip.

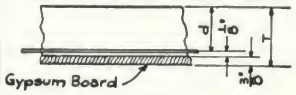
Pitch of Roof—Same as for Sheetrock-Pyrofill Construction given on page 3.

Purlin Sizes and Weights—The table given on page 4 giving "Purlin Sizes and Weights for Various Truss and Purlin Spacings" applying to Sheetrock-Pyrofill Construction applies likewise to the Marks T Construction.

Engineering Service—Our Engineering Service is always accessible to assist in the greatest economy of design. See page 3.

Safe Loads—Marks T Construction

Thickness of slab, in. = T	Weight of slab, lb. per sq. ft.	Galvanized welded-wire reinforcement: Gauge	Diameter, in.	Spacing in.	As	Span of slab in feet (center to center of purlins)	4	4½	5	5½	6	6½	7	7½	8	8½	9
						Safe superimposed loads in pounds per sq. ft. (weight of slab has been deducted)											
2½	11.5	8	0.1620	4	0.0618		68	52	40	31	24	...	...	...	...	...	...
		7					73	56	43	34	27	...	...	...	...	...	...
		6					78	60	46	36	29	23	...	...	...	...	...
		5					83	63	49	39	31	24	...	...	...	...	...
3	13.5	8					101	77	60	48	38	30	24	...	...	...	...
		7	0.1770	4	0.0738		109	83	65	51	41	33	27	...	...	...	...
		6					116	89	70	55	44	36	29	24	...	...	...
		5					123	95	74	59	48	39	31	26	...	...	...
		4					131	101	79	63	51	42	34	28	...	...	...
3½	15.5	7					150	115	90	72	58	47	39	32	26	...	...
		6	0.1920	4	0.0869		...	123	96	77	63	51	42	35	29	24	...
		5					...	131	103	83	67	55	45	37	31	26	...
		4					...	139	110	88	72	59	49	41	34	28	...
	17.5	6					...	161	127	102	83	68	56	47	39	33	27
		5	0.2070	4	0.1010		...	...	135	109	89	73	61	51	42	36	30
		4					...	...	144	116	95	78	65	55	46	39	33
4½	19.5	5					...	...	...	137	112	93	77	65	55	46	39
		4	0.2253	4	0.1196		...	...	...	147	120	100	83	70	59	51	43
		3	0.2437		0.1399		...	...	...	157	128	107	89	75	64	55	47



d = T less ½ in.

Note: The load capacities as shown herewith are based on reinforced slab figures only. An additional factor of safety is obtained in this system by the use of the structural members in the permanent form.

MASTER SPECIFICATIONS

Note: Follow general form for Sheetrock-Pyrofill Specifications given on pages 3 and 4, except as here corrected and amended.

(1) Work Included

Same as par. (1), page 3, except substitute "Marks T" for "Sheetrock-Pyrofill."

(2) Supporting Structural Steel

Same as par. (2), page 3, except substitute "Marks T" for "Sheetrock-Pyrofill."

(3) Materials

(3a) General—*Same as par. (3a), page 3.*

(3b) Subpurlins—*Same as par. (3b), page 3.*

(3c) Plaster Board Forms—Plaster Board Forms shall be cut at the mill in sizes ⅜ in. thick by 32x36 in.

(3d) Reinforcement—Steel reinforcement shall be galvanized electrically welded wire reinforcing fabric, with longitudinal wires 4 in. on centers of proper cross section to carry the load for the given span, and with corresponding transverse wire spaced 12 in. on centers.

(3e) Pyrofill—*Same as par. (3e), page 4.*

(3f) Precast Curb Tile—*Same as par. (3f), page 4.*

(3g) Gypsum Mortar—*Same as par. (3g), page 4.*

(4) Erection

(4a) General—*Same as par. (3a), page 4, except substitute "Marks T" for "Sheetrock-Pyrofill."*

(4b) Poured Curbs—*Same as par. (3b), page 4, except substitute "Pyrofill and board" for "Sheetrock-Pyrofill."*

(4c) Tile Curbs—*Same as (4c), page 4.*

(4d) End Walls—*Same as (4d), page 4.*

(4e) Drainage Fill—*Same as (4e), page 4.*

U.S.G. IMBEDDED RAIL CONSTRUCTION

Description

This type of construction is similar to the Sheetrock-Pyrofill roof, in that standard rail subpurlins span from purlin to purlin, over which is laid the same type of reinforcing material. In order, however, to provide an all gypsum undersurface, the Sheetrock or plaster board is eliminated, and removable wooden forms are hung not less than ¾ in. below the top of the purlins, acting as a support for the slab. If desired, the beams can be formed at the same time, and fireproofed with Pyrofill. The undersurface then has the appearance of our Pyrofill Monolithic Suspension Slab, described on pages 18 to 21.

Continued on next page

PYROBAR PRECAST ROOF TILE

Description

Note: For "Gypsum—General Technical Data," see page 1.

General—All types of precast roof tiles are made of *Structolite* (see page 1) cast in steel moulds and reinforced with electrically-welded galvanized steel fabric.

Types—Pyrobar Precast Roof Tile are divided into two major groups (1) Short Span Solid and Hollow Pyrobar Roof Tile, (2) Long Span Hollow Pyrobar Roof Tile.

The Short Span Tile are subdivided into two distinct kinds, each 12 in. wide x 30 in. long, varying as follows: Standard 3-in. thick Solid Tile, weight 17 lbs. per sq. ft. 4-in. thick Hollow Tile, weight 17 lbs. per sq. ft. The tile can be notched if required for pitched roof thrust.

Where the spans are too great to permit the use of the U.S.G. Bulb Tee, we can furnish a Hooked End Roof Tile, for use with either 16-lb. or 20-lb. rails, depending upon the span and live load.

The Long Span Hollow Tile are subdivided into two thicknesses each 18 in. wide and any length from 4 to 6½ ft. (dependent on economical purlin spacing) as follows: 5 in. thick (weight 20 lb. per sq. ft.) and 6 in. thick (weight 25 lb. per sq. ft.) both thicknesses in either butt end or lap end design for I-beam or channel purlins, respectively, each notched if required for pitch roof thrust.

For details of each type and their variations, see page 13.

Outstanding Advantages

Fireproof—See page 1.

Light Weight—See page 2.

Structural Strength—The structural strength of Pyrobar Roof Tile is amply demonstrated by actual use of the product in the field over a long period as well as by authoritative tests.

An example of the latter is afforded by the transverse bending tests made on Short Span Tile at Columbia University in 1922. In these tests the load was applied at the third points until failure was produced. For the 3 x 12 x 30-in. Solid Short Span Pyrobar Tile, the total load applied at the third point averaged 1020 lb. This represents an equivalent uniformly distributed load of 545 lb. per sq. ft. From the above it is seen that the factor of safety afforded by Pyrobar Roof Tile is more than sufficient for the purpose.

Complete test data will be furnished on request.

High Insulation—See page 12. One of the determining factors in the introduction of Pyrobar Roof Tile more than fifteen years ago was its high insulation value effectively *reducing condensation* and *saving fuel*. Authentic data on insulation savings will be furnished on application.

The Calculated Values for Various Roof Decks

Note: In the table following, the transmission is expressed in B.t.u. per hour per square foot per degree difference in temperature. All roof decks are figured with 5-ply roof covering.

3-in. Solid Short Span Pyrobar	.41 B.t.u.'s
4-in. Hollow Short Span Pyrobar	.35 B.t.u.'s
5-in. Long Span Hollow Pyrobar	.30 B.t.u.'s
6-in. Long Span Hollow Pyrobar	.26 B.t.u.'s

Not Attacked by Sulphur Gases—See page 2.

Good Interior Appearance—The interior appearance is neat and the surface an excellent light reflector.

Economical—Pyrobar Roof Tile are low in cost and permanent. The large lightweight units are easily and speedily erected in any kind of weather in which it is possible to work. The tile are laid directly on the supporting steel work and require only the grouting of joints to make the roof ready for the waterproof covering. This can follow immediately, materially shortening the construction period and making possible earlier occupancy. Maintenance cost is practically nothing.

Broad Adaptability

There is a type of Pyrobar Roof Tile to meet every requirement. The various types and spans are adapted to all kinds of steel framework as they are easily cut to fit around skylights, ventilators, stacks, etc. They are also suited to meet the hip and valley construction of steep pitched roofs, curved surfaces and intricate roof designs and to take slate, tile and metal roof covering. Coupled with the insulating qualities its resistance to sulphur dioxide fumes makes Pyrobar Roof Tile the logical choice for railroad as well as any industrial buildings where this condition must be given first consideration.

The particular adaptability of each type of tile is given in detail below and on next page.

Short Span Pyrobar Roof Tile

Note: For sizes and varieties see "Types" under "Description" in opposite column above. For details see page 13. For curbs, walls, drainage fill, etc., see page 10.

Adaptability—The 3-in. Solid is recommended particularly for nailing purposes because it assures maximum penetration and thus the greatest nail-holding ability. The 4-in. Hollow fills all requirements for a light weight tile to be covered with a built-up roof covering. It is not recommended for nailing purposes. Both tile give a flat ceiling. The short span tile construction is by far the most flexible of any precast system. It can be used with economy on any type of factory or industrial building, power plant, school, etc., and in addition is particularly well adapted to steep pitched roofs or roofs that are badly cut up with dormers, hips, valleys and difficult intersections.

Reinforcement—Reinforcement consists of an electrically welded galvanized steel mat, with five No. 12 longitudinal wires and No. 14 cross wires, 4 in. on centers. See details, page 13.

Purlin Requirements—Short Span (30 in. long) Roof Tile, require subpurlin supports. These are usually Tees (such as U.S.G. Bulb Tees) but light I-beams or channels may be used with economy on spans up to 12 ft. The most economical span for the U.S.G. Bulb Tee is 7 ft., 4 in. A notched 3-in. solid x 30-in. long tile laid directly on light I-beam purlins which span directly between steel trusses or main supports has proven economical in many cases. Note that no end bay bracing is required.

Special U.S.G. Bulb Tee Subpurlins—This section has been developed primarily for use with Short Span Pyrobar Roof Tile, as a more economical subpurlin than standard tees. The wide flange provides ample bearing for the tile, and being designed particularly for this purpose, it has considerably less sectional area than a standard tee of equal load bearing capacity. The United States Gypsum Company is prepared to furnish the bulb tees, erected in place in connection with its installation of Short Span Pyrobar Roof Tile, or, if desired in connection with your own installation of Pyrobar the bulb tee can be furnished fabricated for erection with the structural steel. See details page 13.

Installation—The tile are laid directly on the steel supports without mortar and with sides tight together with full bearing on the subpurlin. The grouting joints are then filled with gypsum mortar and the roof is immediately ready for the application of the roof covering.

Ornamental Roof Covering—A successful application of ornamental roof covering depends upon density of the slab (3-in. Solid tile is recommended) type and penetration of nail, type of covering and slope of the roof. The roof deck should be thoroughly dry or as nearly so as can be reasonably obtained. Square cut hard copper or brass nails have proven their superiority after a large number of tests on all types.

Application of ordinary slate or ornamental tile to roofs up to 60° slope should be made with nails having not less than 2 in. penetration. When the slope is greater than 60° or extra heavy slate or tile is to be fastened, the problem requires special study with any type of nailing deck.

Application of sheet metal (tin or copper) requires thoroughly rigid fastening due to the strain put upon the cleat nails by the expansion and contraction of the sheets. Particularly, there should be sufficient cleats to securely anchor the sheets to the roof construction. Standard practice indicates that the spacing of cleats should be approximately 8 in. on centers, each secured with two nails having not less than 2-in. penetration as mentioned above.

It is standard practice to use a sheet of roofing felt between the gypsum roof deck and the ornamental covering, whether of slate, tile or metal.

Continued on next page

Long Span Hollow Roof Tile

Note: For sizes and varieties see "Types" under "Description," page 9. For details see page 13. For curbs, walls, drainage fill, etc., see below.

Adaptability—Long Span Hollow Pyrobar Roof Tile are primarily designed to provide a flat uniform ceiling with maximum light reflection and insulation. They are manufactured in lengths 4 ft. to 6 ft. 6 in. to suit the steel framing and in depths of 5 and 6 in. The 6-in. depth affords maximum insulation and strength. The tile can be notched to fit over the purlin flanges if desired, and can be furnished either with or without lap joint, depending on the bearing afforded. Lap joint should be used whenever channel purlins are provided. Long Span Tile are not recommended for roofs with difficult framing requiring considerable cutting, nor where a nailing deck is required.

Reinforcement—Consists of an electrically-welded, galvanized steel mat, properly designed to support the load, as shown on details, page 13.

Purlin Requirements—The tile are made to span from purlin to purlin (either steel or wood)—no tees or other type of subpurlins are required. The most economical purlin spacing is approximately 6 ft. Spacing may vary from 4 ft. to not to exceed 6½ ft.

Installations—The tile are laid directly on the steel subpurlins or wood framing with sides tight together. The grouting joints on the top surface are then filled with gypsum mortar and the roof is immediately ready for the application of the roof covering. See tables, page 11.

Gutter and Curb Tile, Drainage Fill

Gutter Tile—Sawtooth valleys, curbs under sawtooth sash, etc., restraining drainage fill or subject to roof loads, are constructed of 3-in. solid reinforced Pyrobar Gutter Tile, 12 in. wide and made in lengths to fit the steel work.

Curb Tile—Curbs, above and below monitor and sawtooth sash, end walls, etc., which do not sustain a superimposed roof load or restrain drainage fill are constructed of 3-in. solid non-reinforced Pyrobar Curb Tile, 15x30 in.

Drainage Fill—The use of Pyrofill (see page 3) for drainage fill over Pyrobar roofs, is ideal on account of its light weight and the quick setting qualities of gypsum. Where deep fill is required the Pyrofill is laid over dry cinders tamped in place. The Pyrofill provides a smooth surface for the roof covering and is an excellent material for constructing fillets and leveling off uneven and broken surfaces, in connection with difficult roof framing.

Re-roofing

All types of Pyrobar Roof Tile, particularly the Short Span Tile, provide a solution of the re-roofing problem. The desired area on the old roof can be removed and replaced immediately with Pyrobar, without interrupting the activities below.

In connection with re-roofing work, the United States Gypsum Company through its Contracting Division will remove the old roof deck or covering, furnish and place additional steel if required, and erect the new Pyrobar Roof Deck, ready for the roof covering. Our wide experience in this field is at your service.

Economical Construction Suggestions

The Proper Steelwork Design—The proper design and detail of the steelwork to best accommodate the roof tile cannot be too strongly emphasized. Sufficient bearing for the tile is very essential. A channel or double angles are usually required at the upper edge of the curb tile to form a sill for sash and also to hold the tile in place. If the curb tile is on a slope or sustains a superimposed load such as drainage fill, an angle should be used at the lower edge. Stop angles to prevent sliding of roof tile on a steep pitch are necessary.

On sloping roofs, if channels are used for main purlins, they should open upwards in order to permit proper clipping of the subpurlins. See details, page 11.

We recommend the use of tie rods for all roofs using channel purlins regardless of the slope or pitch.

Curb tile under sash, skylight frames, etc., are made in a standard size of 3x15x30 in. and the designer should arrange the steel work to accommodate either the full 15 or 30-in. dimension.

Note: If the above is impossible, these tile can be furnished in 15-in. widths with lengths to fit the steel.

On page 13 will be found details and weights of the various types of precast roof tile. On page 11 are tables giving the size, stress, deflection and square foot weight of purlins under various conditions of truss spacing and tile lengths.

The use of these data together with the construction details given on pages 14, 15, 16 and 17 will be of assistance to the designer.

By following standard practice and conforming to the manufacturer's details and specifications, special sizes of tile and difficult conditions will be reduced to a minimum and economy will naturally follow.

Openings—Openings larger than 12 in. must be provided with suitable framing. The tile are readily cut to fit around openings of any size.

This applies particularly to openings for ventilators. Construction details on page 16 show methods of attaching ventilators to precast and poured roof construction. Where ventilators are installed after the roof has been constructed, the details should be referred to our Engineering Department.

Lap Joint Tile—For Long Span Tile, when channel purlins are used, lap joint tile must be used. See details page 58.

Notched Tile—Our standard practice permits notching Short Span Tile and Long Span Hollow Tile to eliminate thrust on pitched roofs. See details, page 13.

Engineering Service—Our engineering service is always accessible to assist in the greatest economy of design—see page 1.

MASTER SPECIFICATIONS—PYROBAR PRECAST ROOF TILE

Note: Notes are explanatory or advisory only and should not be included in the specifications.

(1) Work Included

Note: Here list the various roof areas to be constructed of Pyrobar Precast Roof Tile and specify the prescribed live load. If more than one type of tile is used list separately the areas constructed of each.

(2) Supporting Structural Steel Work

All steel work for the support of the Pyrobar Precast Roof Tile Construction has been designed not only to carry the prescribed live and dead loads, but to accommodate the most economical standard tile installation in accordance with the standard details of the United States Gypsum Company.

Note: See particularly "Purlin Requirements" and "Special U.S.G. Bulb Tee Subpurlins" under heading "Short Span Pyrobar Roof Tile," page 9; "Purlin Requirements" under heading "Long Span Hollow Roof Tile," above, and heading "Economical Construction Suggestions," above.

(3) Materials

(3a) General—All Gypsum products shall be as manufactured by the United States Gypsum Company, 300 West Adams Street, Chicago, Ill.

(3b) Short Span Tile—Where so designated the roof slab shall be constructed of Pyrobar Short Span *(Solid) (Hollow) (Notched End)* Roof Tile.

Note: See "Types" under heading "Description," also "Short Span Pyrobar Roof Tile" on page 9.

(3c) Special U.S.G. Bulb Tee Subpurlins—All subpurlins shall be special U.S.G. Bulb Tees.

Continued on next page

(3d) Long Span Hollow Tile—Where so designated the roof slab shall be constructed of Pyrobar Long Span Hollow *(lap end) (notched end)* Roof Tile of thickness indicated.

Note: *See "Types" under heading "Description," page 9, and "Long Span Hollow Roof Tile," page 10.*

(3e) Precast Gutter and Curb Tile—Where so indicated on plans and details furnish reinforced Gypsum Gutter Tile (3x12 in. by lengths as required) to restrain drainage fill or carry roof loads. Furnish also all necessary non-reinforced Gypsum Curb Tile (3x15x30 in.) for curbs, walls, etc., which do not carry roof loads or restrain drainage fill.

Note: *See "Gutter and Curb Tile," page 10.*

(3f) Gypsum Mortar—Gypsum mortar shall consist of one part of unfibered gypsum cement plaster and not to exceed two parts of clean, sharp sand.

(3g) Pyrofill—Pyrofill (Gypsum Fiber Concrete) shall consist of calcined gypsum and sufficient clean water for proper consistency and not to exceed 12½ lbs. of clean soft wood planer shavings to 87½ lbs. of gypsum.

Note: *See "Drainage Fill," page 10.*

(4) Erection

(4a) By United States Gypsum Company—All Pyrobar Precast Roof Tile Construction, including all *(U.S.G. bulb tee subpurlins) (curbs) (end walls) (saddles) (drainage fill)*, etc., shall be completely erected by the Contracting Division of the United States Gypsum Company.

Note: *For Erection Service see page 1.*

(4b) General—All Pyrobar Precast Roof Tile shall be accurately laid, without mortar, upon the supporting steel work. Bearings shall be even and full and the tile units laid tight. All joints on top surface shall be pointed full with gypsum mortar, struck smooth. All roof surfaces shall be left smooth and true ready to receive the finished waterproof roof covering.

(4c) Tile Curbs—All curbs so indicated on plans and details shall be built of Precast Curb Tile (reinforced when restraining drainage fill or carrying roof loads). Tile shall be laid in gypsum mortar.

(4d) End Walls, etc.—Where so indicated on plans and details, construct all *(end)* walls of *(monitors) (sawtooth skylights) ("A" frames)* etc. of Pyrobar Curb Tile set in gypsum mortar.

(4e) Saddles and Drainage Fill—Provide Pyrofill saddles and drainage pitches to direct roof drainage to *(gutters) (drainage outlets)*. Where deep fill is required, build the fill of clean dry cinders throughly tamped, finished with a surface of Pyrofill.

(5) Waterproof Roof Covering

Note: *Provide in the Roofing and Sheet Metal division of the specifications that the waterproof roof covering shall be applied as soon as possible after the gypsum roof slab is erected (preferably within twenty days).*

Note: *For application of ornamental roofing, such as slate, tile and metal see recommendations given in "Ornamental Roof Covering" under heading "Short Span Roof Tile," page 9.*

PURLIN SIZES AND WEIGHTS FOR VARIOUS TRUSS AND PURLIN SPACINGS

Based on 50 Lb. per Sq. Ft. Total Load—(Live Load—30 Lb.; Slab—17 Lb.; Covering—3 Lb.)

Note: Long Span Tile is not furnished for spans over 6 ft. 6 in.

Purlin Spacing	Truss spacing	8 ft.	10 ft.	12 ft.	14 ft.	16 ft.	18 ft.	20 ft.	22 ft.	24 ft.
4 ft.	Size and wt. in lb. of member	4″[-5.4	4″[-5.4	5″[-6.7	6″[-8.2	7″[-9.8	7″[-9.8	8″[-11.5	9″[-13.4	9″[-13.4
	Wt. of steel in lb. per sq. in. of roof	1.35	1.35	1.67	2.05	2.45	2.45	2.88	3.35	3.35
	Stress in purlin, lb. per sq. in.	10,510	16,420	15,180	14,100	13,230	16,750	15,430	14,350	17,080
	Total deflection, in.	.174	.424	.452	.476	.502	.802	.799	.798	1.131
5 ft.	Size and wt. in lb. of member	4″[-5.4	5″[-6.7	6″[-8.2	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	9″[-13.4	10″[-15.3
	Wt. of steel in lb. per sq. in. of roof	1.08	1.34	1.64	1.64	1.96	2.30	2.68	2.68	3.06
	Stress in purlin, lb. per sq. in.	13,120	13,180	12,980	17,630	16,550	15,610	14,820	17,950	16,780
	Total deflection, in.	.217	.273	.322	.595	.627	.653	.683	.998	.999
6 ft.	Size and wt. in lb. of member	4″[-5.4	5″[-6.7	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	9″[-13.4	10″[-15.3	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	.90	1.12	1.37	1.63	1.92	2.23	2.23	2.55	3.45
	Stress in purlin, lb. per sq. in.	15,750	15,800	15,550	15,170	14,830	14,380	17,780	16,890	12,630
	Total deflection, in.	.262	.327	.386	.441	.491	.535	.820	.847	.627
6 ft. 6 in.	Size and wt. in lb. of member	4″[-5.4	5″[-6.7	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	8″I-18.4	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	.83	1.03	1.26	1.51	1.77	2.06	2.35	2.83	3.19
	Stress in purlin, lb. per sq. in.	17,080	17,120	16,850	16,430	15,980	15,570	15,120	17,340	13,680
	Total deflection, in.	.282	.354	.418	.477	.532	.579	.627	1.078	.678
7 ft.	Size and wt. in lb. of member	4″[-5.4	5″[-6.7	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	12″[-20.7	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	.77	.96	1.17	1.40	1.64	1.91	2.19	2.96	2.96
	Stress in purlin, lb. per sq. in.	18,000	18,000	17,850	17,700	17,200	16,780	16,290	12,430	14,730
	Total deflection, in.	.304	.375	.450	.513	.572	.624	.677	.516	.731
8 ft.	Size and wt. in lb. of member	.....	6″[-8.2	7″[-9.8	8″[-11.5	9″[-13.4	10″[-15.3	8″I-18.4	12″[-20.7	12″[-20.7
	Wt. of steel in lb. per sq. in. of roof	.....	1.02	1.23	1.44	1.68	1.91	2.30	2.59	2.59
	Stress in purlin, lb. per sq. in.	.....	14,400	14,920	15,110	15,120	15,080	17,570	14,220	16,830
	Total deflection, in.	.....	.249	.317	.383	.447	.504	.906	.588	.836

For loads other than 50-lb. total, stresses and deflections will be directly proportionate to those shown above. Thus a lighter load or consideration of only live load deflection will permit the use of a considerably lighter section. In no case is the deflection, due to live load only, greater than 1/360 of the span.

SUBPURLIN SIZES FOR PURLIN SPANS UP TO 8 FT. 5 IN.

Used with Short Span Tile, Solid and Hollow—18,000-lb. Stress

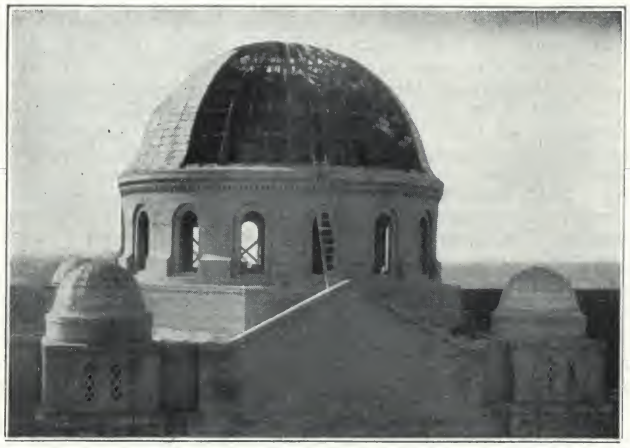
Spaced 30¾ in. on Centers — 50 lb. per Sq. Ft. Total Load — BM = $\frac{1}{10}$ WL

Span	6′ 1″	6′ 11″	7′ 9″	8′ 5″
Size of tee	2¼x2¼—4.1 lb.	2¼x2¼—4.9 lb.	2½x2½—5.5 lb.	2½x2½—6.4 lb.

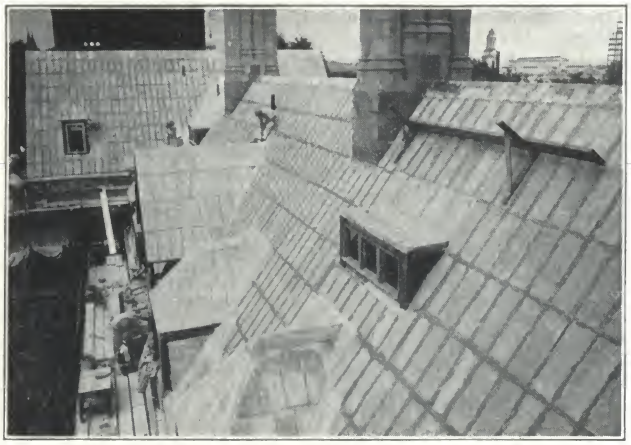
U.S.G. Bulb Tee—3.1 Lb.—1.25 lb. Steel per sq. ft. of roof—Span to 7′-4″

For other spacing of subpurlins, or other loads, allowable span will vary inversely as the square root of the spacing or the load.

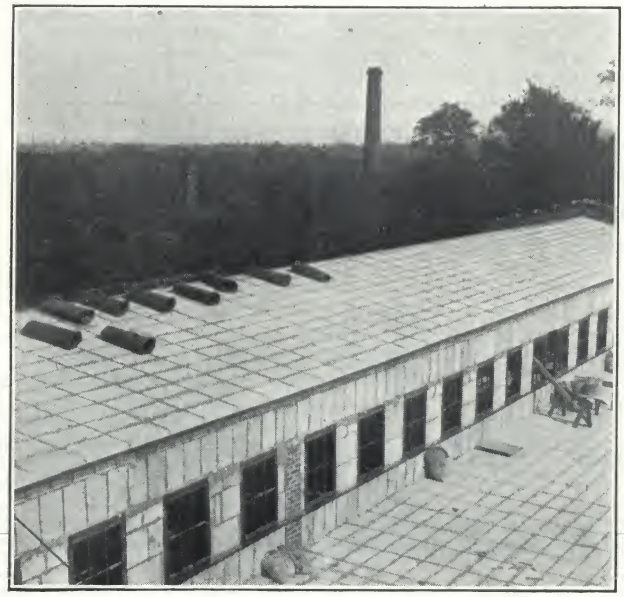
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St. Casimir's Church, Buffalo, N. Y.
OAKLEY & SHALLMO, Architects
6400 sq. ft. Short Span Pyrobar



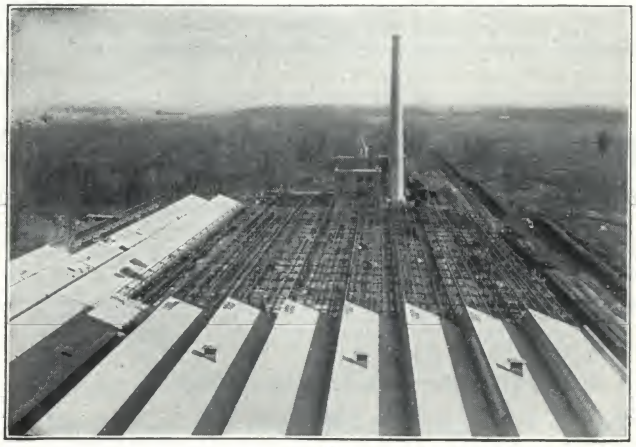
Bingham Hall, Yale University, New Haven, Conn.
W. B. CHAMBERS, Architect
11,755 sq. ft. Short Span Pyrobar



Incinerator Plant, City of Baltimore, Md.
Note the Pyrobar Curb and Monitor Wall Construction



Williams College Library, Williamstown, Mass.
CRAM & FERGUSON, Architects
14,000 sq. ft. Short Span Pyrobar





Tractor Plant, International Harvester Co., Fort Wayne, Ind
DAY AND ZIMMERMAN, Architects
300,000 sq. ft. Long Span Hollow Pyrobar

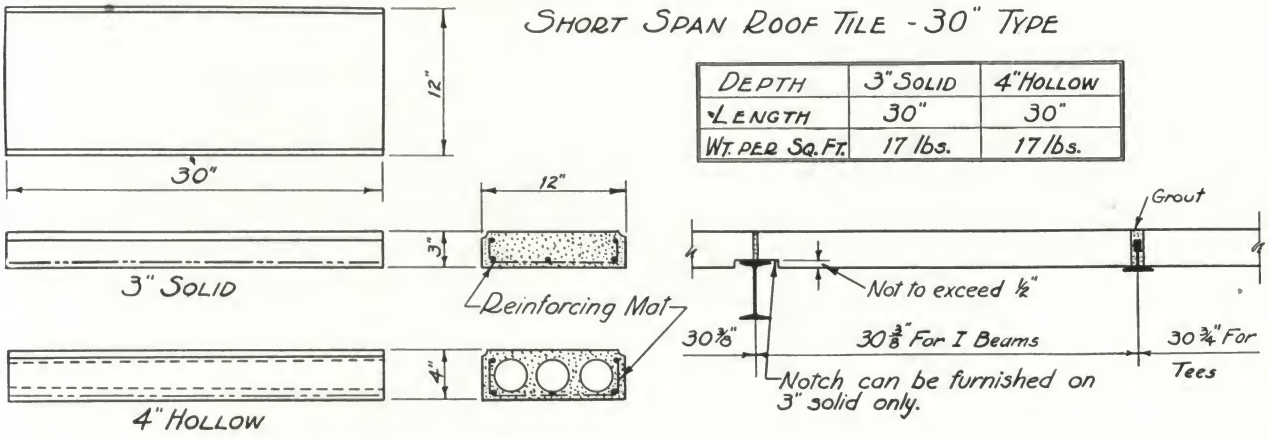
TYPICAL INSTALLATIONS—PYROBAR ROOF TILE

Continued on next page

DETAILS OF PYROBAR ROOF TILE

NOTE: ALL TILE REINFORCED WITH ELECTRICALLY WELDED GALVANIZED STEEL MAT

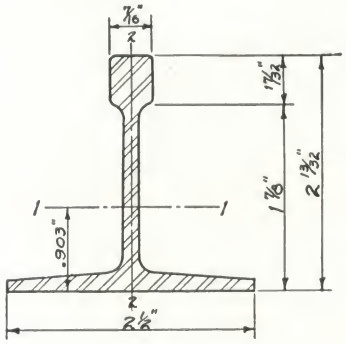
SHORT SPAN ROOF TILE - 30" TYPE



DEPTH	3" SOLID	4" HOLLOW
LENGTH	30"	30"
WT. PER SQ. FT.	17 lbs.	17 lbs.

U. S. G. BULB TEE SUB-PURLIN (STEEL)

FOR SHORT SPAN ROOF TILE



WEIGHT PER YARD	9.30 LBS.
AREA OF SECTION	.890 IN^2
SECTION MODULUS-AXIS 1-1	.462 IN^3
MOMENT OF INERTIA-AXIS 1-1	.695 IN^4
SECTION MODULUS-AXIS 2-2	.150 IN^3
MOMENT OF INERTIA-AXIS 2-2	.188 IN^4

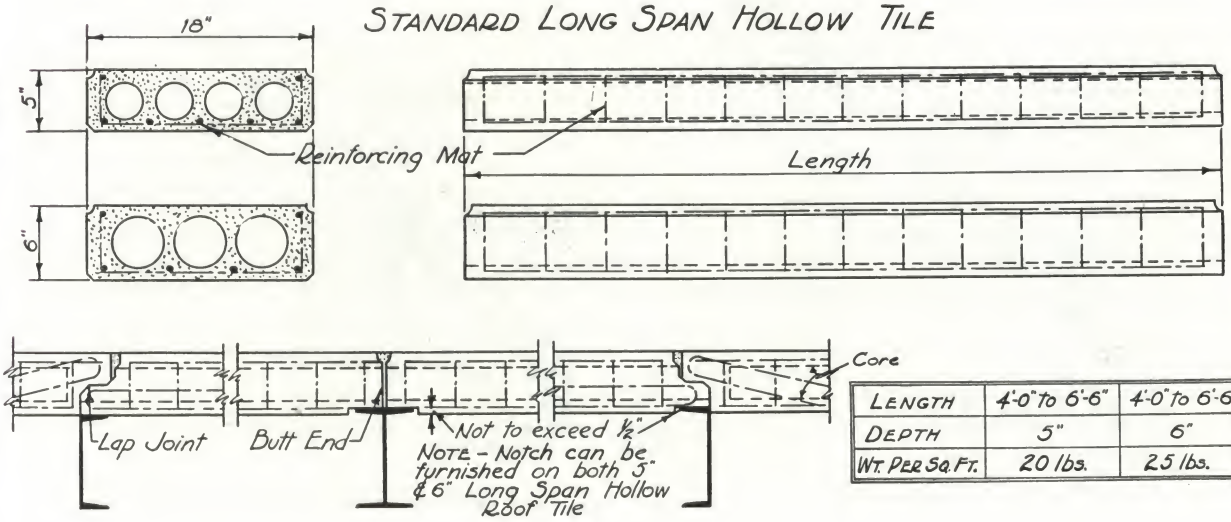
Allowable Spans based on Total Load of 50 lbs. per square foot, spacing of 2'-6¾" - Steel stress of 18,000 lbs. per sq. in. - See note below.

MAX. SPAN 7'-4" } WL/10
MAX. DEFLECTION .27" }

MAX. SPAN 6'-8" } WL/8
MAX. DEFLECTION .23" }

NOTE:-
For spacing other than 2'-6¾", or load other than 50 lbs., the allowable span will vary inversely as the square root of the spacing or the load.

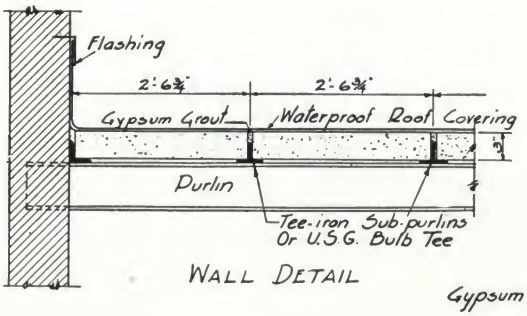
STANDARD LONG SPAN HOLLOW TILE



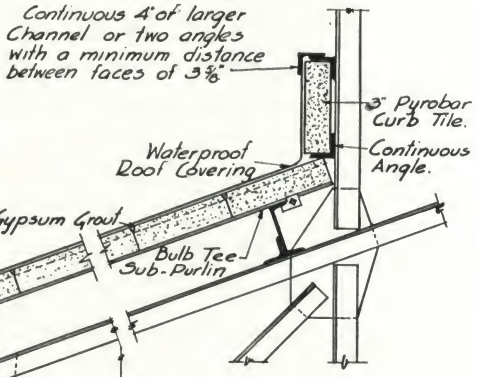
LENGTH	4'-0" to 6'-6"	4'-0" to 6'-6"
DEPTH	5"	6"
WT. PER SQ. FT.	20 lbs.	25 lbs.

DETAILS OF PYROBAR PRECAST ROOF TILE

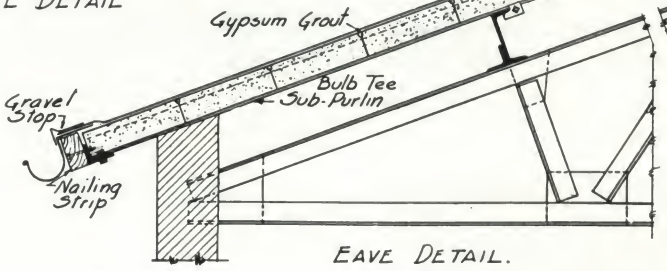
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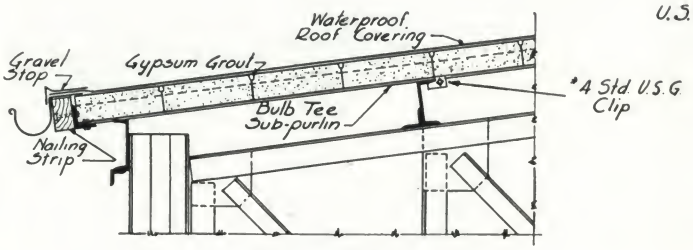
WALL DETAIL



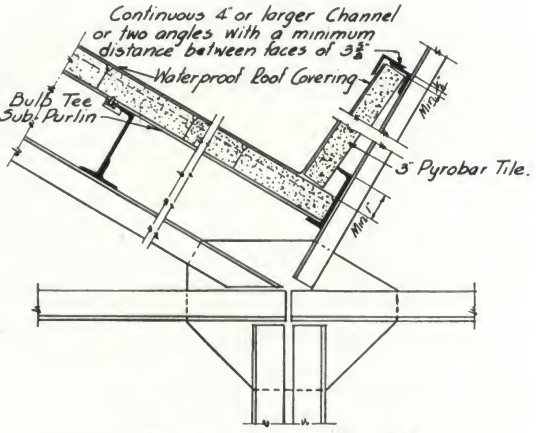
MONITOR CURB DETAIL



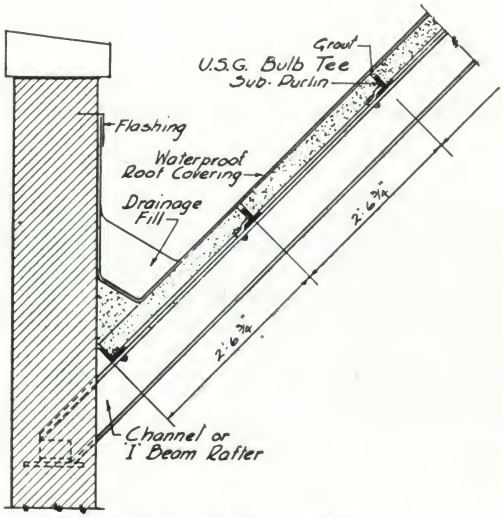
EAVE DETAIL.



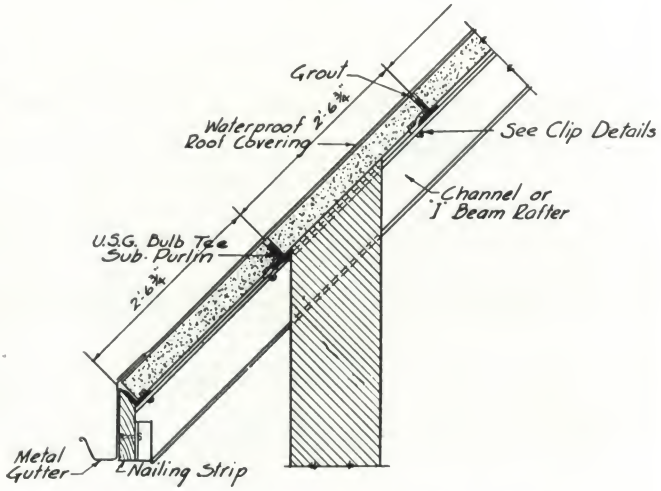
EAVE DETAIL



SAWTOOTH GUTTER DETAIL



STEEP PITCHED ROOF DETAIL

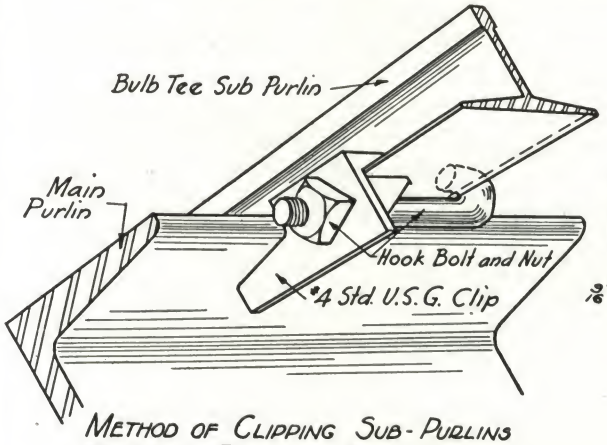


EAVE DETAIL - MANSARD ROOF

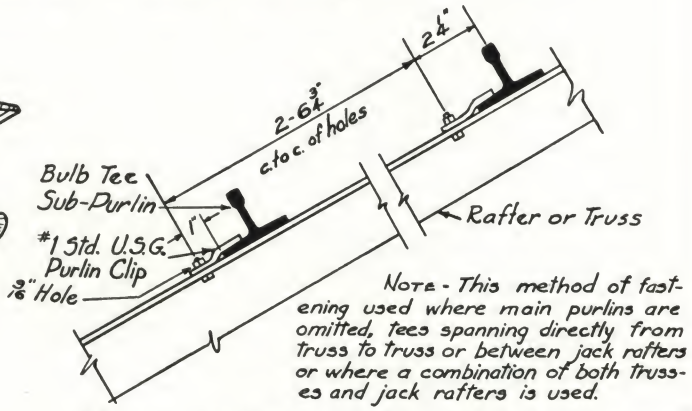
DETAILS OF SHORT SPAN PYROBAR ROOF TILE

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DETAILS OF TEES & SHORT SPAN (30" TYPE) ROOF TILE

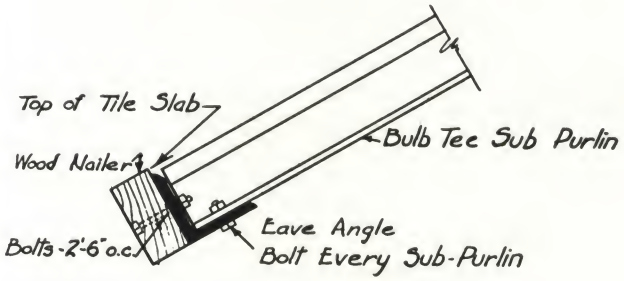


METHOD OF CLIPPING SUB-PURLINS TO MAIN PURLINS - SLOPED ROOF

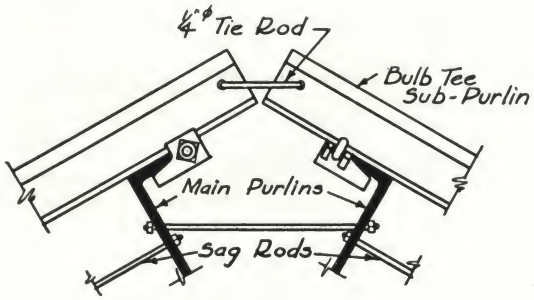


NOTE - This method of fastening used where main purlins are omitted, tees spanning directly from truss to truss or between jack rafters or where a combination of both trusses and jack rafters is used.

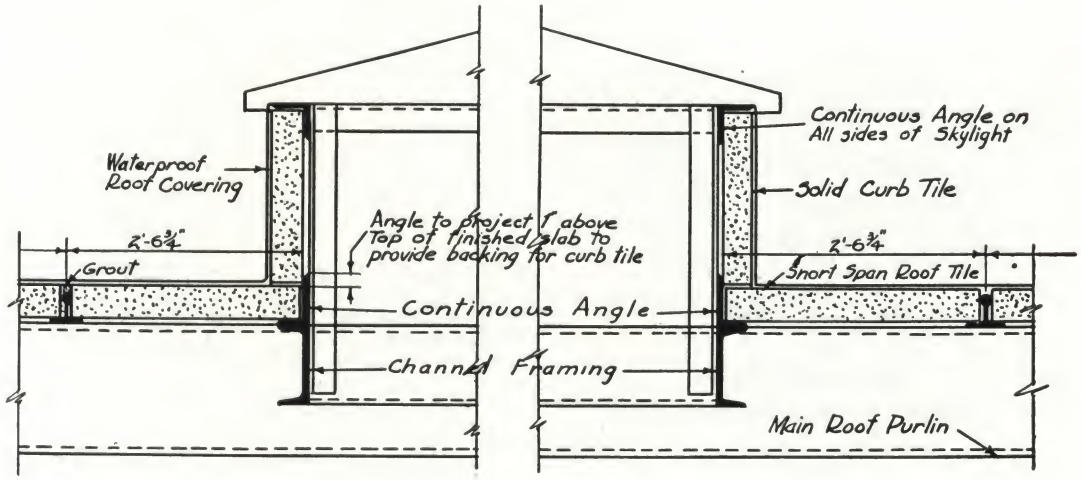
METHOD OF CLIPPING SUB-PURLINS TO TRUSSES OR JACK RAFTERS



METHOD OF BOLTING TEE TO ANGLE AT OVERHANG EAVES



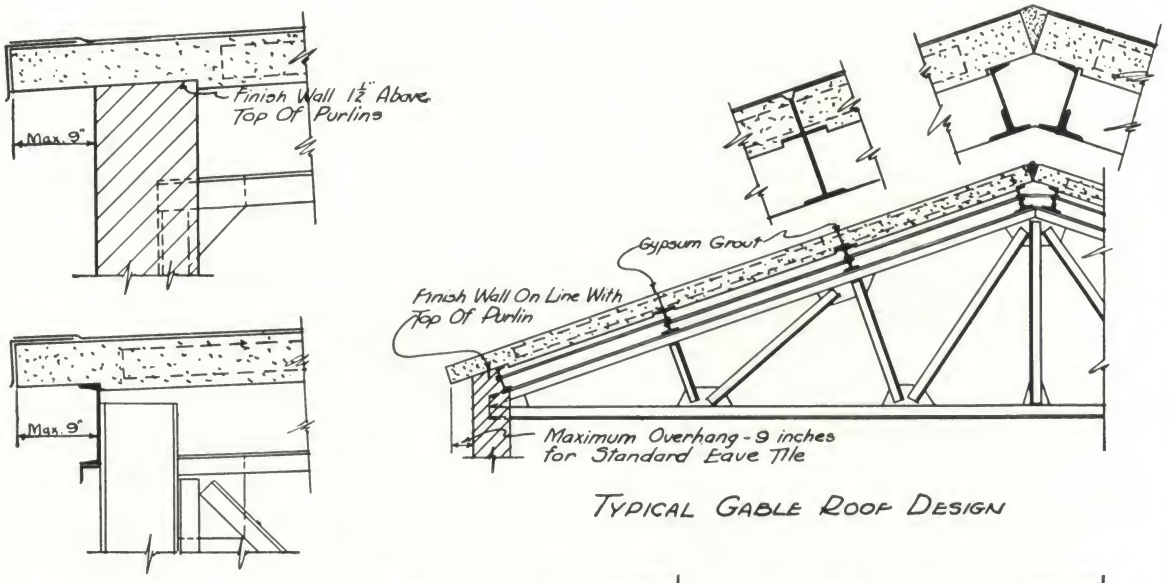
RIDGE DETAIL



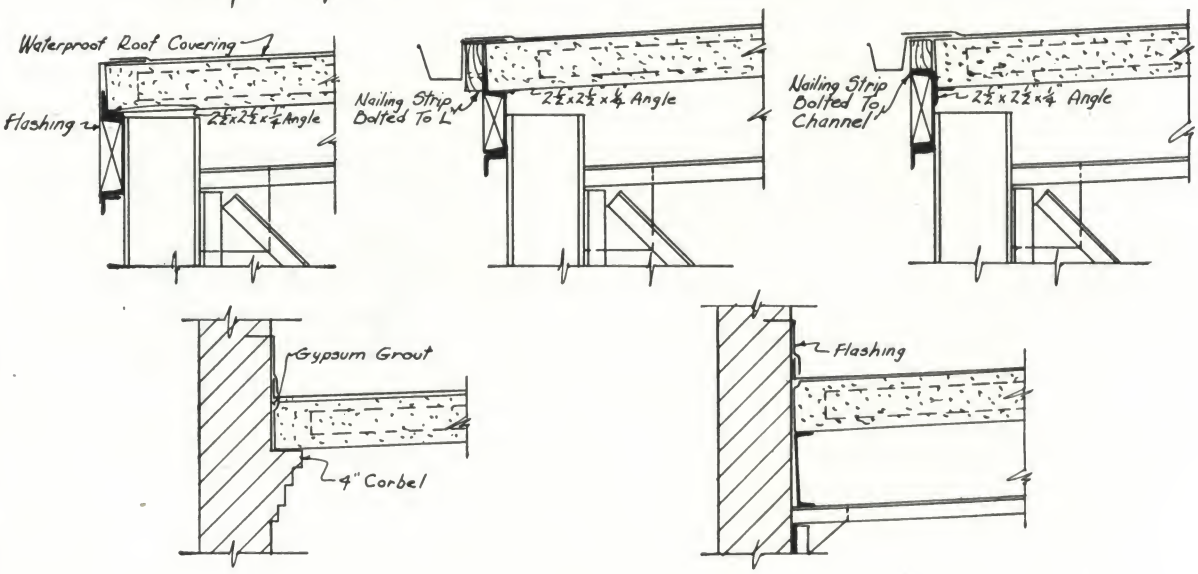
SKYLIGHT DETAIL

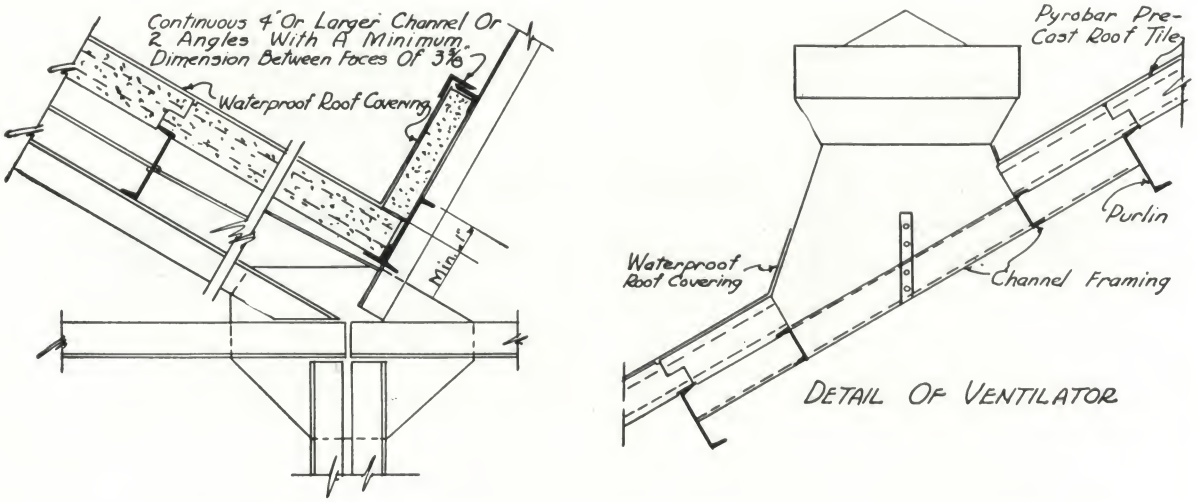
DETAILS OF SHORT SPAN PYROBAR ROOF TILE

Continued on next page



TYPICAL GABLE ROOF DESIGN

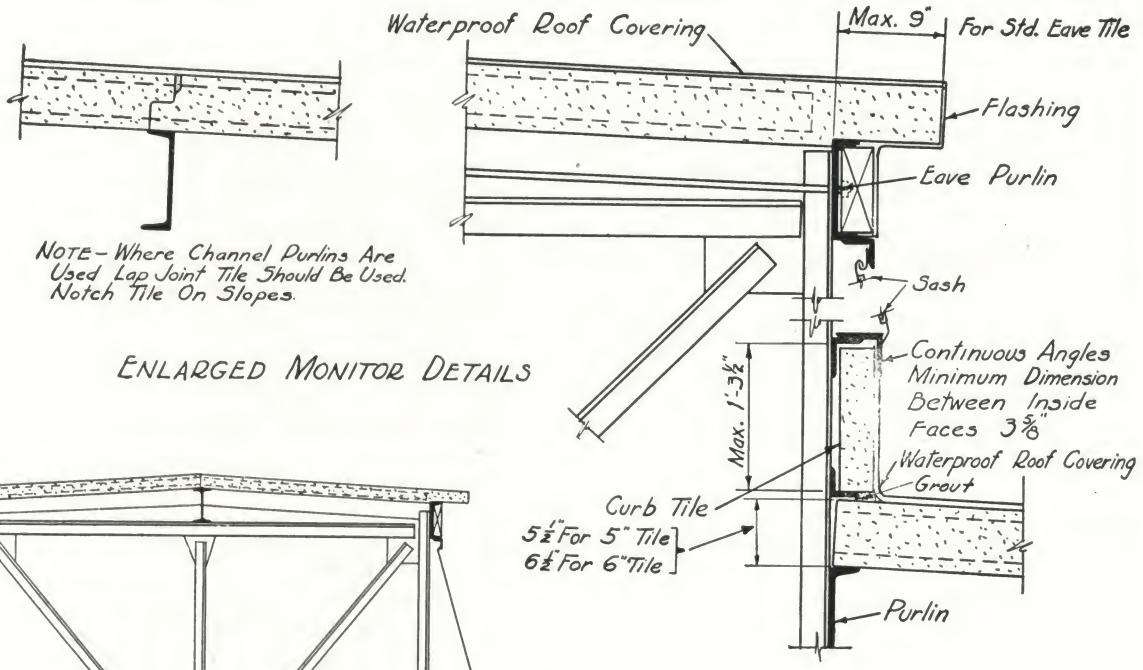




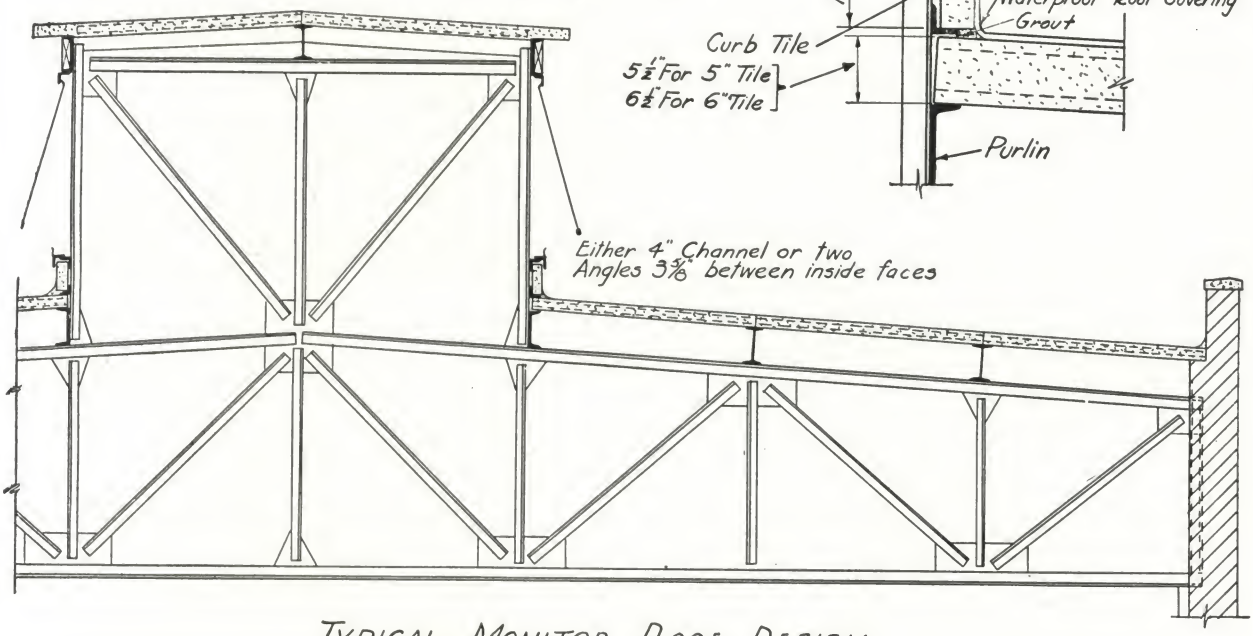
DETAIL OF VENTILATOR

DETAILS OF LONG SPAN PYROBAR ROOF TILE

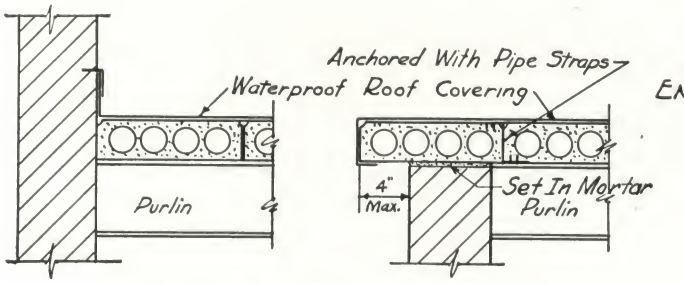
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ENLARGED MONITOR DETAILS

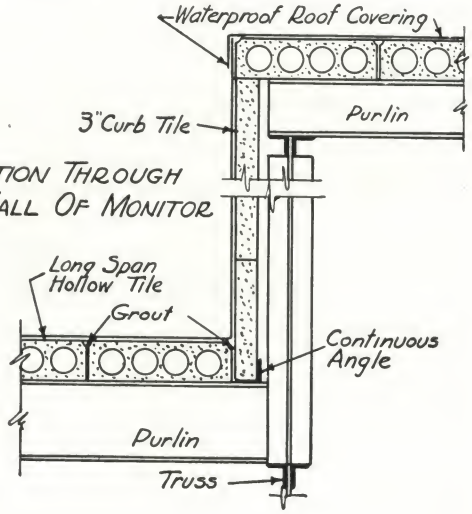


TYPICAL MONITOR ROOF DESIGN



END SECTIONS

SECTION THROUGH
END WALL OF MONITOR



DETAILS OF LONG SPAN PYROBAR ROOF TILE

Continued on next page

PYROFILL MONOLITHIC GYPSUM FLOORS AND ROOFS

Note: For "Gypsum—General Technical Data," see page 1.

Description

The Poured-in-Place System of Gypsum Roof and Floor Slabs has been used in this country for over thirty years, during which time many millions of feet have been installed. While the greater portion of this work has been done in the eastern states, many jobs are to be found throughout the entire country. The Federal Government early recognized its merits and after thorough tests adopted this system as standard for many types of buildings.

This type of construction consists primarily in the use of steel cables placed in suspension. The live or superimposed loads are transferred to the steel cables by the gypsum slab, the cables carrying the load. Tension in the cables, due to the superimposed load, is transmitted to the end purlin or beam and is taken up by the bracing members. The cables are securely anchored at both ends by means of bent strap iron of sufficient strength to resist the maximum pull of the cables. The cables are put in uniform deflection and tension by ⅝ in. round deflection rods. See page 20.

Advantages

General—Among the chief advantages of this type of construction are: light weight, quick setting and high value of insulation. The slab weighs but 55 lb. per cu. ft. (Less than 40% of the weight of concrete). This allows lighter supporting steel and a consequent saving in total cost. Initial set is obtained in ten to fifteen minutes and forms can be removed with safety two hours after slab is poured, thus effecting a saving in the form work required as compared to concrete construction. As Pyrofill generates considerable heat in setting, it is adaptable to winter construction

For additional floors on existing buildings, no other type of construction is more suitable. Any existing construction which is capable of supporting two extra stories of concrete may, with the same increase in weight, carry three and sometimes four additional floors of Pyrofill construction.

High Insulation—See page 2. The suspension type of gypsum roof has always been known for its high insulation, resulting in a reduction of condensation and saving in fuel. Authentic data on insulation savings will be furnished on application.

The Calculated Values for Various Roof Decks

Note: In the following table, the transmission is expressed in B.t.u.'s per hour, per sq. ft., per degree difference in temperature. All roofs are figured with a 5-ply roof covering.

3-in. Pyrofill—Monolithic Slab	.325 B.t.u.'s
3½-in. Pyrofill—Monolithic Slab	.296 B.t.u.'s
4-in. Pyrofill—Monolithic Slab	.272 B.t.u.'s

Adaptability

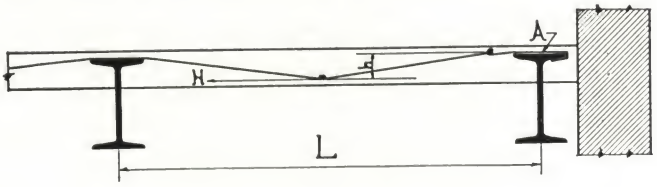
Roofs—Pyrofill Monolithic Roof Decks are adaptable to practically any type of building, either flat, monitor, sawtooth, Pond, Aiken, etc., and will be found to be very economical on jobs of 20,000 ft. or over. On account of the form work needed and the limited number of re-uses, jobs smaller than this will not be found as economical as Sheetrock-Pyrofill Poured System or Precast Tile. The cost of this type of roof will vary with the following conditions: (1) Length of span; (2) Uniformity of span; (3) Pitch of roof; (4) Type of supporting steel—(I-beams or channels); (5) Length of cable run, anchor to anchor.

Usually a span of six to eight feet with a 3-in. or 3½-in. slab will be found to be economical. By preserving uniformity of span, the form work may be used repeatedly without altering; thus effecting an appreciable saving in final cost. While flat roofs require less labor than steep ones, the difference up to 30° pitch is not of sufficient importance to warrant serious consideration on the part of the designer. On a roof pitch of 45° or over, however, it may be necessary to back form from the top, in order to get a good job. This, of course, adds to the cost of the roof.

Floors—The general principles of design and installation of this type of construction are equally applicable to floor construction, except that in strictly fireproof construction, the beams, girders and columns are fireproofed with Pyrofill or Precast Pyrobar Beam Covering. Because of the heavier loads met with in floor design compared with those in roof design we recommend spans not exceeding six or seven feet with slab thickness of 3½ in. or 4 in. for the most economical construction.

Theory of Design

Calculations for this type of construction are based on the well-known suspension bridge formula, in which the cables take the entire load, shear not entering into the calculations. The slab hangs from the cables in much the same manner in which the roadway hangs from the cables of a suspension bridge. The end bracing is designed to take the dead load pull of the cables until the slab is in place.



In the figure above "H" is the horizontal pull per foot width of slab. "S" is the maximum stress in the cables per foot width of slab and is the resultant of "H" and the weight of the load for the half span. Taking moments about point "A," we have:

$$Hh - \frac{WL}{2} \times \frac{L}{4} = 0$$

$$H = \frac{WL^2}{8h}$$

$$S = \sqrt{H^2 + \frac{(WL)^2}{(2)^2}}$$ which reduces to

$$S = \frac{WL^2}{8h}\sqrt{1 + 16\,\frac{h^2}{L^2}}$$ which is used in calculating the cable spacing.

MASTER SPECIFICATIONS
PYROFILL MONOLITHIC GYPSUM FLOORS AND ROOFS

Note: Notes are explanatory or advisory only and should not be included in the specifications.

Note: Provide in the steel specifications that the steel contractor shall submit shop drawings to the United States Gypsum Company *for checking and approval.*

(1) General

(1a) All structural steel members shall be furnished in accordance with the United States Gypsum Company's details for Monolithic Gypsum Floor and Roof Construction designed to carry the prescribed live loads.

(1b) The steel contractor will provide steel framing around all openings larger than 12 in. in diameter and such steel bracing as is required to take the horizontal pull of cables where anchored at end of bays and at all openings.

All channel purlins, at ends of bays and openings, acting as anchorage for the cables, shall open away from the cables to furnish proper support for the clips.

(1c) All openings for (down spouts) (soilpipes) (vents) (specify) etc. shall be accurately located on the forms by others before the slabs are poured.

(2) Work Included

Note: Here list and locate the various floor and roof areas to be constructed of Pyrofill Monolithic Gypsum Floor and Roof Construction and specify the prescribed live loads. If live loads for floors vary, designate the live load applying to the various areas.

Continued on next page

(3) Materials

(3a) General—All Gypsum products shal be as manufactured by the UNITED STATES GYPSUM COMPANY, 300 West Adams Street, Chicago, Ill.

(3b) Forms—Forms shall be of tongue and groove dressed lumber of grade to assure level, true slab thicknesses.

(3c) Reinforcing—Reinforcing shall consist of galvanized steel cables made by twisting two No. 12 wires. The cables shall be calculated to take the entire slab load and shall be provided with suitable end fastenings at their ends to develop the full strength required. In no case shall the stress in the cables exceed 20,000 lb. per square inch or more than 20% of the ultimate strength. Furnish ⅝-in. round steel tension rods for center of each slab span.

(3d) Pyrofill—Pyrofill (Gypsum Fiber Concrete) shall consist of calcined gypsum and sufficient clean water for proper consistency and not to exceed 12½ lb. of clean soft wood planer shavings to every 87½ lb. of gypsum. It shall be *(mill) (field)* mixed.

Curbs, etc.—All *(curb walls) (ends of monitors) (specify)* shall be constructed of *(3-in. Pyrobar Curb Tile, reinforced if restraining drainage fill or carrying roof loads) (poured Gypsum Pyrofill).*

(4) Erection

(4a) By United States Gypsum Co.—All Pyrofill Monolithic Gypsum *(Floor) (and) (Roof)* construction, including all *(curbs) (end walls) (saddles) (drainage fill),* shall be completely erected by the Contracting Division of the UNITED STATES GYPSUM COMPANY.

Note: *For Erection Service, see page 1.*

(4b) Forms—Forms shall be made in a substantial, workmanlike manner, carefully leveled to insure a uniform depth of slab. They shall be cleaned before each re-use, and shall be wet down immediately before placing the Pyrofill.

(4c) Reinforcing—The spacing of cables and the depth of the slab shall conform to the standards of the UNITED STATES GYPSUM COMPANY. Cables shall be drawn tight and rigidly fastened to anchors and brought to uniform tension. Exercise care in placing tension rods that the cables shall not be brought closer than ½ in. to the undersurface of the slab. After cables are in place all workmen of this and other contractors shall be prohibited from walking thereon.

(4d) Slabs—Pyrofill (Gypsum Fiber Concrete) shall be poured upon the forms completely surrounding the reinforcing cables. The top surface of the slab shall be screeded to as smooth a surface as practical to receive the *(floor) (and) (waterproof roof covering).*

(4e) Curbs—All curbs indicated on plans and details shall be built of *(Pyrobar Curb Tile) (poured Gypsum Pyrofill);* when restraining drainage fill or carrying roof loads curbs shall be reinforced.

(4f) End Walls, etc.—Where indicated on plans and details construct end walls of *(monitors) (sawtooth skylights) ("A" frames) (specify)* of *(Pyrobar Curb Tile) (poured Gypsum Pyrofill).*

(4g) Drainage Fill, etc.—Provide Pyrofill saddles and drainage pitches to direct roof drainage to *(gutters) (drainage outlets).*

(5) Waterproof Roof Covering

Note: *Provide in the Roofing and Sheet Metal division of the specifications that the waterproof roof covering shall be applied as soon as possible after the gypsum roof slab is erected (preferably within twenty days). Do not plaster or paint underside of roof slabs until waterproof roof covering has been applied and the slab is thoroughly dry.*

Note: *Include in Roofing and other specification divisions where applicable that plank runways shall be laid on the slab before any wheeling is done. Planks shall be laid from purlin to purlin to take any heavy or concentrated loads which may be applied to the slab.*

CABLE SPACING AND SLAB DEPTHS FOR VARIOUS LOADS AND SPACES

Cables stressed to 20,000 lb. per sq. in. See page 18 for formulas used in calculations

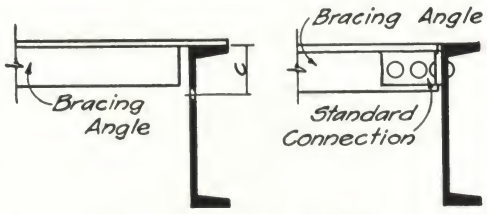
Depth of slab, in.	Wt. of slab per sq. ft., lb.	Cable spacing, in.	PYROFILL MONOLITHIC FLOOR AND ROOF CONSTRUCTION SAFE SUPERIMPOSED LOADS IN POUNDS PER SQUARE FOOT OF SLAB												
			3′-6″	4′-0″	4′-6″	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″	8′-6″	9′-0″	9′-6″	10′-0″
3	12	1	...	...	...	...	172	142	120	102	...	...	...	...	...	...
		1¼	...	...	...	166	134	111	94	79	...	...	...	...	...	...
		1½	...	...	170	136	111	91	76	63	...	...	...	...	...	...
		1¾	...	...	144	115	93	76	63	53	...	...	...	...	...	...
		2	...	161	125	99	80	65	54	45	...	...	...	...	...	...
		2¼	...	142	110	87	70	56	47	39	...	...	...	...	...	...
		2½	168	126	97	77	62	50	41	34	...	...	...	...	...	...
		2¾	151	114	88	69	55	44	36	29	...	...	...	...	...	...
		3	138	103	79	62	49	39	32	...	...	...	...	...	...	...
3½	14	1	...	...	...	...	...	...	150	128	110	95	...	...	...	...
		1¼	...	...	...	...	169	141	118	100	85	73	...	...	...	...
		1½	...	...	...	170	139	114	96	81	69	59	...	...	...	...
		1¾	...	...	...	144	117	96	80	67	57	48	...	...	...	...
		2	...	...	156	124	100	82	68	57	48	40	...	...	...	...
		2¼	...	...	137	109	88	72	59	49	41	34	...	...	...	...
		2½	...	160	122	97	78	63	52	43	36	30	...	...	...	...
		2¾	...	142	109	87	69	56	46	38	31	26	...	...	...	...
		3	171	129	99	78	62	50	41	33	27	...	...	...	...	...
4	16	1	...	...	...	...	...	...	...	154	133	114	100	87	77	68
		1¼	...	...	...	...	...	168	141	120	102	88	76	66	58	51
		1½	...	...	...	...	166	138	115	97	81	71	61	53	46	40
		1¾	...	...	...	172	140	116	96	81	69	59	50	43	37	32
		2	...	...	...	149	121	99	82	69	58	49	42	36	30	26
		2¼	...	...	164	130	105	86	71	59	49	42	35	30	25	...
		2½	...	...	146	116	93	76	63	52	42	36	30	25	...	...
		2¾	...	169	131	103	83	68	56	46	37	31	...	...	...	...
		3	...	154	118	94	75	61	50	41	33	27	...	...	...	...
4½	18	1	...	...	...	...	...	...	...	...	151	134	117	102	90	79
		1¼	...	...	...	...	...	...	...	140	117	103	90	78	68	60
		1½	...	...	...	...	...	160	134	114	94	83	72	62	54	47
		1¾	...	...	...	...	163	135	112	95	78	69	59	51	44	38
		2	...	...	...	...	140	115	96	81	66	58	49	42	36	31
		2¼	...	...	...	152	123	101	83	70	57	49	42	35	30	25
		2½	...	...	...	135	109	89	73	61	49	43	36	30	25	...
		2¾	...	...	152	121	97	79	65	54	43	37	31	26	...	...
		3	...	...	138	109	88	71	58	48	38	33	27	22	...	...
5	20	1	...	...	...	...	...	...	...	...	...	153	133	117	103	91
		1¼	...	...	...	...	...	...	...	160	137	118	103	89	78	69
		1½	...	...	...	...	...	...	153	130	111	95	82	71	62	54
		1¾	...	...	...	...	...	154	128	108	92	79	68	58	50	43
		2	...	...	...	...	160	132	110	92	78	66	57	48	42	36
		2¼	...	...	...	...	140	115	95	80	67	57	48	41	35	29
		2½	...	...	...	153	124	102	84	70	58	49	41	36	29	24
		2¾	...	...	...	137	111	90	74	62	51	42	36	30	25	20
		3	...	...	153	124	100	81	67	55	45	38	31	26	21	...

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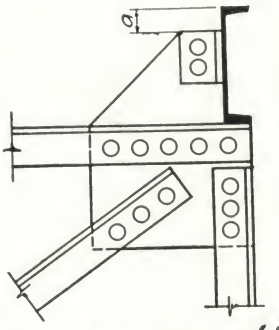
On page 19 will be found a table giving the safe superimposed loads for different depths of slabs, cable spacing and various spans of beams and purlins. These values have been given for the convenience of the designer. Below will be found the size of bracing members for end purlins. In designing a poured gypsum floor or roof, the end purlin must be so designed that it will withstand a lateral pull as well as the direct load, without excessive deflection and without exceeding the allowable stresses.

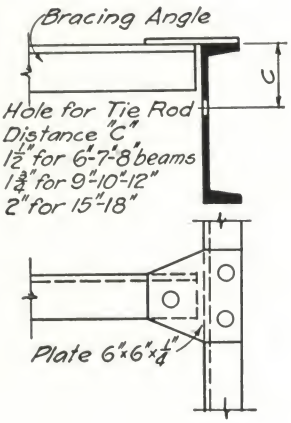
For ordinary roof loadings, the end member which usually consists of a channel will be found to have sufficient strength to take this lateral pull when braced as shown below. When heavier loadings are involved an I-beam or built-up member of this ⌋⌈ or this ⌋⌐ type will be found very efficient for stiffening action for short span purlins without the use of bracing angles and tie rods. The tops of the bracing angles must frame flush with tops of beams. Holes for tie rods should be placed so that the tie rod will come in the center of the slab or be thoroughly embedded after the slab is poured.

BRACING		
SPAN	ANGLE	ROD
7'-0" OR LESS	2" x 2½" x ¼"	5/8" ϕ
7'-0" TO 8'-0"	2½" x 2½" x ¼"	5/8" ϕ
8'-0" TO 9'-0"	3" x 2½" x ¼"	¾" ϕ
9'-0" TO 10'-0"	3" x 3" x ¼"	¾" ϕ



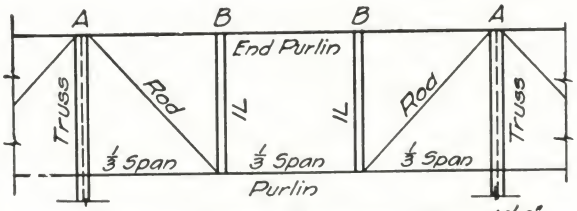
CONNECTION AT "B"



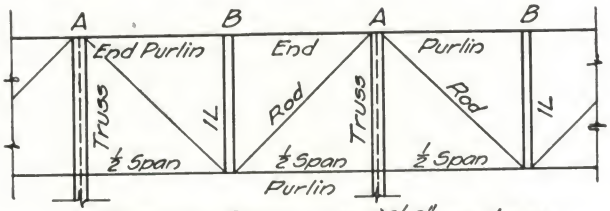


CONNECTION AT "A"

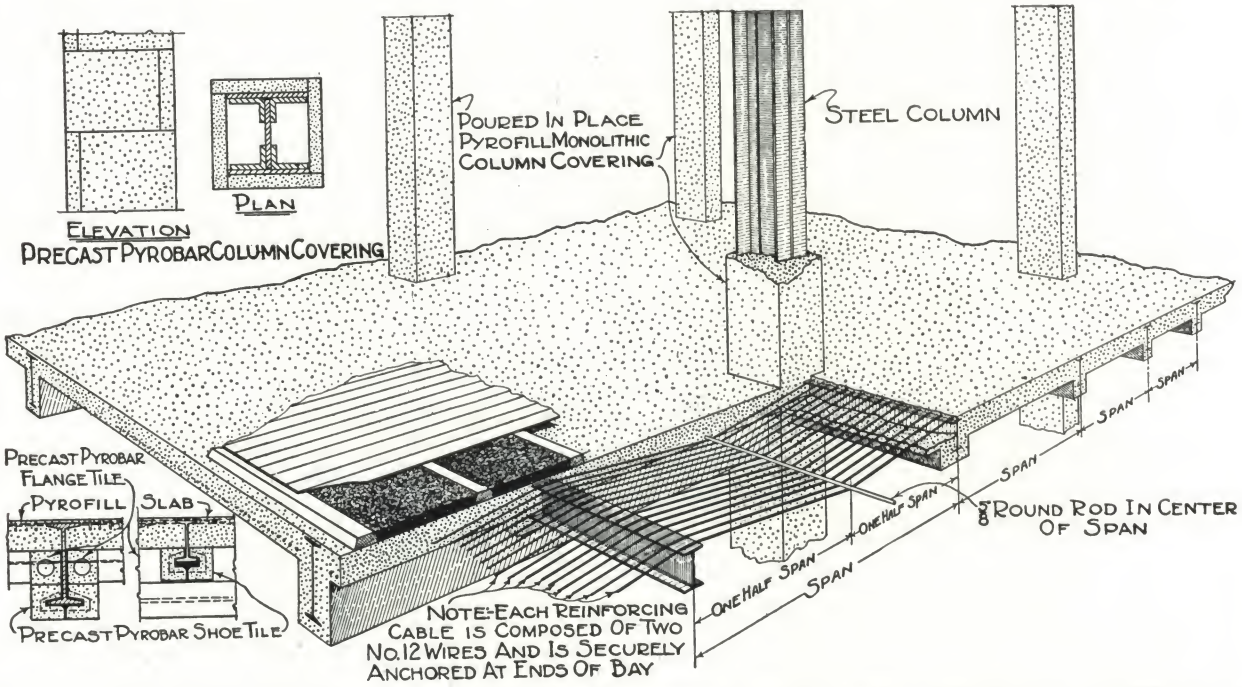
Dimension "a" to be ½" for 15" ⌖ and 1" for all smaller ⌖. When I beams are used make "a" as small as possible.



PURLIN SPAN GREATER THAN 16'-0"

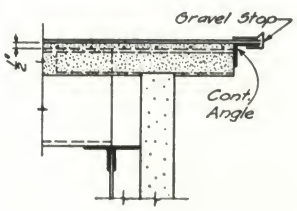


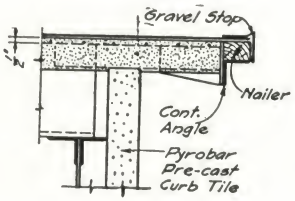
PURLIN SPAN OF 16'-0" OR LESS.

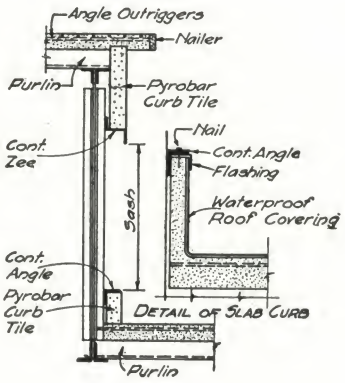


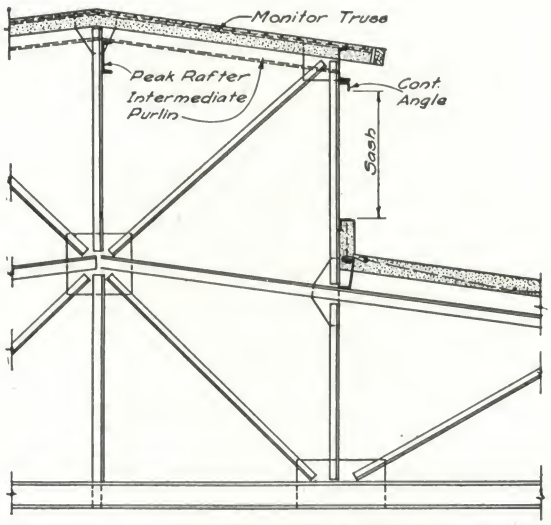
DESIGNING DATA—PYROFILL MONOLITHIC CONSTRUCTION

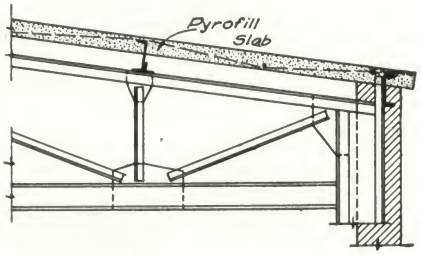
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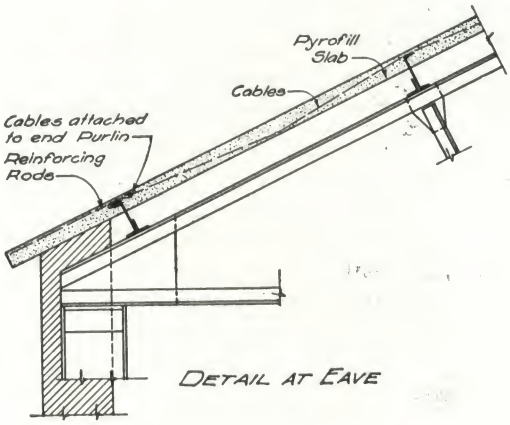




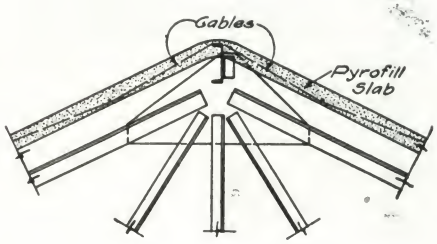




TYPICAL MONITOR CONSTRUCTION



DETAIL AT EAVE



DETAIL AT RIDGE

DETAILS—PYROFILL MONOLITHIC CONSTRUCTION

Continued on next page

PYROBAR PARTITION AND FURRING TILE
PYROBAR COLUMN, BEAM AND GIRDER FIREPROOFING

Description

Note: For "Gypsum—General Technical Data," see page 1.

Pyrobar Gypsum Tile consist of 97% gypsum and 3% special wood fiber. They are moulded in steel moulds by continuous automatic machine process, which insures accurate proportions and an even distribution of gypsum, fiber and water, resulting in tile of uniform size, weight, strength and density.

Physical Characteristics

Fireproof—See particularly page 1. The claims for Pyrobar Tile as a fireproof building material are based upon many tests which have been conducted by recognized authorities over a period of twenty-five years.

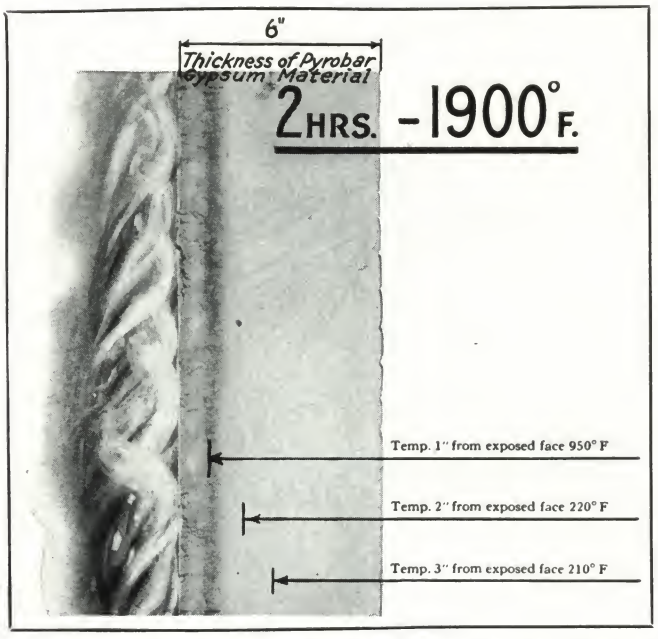
A complete list of authoritative tests will be furnished on request.

Outstanding among the many tests made to obtain favorable rating and to pass the requirements of various district rating bureaus is that conducted at the Underwriters' Laboratories on June 22, 1910. This test was made on a 3-in. hollow Pyrobar partition, plastered on both sides with Gypsum plaster to ½-in. grounds. The partition was subjected to a fire on one side for a period of two hours and the temperature reached 1700° F. in the first 30 minutes and remained at that point for the next 90 consecutive minutes. At the end of two hours a ⅞-in stream of water was applied to the heated side of the panel at a pressure of 50 lb. per sq. in. at a distance of 20 ft. for a five minute period, the object being to determine the structural strength of the Pyrobar wall after such a fire test. The average temperature on the unexposed surface was 166° F., an increase of only 90° above the room temperature of 76° F. Based on the results of these tests, the Underwriters' Laboratories, Inc., has given a two hour fire rating to the above partitions.

The four definite points established in favor of Pyrobar Tile by this test are:

(1) Fireproof and Incombustible
(2) Retention of Structural Strength
(3) Insulation against Heat Transmission
(4) Shatter-proof under water test.

It is significant to note that gypsum tile is the only partition tile used for fireproof construction that has passed the test requirements of the Underwriters' Laboratories, Inc.



Results of Fire Tests Made by Underwriters' Laboratories, Inc., on Gypsum Tile

The tile were subjected to a constant temperature of 1900° F. for two hours. At the end of that time, the temperature of tile, 2 in. away from the flame was but 220° F.

Does Not Expand or Contract—Precast Gypsum does not expand or contract under ordinary conditions. Even under the average fire temperatures a 10 ft. Pyrobar wall will only expand ⅛ in. Other incombustible materials, almost without exception, expand rapidly under high temperatures and, held rigidly between floors, cannot expand except outwardly, and therefore they bulge, crack, spall and finally wreck themselves.

Light Weight—Pyrobar Precast Gypsum Tile Partitions are from 25% to 50% lighter per square foot than ordinary building tile of equal thickness. The use of Pyrobar Tile materially reduces the dead load, effecting worth while savings in steel in columns, girders, beams or other supporting members. Light weight likewise means a saving in freight, hauling, hoisting and labor costs. See Table of Weights, pages 23 and 25.

Non-conductor of Sound—Unless a partition is properly constructed with the purpose of excluding sound, the benefits derived by the use of a soundproof partition are lost. Authentic tests show that less than 1/100 of one per cent of incident sound is transmitted through a gypsum tile partition plastered with gypsum plaster.

When pipes occur in partitions or when doors and transoms are present, the sound resistive value of the construction is materially reduced. Continuous floor finish under a partition, particularly if of cement, marble or tile, or suspended ceilings running over partitions, all tend to carry sound from one room to another.

Gypsum tile partitions are excellent non-conductors of sound and as such are recommended and successfully used in hospitals, schools, office buildings, apartments, hotels and all buildings where a soundproof partition is of particular importance.

Heat Insulating Value—Walter A. Hull, formerly Associate Physicist at the Bureau of Standards, conducted a series of tests, the results of which are published in Technologic Paper of the Bureau of Standards No. 130 entitled, "A Comparison of the Heat Insulating Properties of Some of the Materials Used in Fire Resistive Construction." In this paper Mr. Hull states:

"These tables show that the length of time required for a temperature of 600° C. (1112° F.) to be attained at a depth of one and one-half inches does not vary greatly in the clay and concrete specimens. The gypsums are seen to be distinctly better than the clay and concrete in this respect, only one of them reaching the temperature of 600° C. (1112° F.) at a depth of one and one-half inches in the three and one-half hour test."

It is of considerable interest to note that of twenty-eight gypsum specimens tested, only one of them reached the temperature of 600° C. at a depth of one and one-half inches in the three and one-half hour test. Mr. Hull comments on this as follows:

"Obviously the gypsum specimens and the one of radix having failed to reach 600° C. (1112° F.) at a depth of one and one-half inches, were far from reaching it at a depth of two and one-half inches and indicate distinctly superior thermal protection for embedded steel."

A Perfect Stainless Plaster Base—Since Pyrobar is composed of gypsum and is laid up with gypsum mortar, gypsum plaster unites perfectly with it. Pyrobar constructions are particularly rigid, due to the strength of the tile itself and the large units which reduce the mortar joints to minimum. Containing nothing but gypsum and a small per cent of special UNITED STATES GYPSUM COMPANY fiber, there is no acid or alkali in Pyrobar to stain the plaster or wall decorations.

Plaster Savings—Pyrobar tile are cast in steel moulds assuring a product with straight edges and true faces. They are dried in kilns, not burned—there are no warped or distorted surfaces. When set in the wall, Pyrobar presents a surface requiring less plaster than other fireproof wall construction. Furthermore, due to the fact that there are 40% less joints in a Pyrobar wall than, for example, in a clay tile wall, there is a considerable saving in setting mortar.

Economical—Breakage is almost negligible and the small pieces of waste from cutting and fitting can be utilized. Definite other economies affecting steel and handling are established in "Light Weight" above; plaster in the preceding paragraph, and labor in "Quickly Erected" under heading "Advantages" on the next page.

Low maintenance is assured due to permanence, fireproofness and stainlessness.

Continued on next page

Erection Service

Where desired, Pyrobar Tile are completely erected by the U.S.G. Contracting Division. See page 1.

Approved Uses

In the following classes of fireproof construction, Pyrobar Precast Gypsum Tile are approved by the Underwriters' Laboratories, Inc., and most city building codes.

Non-bearing corridor walls, partitions, wall furring and false columns and pilasters. Partitions and corridors in merchandise storage warehouses.

Fire division walls.

Elevator, stairway, dumbwaiter and corridor enclosures.

Light wells, pipe chases, heat and vent ducts.

As covering for columns, beams, girders, trusses and other steel members requiring fireproofing.

Floor fill, instead of cinder concrete fill.

Insulation on concrete roofs.

PYROBAR PARTITION AND FURRING TILE AND COLUMN COVERING

Description

Partition and Furring Tile—A Pyrobar tile is 30 in. long, 12 in. high and of various thicknesses from 1½ to 6 in. For complete sizes and weights, see table below.

Smooth face tile are made for warehouse and similar use where the furring and partitions are to remain unplastered.

Pyrobar tile meets fully the standard specifications for Gypsum Partition tile or block of the American Society for Testing Materials.

For the protection of owners, architects, engineers and contractors, all Pyrobar Gypsum Tile bear the trade-mark.

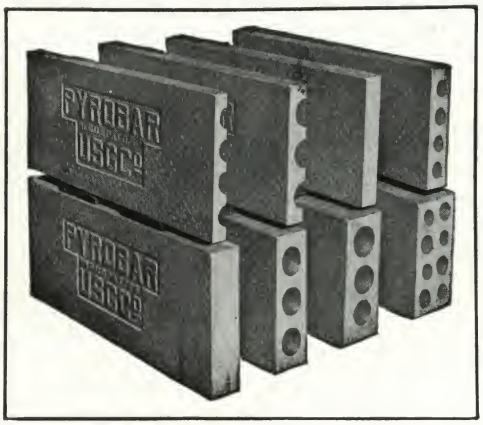
Column Covering—Column fireproofing is accomplished either with 2 in. solid or 3 in. hollow Pyrobar Partition Tile. When desired, or required by a building code, the space between the covering and the steel may be solidly backfilled with pieces of Pyrobar Tile and gypsum mortar. A digest of reports giving tests on gypsum fireproofing is available on request.

Advantages

Alterations Easily Accomplished—Openings in Pyrobar Tile walls may be accurately cut with a saw. Thus alterations are speedily and cheaply made by one mechanic. Trim, fitted over the edges of the tile effectively hides the alteration, saving replastering and redecorating. In most cases the tile removed can be salvaged for other work.

Quickly Erected—Each unit of Pyrobar installed is two and one-half sq. ft. These light 12x30-in. units are handled readily and erected quickly. The average mechanic will lay up more Pyrobar than clay tile in a day and do a neater and more workmanlike job because of the accurately true size and shape of the unit. Pyrobar is easily and quickly sawed to fit around difficult pipe chases, etc., which ordinarily slow up the work. Even curved work is easily accomplished.

Grounds Easily Provided For—Grounds for the attachment of fixtures and wood trim are securely attached to easily installed staggered nailing plugs or nailing blocks. See details, page 27.



Recommended Thickness—Partition and Furring Tile

Pyrobar Gypsum Tile for furring and partitions are made in standard face dimensions (12x30 in.) in both solid and hollow types, and various thicknesses to meet Underwriters' standards and the building codes of the various cities. For table of sizes and weights, see below.

The thickness of the partition should be determined primarily by the ceiling height and by its location. As a rule 3 or 4-in. tile is the thickness used for the average building where partitions do not exceed 15 ft. in height. Corridor partitions are generally thicker than transverse partitions.

Two-inch solid Pyrobar Tile are used for partitions not exceeding 10 ft. in height and for covering columns, constructing pipe chases, vent ducts, dumbwaiter shafts, etc.

Split and hollow Pyrobar Furring are laid up against exterior walls and securely spiked every square yard. Joints should be broken the same as for partition work. Furring may also be fastened to the building wall by means of wall ties built into the masonry. The hollow portion of the tile should be placed against the walls, thus minimizing the contact area with the outside walls.

Where furring stands free from the wall, allowing space for pipes, vents, etc., it is customary to use 2-in. solid or 3 or 4-in. hollow Pyrobar Tie to assure necessary rigidity.

Free standing furring should be anchored to the exterior wall either by dwarf walls between the furring and exterior wall, or by building into the exterior wall corrugated metal wall ties of sufficient length to span the space and be embedded in the furring tile joints.

Set Fast Cement

This is a specially prepared gypsum cement used with water and sand as a mortar for setting gypsum partition tile, and gypsum fireproofing and column covering. It is also extensively used as a mortar for interior clay tile partitions and fireproofing. Its easy working qualities together with the early setting of the gypsum makes Set Fast Cement Mortar ideal for economical, rigid mortar joints in all interior tile work.

SIZES AND WEIGHTS OF PYROBAR PARTITION AND FURRING TILE

Size of Pyrobar, Gypsum Tile, In.	For ceiling heights up to	Weight tile per sq. ft., lb.	Weight mortar per sq. ft., lb.	Weight plaster, one side, per sq. ft., lb. ½ in. grounds	Total weight plastered, one side, per sq. ft., lb.	Weight plaster two sides per sq. ft., lb.	Total weight plastered, two sides, per sq. ft., lb.
1½-in. Split—1½x12x30	Furring†	4.9	1.4	3	7.9		
2-in. Split—2x12x30	Furring†	6.4	1.4	3	9.4		
2-in. Solid—2x12x30	10 feet*	9.4	1.5	3	12.4	6	15.4
3-in. Hollow—3x12x30	13 feet*	9.9	2.0	3	12.9	6	15.9
3-in. Solid—3x12x30	15 feet†	13.0	2.0	3	16.0	6	19.0
4-in. Hollow—4x12x30	17 feet*	13.0	2.5	3	16.0	6	19.0
5-in. Hollow—5x12x30	20 feet*	15.6	2.75	3	18.6	6	21.6
6-in. Hollow—6x12x30	30 feet*	16.6	3.0	3	19.6	6	22.6

*Underwriters' Laboratories recommendations. †No Underwriters' recommendation.

Continued on next page

PRELIMINARY SPECIFICATION REQUIREMENTS

(Applying to Pyrobar Partitions, Furring and Column Covering)

Note: The following should be included under other specification divisions where and when they apply.

Note: Notes are explanatory or advisory only and should not be included in the specifications.

(1) Masonry Work

Note: As stated under "Recommended Thickness," page 23, there are two methods of securing furring and the ends of partitions to the building masonry walls: (1) with 10d cut nails driven into the joints of the masonry, (2) with corrugated metal wall ties of the proper length to be built into the masonry, spanning furring space if any and to be embedded in the Pyrobar Tile joints. If method (2) is used include the following clause:

(1a) Provide and build into masonry walls corrugated galvanized sheet iron ties to anchor the *(ends of Pyrobar partitions) (and) (Pyrobar Wall Furring)* to the masonry work.

(1b) Ties for partition ends shall be accurately set and spaced 12 in. apart on centers to build into the Pyrobar Tile joints.

(1c) Ties for furring, one for each surface, sq. yd., shall be accurately set to build into the Pyrobar Tile joints.

(2) Miscellaneous Steel Work

Note: See details, page 27.

(2a) All openings in Pyrobar partitions so noted on plans or schedules shall be provided with (channel bucks) (channels reinforcing wood bucks).

(2b) The lintel bucks of all openings in Pyrobar partitions over 6 ft. wide shall be reinforced with steel lintels as *(noted on plans or schedules) (as detailed).*

(3) Reinforcing Bars

All openings in Pyrobar partitions over 4 ft. wide but not over 6 ft. wide shall be provided with ½ in. steel reinforcing bars, 3 to the opening. Bars shall be 8 in. longer than the actual width of tile opening (not buck width).

(4) Carpentry Work

Note: See details, page 27.

(4a) Bucks—Provide wood bucks for all openings in Pyrobar partitions (except where steel bucks are indicated) (reinforced with steel channels where so indicated). Bucks shall be made of 2-in. lumber the depth of the Pyrobar Tile thickness, to the edges of which shall be secured ½x2¾-in. plaster grounds forming a rabbet to receive the tile. Bucks shall be accurately set, plumb and true and rigidly braced, so as to cause no delay or interruption in the erection of the partitions.

(4b) Nailing Blocks—Provide and nail directly to the end of Pyrobar *(partition) (and) (furring)* tile nailing blocks spaced 30 in. on centers to take all wood grounds to receive trim. Blocks shall be ⅞ in. thick and of such dimensions as will completely cover the end of the tile.

Where required to secure heavy fixtures, trim, etc., provide similar 1½-in. thick nailing blocks spaced not to exceed 15 in. on centers.

(4c) Grounds—Provide ½-in. plaster grounds to receive all trim.

(5) Miscellaneous

Note: Heavy fixtures, etc. are best secured to Pyrobar partitions with steel plates and through bolts as detailed on page 27. Provide where required.

(6) Plastering

Note: For Plastering on Pyrobar, see Sweet's Manufacturer's Index for U.S.G. "Master Specifications—Interior Lathing and Plastering." Under no circumstances should Portland cement or lime plaster be used for the first coat —use only gypsum plaster.

MASTER SPECIFICATIONS
PYROBAR PARTITION, FURRING AND COLUMN COVERING

Note: Notes are explanatory or advisory only and should not be included in the specifications.

(1) Work Included

All partitions *(and) (all furring for exterior masonry walls) (and) (all column covering)* shall be built of Precast Pyrobar Gypsum Tile.

Note: If there are any exceptions, so note. List and locate any special requirements not clearly indicated on plans and details. Particularly list and locate where smooth face tile are to be installed requiring no plaster finish.

(2) Preliminary Provisions

(2a) All reinforcing bars for reinforced lintels will be furnished by others.

(2b) All rough bucks for openings will be provided and accurately set by others.

(2c) All wood nailing blocks to receive grounds, etc., will be provided and attached to tile by others.

(3) Materials

(3a) General—All gypsum tile and cement shall be as manufactured by the United States Gypsum Company.

(3b) Partition Tile—Pyrobar of thicknesses indicated on plans. *(Pipe chases) (small shafts) (heat) (and) (vent) (ducts)* etc. shall be constructed preferably with 3-in. Hollow Pyrobar, otherwise of 2-in. solid Pyrobar.

Note: See "Recommended thickness," page 23.

Where no plastering is required, tile shall be smooth face.

(3c) Furring Tile—Pyrobar *(split) (solid) (specify thickness).*

Note: See "Recommended thickness," page 23.

Where no plastering is required, tile shall be smooth face.

(3d) Column Covering—Pyrobar (2-in. solid) (3-in. hollow).

(3e) Mortar—Sand for mortar shall be clean and sharp and free from organic matter with grains graded from fine to coarse.

Cement for mortar shall be Setfast Gypsum Cement.

Note: Do not use portland cement or lime.

Mortar shall be mixed in a clean mortar box in the proportions of one part of cement to three parts of sand, by weight and sufficient clean water to bring to the right consistency. First place a layer of sand in the high end of the mortar box, over which spread a layer of cement. Hoe dry from one end of the box to the other and back again, working sand and cement thoroughly together to a uniform color. Put water in low end of box and hoe mortar into water mixing thoroughly. Do not mix more material than can be applied in approximately one hour. Do not retemper.

(4) Erection

(4a) By U.S.G. Co.—All Pyrobar *(partitions) (and) (furring) (and) (column-covering)* shall be completely erected by the United States Gypsum Company's Contracting Division.

Note: See "Erection Service," page 23.

(4b) General—All tile shall be laid in gypsum mortar with full, flush joints to a line, with horizontal beds uniformly level on each course. All joints, chinks and crevices between the tile and other work shall be filled with mortar well slushed in. Joints in alternate courses shall be broken.

All joints of smooth tile (unplastered) shall be neatly pointed smooth as the work progresses. Fill all exposed core openings at corners, etc.

All tile shall be started on the fireproof floor, set plumb straight and true, and wedged at ceiling and slushed with mortar. Tile at corners and re-entrant angles shall be laid interlocked in alternate courses.

(4c) Partitions—All partitions coming in contact with existing walls shall be rigidly anchored, *(by driving 10d spikes driven into the mortar joints of the wall at the joints of each partition tile course) (by building in at each partition tile course metal ties provided and built into the masonry by others.)*

Continued on next page

Note: Select clause which applies. See under "Masonry Work," on page 24.

(4d) Furring—Furring shall be laid *(against) (or) (free from)* the walls as shown on the plans and details.

Rigidly anchor the furring tile to the masonry wall every square yard of face area *(by 10d spikes driven into the mortar joints of the wall at the course joints of the furring tile) (by building in at the furring tile course metal ties provided and built into the masonry by others).*

Note: Select clause which applies. See under "Masonry Work," on page 24.

(4e) Column Covering—A single thickness of tile shall be laid against the outside edges of the steel (and the space between the tile and steel shall be solidly backfilled with pieces of Pyrobar tile and gypsum mortar).

Note: Include or omit clause covering backfilling as required. See last paragraph under "Description," page 23.

(4f) Buck Anchors—Anchor all wood bucks to tile by 10d cut nails driven into the buck at each tile course or other approved metal anchor.

(4g) Lintels—Lintels shall have at least 4-in. bearing at each end on the tile beneath. Openings not over 22 in. wide shall be spanned by a single tile. Lintels over openings more than 22 in. and not over 4 ft. wide shall be laid in the form of a jack-arch. Lintels over openings more than 4 ft. and not over 6 ft. wide shall be reinforced with steel rods set in the tile voids flushed full with mortar. Lintels over openings more than 6 ft. wide shall be provided with steel lintel furnished by others.

PYROBAR BEAM AND GIRDER FIREPROOFING

Description

Pyrobar Beam and Girder Fireproofing is made from the same materials and in the same manner as Pyrobar Partitions and Furring Tile, described on page 23.

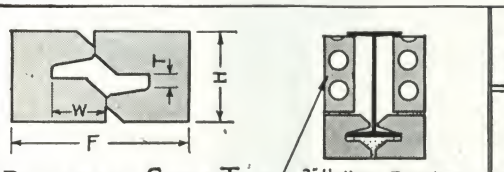
Pyrobar Shoe Tile, which fit over the lower flanges of the steel, in combination with Pyrobar Partition Tile for side protection are used as beam fireproofing for sections with a flange width not over 9 in., as indicated below. A Pyrobar Shoe Tile is moulded in a double unit, 18 in. long, sufficient for a foot and a half of beam. It is light in weight, easily split, and placed with a minimum quantity of mortar and labor. The double unit reduces breakage, and provides protection for the inner edges during shipment and handling.

For rolled sections and built-up members covered to a depth not exceeding 36 in., all with a flange width greater than 9 in., Pyrobar Soffit Tile, 2 in. thick, are used in combination with Pyrobar Partition Tile for side covering. The Soffit Tile with supporting strap imbedded, project beyond the flanges of the member, providing a support for the side covers. The Soffit Tile is specially moulded at the mill of the proper width, with straps imbedded to act as reinforcement for supporting the tile. It is shipped in units 24 in. long.

For deep built-up members with cover plates, rivets, etc., Pyrobar Angle Tile in combination with Pyrobar Soffit Tile, either 2 in. solid or 3 in. hollow, are used. Angle Tile are shipped in single units 18 in. long, two Angle Tile being required per lineal foot of beam. Soffit Tile 3 in. hollow can be cut on the job from ordinary 3-in. hollow Pyrobar Partition Tile, and held in place with pipe straps.

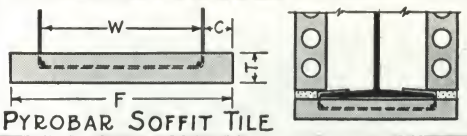
These constructions provide 2 in. of protection to all parts of the steel, and fulfill the requirements of the National Board of Fire Underwriters.

PYROBAR BEAM AND GIRDER FIREPROOFING
WEIGHTS OF DOUBLE SHOE, TWO ANGLE TILE AND SOFFIT TILE PER LINEAL FOOT OF BEAM



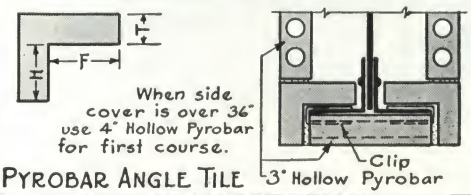
PYROBAR SHOE TILE

TYPE	F	H	T	W	WEIGHT
B-40	7⅜"	4¼"	½"	2"	12.5 Lbs.
B-50	8¼"	4¼"	⅝"	2½"	13
B-65	9¾"	4¼"	13/16"	3¼"	15
B-80	10½"	4¼"	15/16"	4"	16



PYROBAR SOFFIT TILE

TYPE	F	C	T	W	WEIGHT
S-10	15¼"	2½"	2"	10"	13 Lbs.
S-11	15¼"	2"	2"	11"	13
S-12	17¼"	2½"	2"	12"	14.5
S-13	17¼"	2"	2"	13"	14.5
S-14	19¼"	2½"	2"	14"	16
S-15	19¼"	2"	2"	15"	16



PYROBAR ANGLE TILE

TYPE	F	H	T	WEIGHT
L-34	3"	4"	2"	15 Lbs.
L-45	4"	5"	2"	18.5
L-46	4"	6"	2"	20.

TYPE SHOE	Standard I-Beams	Bethlehem I-Beams	Bethlehem Girder Beams	Carnegie Beams
B-40 Max. Flange Width = 5"	6" 12.5#-17.25# 7" 15.5#-20# 8" 18.4#-25.5# 9" 21.8#-35# 10" 25.4#-30#			B-39
B-50 Max. Flange Width = 6"	10" 35#-40# 12" 31.8#-55# 15" 42.9#-55#	8" 17.5#-19# 9" 20.5#-24#		B-40 CB10I 21#-30# CB12I 25# CB14I 30# CB16I 35# 38#
B-65 Max. Flange Width = 7½"	15" 60.8#-75# 18" 54.7#-96# 20" 65.4#-100# 24" 79.9#-100#	10" 21#-28.5# 12" 25#-48.5# 15" 36#-59.5#		CB 82 24#-30# CB 92 29#-35# CB122 28#-36# CB142 33#-42# CB162 40#-50# CB181 47#-58#
B-80 Max. Flange Width = 9"	24" 105#-120# 27" 90#	15" 71.5# 18" 47#-74# 20" 56#-78# 22" 70#-79.5# 24" 58#-73#	8" 29.5#-36.5# 9" 36#-43.5# 10" 41.5#-50#	CB 83 31#-72# CB 93 38#-48# CB102 31#-42# CB103 49# CB123 40#-50# CB143 48#-58# CB163 58#-68# CB182 67#-78# CB211 60#-70# CB212 80# CB241 70#

Continued on next page

MASTER SPECIFICATIONS
PYROBAR BEAM AND GIRDER FIREPROOFING

Note: *Notes are explanatory or advisory only and should not be included in the specifications.*

Note: *Where Pyrobar Beam and Girder Fireproofing is used in conjunction with Pyrobar Partitions, Furring and Column Covering, these specifications may be merged with the Master Specifications given on pages 24 and 25 and clauses here given added where they apply.*

(1) Work Included

All steel *(beams) (girders) (trusses)* shall be protected with precast gypsum fireproofing.

Note: *If there are any exceptions, so note. List and locate any special requirements not clearly indicated on plans and details.*

(2) Materials

(2a) Fireproofing—All fireproofing shall be Pyrobar Beam Shoe, Angle and Soffit Tile, and Pyrobar (2 in. solid) (3 in. hollow) Partition Tile as made by the UNITED STATES GYPSUM COMPANY. All steel shall be protected with a minimum of 2 in. of precast gypsum.

(2b) Mortar—***Note:*** *Same as "Mortar" under "Materials," page 16.*

(3) Erection

(3a) By United States Gypsum Company—All fireproofing shall be completely erected by the UNITED STATES GYPSUM COMPANY'S Contracting Division.

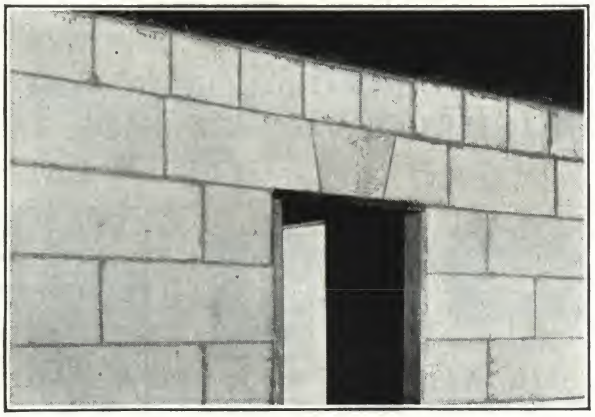
(3b) General—All fireproofing shall be erected in strict accordance with the UNITED STATES GYPSUM COMPANY'S standard details. All units shall be laid in gypsum mortar with full flush joints, true to line and plumb. Joints in alternate courses shall be broken.

Weight of Fireproofing per Lin. Ft. of Beam in Lb.

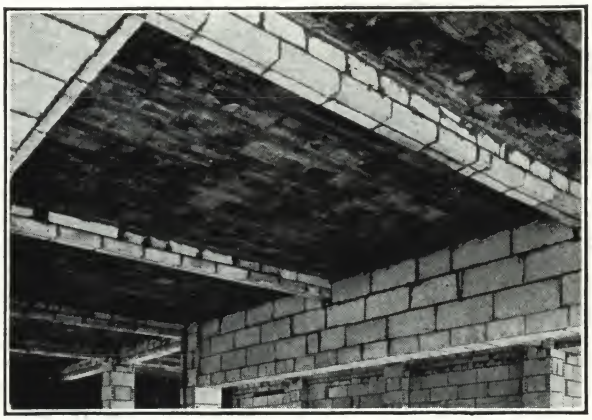
Size member	Precast Gypsum	Clay Tile	Concrete
6 in. I	19	33	60
7 in. I	21	36	71
8 in. I	23	39	93
9 in. I	25	43	95
10 in. I	27	47	118
12 in. I	30	51	131
15 in. I	35	60	168
18 in. I	42	68	208
20 in. I	44	73	234
21 in. I	48	79	293
24 in. I	52	85	297
27 in. I	58	96	392



Erecting Pyrobar Partitions and Furring
Note ease of sawing and handling



Typical Pyrobar Partition Installation—Showing Standard Jack-arch



Application of Pyrobar Beam, Girder and Column Covering

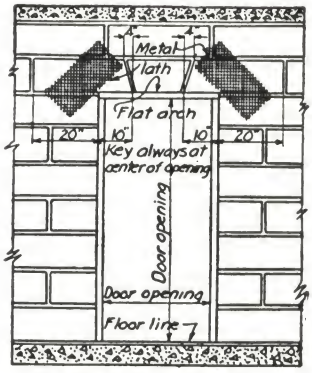


Pyrobar Beam and Girder Covering in Connection with Steel Joist Floors

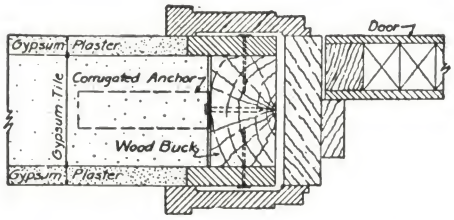
PYROBAR PARTITIONS AND FIREPROOFING

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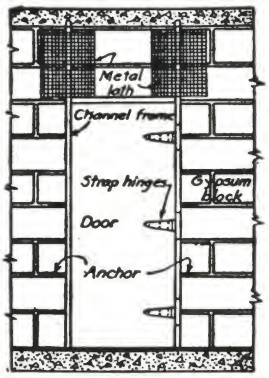
CONSTRUCTION DETAILS PYROBAR PARTITION TILE



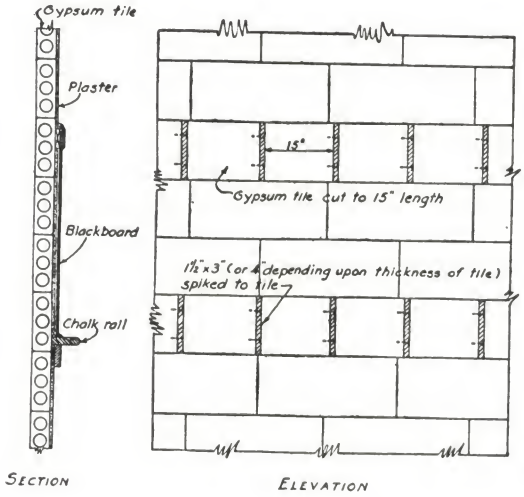
DETAIL SHOWING JACK ARCH CONSTRUCTION



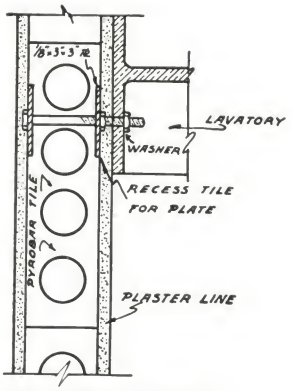
SECTION OF DOOR JAMB SHOWING WOOD BUCK



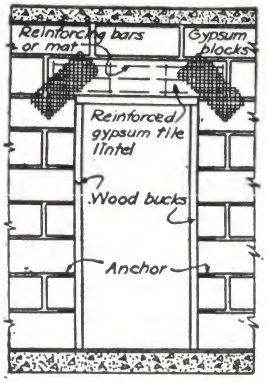
DETAIL OF DOOR WITH CHANNEL IRON FRAME



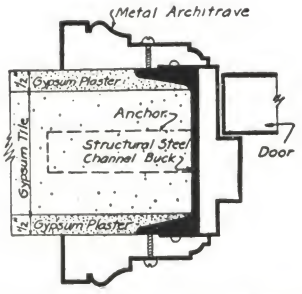
METHOD OF FASTENING SLATE BLACKBOARDS



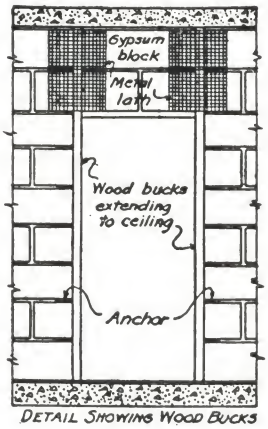
METHOD OF SUPPORTING LAVATORY ON PYROBAR PARTITIONS.



DETAIL SHOWING REINFORCED GYPSUM LINTEL CONSTRUCTION



SECTION OF DOOR JAMB SHOWING METAL BUCK



DETAIL SHOWING WOOD BUCKS

DETAILS—PYROBAR PARTITIONS


USS

J. B. EURELL COMPANY

Gypsum Floor and Roof Construction

225 South Fifteenth Street, PHILADELPHIA, PA.

BRANCH OFFICES

RICHMOND, VA., 1223 Mutual Building

PHILLIPSBURG, N. J., 656 Columbus Avenue

Products

SUSPENSION SYSTEM, POURED-IN-PLACE GYPSUM FLOORS and ROOFS.

Description of the Suspension System

The suspension system and the formulæ used are based upon the simple principles of the suspension bridge. Cold drawn, twisted steel cables are laced across the floor or roof and are securely anchored at both ends to the wall purlins or beams. The cable spacing is such that the cables bear the entire designed load with a factor of safety of four. Steel transverse rods deflect the cables in the center of each arch and give them initial tension.

Advantages

Strength—Since the steel cables alone are considered, the gypsum being ignored, in calculating the strength of the slab, different commercial loads are taken care of by varying the cable spacing.

Light Weight—The suspension system gypsum slab weighs but 4½ lb. per sq. ft. per in. of thickness. Average floor slabs are 4 in. thick; average roof slabs are 3 to 3½ in. This weight, combined with beam spacings averaging 6 to 7 ft., produces remarkable savings in the amount of steel used in the building framework.

Speed of Construction—The wooden forms used in pouring the slab may be stripped one hour after pouring and the slab will be capable of bearing the full designed strength. Practical construction men can appreciate what this means in the way of rapidity of construction.

Fire Resistance—Numerous official tests have demonstrated that a gypsum slab will resist intense fires for long periods and not only effectually prevent the spreading of the fire, but also suffer but small damage to itself, which is easily repaired.

Heat Insulation—As a heat insulator, gypsum is more than three times as effective as stone or cinder concrete. No other fireproof material is nearly as effective as a heat insulator. This means saving in heating plant investment and in fuel bills. It also means freedom from condensation drip from the underside of roof slabs.

Durability—Suspension type gypsum roofs installed over thirty years ago are in a condition equal to that of the day they were installed.

Other Advantages—In addition, gypsum suspension slabs are elastic and free from expansion or contraction strains. Gypsum slabs lend themselves readily to alterations, such as cutting holes for stairways. Gypsum is also a sound-deadening material.

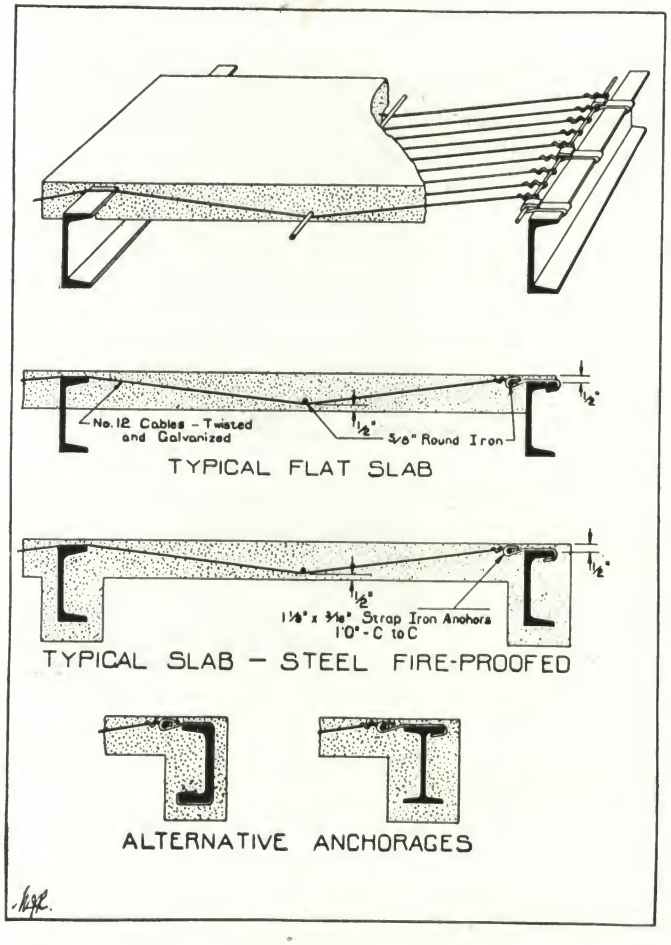


TABLE OF TOTAL LOADS
FLOOR AND ROOF CONSTRUCTION
SUSPENSION TYPE

Unit Working Stress = 20,000 Lbs. per Sq. In. for Steel
Cables Composed of 2 No. 12 Cold Drawn Galvanized Steel Wires Twisted
Cable Tension=T = 2 x .00874 x 20,000 lbs. = 350 lbs./Cable.

$$W = \frac{1152Td}{bL\sqrt{L^2+16d^2}}$$

W = Total Safe Load, Lbs./Sq. Ft.
d = Deflection of Wires, Ins.
b = Cable Spacing, Ins.
L = Clear Span, Ins.

	Slab thickness inches	Cable spacing inches	Clear Distance Between Flanges of Beams													
			3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'6"	10'0"
Roofs Only	3	1	450	345	273	221	183	154	131	114						
		1¼	360	276	218	177	147	124	105	91						
		1½	301	230	182	147	123	103	88	76						
		1¾	258	197	156	126	104	88	75	65						
		2	225	172	137	110	92	77	65	57				←Roofs only→		
		2¼	200	153	122	99	82	68	58	51						
		2½	180	138	109	88	74	61	53	46						
		2¾	164	125	100	80	67	57	48	41						
	d = 2	3	150	115	91	74	61	52	44	38						
	3½	1	556	430	340	275	227	193	165	141	124	109	96			
		1¼	445	343	272	220	182	154	132	113	99	87	77			
		1½	370	285	226	184	152	128	110	95	82	73	64			
		1¾	317	245	192	155	130	110	94	82	71	62	55			
		2	278	215	169	138	114	96	82	71	61	55	48			
		2¼	247	191	150	123	102	85	73	63	54	49	42			
		2½	222	171	136	110	91	77	66	57	50	44	38			
		2¾	202	155	124	101	83	70	59	52	45	39	35			
	d = 2½	3	185	143	113	92	76	64	55	47	41	36	32			
Floors and Roofs	4	1	658	508	403	330	270	230	195	169	148	129	115	102	93	83
		1¼	527	406	322	264	216	184	156	135	118	103	91	82	75	67
		1½	438	338	268	220	180	153	130	112	98	86	77	69	62	56
		1¾	376	290	230	188	154	131	111	97	84	74	66	59	53	48
		2	328	254	201	165	135	115	98	84	74	64	57	52	46	41
		2¼	292	226	178	147	120	102	87	75	65	57	51	46	41	37
		2½	264	203	165	131	108	91	78	67	58	52	46	41	37	34
		2¾	240	185	147	120	98	83	71	61	54	47	42	37	34	31
	d = 3	3	219	169	134	110	90	77	65	57	49	43	38	35	31	28
	4½	1	757	583	466	382	313	264	226	195	172	150	134	120	107	97
		1¼	605	467	373	305	251	212	181	155	137	121	107	96	86	78
		1½	505	389	310	255	209	177	150	130	114	101	89	79	72	64
		1¾	432	334	266	218	179	151	129	111	98	86	77	69	61	56
		2	378	292	233	190	157	132	113	97	85	76	67	60	54	48
		2¼	336	260	207	169	140	118	101	86	76	67	59	54	48	43
		2½	303	234	186	152	126	106	90	78	68	60	54	48	43	38
		2¾	275	213	170	139	114	96	82	71	62	56	49	43	39	35
	d = 3½	3	252	194	155	127	104	88	75	65	57	50	45	40	35	32
	5	1	853	660	528	433	358	302	259	224	196	173	153	136	122	111
		1¼	682	528	423	347	286	242	207	179	156	138	123	109	98	89
		1½	569	441	352	288	239	201	172	150	130	115	102	91	81	74
		1¾	487	378	302	247	205	172	147	128	111	98	87	78	70	63
		2	427	330	264	216	179	151	129	112	98	86	77	68	61	56
		2¼	380	294	235	193	159	134	115	100	86	77	68	60	55	50
		2½	341	265	212	173	144	120	104	90	78	69	61	55	49	44
		2¾	310	241	192	157	130	109	94	82	71	62	56	50	45	40
	d = 4	3	284	220	176	144	120	101	86	75	65	58	51	45	41	37
	5½	1	944	738	592	483	402	340	290	252	220	193	171	153	138	125
	6	1	1032	807	648	531	442	374	321	278	243	214	190	170	153	138

Specification

The floor [roof] construction shall be Poured-in-place, Suspension System, Gypsum Slab. No. 12, cold drawn, twisted steel cables shall be laid over the tops of the beams [purlins] and secured to the wall beams [end purlins] by means of strong strap anchors and anchorage rods. These cables shall be laid parallel .... inches apart (see table) and shall be tied down in the center of each arch by means of iron rods running parallel to the structural beams. The wooden forms shall be placed so that they are ½ in. below the cables at the point of greatest deflection. Gypsum concrete, composed of calcined gypsum and not more than 12% by weight of soft wood chips, shall be poured-in-place and be troweled to an even surface ½ in. above the tops of the beams [purlins], ready to receive the sleeper fill [grading] [waterproofing] [slate] [tile]. The slab shall carry the specified live load of .... pounds per square foot with a factor of safety of 4.

Some Installations of the Suspension System Installed by the J. B. Eurell Organization

Bethlehem Steel Company, over 1,500,000 sq. ft.
Baldwin Locomotive Works, Eddystone, Pa., Section "D" Machine Shop, 500,000 sq. ft.
Johns-Hopkins Hospital, Women's Clinic, Joseph Evens Sperry, Architect
Philadelphia Rapid Transit Company, Philadelphia, Pa.
University of Pennsylvania, Philadelphia, Pa., Day & Klauder, Architects
Ingersoll-Rand Co., Phillipsburg, N. J.
American-La France Fire Engine Co., Philadelphia, Pa., Carson & Carson, Engineers
Watson Stabilator Co., Philadelphia, Pa., Ballinger Co., Architects and Engineers
Seminary of St. Charles of Borromeo, Philadelphia, Pa., Paul Monoghan, Architect

KEYSTONE GYPSUM FIREPROOFING CORPORATION

Marbridge Building, 34th Street and Broadway
NEW YORK, N. Y.

BRANCH OFFICES

PHILADELPHIA, PA., North American Building
WASHINGTON, D. C., 2525 Pennsylvania Ave., N. W.
BOSTON, MASS., 8 Beacon Street
QUEBEC, QUE., 140 St. John Street
MONTREAL, QUE., 306 New Birks Building

Products

The erection of the METROPOLITAN SYSTEM of GYPSUM FIREPROOF FLOOR and ROOF CONSTRUCTION.

Metropolitan System of Gypsum Fireproof Floor and Roof Construction

The principle of this system is that of the suspension bridge. It is a gypsum slab poured in place on parallel and uniformly spaced cables, the ends of the cables securely and rigidly anchored to the frame of the building. Enough cables are put in to carry the total load, with a factor of safety of 4, without regard to the compression value of the Metropolitan composition.

The composition is 87½% calcined gypsum, and 12½% wood planer chips.

The practical advantages of the system have been demonstrated over a period of thirty-eight years in hundreds of installations throughout the United States and Canada, under a wide extreme of climatic conditions.

Meritorious Features of the Metropolitan System

Safety and Strength—The metal construction makes the Metropolitan system one of the safest types of roof and floor construction. Stresses are calculated by approved engineering formulae. The cables carry all the load. The Metropolitan composition is used merely to protect the wires and structural framework against fire and corrosion and to distribute the load.

Economy of First Cost Due to Light Weight and Rapidity of Construction—Metropolitan composition weighs less than 5 lb. per sq. ft. per inch of thickness. For floors minimum thickness is 3½ in.; for roofs, 3 in. The light weight permits lighter beams and wide spacing, thus saving tons of steel. This feature makes it particularly advantageous in additional story work. In existing structures, this extreme lightness permits the replacing of less sturdy floors without either strengthening existing frames or overloading them.

The fact that Metropolitan gypsum composition sets within 30 minutes after the slab is poured, and forms can be dropped within 60 minutes, leaving slab good for calculated loads, makes for rapid construction—a prime factor in construction economy. The Swarthmore Apartments in Philadelphia, Pa., stand as a monument to the speed with which the system may be installed. This job was put up, 12 floors and roof, in fourteen working days.

Non-conductivity, Insulation and Fire Resistance—The high insulating value of Metropolitan gypsum composition as a roof material effects a saving in cost of the heating plant. Condensation of moisture on the undersurface is eliminated.

It is a fire resistant of the highest quality. Complete reports of fire tests conducted for the New York and Toronto building bureaus gladly furnished.

Sound Deadener—Gypsum has excellent sound deadening properties. In the Metropolitan composition full advantage is taken of this characteristic.

Durability—Metropolitan floors and roofs have been in active service, under severe conditions, for nearly forty years and are today, without exception, in as good a condition as when installed. Frequently sections have been cut out of Metropolitan floors which have been installed for many years, and in every case, the embedded beams and girders, as well as the steel cables, have been found in perfect condition.

Low Maintenance—Elasticity is necessary to good roof and floor construction. Shocks, vibrations and unequal stresses are likely to crack an inelastic construction. The wood filler in the Metropolitan composition provides elasticity and Metropolitan roofs and floors remain intact under the severest conditions, thus eliminating the annoyance and expense of constant repairs.

Service—This company contracts for entire installation of both floor and roof arches. They regard each contract as a sale of service in addition to sale of material and workmanship. Nor is delivery of service completed with acceptance of contract. It is a service, in other words, rendered not only *during* the work but *before* and *after* its execution.

Guaranteed Construction—The KEYSTONE GYPSUM FIREPROOFING CORPORATION guarantees every square foot of floor or roof construction they install against failure from any cause, under the conditions for which it was designed.



Colton Manor Hotel, Atlantic City, N. J.
Twelve Metropolitan floors and roof

Where the Metropolitan System Is Used

The Metropolitan system is in thoroughly satisfactory use in innumerable hotels, clubs, schools, hospitals, churches, apartment houses, theatres, office buildings, power plants, paper mills, machine shops, garages and manufacturing buildings.

Continued on next page

Information for Designing

Services of Engineering Department—Our Engineering Department should be consulted before steel design of building is completed. We will gladly send our engineers to confer with you without expense or obligation.

Economical Spans—The construction can be installed between supports spaced up to 9 ft. in clear. Our experience has shown that under average conditions a spacing of 6 ft. 6 in. to 7 ft. is the most economical.

Waterproof Roofing—Any standard type of waterproof roofing may be successfully applied to our metropolitan system. The form most generally applied, however, is a 3-ply built-up roofing.

Specifications

Fireproof Floors and Roofs—After forms or centers have been placed in proper position, cables, each composed of two No. 12 (or equivalent) galvanized wires twisted, shall be carried over the tops of the beams or purlins to outside wall beams or end purlins and be secured to them by strong hooks or anchors. These cables shall be laid parallel, 1 to 3 in. apart, according to spans and loads, and shall pass under round iron bars, midway between the purlins, so as to cause the cables to deflect uniformly. The Metropolitan composition shall then be poured-in-place, and brought to an even surface about ½ in. above the top of the beams, forming a slab ready to receive [sleeper fill or grading] [finished roofing or grading] and with the underside left as smooth as practicable. The slab shall be designed to carry safely the live load with a factor of safety of 4.

Note: For fireproof floors, fireproofing beams and girders (not trusses) shall be used, according to the local building laws.

Cables composed of 2-No.12 Cold Drawn Galvanized Steel Wires Twisted

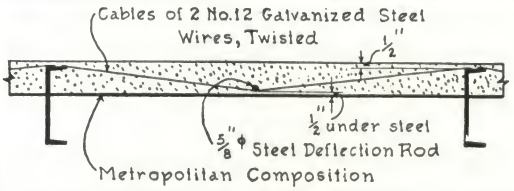
Cable = 2 × .00874 @ 20000#/□" = 350#

$W = \frac{1152\,Td}{bLYL^2 + 16d^2}$ — 20000#/□" — NO. 12.

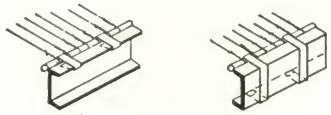
	SLAB THICKNESS	CABLE SPACING	CLEAR DISTANCE BETWEEN FLANGES OF BEAMS 3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
ROOFS	3	1	450	345	273	221	183	154	131	114						
		1¼	360	276	218	177	147	124	105	91						
		1½	301	230	182	147	123	103	88	76						
		1¾	258	197	156	126	104	88	75	65						
		2	225	172	137	110	92	77	65	57						
		2¼	200	153	122	99	82	68	58	51						
		2½	180	138	109	88	74	61	53	46						
		2¾	164	125	100	80	67	57	48	41						
		3	150	115	91	74	61	52	44	38						
	3½	1	556	430	340	275	227	193	165	141	124	109	96			
		1¼	445	343	272	220	182	154	132	113	99	87	77			
		1½	370	285	226	184	152	128	110	95	82	73	64			
		1¾	317	245	192	155	130	110	94	82	71	62	55			
		2	278	215	169	138	114	96	82	71	61	55	48			
		2¼	247	191	150	123	102	85	73	63	54	49	42			
		2½	222	171	136	110	91	77	66	57	50	44	38			
		2¾	202	155	124	101	83	70	59	52	45	39	35			
		3	185	143	113	92	76	64	55	47	41	36	32			

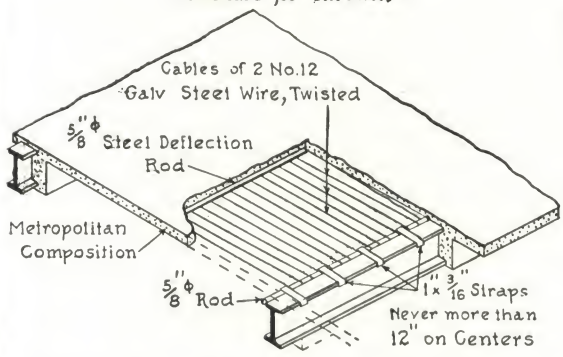
← ROOFS

	SLAB THICKNESS	CABLE SPACING	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
FLOORS	4	1	658	508	403	330	270	230	195	169	148	129	115	102	93	83
		1¼	527	406	322	264	216	184	156	135	118	103	91	82	75	67
		1½	438	338	268	220	180	153	130	112	98	86	77	69	62	56
		1¾	376	290	230	188	154	131	111	97	84	74	66	59	53	48
		2	328	254	201	165	135	115	98	84	74	64	57	52	46	41
		2¼	292	226	178	147	120	102	87	75	65	57	51	46	41	37
		2½	264	203	165	131	108	91	78	67	58	52	46	41	37	34
		2¾	240	185	147	120	98	83	71	61	54	47	42	37	34	31
		3	219	169	134	110	90	77	65	57	49	43	38	35	31	28
	4½	1	757	583	466	382	313	264	226	195	172	150	134	120	107	97
		1¼	605	467	373	305	251	212	181	155	137	121	107	96	86	78
		1½	505	389	310	255	209	177	150	130	114	101	89	79	72	64
		1¾	432	334	266	218	179	151	129	111	98	86	77	69	61	56
		2	378	292	233	190	157	132	113	97	85	76	67	60	54	48
		2¼	336	260	207	169	140	118	101	86	76	67	59	54	48	43
		2½	303	234	186	152	126	106	90	78	68	60	54	48	43	38
		2¾	275	213	170	139	114	96	82	71	62	56	49	43	39	35
		3	252	194	155	127	104	88	75	65	57	50	45	40	35	32
	5	1	855	660	528	433	358	302	259	224	196	173	153	136	122	111
		1¼	682	528	423	347	286	242	207	179	156	138	123	109	98	89
		1½	569	441	352	288	239	201	172	150	130	115	102	91	81	74
		1¾	487	378	302	247	205	172	147	128	111	98	87	78	70	63
		2	427	330	264	216	179	151	129	112	98	86	77	68	61	56
		2¼	380	294	235	193	159	134	115	100	86	77	68	60	55	50
		2½	341	265	212	173	144	120	104	90	78	69	61	55	49	44
		2¾	310	241	192	157	130	109	94	82	71	62	56	50	45	40
		3	284	220	176	144	120	101	86	75	65	58	51	45	41	37
	5½	1	944	738	592	485	402	340	290	252	220	195	171	153	138	125
	6	1	1032	807	648	531	442	374	321	278	243	214	190	170	153	138

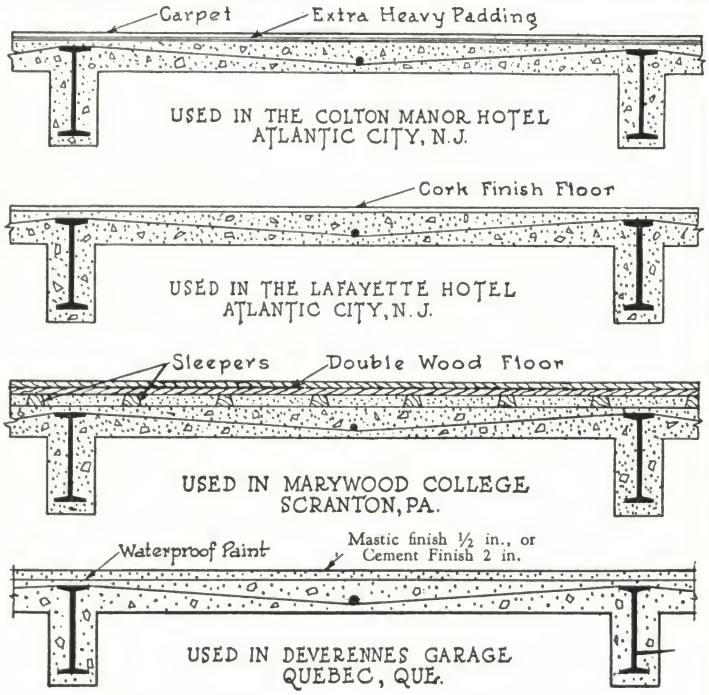


TYPE C FIREPROOF ROOF CONSTRUCTION





TYPE B FIREPROOF FLOOR CONSTRUCTION



VARIOUS TYPES OF FLOORING AND FLOOR COVERING USED WITH THE METROPOLITAN SYSTEM

DETAILS SHOWING ADAPTABILITY OF THE METROPOLITAN SYSTEM

A Few Representative Installations of the Metropolitan System

State Office Building, Richmond, Va.
Richmond Trust Co., Richmond, Va.
Marywood College, Scranton, Pa.
Title Guarantee and Trust Co., New York, N. Y.
42 Broadway Building, New York, N. Y.
60 Wall Building, New York, N. Y.
Colton Manor Hotel, Atlantic City, N. J.
Lafayette Hotel, Atlantic City, N. J.
Levin Apartment Hotel, Atlantic City, N. J.
Thalheimer Store, Richmond, Va.
Sauvegarde Life Insurance Building, Montreal, Que.
Technical High School, Toronto, Ont.
Elks Club, Scranton, Pa.
Germantown Hospital, Germantown, Pa.
Overbrook Apartments, Overbrook, Pa.
Corcoran Art Gallery, Washington, D. C.
General Electric Building, Buffalo, N. Y.
Wesleyan Building, Boston, Mass.

LATHROP-HOGE GYPSUM CONSTRUCTION CO.

Gypsum Floors and Roofs

Neave Building, CINCINNATI, OHIO

BRANCH OFFICES

CHICAGO, ILL., 105 West Monroe Street PITTSBURGH, PA., 207 Fulton Building PHILADELPHIA, PA., 1700 Sansom Street
DETROIT, MICH., 439 Penobscot Building NEW YORK, N. Y., 347 Madison Avenue

Products

MONOLITHIC GYPSUM FLOOR and ROOF CONSTRUCTION:

Standard Suspension Type.

Hoge Rail Type (U. S. Pat.—1464711, Can. Pat. —241477).

Enclosed Rail Type (U. S. Pat.—1721393, Can. Pat. —254632).

Preformed Rail Type Floor and Roof Slabs (U. S. Patent 1688723).

Construction Service

This company, backed by 15 years' experience in gypsum construction, is at your service for advice and estimates for the above types of construction installed complete in any part of the world.

Advantages of Rail Types

The rail types of construction have all the advantages of light weight, rapid erection, high insulation properties, fire resistance, vibration resistance, permanence and strength.

The rail type is readily applied to all framing designs in replacement of old roofs and floors where applications to framing are difficult, or where a uniform paneled undersurface is desired.

The simplicity of the rail designs permits adaptation to any layout of supports by varying the size of rails in accordance with standard structural design. Rails bear on walls and no bracing of end purlins is required as with other designs.

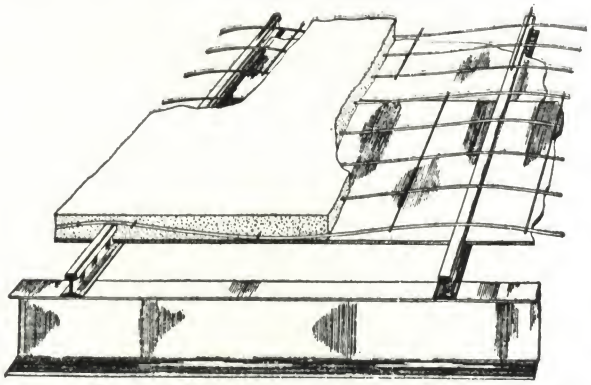
Rail Type of Monolithic Gypsum Floor and Roof Construction

The Standard Suspension type of gypsum slab construction was the only type of poured-in-place or monolithic roof and floor slab construction extensively used until the rail types were originated and developed by this company a few years ago.

Specifications and list of representative installations of the Standard Suspension type of construction sent on request.

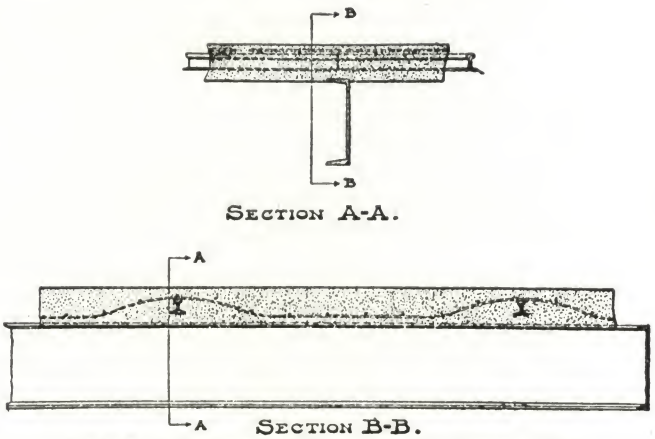
While this company is prepared to install the Suspension type where specified or on rare occasions where it fits special conditions, the approval of architects, engineers, and owners throughout the United States and Canada is convincing proof that the Hoge and the Enclosed Rail Types are best suited to the great majority of conditions, and conform more readily to the standards of design and appearance required by architects.

Hoge Rail Type—In the Hoge Type small A.S.C.E. rail sections are laid about 32 in. apart on the top of walls, beams or purlins spanning the distance be tween beam or wall supports. On the lower flanges of the rails are supported ⅜-in. standard gypsum board, Celotex or other composition board, with joints made over purlins to form a solid under surface, paneled by the lower flanges of the rails. The rails are designed to carry all loads, which are transferred to them by continuous mesh reinforcement running across and resting on top of the rails. Standard gypsum composition is poured in place over the gypsum board or Celotex, and finished smooth ½ in. or more above the tops of the rails, ready to receive the roof or floor finish. The under surface can be decorated as desired or a finished plaster ceiling can be applied.



Hoge Type of Monolithic Gypsum Floor and Roof Construction

Enclosed Rail Type—Where fireproofing or greater insulation value is desired, the rails are blocked above the top of purlins with insulating material, wooden forms are so placed as to permit covering the bottom of the rails with ¾ in. or more of gypsum composition, leaving a solid, plain gypsum undersurface even with the top of the purlins, the full thickness of the slab being above the superstructure, yielding maximum insulation value.



Details of Enclosed Rail Monolithic Gypsum Slab Construction

Continued on next page

Specifications for Monolithic Gypsum Floor and Roof Construction

Hoge Type—The floors and roofs named herein shall be the Hoge Type Monolithic Gypsum Board and Rail Construction as furnished by the LATHROP-HOGE GYPSUM CONSTRUCTION Co., Cincinnati, Ohio.

Standard rail sections designed to carry all loads between supports shall be laid on the top of walls, beams, or roof purlins at sufficient spacing to receive ⅜-in. standard gypsum board carried on the lower flanges; gypsum board shall be butted tightly to form an even undersurface and braced in place if necessary to prevent buckling; galvanized mesh reinforcement of a minimum area per foot of the slab cross section of .026 in. shall be stretched over the tops of rails and allowed to sag to the top of gypsum board, forming a continuous reinforcement.

Standard gypsum composition containing at least 85% calcined gypsum shall be mixed with water to a medium quaking consistency and poured into place, forming a solid reinforced slab 2½ in. thick, including the gypsum board. The top surface of slab shall be left ready to receive the finish desired, such as fill, grading or waterproofing.

Overhangs in direction of span of rails shall be formed by extending same to required distance beyond the last purlin. Other overhangs shall be reinforced on the cantilever principle with reinforcement embedded in the adjacent main slab and secured to the steel of the same.

Curbs, walls, mullions, etc., shall be constructed with gypsum board facing and gypsum composition poured or plastered to regular thickness on the outer surface; or such curbs, walls, mullions, etc., may be constructed of precast gypsum blocks, all joints to be struck and outer surfaces on roofs left ready for waterproofing or other finish.

Note: The word Celotex may be substituted for Gypsum Board in the above specification when this type of undersurface is desired.

Enclosed Rail Type—The floors and roofs named herein shall be the Enclosed Rail Monolithic Gypsum Slab Construction as furnished by the LATHROP-HOGE GYPSUM CONSTRUCTION Co., Cincinnati, Ohio.

Standard rail sections designed to carry all loads between supports shall be set on walls, beams, or roof purlins at proper elevation to provide at least ¾-in. covering of gypsum under their bottom flange. Across these rails shall be stretched galvanized mesh reinforcement, having .026 in. minimum area per foot of slab cross section, and allowed to sag to within ¾-in. of temporary wood or other forms, making a continuous reinforcement at right angles to the rail subpurlins.

Standard gypsum composition containing at least 85% calcined gypsum shall be mixed with water to a medium quaking consistency, and poured into place on the forms, completely enclosing the rails to form a slab 3 in. thick (or more where specified). The top surface of slab shall be left ready to receive the finish desired, such as fill, grading, or waterproofing.

Overhangs in direction of span of rails shall be formed by extending same to required distance beyond the last purlin. Other overhangs shall be reinforced on the cantilever principle, with reinforcement embedded in the adjacent main slab and secured to the steel of the same.

Curbs, walls, mullions, etc., shall be constructed with gypsum composition as above, sufficient steel reinforcement being provided to stiffen against wind pressure or other loading. Or such curbs, walls, mullions, etc., may be constructed of gypsum composition blocks laid up in gypsum mortar, all joints to be struck, and outer surfaces on roofs left ready for waterproofing.

Typical Installations

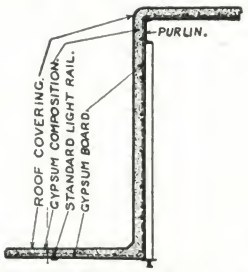
Hoge Type

INSTALLATION	SQ. FT.
John Van Realty Co., Cincinnati, Ohio	130,000
Clinchfield Railroad Co., Erwin, Tenn.	93,000
Pullman Car Co., Pullman, Ill.	300,000
J. P. Devine Mfg. Co., Mt. Vernon, Ill.	90,000
Bessemer Gas Engine Co., Grove City, Pa.	44,000
Fraser Co., Ltd., Madawaska, Me.	240,000
White Motor Co., San Francisco, Calif.	35,000
Coshocton Iron Co., Monongahela, Pa.	75,000

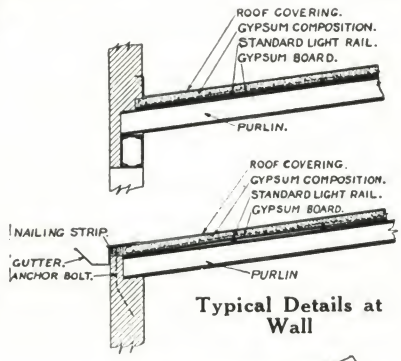
Installations of the Hoge type may be found in practically every section of the United States.

Enclosed Rail Type

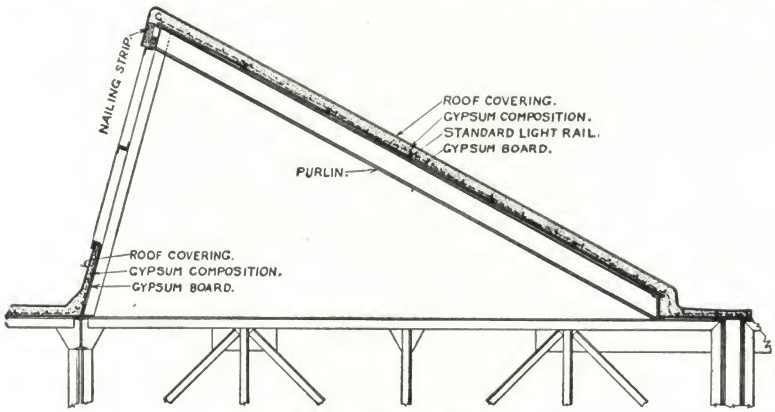
INSTALLATION	SQ. FT.
Port Alfred Pulp & Paper Co., Port Alfred, Que.	135,000
Newfoundland Power & Paper Co., Corner Brook, N. F.	43,000
Southern International Paper Co., Bastrop, La.	98,000
Southern International Paper Co., Camden, Ark.	85,000
United Paperboard Co., Lockport, N. Y.	46,000
E. B. Eddy Co., Hull, Que.	35,000



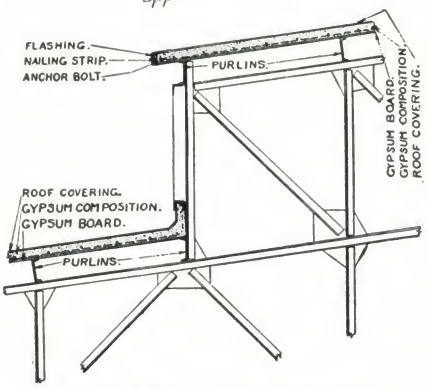
Typical Section Through End Wall of Sawtooth



Typical Details at Wall



Typical Sawtooth Construction

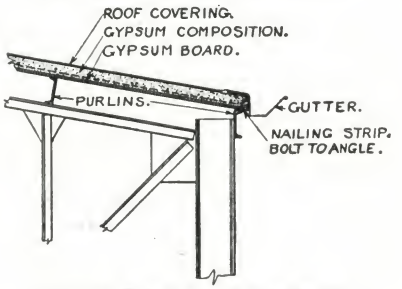


Typical Monitor Construction

SAFE LOAD FOR RAIL TYPE SLABS

Rails 32" o.c. $S = 18000$ lb per sq. in. $M = \frac{WL}{10} = S\frac{I}{X}$ For Rail Spacing of 24" Multiply Table Values by 4/3 For Rail Spacing of 36" Multiply Table Values by 9/9

SPAN / RAIL SECTION	4'0	4'6	5'0	5'6	6'0	6'6	7'0	7'6	8'0	8'6	9'0	9'6	10'0	10'6	11'0	11'6	12'0	12'6	13'0	13'6	14'0	14'6	15'0	15'6	16'0
8#	119	94	77	63	53	46	39							Slab Weight 12 lb per sq ft											
12#			153	126	107	90	78	68	60	53	47	40													
16#					167	141	122	107	93	83	74	67	60	55	49	44									
20#	Slab Weight = 14 #/a'				197	169	148	130	115	103	91	83	76	69	63	58	54	50	46						
25#	Slab Weight = 15 #/a'						186	164	144	130	115	106	97	87	79	72	67	62	58	54	50	47			
30#	Slab Weight = 16 #/a'									192	165	150	137	124	113	105	97	89	82	76	71	66	62	59	



Typical Details of Eave Purlin

STRUCTURAL GYPSUM CORPORATION

Manufacturers of Gypsteel Gypsum Pre-cast Floors and Roofs

GENERAL OFFICE

LINDEN, N. J.

(Telephone Linden 2-3700)

FACTORIES: LINDEN, N. J. and AKRON, N. Y.

BRANCH OFFICES

NEW YORK, N. Y. PHILADELPHIA, PA. SCRANTON, PA. NEWARK, N. J.
BOSTON, MASS. BUFFALO, N. Y. SYRACUSE, N. Y.

Product

GYPSTEEL GYPSUM PRE-CAST ROOFS and FLOORS.

For Gypsteel Gypsum Partition Tile, Beam and Column Covering and Gypsteel Gypsum Plasters, see Manufacturers' Index.

The many advantages of gypsum for floors, roofs and walls are recognized today more than ever before.

Gypsteel gypsum products enable the designer to achieve maximum efficiency in building design with numerous economies that, we believe, no other type of construction gives.

TRADE-MARK

Services

This Corporation welcomes the privilege of consulting with architects, engineers and builders as to the best methods of utilizing its various types of roofs and floors on any building.

Through affiliated companies it submits proposals for the installation of its products by experienced workmen.

GYPSTEEL PRE-CAST FLOORS AND CEILINGS

PATENTED

What Gypsteel Pre-cast Floor Construction Is and Does

The Gypsteel Pre-cast Floor System combines the calculable strength and safety of steel supporting-members with the unsurpassed fire-resistive properties and lightness of gypsum. It embodies many distinctive advantages unobtainable in other methods of fireproof construction. It has been in constantly growing use for the past eight years.

Gypsteel Pre-cast Floor Construction consists of Standard structural rolled steel sections, or welded, open-web steel joists, on top of which are placed Gypsteel Pre-cast Floor Slabs, and from which are suspended Gypsteel Pre-cast Ceiling Slabs by hangers.

The steel work of the floor is thereby completely fireproofed by a blanket of gypsum 2½ in. above and 2 in. below. The steel rods in the floor slabs are tied together to form continuous reinforcement throughout, imparting the strength and safety of a continuous beam, and holding each slab firmly in place. All slabs being grouted in, the floors and ceilings become practically monolithic.

The completed structural floor is then ready to receive the finished floor. The ceiling is ready for brown and finish coats of plaster, *without a scratch coat.*

Photographs and details showing exact method of installation of Gypsteel Pre-cast Floor Construction will be found on following pages.

Gypsteel Floor and Ceiling Slabs are made of a particularly high grade calcined gypsum, mixed with a small percentage of fiber and the proper proportion of water. The fibre acts as a binder, and imparts to the slabs their peculiar toughness.

Where They Are Used

Gypsteel Pre-cast Floors are approved for live loads up to 150 lbs. per sq. ft. They are used in schools, hospitals, apartment and hotel buildings, office buildings, public buildings, homes and wherever flat ceilings are desired.

As a result of the standard fire, water and load tests, Gypsteel Pre-cast Floor Construction is approved by the building departments of the principal cities as standard fireproof construction for floors, in buildings of the first class.

Gypsteel Pre-cast Floors Meet All Requirements of a Fireproof Floor Construction

Mere incombustibility is but one of several essential qualifications for a satisfactory fireproofing material.

To perform its proper function in a modern building, a fireproofing material must be more than incombustible.

It must be *fire-resistive,* possessing a degree of non-conductivity of heat that will effectively protect the supporting structural steel work from injury under the most severe conditions of fire.

It should also possess a sufficiently low coefficient of expansion to insure against serious injury, throughout the unchecked duration of a severe fire, and also during the subsequent application of a stream of water at high pressure.

Gypsteel Pre-cast Floor Construction meets all of the very exacting requirements of modern fireproofing. In addition, it embodies many distinctive advantages and economies that cannot be obtained by other methods, as explained on the next page.

Continued on next page

REPRESENTATIVE INSTALLATIONS OF GYPSTEEL PRE-CAST FLOOR CONSTRUCTION

(Name of Building is followed by name of Architect)

895 Park Avenue, New York, N. Y., Sloan & Robertson
Hotel Newburgh, Newburgh, N. Y., Kenneth Franzheim
Hotel Stratfield, Bridgeport, Conn., Monks & Johnson
800 West Ferry Street, Buffalo, N. Y., Bley & Lyman
Easton Hall, Lafayette College, Easton, Pa., Thomas, Martin & Kirkpatrick
Technical High School, Scranton, Pa., A. J. Ward
Delaware Avenue Grade School, Tonawanda, N. Y., Edward B. Green & Sons
Amesbury Hospital, Amesbury, Mass., Kendall, Taylor & Co.
Lawrence Hospital, Nurses Home, Bronxville, N. Y., Bates & Howe
Norwood Hospital, Norwood, Mass., J. Williams Beal & Sons
Museum of Natural Science, Buffalo, N. Y., Esenwein & Johnson
Genesee Valley Trust Co., Rochester, N. Y., Voorhees, Gmelin & Walker
Rhode Island Insurance Co. Office Building, Providence, R. I., Howe & Church
Saks-Herald Square (Addition), New York, N. Y., Starrett & Van Vleck
Hotel Hildebrecht, Trenton, N. J., Walter Hankin
Molly Pitcher Hotel, Red Bank, N. J., Nathan Harris
Hotel Suburban, East Orange, N. J., E. V. & C. F. Warren
Wychwood Apartment, Great Neck, L. I., N. Y., Schwartz & Gross
Frances Willard High School, Scranton, Pa., Frank J. Miller
Junior High School, Upper Darby, Pa., Heacock & Hokanson
Longfellow Junior High School, Yonkers, N. Y., G. Howard Chamberlin
Monroe County Hospital, Rochester, N. Y., Horace T. Hatton
Mercy Hospital, Buffalo, N. Y., H. L. & W. T. Spann
Seneca Theatre, Buffalo, N. Y., Henry L. Spann
Library, Morristown, N. J., Oscar B. Smith
Ross Stores, Inc., Yonkers, N. Y., Hopkins & Dentz
Sibley, Lindsay & Curr Co. (Addition), Rochester, N. Y., J. Foster Warner
Johnston Building (Addition), Charlotte, N. C., W. L. Stoddart
Newark Evening News (Addition), Newark, N. J., D. H. Scudder
Hotel Pennsylvania (Addition), New York, N. Y., McKim, Mead & White
National City Bank (Alteration), New York, N. Y., McKim, Mead & White
Munds & Winslow (Alteration), New York, N. Y., Walker & Gillette
F. G. Shattuck Store (Alteration), Boston, Mass., Parker, Thomas & Rice
Pagoda Restaurant (Alteration), Philadelphia, Pa., Ballinger Co.
Commonwealth Building (Alteration), Philadelphia, Pa., John T. Windrim

GYPSTEEL PRE-CAST FLOORS AND CEILINGS HAVE 12 MAJOR ADVANTAGES

(1) Economy and Uniformity

Standard sizes and quantity production mean moderate cost. Rigid chemical and mechanical control and inspection assure uniform quality.

(2) Strength and Safety

The definite, calculable strength of steel members, combined with conservatively designed slab-span, provide a wide margin of safety. In official load tests failure of the floor slab did not occur until the load had reached almost *ten times* the designed live load of 150 lbs. per sq. ft.

(3) Speed and Ease of Installation

Pre-cast slabs are shipped to the job dry, ready for erection. Simple operations, requiring a minimum of labor, no form work.

(4) Winter Work

Winter has no affect upon the progress of a building when Gypsteel Pre-cast Floors are used. The floors and ceilings can be installed in any weather when men can work. The absence of water enables work on Gypsteel Pre-cast Floors to be conducted on the coldest days.

(5) Fire Protection

The superiority of Gypsteel lies not merely in its incombustibility but, more particularly, in its insulating efficiency, which protects the structural steel against injurious temperatures during a fire; and its freedom, under high temperatures, from the expansion, cracking, spalling, or fusing frequently experienced with other materials. It is approved as fireproof for buildings of the first class, for live loads up to 150 lbs. per sq. ft., by the building departments of the principal cities.

(6) Lightness

The extremely light weight of Gypsteel (21 lbs. per sq. ft. total for floor and ceiling slabs), compared with any other flat-ceiling fireproof construction, permits a substantial saving in the tonnage of columns, girders and footings. In a ten-story building with columns spaced 20 ft. on centers, the saving in dead load effected by Gypsteel Pre-cast floors, as compared with other typical long-span floors, is from *fifty* to *sixty tons* at each column footing.

(7) Sound Insulation

With Gypsteel Pre-cast Floor Construction, the total of 4½ in. of solid gypsum slabs, together with the dead air space between the floor and ceiling slabs, affords a *high degree of insulation against the transmission of sound from floor to floor.*

(8) Heat Insulation

The superior insulating efficiency of Gypsteel Floors means added comfort for the occupants, and less expense to the owners for heating.

(9) Savings in Plaster

Gypsteel ceilings require only two coats of plaster—brown and finish—no scratch coat required. Gypsum plaster forms a natural chemical bond with a Gypsteel Ceiling.

(10) Alterations and Additions

The light weight of Gypsteel Floors frequently permits adding additional stories to old buildings without strengthening the existing columns or foundations. For alterations during occupancy, the elimination of form work, drip, etc., when Gypsteel is used, is important.

Gypsteel Pre-cast Floors are particularly well adapted for use in installing mezzanines, balconies, loggias, etc., in existing buildings, or for additional floors above the existing structure.

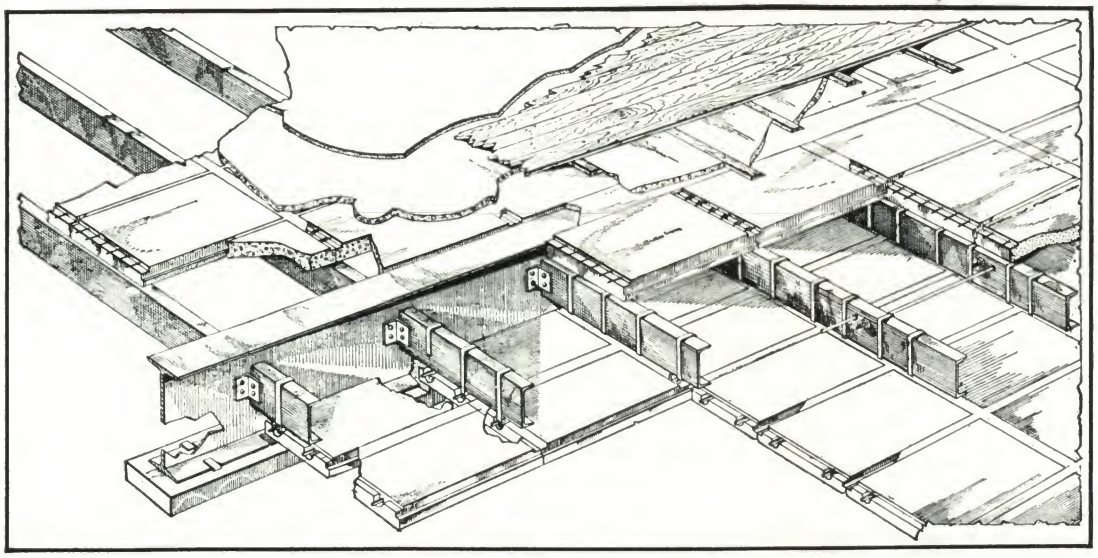
(11) Facilitates Work of Other Trades

The use of Gypsteel Pre-cast Floors facilitates the work of other trades in the usual course of building construction. The cinder fill or finish on top of the floor may be laid at once, and ceilings may be plastered immediately. The ease with which Gypsteel Slabs can be cut, sawed or bored greatly simplifies and speeds up the installation of plumbing, heating and electrical work.

(12) Makes Joist Construction Fireproof

Gypsteel Pre-cast Ceilings are accepted as full-protection fireproofing in the larger cities, and therefore enable the use of steel joists in buildings beyond the height limitation for these members where metal lath ceilings are used.

Continued on next page



Cutaway View of Gypsteel Pre-cast Floor Construction

COMPONENT PARTS OF GYPSTEEL PRE-CAST FLOOR AND CEILING CONSTRUCTION

Floor Slabs

The floor slabs used in Gypsteel Pre-cast Floor Construction are 30 in. long, 24 in. wide and 2½ in. thick, reinforced with 6 cold drawn steel wire rods, $\frac{3}{16}$ in. in diameter, spaced 4 in. on centers, each rod emerging from both ends of slabs within ¾ in. of top surface, and projecting about 2½ in. The rods are ridigidly restrained in the mould while slab is cast, assuring uniformly correct position.

Ceiling Slabs

Gypsteel ceiling slabs (standard size) are 30 in. long, 24 in. wide and 2 in. thick, reinforced with two steel bars, ⅜x¼ in., projecting beyond each end of the slab. These steel bars are rigidly held in the proper position in the mould while being cast, assuring accurate alignments. Slabs are also made in lengths of 24 and 36 in.

Soffit Slabs

Gypsteel soffit slabs, 2 or 3 in. thickness, and in varying widths to fit girder flanges, have two pairs of projecting steel straps, ¾x⅛ in., embedded in the slab and projecting from the top surface. These projections are securely clamped around girder flanges. Soffit slabs extend not less than 1½ in. beyond the edges of the girder flanges.

Haunch Slabs

Gypsteel haunch slabs are solid, 2 in. thickness. They are manufactured in two sizes, 12x24 and 12x30 in.

Hangers

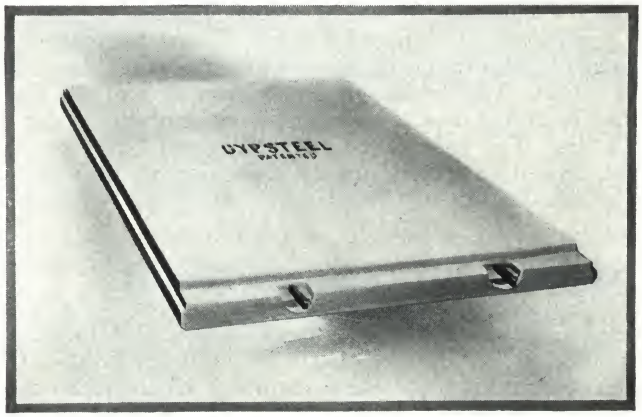
Steel hangers, made in various types to suit the standard rolled and open-web welded sections commonly used as floor members, support the ceiling slabs. They are bent to automatically give the correct alignment of ceiling slabs as they are hung on the job.

Bearing Plates

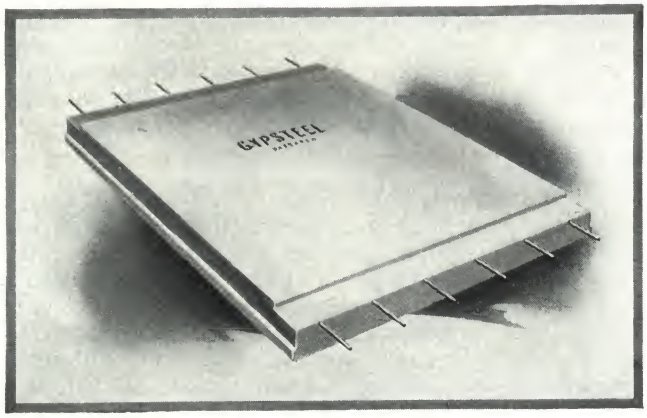
Bearing plates, so designed as to hold themselves in position, can be supplied for use where flange widths of structural members provide insufficient bearing.

Grout

Gypsteel gypsum grout is used for grouting the floor and ceiling joints. Haunch blocks are set in Gypsteel gypsum mortar.



Gypsteel Pre-cast Ceiling Slab



Gypsteel Pre-cast Floor Slab

Continued on next page

INSTALLATION OF GYPSTEEL PRE-CAST FLOORS AND CEILINGS



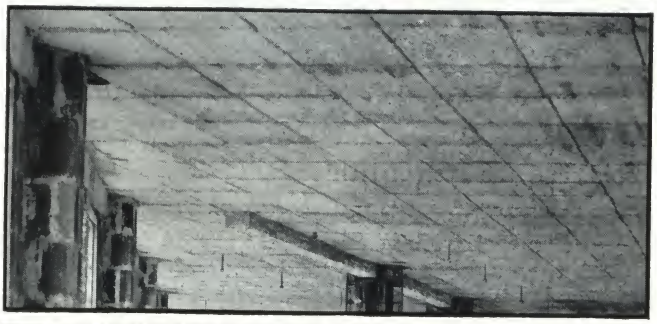
Ceiling Slabs Are Hung

Projecting rods of each ceiling slab are inserted in slots of hangers, which are then clamped to the steel member. Rods of opposite slabs are fitted into same slots, each slot holding two rods projecting in opposite directions. Floor members may be standard rolled sections, or welded, open-web steel joists.



Ceiling Slabs Are Fastened

The portion of the hanger projecting beyond the member is hammered around and under its top flange, forming a secure anchorage. Soffit Slabs are fastened against lower flanges of girders in a similar way, and securely clamped. All joints in ceiling are grouted from above.



Ceiling Is Completed

A flat, regular ceiling is the result, ready for the brown and finish coats of plaster. No scratch coat is required. Grouting seals all joints against passage of heat or flames from below. Into pockets in the slabs the bottom of hangers slip, keeping them *out* of the joint, and protecting them by the slab from fire below.



Floor Slabs Are Placed

Floor slabs are placed from center of one floor member to center of next member, with projecting steel rods turned straight up. A one-man job. The slabs are light and of an easy size to handle.



Floor Slabs Are Tied

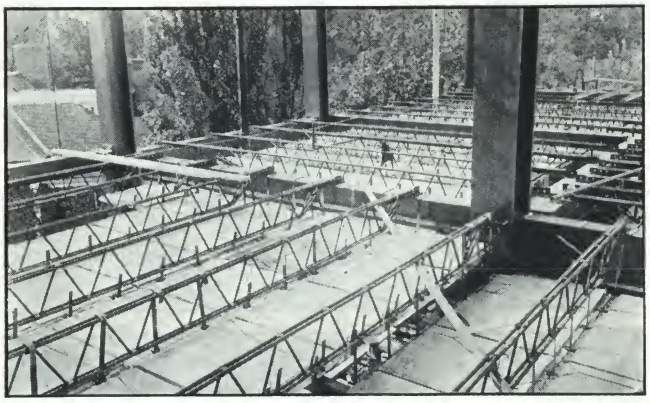
Reinforcing rods are securely tied together with a mechanical device, by one man, and hammered down into recesses. Recesses are grouted, as with ceiling slabs. Result is an unbroken, flat floor surface, ready for the cinder fill or finish floor. The steel rods, being tied between slabs, are continuous over the supports, giving, in effect, a monolithic construction.

Continued on next page

Gypsteel Pre-cast Ceilings Remove Several Limitations on Steel Joist Construction

The problem of using steel joist floor construction, and making it completely fireproof at a practical cost, is solved. Where building codes do not accept metal lath and plaster ceilings, but call for fireproofing the structural steel, a *practical* and *economical* method is to completely fireproof the joists from below with 2-in. Gypsteel Pre-cast Ceiling Slabs. The joists may be fireproofed from above by a concrete or gypsum floor. The Gypsteel Pre-cast Ceiling thus provides an unbroken fireproof protection of 2 in. of solid gypsum, complying with the strictest building code.

The architect or engineer who desires to use steel floor joists for their lightness, convenience and economy, but have his building of the fireproof type, uses Gyp-



Open-web Joists Fireproofed from Below with Gypsteel Pre-cast Ceiling Slabs

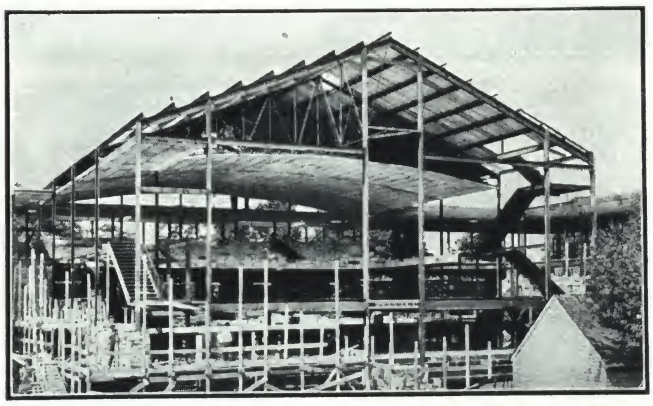
steel Pre-cast Ceilings. Their installation is easy and rapid, and the system is moderate in cost.

Fireproofing Roof Girders and Trusses with Gypsteel Pre-cast Ceiling Slabs

A thoroughly practical and economical method for fireproofing girders and trusses supporting roof construction is shown here. The use of Gypsteel Pre-cast Ceiling Slabs hung directly from a series of light steel angles or channels supported on the bottom chords of the trusses eliminates much of the dead load and expense of encasing the individual members.

The result is a ceiling ready for brown coat of plaster, with all steel work above completely protected from fire from below by the Gypsteel Ceiling. Metal lath and furring is eliminated. A Gypsteel Roof will likewise protect the steel from above.

This type of construction is approved by the building departments of the principal cities, and provides an attractive flat ceiling with all truss work concealed.



Illustrating Use of Gypsteel Pre-cast Ceiling Slabs for Fireproofing Roof Trusses from Below

Literature—Complete catalogue on Gypsteel Pre-Cast Floors, and Architects' Service Sheets are available on request to our Linden, N. J., office.

Specifications for Gypsteel Pre-cast Floors and Ceilings

Floors and ceilings shall consist of Gypsteel Pre-cast Floor Construction, manufactured by Structural Gypsum Corporation.

Ceiling Slabs—Gypsteel Pre-cast Ceiling Slabs (factory moulded), 2 in. thick, shall be suspended underneath the steel floor members to form a flat ceiling and to fireproof the supporting steel. The ceiling slabs shall be reinforced with ¼x⅜-in. flats running lengthwise and projecting from the ends of the slabs about 1 in. When erected, the slabs shall be hung from their reinforcing by heavy slotted hangers formed from ⅛x1-in. flat steel, securely attached to the supporting steel members.

Beveled ribs shall be moulded along the sides of the slabs at the bottom edges. The ribs on adjacent slabs, abutting each other, shall form an open joint ½ in. in width extending downward from the top surface. The ends shall be rabbetted to form slots about 2 in. wide by ½ in. deep extending across the full width of slab. All joints shall be filled solidly with gypsum grout, thus completely sealing them.

Floor Slabs—Shall be 2½-in. thick Gypsteel Pre-cast Floor Slabs moulded at the factory. These slabs shall be reinforced with $\frac{3}{16}$-in. cold drawn wire rods, spaced 4 in. on centers, each reinforcing rod emerging from the ends of the slab within ¾ in. of the top surface, and projecting about 2½ in.

The slabs shall be set in place upon the steel members, each slab spanning one of the 2 ft. 6-in. spaces. The projecting ends of opposite rods in abutting slabs shall be tied together with a mechanical device, furnished by the Structural Gypsum Corporation, by means of which these rods shall be drawn up taut at their connections. When tied, the ends of the rods shall lie in depressions formed by the rabbetted ends of the slabs. Ribs similar to those on the ceiling slabs shall form open joints at the sides. All joints shall be filled solidly with gypsum grout, and so leveled off as to form an unbroken surface with the tops of the slabs.

Girder Fireproofing—The projecting webs and flanges of the girders shall be fireproofed by applying, to their soffits, Gypsteel Pre-cast Soffit Slabs, 2 in. in thickness; these slabs shall contain ¾x⅛-in. flats, passing transversely through the slabs not less than ½ in. above the lower surface, and the ends of which shall project through the upper surfaces of the soffit slabs and shall be clamped over the girder flanges. Plastic gypsum shall then be deposited in the spaces between the top surfaces of the soffit slabs and the adjacent ceiling slabs, and shall be left square and flush with the outside edges of the soffit slabs. This construction shall give a minimum protection of 1½ in. beyond the outside edges of the steel.

On deep girders and trusses, there may be substituted, for the plastic grout, built-up walls of Gypsteel blocks, not less than 2 in. in thickness, supported by the bottom flanges of the girders or trusses and the soffit slabs, and laid in gypsum cement mortar.

Insert in Steel Specifications—

Complete steel erection diagrams and shop details prepared by the steel contractor shall be submitted to and approved by the Structural Gypsum Corporation for details affecting the Gypsteel Floor and Ceiling Construction (but not for design), before proceeding with fabrication.

Insert in Plastering Specifications—

All ceilings shall be formed of Gypsteel Pre-cast Ceiling Slabs.

Plaster shall consist of gypsum cement mortar mixed in the proportions of 1 part of neat gypsum plaster to not more than 2½ parts clean, sharp sand, by weight. Where necessary, the Gypsteel slabs shall be sprinkled slightly with water to reduce suction.

A scratch coat is unnecessary on Gypsteel ceiling slabs. The brown coat may be applied directly to the slabs, of sufficient thickness to take up any slight irregularities, but not less than ½-in. thickness at any point. Brown coat shall be laid on with sufficient pressure to force well into all joints and fill same solidly.

Bring brown coat to a straight and even surface to receive finishing coat. Darby lightly and use water sparingly.

***Note:** No lime shall be used in first coat.*

After brown coat has set, any type of finishing coat may be applied, including gypsum finish, lime putty finish gauged with gypsum gauging plaster, sand float finish, Keene's cement finish, etc.

Continued on next page

GYPSTEEL PRE-CAST GYPSUM ROOFS

General—Three Types

Gypsteel Pre-cast Roofs are constructed with Long Span Slabs and Short Span Slabs. These roofs have 13 major advantages of construction, economy and upkeep, but their methods of installation are different. Each has certain characteristics making it most adaptable to particular kinds of construction.

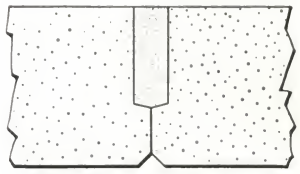
Gypsteel Long Span Suspension Type Pre-cast Roof consists of slabs up to 7 ft. long, spanning the distance between and resting on the top flanges of the main roof purlins. No secondary steel framing is required. The purlins may be spaced to suit the convenience of design up to 7 ft.

Gypsteel Short Span Pre-cast Roof consists of slabs 30 in. in length, resting upon and supported by the bottom flanges of subpurlins, usually tees, angles, light rails, or the Gypsteel subpurlin of exclusive design.

Gypsteel Assembled Pre-cast Roof is a combination of Long Span and Short Span roofs. Standard 30-in hollow short span slabs are assembled in the factory between special rolled steel subpurlins, properly designed to carry the total roof load, thus combining the economies of quantity manufacture of a standard-size product, with the simplicity of long span slab erection.

The composition of which all Gypsteel slabs are made is purest calcined gypsum, with which is mixed a small percentage of fiber that acts as a binder and imparts to the slabs their peculiar toughness and elasticity.

A highly important and patented detail of all Gypsteel Pre-cast Slabs is the narrow beveled rib moulded along the sides at the bottom edges. These ribs on adjacent slabs abut each other, forming an open joint ½ in. wide extending downward from the top surface more than two-thirds of the slab depth. This slot, when solidly filled with Gypsteel gypsum grout, makes a tight, sealed joint that prevents the asphalt or pitch of the waterproofing from seeping through the side joints when it is softened by the sun in warm weather.



Side View of Gypsteel Pre-cast Slabs
Showing patented side joint to give tight joint

Where Each Type Is Used

For maximum economy and simplicity of construction the Gypsteel Assembled Roof is recommended for all general roof construction.

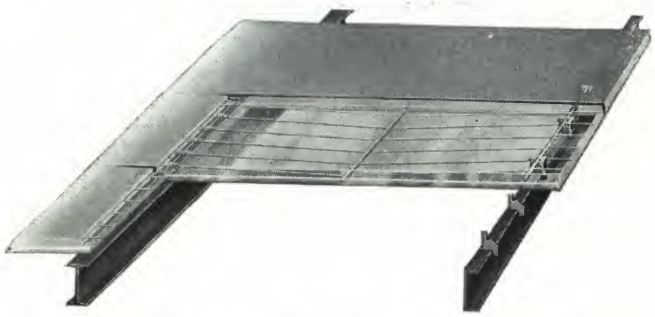
Where the paneled effect in the ceiling made by the exposed bottom flanges of the Gypsteel subpurlins may not be acceptable, or where manufacturing processes producing high temperatures and humidities may cause excessive condensation to form on the subpurlins, the Gypsteel Suspension Type Long Span Roof is offered. This system, with its smooth ceiling formed by slabs passing entirely over the supporting steel, gives an unusually pleasing appearance and the highest possible insulation.

For curved surfaces, very irregular roofs, or those with numerous hips, valleys or dormers, the Gypsteel Short Span Roof is most adaptable.

Gypsteel Pre-cast Roofs are used for all types of industrial buildings, apartment houses, churches, clubs, garages, hospitals, hotels, office buildings, public buildings, schools, theatres and similar buildings.

What Gypsteel Suspension Type Pre-cast Long Span Roofs Are and How Installed

Gypsteel Suspension Type Pre-cast Roof Construction consists of closely spaced steel cables in deflection and tension, embedded in and entirely supporting pre-cast slabs of Gypsteel gypsum composition, as illustrated in the phantom drawing.



Phantom View of Gypsteel Suspension Type Pre-cast Long Span Roof Construction
Showing cable ties, anchorage and grouted ends, side joints, anchor slots, cables in deflection and tension running through slabs, ends of cables tied together and hammered down in depression between slabs

The Gypsteel slabs are moulded at the factory in steel forms, in which the steel cables are placed and held in uniform deflection and tension. Each cable in the finished slab emerges within ¾ in. of the top of the slab surface, and projects not less than 2½ in. beyond the ends of the slab.

The slabs are laid from center to center of the main roof purlins, abutting cables are twisted together and hammered down into the recesses, while at the sides of the building they are securely anchored to the steel frame. All joints are then grouted to form, in effect, a monolithic roof. As soon as grout has set, waterproofing may be applied. There is no waiting for the roof to dry out, or for forms to be stripped.

Gypsteel Suspension Type Pre-cast Roofs are suitable for all classes of roofs not excessively steep in pitch, and having rectangular areas.

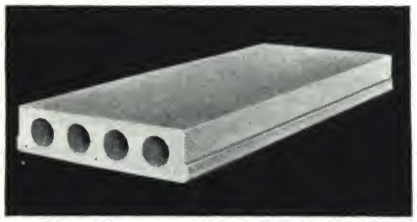


Installation of Suspension Type Roof
Projecting cables are tied together, hammered down, and joints grouted

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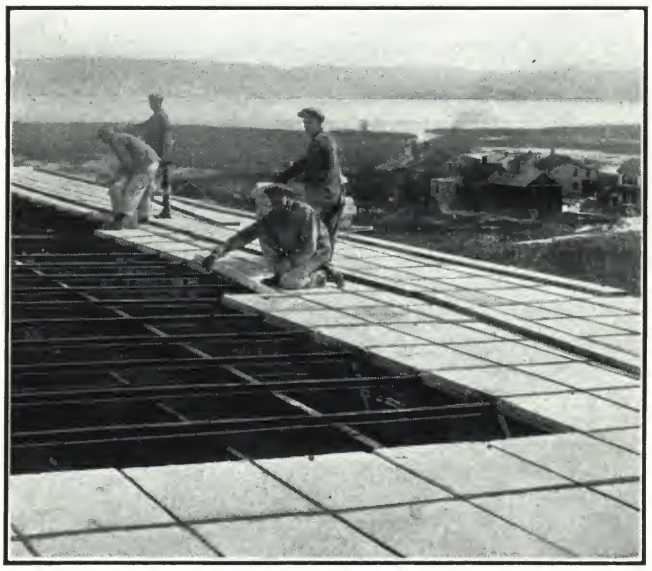
What Gypsteel Pre-cast Short Span Roofs Are and How Installed

Gypsteel Pre-cast Short Span Roofs consist of reinforced rectangular solid or hollow slabs of Gypsteel composition manufactured in standard length of 30 in. only. The solid slabs are 24 in. wide and come in 2½, 3 or 3½-in. thickness. The hollow slabs are 12 in. wide and 3-in. thick. These slabs are set on subpurlins which span the distances between and rest upon the main purlins or trusses, to the top flanges of which the subpurlins are either bolted, clipped or spot welded. The simplicity of its design and installation permits speedy erection with inexperienced labor.



3-in. Hollow Short Span Slab

Short Span roofs are particularly adaptable to buildings where the pitch is unusually steep or cut up by hips and valleys, or where there are dormers or many other irregular openings. Supported by Gypsteel subpurlins where the main purlins are not over 7 ft. 9 in. on centers, or by 16-lb. light rails if the spans are greater, they are very economical on the usual factory or flat pitched type of roof.



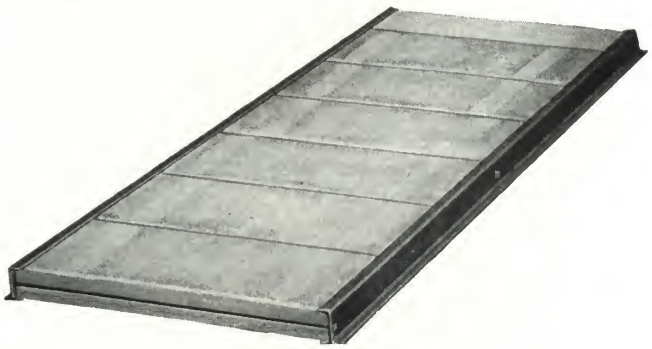
Installation of Gypsteel Pre-cast Short Span Roof

The slabs are set on the flanges or horizontal legs of light rail, tee, angle or Gypsteel subpurlins, spaced about 30½ to 31½ in. on centers—each slab spanning one of the subpurlin spacings. The spaces between the ends of the slabs, and over the intervening railheads, stems of tees, or vertical legs of angles, are solidly filled with gypsum grout, which is leveled flush with the top surface of the slabs.

What Gypsteel Pre-cast Assembled Slab Roofs Are and How Installed

Gypsteel Pre-cast Assembled Roofs give maximum economy and simplicity, combining the advantages of Long Span and Short Span roofs, as already described.

Gypsteel Pre-cast Assembled Roofs are recommended for all types of rectangular shaped roofs, pitched or flat, where conditions of high humidity are not normal in the building. As the slabs are hollow, they are not recommended where copper, slate, or tile roofing is to be nailed direct to the slabs.



Assembled Slab

Showing hollow short span slabs between patented Gypsteel subpurlins

Standard Gypsteel Pre-cast 30-in. hollow roof slabs are assembled *at the factory*, between Gypsteel subpurlins of exclusive design, to form units 30 in. wide that span the distance between and rest upon the top flanges of the main roof purlins. Of rolled steel, the strength of these subpurlins is readily calculable, and is more than twice as great as any section of equal weight that can be used for similar purpose. Based upon accepted engineering design, this construction will safely carry a live load of 30 lbs. per sq. ft. on purlin spacings up to 7 ft. 9 in.



Installing a Gypsteel Pre-cast Assembled Slab Roof

The complete units are erected in continuous lines approximately 30½ in. apart. The space between is then filled with Gypsteel Pre-cast Short Span hollow slabs, which rest upon the outstanding lower flanges of the factory assembled units. All joints between the sides and ends of the slabs are then flushed full with gypsum grout, which is brought level with the top surfaces of the slabs.



ELEMENTS OF GYPSTEEL SUBPURLINS

Weight per linear foot	2.64 lbs.
Area	.775 sq. in.
Moment of inertia	1.079 in. 4
Section modulus	.603 in. 3

TOTAL LOAD CARRYING CAPACITY IN POUNDS PER SQUARE FOOT

Based on 30-in. spacing

M = WL/8 S = 18,000 Maximum deflection .268 in.

Span	5′–0″	5′–6″	6′–0″	6′–6″	7′–0″	7′–6″
Load, lbs. sq. ft.	115	95	80	68	59	51

Continued on next page

GYPSTEEL PRE-CAST ROOFS HAVE 13 MAJOR ADVANTAGES

(1) Fire Resistance

The gypsum composition used in Gypsteel Pre-cast Roofs is universally accepted as the highest class fireproofing material. Gypsteel Pre-cast Roof Construction provides such high resistance to fire that insurance underwriters offer rates on buildings with Gypsteel Roofs, unsprinklered, that are as low as the rates quoted for wooden roofs with automatic sprinklers.

(2) Savings in Fuel and Heating Plant

Because gypsum is an unusually effective heat insulator, Gypsteel Pre-cast Roofs bring a substantial saving in fuel consumption and original investment for heating equipment.

We have available upon request, copies of a report of Prof. Chas. L. Norton on the relative effectiveness of various roofs in preventing condensation and heat loss, containing formulae and tables from which may be readily determined the saving in fuel and heating equipment by using Gypsteel Pre-cast Roofs.

(3) Preventing Damage from Condensation and Drip

Condensation occurs when the temperature of the underside of a roof falls but a few degrees below the room temperature. This fall in temperature is the result of heat-loss *through* the roof deck, or the flow of the indoor heat to the colder outdoor air.

By reason of its high insulating value, a Gypsteel Pre-cast Roof prevents condensation from forming under conditions of humidity and differences in indoor and outdoor temperatures that would cause drip from other types of roofs. The condensation points under wide ranges of humidity and temperature are charted for Gypsteel and other types of roofs in the report of Prof. Chas. L. Norton, a copy of which will be sent upon request.

Condensation and drip must be prevented if damage to machinery and goods, as well as roof repairs and replacements, are to be avoided. Where the humidity within a building might cause condensation to form upon the bottom flanges or subpurlins supporting the roof, this condition may be avoided by using the Gypsteel Suspension Type Roof which spans the distance between and passes over the top flanges of the main roof purlins.

(4) Strength and Safety

Each type of Gypsteel Pre-cast Roof is based upon the most conservative design. The load carrying members supporting the Assembled Construction are rolled steel sections, the capacity of which is calculated in accordance with the standard practice of the A. I. S. C. The pre-cast slabs used in both this and the Short Span Construction *span only 30 in.* and by actual tests of recognized laboratories will *safely sustain many times the normal roof loads.*

The Long Span Suspension Type Construction is based upon the principle of the suspension bridge; continuous cold drawn steel cables, anchored at the eaves to the steel frame, carry the entire load. The compressive value of the Gypsteel Composition is not considered as in reinforced concrete design.

(5) Economy—Lightness

The extremely light weight of Gypsteel Pre-cast Roofs permits of a substantial reduction in the weight of supporting steel, and in the foundation, as compared to many other types of fireproof roof construction.

This saving in structural steel, combined with the moderate cost of Gypsteel slabs resulting from quantity production by modern machinery, makes them one of the most economical of fireproof, insulating roofs.

(6) Attractive Appearance

The smooth undersurface of Gypsteel Pre-cast Roof Slabs gives an attractive appearance, reflects a maximum amount of light, and does not collect dirt or dust.

(7) Speed and Ease of Installation

Absence of form work and drip during installation makes Gypsteel Pre-cast Roofs easy and rapid to install. The almost incredible speed with which Gypsteel Pre-cast Roofs can be installed represents a real, calculable saving to both owner and contractor. There are no forms to erect or strip, no concrete to set. Since no water is employed in the installation of Gypsteel Roofs (except the negligible quantity used to mix the grout for the joints) no time is wasted in waiting for slabs to dry. Roof decks can be laid and the work carried ahead as rapidly as the steel work permits. Waterproofing can follow the erection of the roof slabs at once.

(8) Winter Work

Gypsteel Pre-cast Roofs can be installed in any weather in which men can work, so long as supporting steel is not encased in ice. Absence of water from the operation makes winter work practical and results certain.

(9) Non-corrosiveness

The gypsum composition used in Gypsteel Roof Construction is an effective preservative against corrosion of the encased steel. Gypsum slabs removed from buildings during alterations, after having been in place for more than 20 years, have in all cases shown the encased cables to be entirely free from corrosion.

(10) Durability and Longevity

A Gypsteel Pre-cast Roof is *permanent.* It eliminates repairs, maintenance and renewals. It offers an ideal surface for application of waterproofing.

(11) Cooler in Summer

Comparative tests under identical conditions have shown that the temperature beneath a Gypsteel Pre-cast Roof is substantially lower in summer than that below many other roofs.

(12) Non-expansiveness

Because gypsum has a coefficient of expansion of practically zero, Gypsteel Pre-cast Roofs do not crack or spall due to extreme variations in temperature. This property of Gypsteel Roofs is particularly important in industrial buildings having an unbroken stretch of roof area many hundreds of feet in length.

(13) Resistance to Vibration

Gypsteel Pre-cast Roofs do not crack under the vibration of roof structure frequently encountered in certain industrial processes. They resist vibration because of their toughness and elasticity. Gypsteel composition is sufficiently elastic to absorb or cushion vibrations and pulsations without any tendency to crack or spall.

Continued on next page

DETAILS AND SPECIFICATIONS OF LONG SPAN, SHORT SPAN AND ASSEMBLED SLAB ROOFS

Details of Suspension Type Long Span Design

In designing Gypsteel Suspension Type Roof Construction, the cost, both for labor and material, is reduced if the purlins run perpendicular to the longest dimension of the building. Under these conditions the slabs are so placed as to run the long way of the building, thereby requiring less anchorage and consequently necessitating less time in fastening the slabs to the end purlins.

The strength of Gypsteel Suspension Type Roofs is due to the suspension principle of design employed. For this reason, the supporting cables must be securely anchored at their ends. End or anchorage purlins must therefore be provided at the outside walls as well as at inside points, such as at the bases of monitors, ventilator frames, etc.

In all instances the anchorage steel members should be placed with the flanges turned out, so that the anchors can be attached to the top flanges. If, however, other details require that these end purlins be set with the flanges turned in, angles should be riveted to the backs of the channels, with the top surfaces of the angles and of the purlins in the same plane.

If the supporting purlins have flanges less than 2½ in. in width, it is necessary to use bearing plates for the temporary support of the slabs until the supporting suspension cables are tied up and grouted. When these are necessary they are furnished with the Gypsteel Slabs.

Tie-rods should be specified as it is practically impossible for the steel erectors otherwise to set and hold purlins true to line.

Since the supporting steel cables are placed in tension as well as deflection, the resulting pull exerted upon the end purlins or trusses must be allowed for. This is ordinarily done by means of angle and tie-rod bracing.

This bracing should be shown on the steel drawings, and provided by the steel contractor during fabrication, at considerably less cost than if it were cared for under separate contract.

The maximum unsupported overhang is 12 in. beyond the outside edge of the anchorage purlin. Where such an overhang is partially supported by a wall, it may extend not over 18 in. beyond the outside edge of the anchorage purlin, and not over 12 in. beyond the outside face of the wall, providing the over-all length of the slab does not exceed 7 ft. 6 in.

At the sides of the building where slabs are not anchored, the overhang must not extend more than 6 in. beyond the outside face of the wall, end of purlin, or other support.

The maximum span allowable with Gypsteel Suspension Type Pre-cast Roofs is 7 ft.

Specifications for Gypsteel Suspension Type Pre-cast Long Span Roofs

All roof decks shall consist of Gypsteel Suspension Type Pre-cast Roofs manufactured by the Structural Gypsum Corporation. The slabs shall be moulded at the factory and be designed to safely carry a live load of .... lbs. per sq. ft., with a factor of safety of 4.

The load shall be supported by cables, consisting of $\frac{3}{16}$-in. cold drawn steel wires, embedded in each slab and spaced at proper distances apart to develop the above live load capacity with a factor of safety of 4. These cables shall have been put into uniform deflection and tension by means of steel deflection-rods, at the center of each slab, rigidly restrained at the sides of the mould. The cables shall project not less than 2½ in. at each end of the slab.

The slabs forming the end—or anchorage panel—shall have embedded at the anchorage end ⅝-in. round steel bars. These bars shall be rigidly restrained at the sides of the mould, so as to permit of the supporting cables being put into uniform deflection and tension after the cables have been securely fastened to said bars and before the Gypsteel Composition is poured into the mould. By means of cores, slots shall be formed in the slab at the anchorage end to receive the anchors, the anchorage bar, embedded in the slab, spanning these slots.

The slabs shall be laid in place on the purlins, with their ends abutting each other. In erecting the anchorage slabs, the Gypsteel Anchors (made from heavy steel plates) shall be set in place on the flanges of the end purlins and the slabs lowered into position, the anchors coming up through the slots with their necks inside of the exposed anchorage bar in the slots. The slab shall then be pulled inward until the bar engages the anchors snugly, and the slots flushed full of gypsum grout, embedding the anchors and the bar, where the latter spans the slots.

The supporting cables, projecting from the ends of the slabs, shall be firmly tied up to each other so as to become continuous from one anchorage point to the other. When tied, the ends of these cables shall lie in the depression formed by the rabbeted ends of the slabs, and this depression shall be filled solidly with a gypsum grout, which shall be leveled off so as to form a smooth surface with the tops of the slabs. A special device designed and manufactured by Structural Gypsum Corporation shall be employed for tying of these cables to insure each tie being uniformly tight and without play.

Where overhanging eaves are shown, these shall be formed as part of the end or anchorage slab, by continuing the supporting cables entirely around the embedded anchorage bar, so that the cables project beyond the bar to within ¼ in. of the edge of the overhang. The overhang shall then be poured with and become part of the end slab.

Insert in Mason's Specifications—

In case the eave purlin or any purlin to which it is necessary to anchor the slab is buried in a wall, or the anchor flange comes within less than 1½ in. of a wall, the mason contractor shall not carry the brickwork above the lower flanges of the wall purlins or trusses until the roof slabs have been set in place, in order to permit of the slabs being anchored to the upper flanges; except where parapet walls occur, in which case the mason contractor shall leave recesses or form corbels at the proper level to receive the ends of the slabs.

(Also add General Specifications for all Gypsteel Pre-Cast Roofs, on following page.)

Details of Short Span Design

The subpurlins supporting the Gypsteel Short Span Slabs should be erected in parallel lines, and in the same plane, approximately 30½ to 31½ in. on centers, depending upon the type of section used, thickness of stem, etc. Along hips and valleys provide support for the diagonal sides of the slabs. On pitched roofs, where the subpurlins run up and down the slope, provide, at the foot of all slopes, stop angles or masonry to take the thrust.

Specifications for Gypsteel Pre-cast Short Span Roofs

All roof decks shall consist of Gypsteel 3-in. Hollow Short Span Pre-cast Roof Slabs (or solid—2½, 3 or 3½ in. thick), manufactured by the Structural Gypsum Corporation. These slabs shall be supported by subpurlins designed safely to carry a live load of —— lbs. per square foot.

Slabs shall span the distance between, and rest directly upon, the horizontal flanges of the subpurlins. The joints between the sides of the slabs formed by beveled ribs moulded along the bottom side edges, and the spaces between the ends of slabs, are to be flushed solid with gypsum grout, and leveled off flush with the top surface.

(Also add General Specifications for all Gypsteel Pre-Cast Roofs, on following page.)

Details of Assembled Slab Design

No supplementary subpurlins, bracing, etc., beyond that required for ordinary roof construction, is necessary for Gypsteel Assembled Roofs. It is unnecessary to provide supporting steel at the eaves providing the masonry is built to, or a shelf is left at, the proper level to support the slabs.

For maximum economy, purlins should be spaced 7 ft. 9 in. where a 30-lb. live load is acceptable and 7 ft. where 40 lb. is required. Contrary to the Long Span Construction, it is more economical if the purlins run parallel to the length of the building. This applies particularly to sawteeth, where purlins should run across the slope, or to other narrow runs, where they should run the length of the area.

Where necessary, in order to take up any thrust in the roof, steel plates are riveted to the bottom flanges of the Gypsteel Subpurlins at their up-slope ends. These plates pass over and are bent around the top flanges of the main roof members. At the eaves, a small plate is welded across the end of each subpurlin to prevent movement of any of the field slabs due to the roof slope.

Specifications for Gypsteel Pre-cast Assembled Slab Roofs

All roof decks shall be of Gypsteel Pre-cast Assembled Roof Construction, manufactured by the Structural Gypsum Corporation. Units of a length to span the distance between purlins, shall be factory assembled from Gypsteel Subpurlins and Gypsteel Hollow Roof Slabs, 3 in. thick, 12 in. wide, 30 in. long. These units shall span the distance between and rest upon the top flanges of the roof purlins, and shall be erected

Continued on next page

in parallel lines approximately 30½ in. apart. Between the assembled units shall be placed individual Hollow Roof Slabs, of the same size as used in the composite slab, resting upon the outstanding bottom flanges of the Gypsteel Subpurlins.

The joints between the sides of the slabs formed by beveled ribs moulded along the bottom side edges, and the spaces between the ends of slabs, are to be flushed solid with gypsum grout, and leveled off flush with the top surface.

(Also add General Specifications for all Gypsteel Pre-cast Roofs, immediately following.)

General Specifications for all Gypsteel Pre-cast Roofs, to Be Added to Specifications for Each Type As Given

Curbs under and heads over sash shall be constructed of 3-in. slabs of Gypsteel Composition, properly reinforced when necessary with rods and left ready for waterproofing. These slabs shall be laid in place between angles properly spaced and located to provide supports for same, and shall then be grouted with gypsum cement mortar and left ready for waterproofing.

Gable and Sawtooth Ends—Gable ends and the ends of sawteeth should be built of 3-in. blocks of Gypsteel Composition, laid in gypsum cement mortar, with joints struck neatly. With this form of construction, the outside surface should be protected with built-up or composition waterproofing. On high walls, steel framework must be provided behind the wall so that it may be tied at intervals. The diagonals of trusses are usually sufficient for this purpose. Provision should be made at the base of heavy walls for their support independent of the roof slab.

Insert in Steel Specifications—

Before proceeding with fabrication, the steel contractor shall submit drawings for checking by the Structural Gypsum Corporation, in order to insure all details being cared for which may be necessary to insure the proper installation of the Gypsteel Roof Construction—such as framing of all purlins with tops in the same plane, framing out of openings; bracing where necessary; position and spacing of angles supporting curbs, heads, etc.

Literature

Complete catalogue on Gypsteel Pre-Cast Roofs and Architects' Service Sheets are available on request to our Linden, N. J., office.

REPRESENTATIVE LIST OF GYPSTEEL PRE-CAST ROOF INSTALLATIONS

Owner	Building	Location	Architect
Virginia-Carolina Chemical Co.	Manufacturing Building	Richmond, Va.	Owners
City of Atlantic City	Convention Hall	Atlantic City, N. J.	Lockwood-Greene Engineers Inc.
Celanese Corp. of America	Solvent Recovery Building and Spinning Rooms	Amcelle, Md.	Owners
Union Smelting & Refining Co.	Warehouse	Newark, N. J.	The Austin Co.
Western Maryland Ry. Co.	McComas Street Terminal	Baltimore, Md.	J. E. Greiner & Co.
National Electric Products Co.	Steel and Rod Mill	Bayway, N. J.	United Engineers & Constructors
Sunbury Converting Works	Industrial Group	Belvidere, N. J.	W. E. S. Dyer
Sunbury Converting Works	Industrial Group	Sunbury, Pa.	Owners
Otis Steel Company	Warehouse	Cleveland, Ohio	Owners
Columbus Power & Light Co.	Substation	Columbus, Ohio	Owners
McCall Publishing Co.	Printing Plant	Dayton, Ohio	Lockwood-Greene Engineers Inc.
Dunkirk Radiator Corp.	Foundry and Machineshop	Dunkirk, N. Y.	Owners
Public Service Gas & Electric Co. of New Jersey	Gas Plant	Harrison, N. J.	Owners
R. H. Macy & Co. Inc.	Distributing Station	Hackensack, N. J.	R. D. Kohn and F. A. Holden
R. H. Macy & Co. Inc.	Distributing Station	Yonkers, N. Y.	R. D. Kohn and F. A. Holden
Western Electric Co.	Factory Buildings	Kearny, N. J.	Owners
Western Electric Co.	Factory Buildings	Baltimore, Md.	Owners
Western Electric Co.	Factory Buildings	Cicero, Ill.	Owners
Bethlehem Steel Co.	Factory Buildings	Lackawanna, N. Y.	Owners
Bethlehem Steel Co.	Factory Buildings	Lehigh, Pa.	Owners
Bethlehem Steel Co.	Office Building	Naginey, Pa.	Owners
Bethlehem Steel Co.	Factory Buildings	Barrackville, W. Va.	Owners
American Cyanamid Co.	Factory Buildings	Linden, N. J.	Owners
American Cyanamid Co.	Factory Buildings	Niagara Falls, Ont.	Owners
Yale Arena	Hockey Rink	New Haven, Conn.	R. W. Foote
New York, New Haven & Hartford R. R. Co.	American Ry. Express Building	New York, N. Y.	Owners
City of Philadelphia	Porter Street Pier	Philadelphia, Pa.	Department Wharves, Docks and Ferries
City of Philadelphia	Girard Piers 3 and 5	Philadelphia, Pa.	Department Wharves, Docks and Ferries
N. J. Zinc Company	Rolling Mill	Palmerton, Pa.	Owners
Robert Gair Company	Storage Building	Piermont, N. Y.	The Austin Co.
Bornot, Inc.	Dyeing and Cleaning Plant	Philadelphia, Pa.	S. G. Mathews
Brown University	Athletic Building	Providence, R. I.	Clarke & Howe
Pennsylvania R. R. Co.	Produce Terminal	Philadelphia, Pa.	Owners
Pennsylvania R. R. Co.	Produce Terminal	Pittsburgh, Pa.	Owners
Pennsylvania R. R. Co.	Freight Houses	Trenton, N. J.	Owners
Whitaker Paper Co.	Warehouse	Pittsburgh, Pa.	Robt. Maurice Trimble
Metropolitan Resources, Inc.	Manufacturing Plant	Queensboro, L. I., N. Y.	Lockwood-Greene Engineers Inc.
Rosedale Knitting Mills	Knitting Mill and Boiler House	Reading, Pa.	Owners
Missisquoi Pulp & Paper Co.	Plant Addition	Sheldon Springs, Vt.	Owners
American Radiator Co.	Factory Buildings	Buffalo, Boston and St. Paul	Owners
First National Stores, Inc.	Garage and Assembly Plant	Somerville, Mass.	Monks & Johnson
U. S. Hoffman Machine Co.	Foundry	Syracuse, N. Y.	Lockwood-Greene Engineers Inc.
J. Spalding & Sons Co.	Tube Making Room	Tonawanda, N. Y.	George F. Hardy
John A. Roebling's Sons Co.	Rolling Mill	Trenton, N. J.	John W. Ferguson Co.
John A. Roebling's Sons Co.	Locomotive House	Roebling, N. J.	Owners
Connecticut Company	Car Barns	Waterbury, Conn.	R. W. Foote
Hood Rubber Company	Factory Addition	Watertown, Mass.	Owners
J. Frank Darling Co.	Oven Building "B"	Wilmington, Del.	Monks & Johnson
Arrowhead Steel Products Co.	Manufacturing Building	Buffalo, N. Y.	Owners
Congdon & Carpenter	Warehouse and Office Building	Providence, R. I.	Jenks & Ballou
Westinghouse Electric & Mfg. Co.	Service Building and Warehouse	Newark, N. J.	Bernard H. Prack
J. B. Lyon Paper Co.	Printing Plant	Albany, N. Y.	H. Chapman
Baltimore & Ohio R. R. Co.	Fruit Terminal	Baltimore, Md.	Owners

AMERICAN CEMENT TILE MFG. CO.

INCORPORATED FEBRUARY 1902

Manufacturers of Cementile Roofing

Oliver Building, PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK, N. Y., Woolworth Building
PHILADELPHIA, PA., 34 So. 17th Street
BOSTON, MASS., 832 Park Square Building
BIRMINGHAM, ALA., 2700 North 23rd Street
ATLANTA, GA., 1007 Candler Building

WORKS: WAMPUM, PA.; LINCOLN, N. J.; BIRMINGHAM, ALA.

Products

Manufacturers of "CEMENTILE"—a reinforced cement tile roofing.

CEMENTILE
TRADE-MARK

Description of "Cementile"

"Cementile" are very large, light, steel reinforced cement roofing tile furnished in three distinct types; namely, Interlocking, Flat, and Channel, besides such necessary fittings as ridge tile of various types, skylight or glass insert tile, flashing tile, collar tile, etc., all factory made and cured—a specialized product, brought to its highest state of development.

The tile are laid directly on open steel roof purlins (which are spaced on a span suitable for the type of tile selected).

In no case is sheathing or other base support required. This eliminates excessive weight and insures greatest economy in design of the supporting structure.

All in all, "Cementile" roofs are roofs of economy and quality, speedily laid, with guaranteed results backed by our established reputation as manufacturing and contracting engineers over a period exceeding 25 years.

Interlocking "Cementile" are designed for pitched roofs. Laid directly on purlins spaced approximately 4 ft. apart, they are fireproof and waterproof, the finished surface having a particularly pleasing red Spanish tile effect. Like Flat "Clementile" and Channel "Cementile" they are very strong and light.

Flat and Channel "Cementile" are designed for flat roof construction, or for pitched roofs where it is desired to waterproof with composition covering. These tile are laid directly on purlins; the 1½-in. Flat "Cementile" for standard spacing of 5 ft., and the Channel "Cementile" standard 8-ft. spans, are a combination of tremendous strength and lightness that eliminates all form work and assures speed in erection with positive results.

Advantages of "Cementile"

Weight—These tile are designed along economical lines, reducing the dead load on the steel structure to a minimum.

Strength—In conformity with the standard purlin spacing, "Cementile" roofs will sustain such roof loads as are usually encountered. Breaking load tests made at Columbia University for the New York Building Department, showed as high as 350 lb. per sq. ft. under a uniformly distributed load on the standard spacing.

Adaptability—"Cementile" will be found suitable for any type of roof construction and of any size.

Life—It is evident that no material can surpass the performance of reinforced concrete. "Cementile" is not affected by moisture, heat, fumes, smoke or weather. It is absolutely fireproof and never loses its strength under any conditions of service.

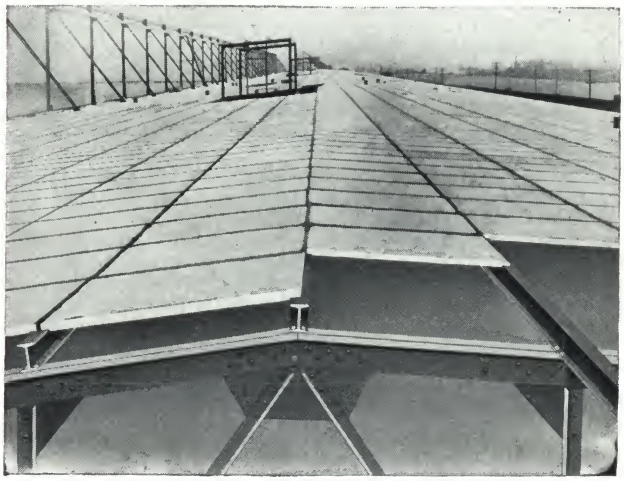
Economy—Being laid directly on the roof purlins, the absence of roof boarding, nailing strips and other forms of fastenings makes the initial cost reasonable. Maintenance charges are eliminated, thus making the first cost usually the last.

Service

Our engineering department renders free service to owners, engineers, architects and contractors whenever desired. Send your problems and preliminary plans during the early stages of the work. Our experience of 25 years allows us to offer suggestions as to the most economical purlin layout. Upon receipt of preliminary or finished drawings, either approximate or definite proposals will be furnished, as may be desired.

"Cementile" roofs are erected preferably by experienced and efficient crews maintained by the company.

All materials and workmanship fully guaranteed.



Lehigh Valley R. R. Co. Pier Shed, Jersey City, N. J.
110,000 sq. ft. of Flat "Cementile" ready for waterproof covering



General Electric Company, West Lynn, Mass.
More than 370,000 sq. ft. of Red Interlocking "Cementile" was used on 16 separate buildings

FEDERAL CEMENT TILE COMPANY

Precast Reinforced Concrete Roof Slabs

608 South Dearborn Street, CHICAGO, ILL.

Featherweight Concrete Insulating Roof Slabs

These slabs represent the highest development in permanent, fireproof, no-maintenance roof construction. They are made of Haydite aggregate (trapped air cells) instead of sand, *weigh as low as 10 lb. per sq. ft.,* are strong, and possess new insulating value. These slabs go on the same light steel frame that carries other roofs. Used for flat or sloping roofs. Composition covering required.

Federal Interlocking Slabs for Pitched Roofs

Form a complete waterproof roof, entirely eliminating all composition covering. Their attractive red color enhances the appearance of the building.

Federal Glass Tile

Used in combination with Federal Interlocking Slabs for top lighting, these tile form an ideal "daylight roof." Can be so distributed as to admit light over entire floor space, or concentrated on any operation. Glass is embedded in the concrete during manufacture.

Featherweight Nailing Concrete Slabs

Form a fireproof concrete deck to which slate, ornamental tile, copper or other roofing can be directly nailed.

Federal Cork Insulated Slabs

Afford a splendid superinsulation for use in extreme conditions, as for instance on certain types of paper mill buildings.

The Roof for Permanence

Federal Slabs are made of the most indestructible of all materials—reinforced concrete. They are not affected by heat, cold, ice, snow, fire, water, acid fumes, gases, or any other destructive forces. They actually grow stronger with age. Laid directly on structural steel, they make a lightweight, fireproof construction requiring no painting, repairing or replacement. The slabs carry a load well above all building code requirements. Federal is the lowest cost permanent roof obtainable. Over a hundred million square feet in use.

Service and Structural Details

All Federal roofs are installed and fully guaranteed by us. Our engineers will gladly suggest the most economical layout of both steel and slabs without charge or obligation. "Catalog and Roof Standards" on request.

Condensed Specifications

Note: For more detailed specifications see our "Catalog and Roof Standards"

Roof Deck Slabs

All slabs to carry approximately 250 lb. per sq. ft. breaking load uniformly distributed when resting on supports spaced the same as the purlins. All slabs to be as nearly perfect as good workmanship will permit and no cracked, broken or warped slabs are to be placed in the roof. Manufacture shall not be started until this contractor has secured approval of his precast slab details. All slabs are to be erected by or under the supervision of the manufacturer.

Roof decks are to be precast Featherweight Concrete Insulating Roof Slabs of Haydite aggregate, weighing 10 lb. per sq. ft. for spans to 6 ft. 8 in., 12 lb. per sq. ft. for 8 ft. spans. The leg of each slab is to be reinforced with one deformed bar accurately placed and the web with a sheet of *galvanized welded* wire mesh accurately centered. The slabs are to be vibrated to give greatest possible density and a finished ceiling effect to the underside.

All joints of the channel slabs are to be cemented on the upper side with an approved brand of asphaltic cement and the finished deck present a smooth surface ready for the application of the roof covering.

Nailing Concrete Slabs

All slabs to carry approximately 250 lb. per sq. ft. breaking load uniformly distributed when resting on supports spaced the same as the purlins. All slabs to be as nearly perfect as good workmanship will permit and no cracked, broken or warped slabs are to be placed in the roof. Manufacture shall not be started until this contractor has secured approval of his precast slab details. All slabs are to be erected by or under the supervision of the manufacturer.

Where specified, the roof decks are to be precast Featherweight Nailing Concrete Slabs similar in design to the standard flat slab 5 ft. 4 in. and under, and to the channel slab 5 ft. 4 in. up to 6 ft. 6 in., but with an added top section of 1½ in. of nailing concrete cast integral with the Featherweight Concrete bottom section. Weight not more than 20 lb. per sq. ft. No plastic cement required in the joints.

Interlocking Slabs and Glass Tile

All slabs to carry approximately 250 lb. per sq. ft. breaking load uniformly distributed when resting on supports spaced the same as the purlins. All slabs to be as nearly perfect as good workmanship will permit and no cracked, broken or warped slabs are to be placed in the roof. Manufacture shall not be started until this contractor has secured approval of his precast slab details. All slabs are to be erected by or under the supervision of the manufacturer.

Where specified, sloping roofs are to be Federal Reinforced Concrete Interlocking Slabs, the exposed surface of which is to present a smooth, permanent, red finish, and this color to penetrate the top one-half of the slab.

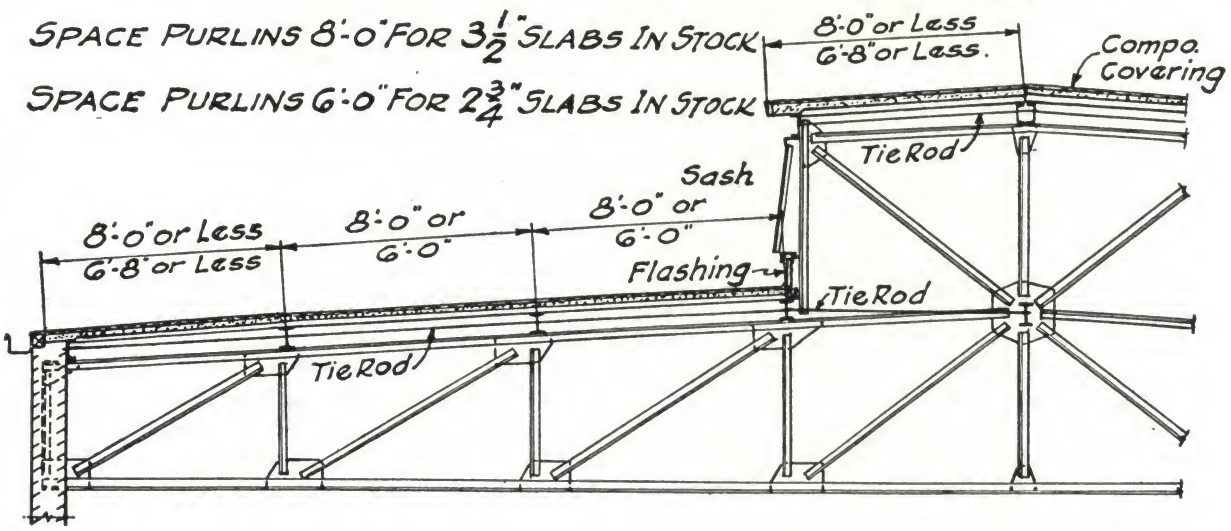
Each slab is to be reinforced with a sheet of galvanized cold drawn wire mesh accurately centered in the slab. The longitudinal wires to be spaced not more than 2 in. apart and cross wires woven around the longitudinal wires.

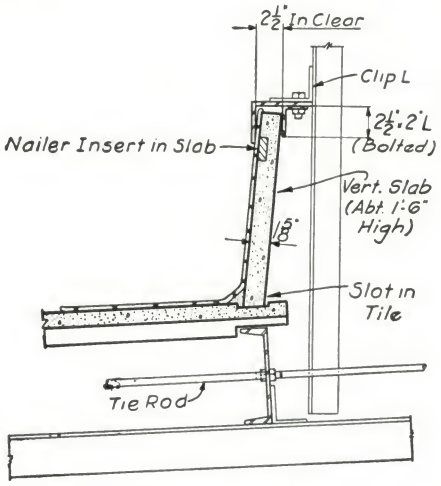
The longitudinal joints to be cemented with a high grade oil cement and a weather cap coat of highest grade elastic compound. The lap or cross joint to be a squeeze joint of high grade oil cement.

All trimmings, such as ridge roll, flashing slabs, finishing slabs, sawtooth ridges and ventilator collar slabs of the same specification as above, to be furnished as shown on the drawings.

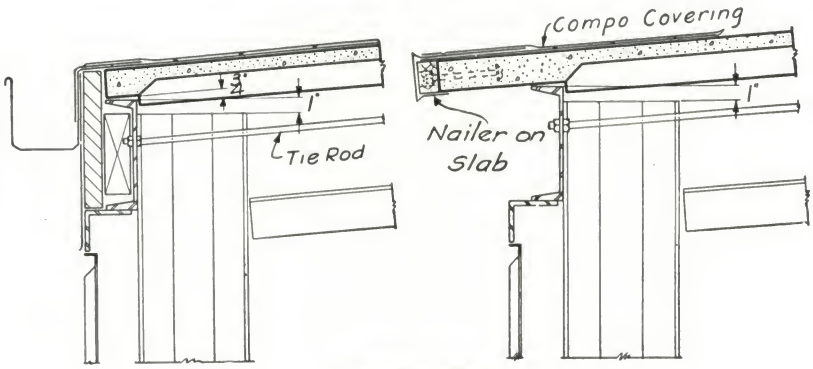
Where shown on the drawings, Federal Glass Tile are to be furnished. Each slab is to have a sheet of ¼-in. wire glass 21x35 in. embedded in the concrete with an expansion cushion, during the process of manufacture of the glass tile, thus becoming an integral part thereof.

Continued on next page

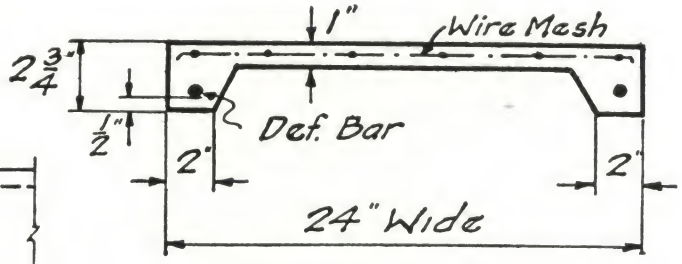




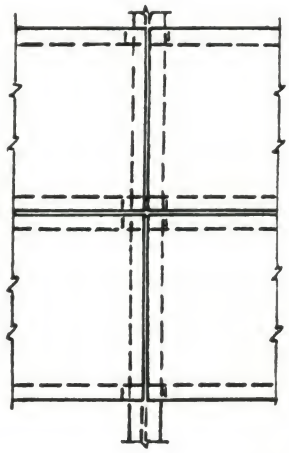
Flashing Detail



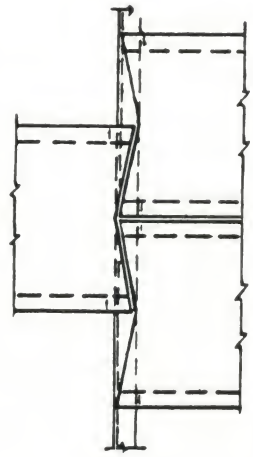
Eave Details



(Weight, 10 lb. per sq. ft.)



Construction on I-beam Purlins



Dovetail Construction on Channel Purlins

Featherweight Concrete Insulating Roof Slabs

Essential Data

Adapted to all roof decks, flat or sloping. Composition or other covering required.

Space channel or I-beam purlins 6 ft. for standard 2¾-in. channel slabs, maximum 6 ft. 8 in.—weight 10 lb. per sq. ft. Space 8 ft. for standard 3½-in. slabs—weight 12 lb. per sq. ft.

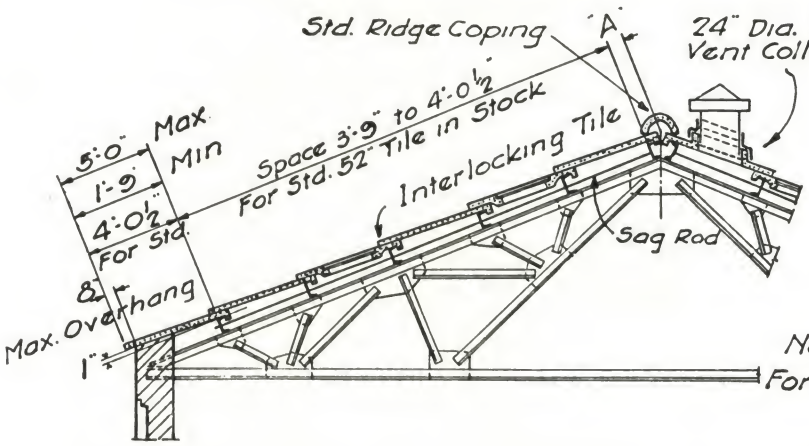
Safe carrying load, 60 lb. per sq. ft., factor of safety, 4.

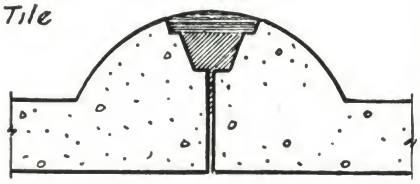
All joints are cemented on upper side with asphaltic cement and present a smooth surface for application of composition covering.

Slabs reinforced with deformed bars in legs and galvanized welded wire mesh in web.

See Specifications on preceding page

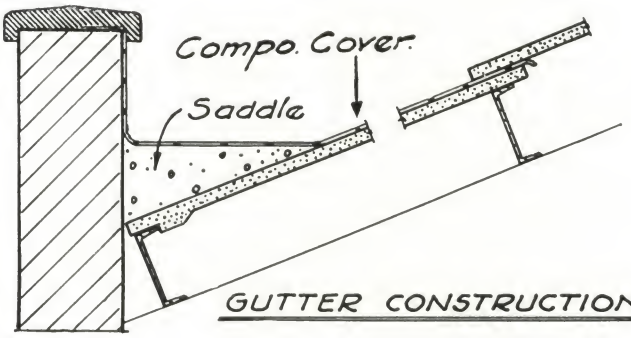
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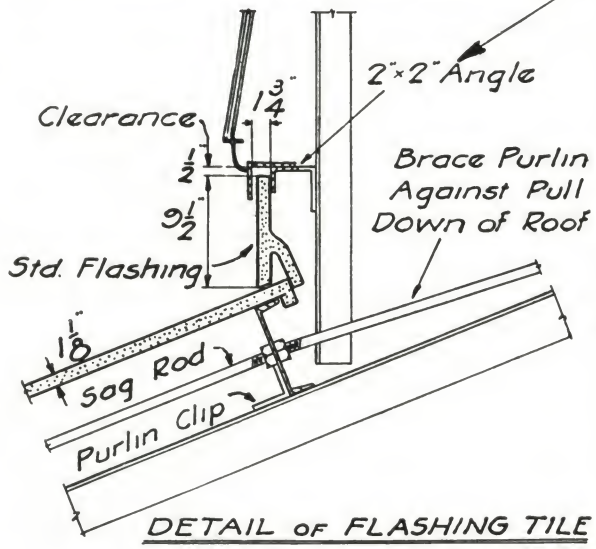


SECTION THRU JOINT

Note: Bolt Sill Angles To Allow For Removal In Placing Flashing



GUTTER CONSTRUCTION



DETAIL OF FLASHING TILE UNDER MONITOR WINDOWS

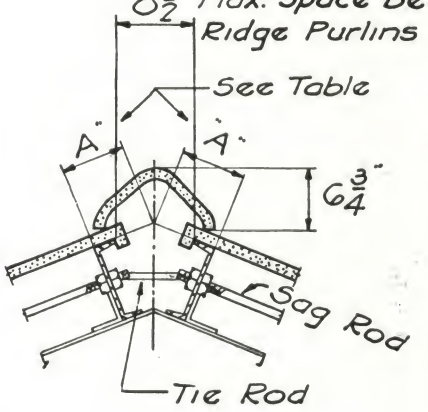


Table of Purlin Data at Ridge

Size of Purlins	⅓ Pitch Log.Sec.=.07985		¼ Pitch Log.Sec.=.04846		⅕ Pitch Log.Sec.=.03225	
	Dim "A"		Dim "A"		Dim "A"	
	Max	Min.	Max.	Min.	MAX.	Min.
9" [13.4#	9"	8⅝"	7⅜"	7⅛"	7⅛"	6⅛"
8" [11.5#	8⅛"	7⅛"	7¼"	6½"	7"	5¾"
7" [9.8#	8¾"	7"	7"	5¾"	6¾"	5"
6" [8.2#	8¾"	6¼"	7"	5¼"	6¾"	4½"
5" [6.7#	8½"	5⅜"	6¾"	4½"	6½"	4"
	Spec. Ridge Req.		Std. Ridge Stock		Std. Ridge Stock	

Federal Red Interlocking Slabs and Glass Tile

Essential Data

For use on slopes of not less than one-sixth pitch (4-in. rise in 12).

No composition covering required.

Weight 17 lb. per sq. ft.

Standard dimensions 52 in. long, 24 in. wide, 1⅛ in. thick.

Space channel purlins 3 ft. 9 in. to 4 ft. ½ in. back to back for stock length 52-in. tile. Maximum purlin spacing 5 ft. for special lengths.

Safe carrying load 60 lb. per sq. ft., factor of safety, 4.

Impervious slabs—attractive, permanent red color.

All joints and overlaps cemented with special elastic cement—guaranteed absolutely watertight.

Slabs reinforced with galvanized wire mesh.

May be used interchangeably with Glass Tile.

Each glass tile has sheet of ¼-in. wire glass 21x35 in. embedded in the concrete.

See Specifications on second preceding page

JOHNS-MANVILLE

EXECUTIVE OFFICES
292 Madison Avenue, NEW YORK, N. Y.

For Branch Offices, see section on Wall Tile

Products

JOHNS-MANVILLE TRANSITE, FLAT and CORRUGATED.
Also Packings for all purposes; Refractory Cements; Waterproofing and Dampproofing; Asbestos Ebony; Asbestos and Asphalt Roll Roofing; Rotproof Roofs; Asbestos products of all kinds.

For the following Johns-Manville products, see Manufacturers' Index: Acoustical Treatment and Sound Isolation; Shingles; Built-up Roofing; Celite for concrete and mortar; Home Insulation; Insulating Board and Plaster Lath; Insulations; Tile Flooring; Wall Tile.

JOHNS-MANVILLE TRANSITE, FLAT AND CORRUGATED, AND ASBESTOS WALLBOARD

Transite Corrugated Asbestos

Transite Corrugated Asbestos Roofing and Siding is made of asbestos fibres and portland cement united under great hydraulic pressure into dense, unlaminated, monolithic sheets of great strength and rigidity. It is designed for application directly over purlins or girts of skeleton steel or wood frame construction. It will not burn or rust, rot, split, crack or curl. It offers high resistance to acid fumes and atmospheric conditions which are fatal to many materials. It does not require paint as a preservative.

Transite can be readily punched, drilled or sawed and is secured with bolts, nails, screws, clips, etc., designed for that purpose.

Special shapes for use as ridge roll, corner roll, louvres, etc., are available, made of the same materials.

Sizes—The sheets are furnished 42 in. wide in lengths of 4 ft., 5 ft., 6 ft., 7 ft., 8 ft. and 8 ft. 6 in. They are $\frac{7}{16}$ in. thick at ridges and valleys of corrugations and $\frac{5}{16}$ in. thick at the slope. The corrugations are 4.2 in. pitch. The over-all thickness of the sheets is 1½ in.

The sheets are laid with an end lap of 6 in. and a side lap of one corrugation providing an exposed width of 37.8 in.

Weight—Approximately 4.1 lb. per sq. ft. or approximately 5 lb. per sq. ft. applied.

Color—Light gray.

Spacing of Supports—This material may be applied over supporting members spaced not to exceed the following: Purlins (roofing) 60 in. center to center. Girts (siding) 72 in. center to center.

Minimum Roof Pitch—Transite Corrugated may be applied to roofs having a slope or pitch of 2 in. to 1 ft. or greater.

Application—The method of applying this material is similar to that followed in applying other corrugated sheet materials.

Transite Flat

Transite Asbestos Wood is composed of the same materials and has the same characteristics as Transite Corrugated, but is furnished in flat sheet form. It has innumerable uses.

Sizes—The sheets are furnished 36x48 in., 42x48 in. and 42x96 in. in thicknesses of ⅛, $\frac{3}{16}$, ¼, $\frac{5}{16}$, ⅜, ½, ⅝, ¾, ⅞, 1, 1¼, 1½, 1¾ and 2 in. and greater up to 4 in. on special order.

Special Shapes—Ventilators, ducts and other special shapes are procurable on special order.

Asbestos Wall Board

Johns-Manville Asbestos Wall Board is composed of asbestos fibre, portland cement and coloring matter formed under hydraulic pressure into laminated sheets, strong, rigid, durable and fireproof. It is of a light cream color.

Although it has many of the characteristics of Transite it should not be used where subjected to severe conditions of heat, acid fumes and weather exposure. It may be most successfully employed as a fireproof material for lining garages and for covering walls and ceilings generally where the use of a wallboard possessing fireproof qualities is desirable or necessary.

Size—The sheets are furnished 48x48 in. and 48x96 in. in thicknesses of $\frac{3}{16}$, ¼ and ⅜ in.

Short Form Specification for Furnishing and Applying J-M Transite Corrugated Asbestos Roofing and Siding

Roofing and Siding

Where shown or indicated on drawings, the roofs and sides of building shall be covered with Transite Corrugated Asbestos Roofing and Siding (4.2 in. pitch) as manufactured by JOHNS-MANVILLE. The material shall be of solid monolithic, unlaminated construction, weighing approximately 4.1 lb. per sq. ft. and to be approximately $\frac{7}{16}$ in. thick at ridge and valley of corrugations and approximately $\frac{5}{16}$ in. thick on slope.

Sheets shall be 42 in. wide and of suitable length so that all end laps shall occur over a purlin or girt. Sheets shall be furnished with cut corners enabling material to be laid with side laps forming vertical lines.

Sheets shall be laid with 6 in. end lap and one corrugation side lap.

All side and end laps shall be formed with J-M Black Asbestos Roof Putty between the sheets.

Flashing (and Building Trim)

Where indicated on drawings Ridge Roll, Corner Roll, Louvres, and Flashing shall be of the same material as the roofing and siding. All other flashing to be of 4 lb. sheet lead.

Fasteners

J-M (corrosion-resisting finish) Fasteners shall be used. Heads of all fasteners on weather side of building shall be protected with J-M Asbestos Roof Putty, or with a heavy coat of white lead.

Method of Application

The method of application shall be in strict accordance with the manufacturer's standard erection instructions.

Note: Spacing of Supports: (to be provided for in specifications covering roof and wall framing):

The spacing of roof purlins shall not exceed 60 in. center to center; siding girts shall not exceed 72 in. center to center.

THE AEROCRETE CORPORATION OF AMERICA

Manufacturers of Aerated Concrete

51 East 42nd Street
NEW YORK, N. Y.

General Properties of Aerocrete

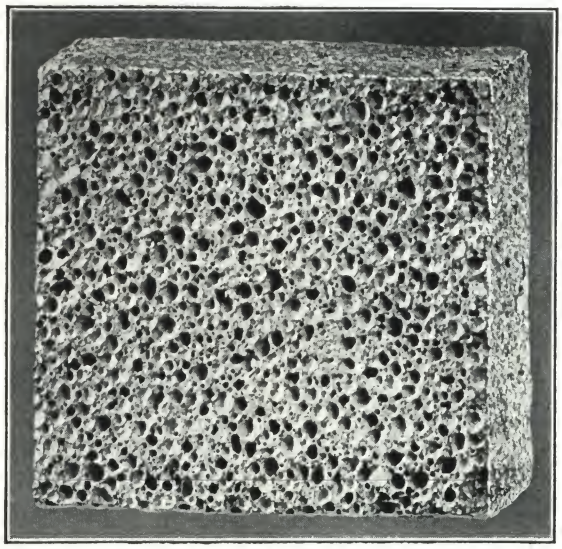
Aerocrete is a porous concrete made through the aeration of a mixture of cement, aggregates and water by the action of a specially prepared compound which is marketed by THE AEROCRETE CORPORATION OF AMERICA and added to the concrete mix on the job. The technique of mixing and placing Aerocrete is practically identical to that of ordinary concrete.

Being a concrete product Aerocrete has the permanence of ordinary concrete, but the introduction of pores in the material makes it light, highly soundproof, heat-insulating and fireproof. Proportions of mix as well as degree of aeration may be varied within wide limits and properties will vary accordingly.

Weight—Aerocrete can be made to weigh from 30 to 80 lb. per cu. ft. Stone concrete weighs 144 lb. per cu. ft.

Compressive Strength—The lightest grades of Aerocrete have a compressive strength of 250 lb. per sq. in. The strength increases with the weight. 80 lb. Aerocrete has a strength of 1300 to 1500 lb. per sq. in.

Soundproofness—Numerous comparative tests have established the superiority of Aerocrete as a deadener of sound.



Aerocrete Block Showing Actual Size Air Cells

Heat Insulation—The following table gives the relation between the density and conductivity of Aerocrete:

Density, lb. per cu. ft.	Conductivity B.t.u.'s per sq. ft. per inch thickness per degree F.
30	0.69
40	1.06
50	1.44
60	1.80
70	2.18

The conductivity factor for ordinary concrete, weighing 144 lb. per cu. ft. is around 8.

Fireproofness—Due to its high insulating qualities Aerocrete is more fireproof than ordinary concrete.

Application

Long Span Floor Construction—Aerocrete encasing continuous light weight bar joists or I-beams. Spans up to 24 ft. with total thickness for maximum span only 7½ in. Weight of floor including steel and fireproofing of girders 30 lb. per sq. ft. Flat ceiling. *Highly soundproof. Forms may be stripped after 1 or 2 days.*

Medium and Short Span Floor Construction—Structural Aerocrete used instead of concrete or cinder concrete. Spans up to 8 ft. Thickness of arch 4 in. Weight of floor including fireproofing and steel in reinforcement, beams and girders, 30 lb. per sq. ft. *Soundproof.*

Long Span Reinforced Precast Roof Slabs—Spans up to 8 ft., thickness 3 to 4 in. Carry a uniform load of more than 300 lb. per sq. ft. Weight of slab 20 lb. per sq. ft. *Heat insulating. Excellent base for built-up roofing.*

Short Span Reinforced Precast Roof Slabs of Nailing Aerocrete—Standard dimensions, 24x32 in., 2½ to 3-in. thickness. *Made from Aerocrete that holds nails.* Weight of slabs 10 to 15 lb. per sq. ft.

Floor Fill—Weight 50 to 80 lb. per cu. ft. *Soundproof and chemically pure;* does not corrode iron pipes and conduits embedded in the fill.

Roof Fill—Weight 30 to 80 lb. per cu. ft. *Highly insulating and excellent base for built-up roofing.*

Specifications

Specifications for the different applications of Aerocrete will be submitted to the Architect and Contractor upon request, as well as assistance given in the working out of designs in which Aerocrete may be advantageously employed.

THE NAILCRETE CORPORATION

Manufacturer of the Original Nailing Concrete

105 West 40th Street, NEW YORK, N. Y.

SELLING AGENTS IN ALL THE PRINCIPAL CITIES IN THE UNITED STATES

Product

NAILCRETE (Nailing Concrete). Patented—name registered.

For Nailcrete Nailable Building Blocks, see Manufacturers' Index.

Nailcrete (Nailing Concrete)

Nailcrete is a cementitious, fibrous, *all-mineral* fireproof compound, containing no animal or vegetable matter, no acids, alkalis or any substance injurious to metals, wood or other construction materials coming in contact with it.

Nailcrete is regularly supplied in burlap bags containing in each case the correct quantity for the mix used. It is to be mixed on the job with portland cement, screened sand and clean water, and screeded smooth and level. Complete instructions with each shipment.

Origin

Nailcrete has been in successful commercial use for more than 20 years. It was developed after extended laboratory research and tests conducted by Grosvenor Atterbury, F.A.I.A., collaborating with the Russell Sage Foundation in connection with their economic construction developments.

Advantageous Qualities and Physical Properties

Nailcrete is absolutely fireproof and verminproof; will not shrink, swell, or rot; is unaffected by dampness, a poor conductor of heat and an effective sound deadener.

Nailcrete has the same compressive strength as 1-3-6 cinder concrete and is 20% lighter (Nailcrete weighs about 96 lb. per cu. ft.) thereby saving steel in building design. Its nailing properties are unsurpassed, as Nailcrete holds nails better than pine.

Coefficient of expansion, also setting and drying periods are substantially the same as those of cinder concrete. Nailcrete calls for the same precautions against freezing, quick drying, etc., as are necessary with ordinary concrete.

Uses of Nailcrete

Nailcrete is used without sleepers and without underflooring or sheathing, and is more durable than the ordinary construction using wood sleepers and cinder-concrete fill. It is especially suitable as a fireproof nailing base for floors, roof covering of various kinds, etc., as follows:

(a) Subfloors—Nailcrete is laid 2 in. thick as a subfloor on top of the structural slab or floor arch, to which is directly applied wood flooring, cork tile, etc., giving the floor greater resiliency and making it more impervious to sound. (See specifications.)

(b) Reinforced Floor Slabs for Metal Lumber—Nailcrete is used 2 in. thick on top of metal lath placed on metal lumber or bar joist floor beams. In this case the Nailcrete acts as fireproof floor slab and as a nailing base for the finished wood floor. (See specifications and table of safe loads.)

(c) Roof Coating—A fireproof, rotproof nailing base 1½ to 2 in. thick directly on top of roof slab to receive tile, slate, copper, etc. (See specifications.)

(d) Reinforced Roof Slab—A poured-in-place construction on rafters of steel, metal lumber or bar joists. (See specifications and table of safe loads.)

(e) Plaster, Interior and Exterior—For interior plastering, especially for fireproofing, sound-insulating and as a nailing base for wood paneling; for exterior plastering or penthouse walls, skylight curbs, etc., to receive the sheet metal covering. (See specifications.)

NAILCRETE SLABS—SAFE LOADS IN POUNDS PER SQUARE FOOT

Gross sectional area of steel in sq. in. per ft. slab	Thickness of Nailcrete above steel	Span in feet									
		1½	2	2½	3	3½	4	4½	5	5½	6
⅜-in. Hy-Rib, Ribplex or equal, .061 sq. in.	2 in.	480	312	176	122	....	....	....	....	....	....
	2½ in.	....	....	232	161	118	91	....	....	....	....
	3 in.	....	....	....	....	144	110	87	70	....	....
¾-in. Hy-Rib, Ribplex or equal, .1407 sq. in.	2 in.	....	....	....	158	114	87	....	....	....	....
	2½ in.	....	....	....	230	171	130	102	....	....	....
	3 in.	....	....	....	....	233	177	139	113	....	....
	3½ in.	....	....	....	....	....	228	180	146	121	....
	4 in.	....	....	....	....	....	....	238	193	159	134

Nailcrete weighs about 96 lb. cu. ft. or 8 lb. per in., 1 ft. square.
Table based on WL/10. For WL/8 (or simple span), deduct 20% from above.
Brace self-centering lath to support wet Nailcrete.
Safe loads on spans above 6 ft. furnished on request.
Total live and dead load on tile roofs: 2-ft. slab, 66 lb.; 2½-ft., 70 lb.; 3-ft., 74 lb.; 3½-ft., 78 lb.; 4-ft., 82 lb. per sq. ft.



Fort Lee High School, Fort Lee, N. J.
ERNEST SIBLEY & L. C. LICHT, Architects
One of many school buildings in which Nailcrete has been used. Suitable as a nailing base for wood floors or on roofs under slate, tile or metal

Continued on next page

Cost

Nailcrete installed costs less than wood sleeper, underfloor and concrete fill construction.

Service and Supervision

Where practicable, THE NAILCRETE CORPORATION will send a representative to the job, without expense to the contractor, to instruct users in the proper installation of Nailcrete.

References

On request, we shall be glad to supply technical data, list of installations and give definite information applicable to the proposed use of Nailcrete.

Specifications for Nailcrete

Note: Always specify Nailcrete by name.

Materials—Nailcrete shall be made with portland cement and sand strictly in accordance with the specifications of the manufacturer. All sand shall be sharp, clean, and screened through ¼-in. mesh.

Preparatory Work—Immediately before Nailcrete is laid, the surface to be covered shall be swept broom-clean, thoroughly wetted and grouted.

Setting—All Nailcrete shall be allowed to set properly before being walked on.

Note: Ordinarily 2 days in summer and 3 days in winter.

Nailcrete Subfloors—On structural floor construction Nailcrete shall be laid 2 in. thick and screeded, and, if necessary, troweled, to a level.

When Nailcrete is dry, the surface shall be given a brush coat of asphaltic waterproofing before flooring is laid. Flooring to be nailed with 8d cut nails, driven at an angle of approximately 45°.

Note: For high class work specify (under the heading of Carpentry) 1 layer of tarred paper (not less than 2-ply) additional deadening felt, if desired, and the finish wood flooring to be used. *Underflooring* is *never* necessary.

On Metal Lumber Beams—Cover the floors of rooms, etc. (specify which ones are to be covered), with metal lath secured directly to the beams (not over 2 ft. apart) and on top of the metal lath put a bed of Nailcrete not less than 2 in. thick at the thinnest point, screeded level to receive the finish flooring specified under Carpentry.

Note: In high class work specify paper as above. Even in work of the highest class underflooring is unnecessary.

Nailcrete Roof Coating—The structural roof construction shall be covered with 2 in. of Nailcrete.

Note: If slate are thicker than ¾ in., consult THE NAILCRETE CORPORATION as to the thickness of the Nailcrete.

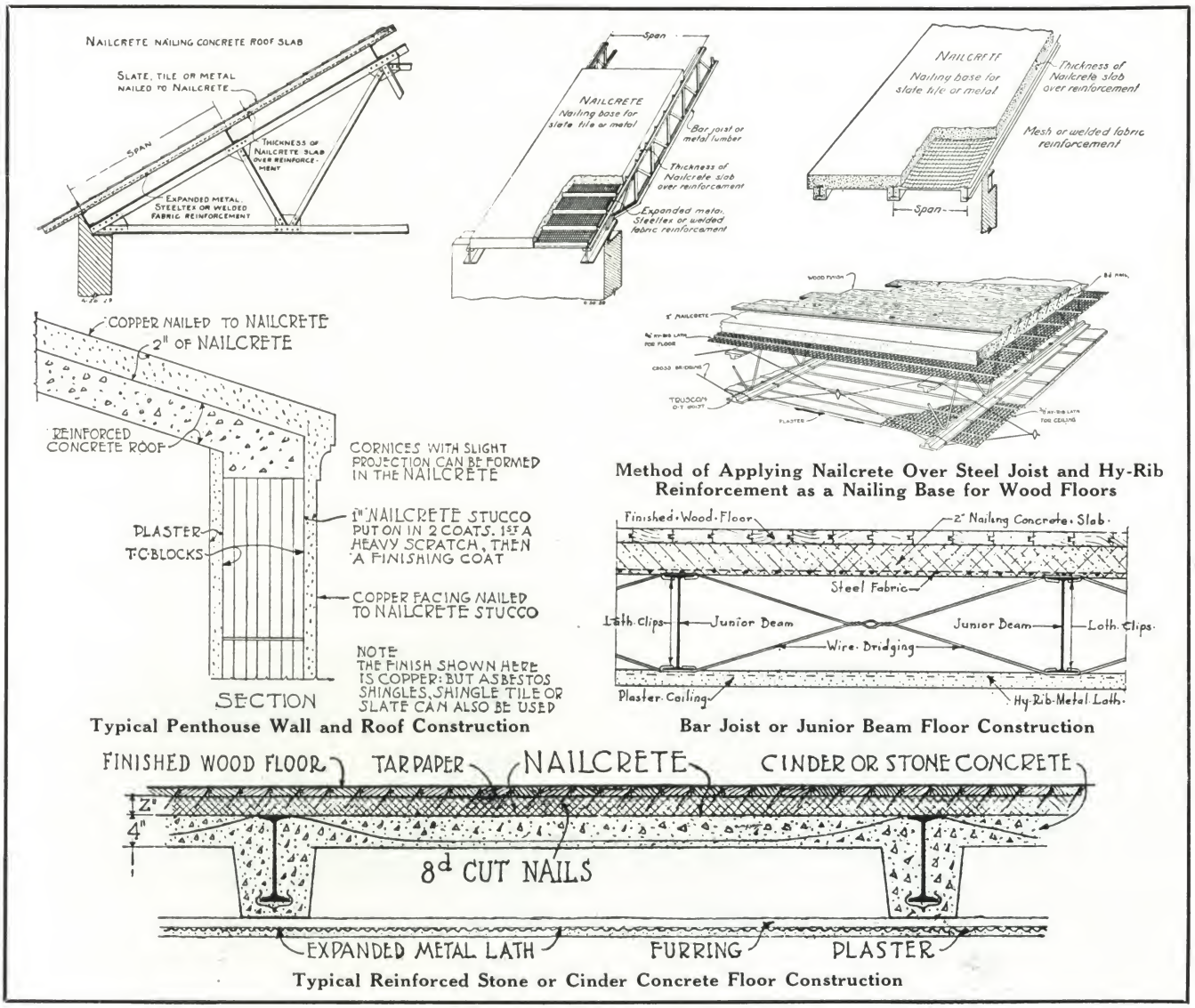
Reinforced Sloping Roof Slab—Cover steel rafters with self-centering lath (as specified by manufacturers) or pour in place fabric-reinforced Nailcrete slab ..... in. thick. (See table for areas of steel and safe loads.)

Nailcrete Floor-Fill—Over structural arch apply ..... in. Nailcrete Floor-Fill in accordance with manufacturer's specifications.

Plaster—*Interior*—Plaster interior walls to an approved finish, true and even as per instructions of THE NAILCRETE CORPORATION.

Exterior—Plaster the exterior of penthouse walls, skylight curbs, etc., with Nailcrete plaster 1 in. thick in 2 coats, scratch and finish, troweled (or floated) true and even.

Note: If the Nailcrete plaster is to be applied to gypsum blocks, the blocks should be covered first with proper bonding material, and the Nailcrete is then to be applied while the bonding material is still tacky.



Method of Applying Nailcrete Over Steel Joist and Hy-Rib Reinforcement as a Nailing Base for Wood Floors

Typical Penthouse Wall and Roof Construction

Bar Joist or Junior Beam Floor Construction

Typical Reinforced Stone or Cinder Concrete Floor Construction

Typical Examples of Nailcrete Construction

NATIONAL NAYLEGRIP CO., INC.

Manufacturers of "Naylegrip"—A Compound for Making a Fireproof Nailing Concrete

1721 Ash Street
ERIE, PA.

Products

"Naylegrip," Nailing Concrete Compound.
Roof Decks.
"Naylegrip" Slabs.
Korkene Insulating Blocks.
Nailbond Nailing Concrete.

"Naylegrip"

"Naylegrip" is a composition or matter manufactured under a special process composed of only one-fifth of the material necessary for making a superior nailing concrete, the balance of the material necessary being purchased at the nearest shipping point adjacent to the contemplated structure, saving transportation and lowering the cost of construction.

In the use of "Naylegrip," the constructor may be sure the nails will hold. "Naylegrip" Compound bonds the nail into the concrete. The longer the driven nails remain, the more difficult to draw. No need to fear the most delicate lath or steel used in "Naylegrip" Concrete.

"Naylegrip" is composed of one of the minerals having the greatest insulating values known to science. Capillary attraction (such as a sponge drawing water from below) is what all architects wish to avoid. "Naylegrip" Concrete has little attraction of this nature, making it desirable for basements or ground floors where a wood floor is desired to be placed. This form of construction does not require a sub-base. Three inches of "Naylegrip" Concrete with one layer of an asphalted asbestos waterproof paper laid directly on the concrete and butted together is sufficient on which

"Naylegrip"
TRADE-NAME
Reg. U. S. Pat. Off.

to lay a wood floor where no water pressure is encountered, developing a compressive strength of from 800 to 1200 lb. per sq. in. and is composed of materials that will not deteriorate and are suitable for use in fireproof construction.

"Naylegrip" Concrete is light in weight, weighing approximately 80 lb. per cu. ft.

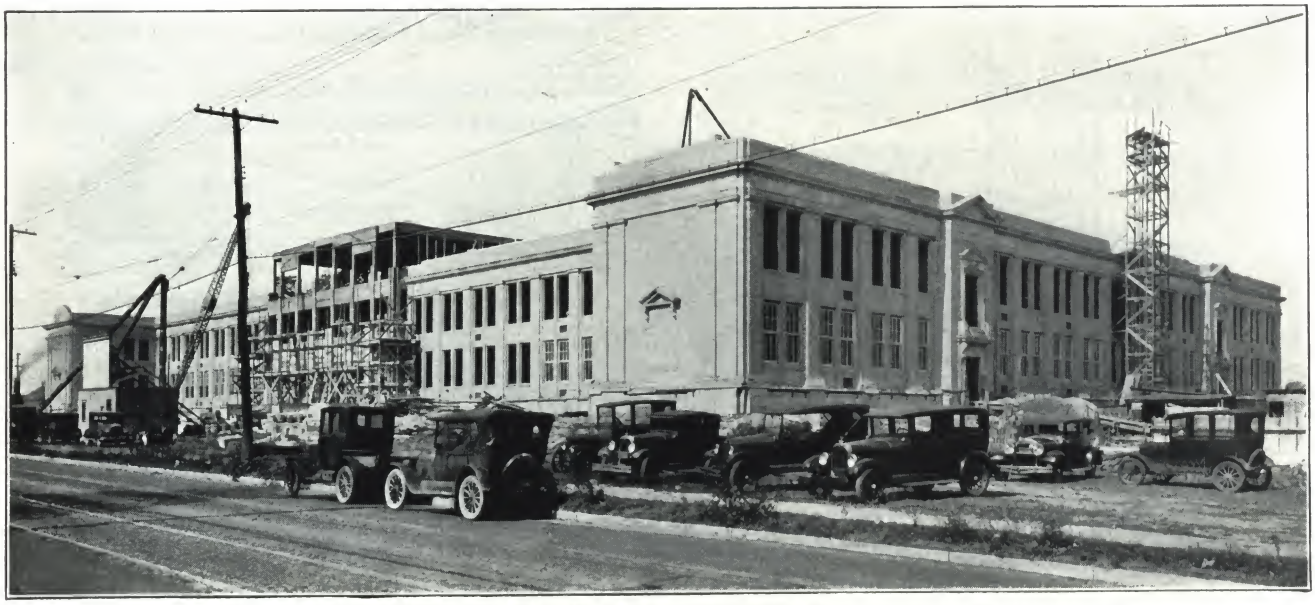
Fireproof—Laboratory tests show that "Naylegrip" Concrete will withstand fire and water equally as well or better than stone concrete and is not injured by water when applied to the concrete at high temperatures.

Bonds Readily—"Naylegrip" Concrete bonds to the concrete base on which it is placed, adding to the strength of the floor slab as a whole. "Naylegrip" is used extensively in roof decks, having a pitch as steep as 45°.

Metal Floor Joist Construction—"Naylegrip" Concrete is a very desirable floor construction in combination with steel joist and rib lath or other suitable mesh. There is a very small loss through the mesh.

Other Uses for "Naylegrip"—"Naylegrip" can be used for a base on which to place linoleum by covering with a thin coat of cement and sand grout, composed of one part cement, three parts sand poured over the surface of the "Naylegrip" Concrete, floated to a true even surface and troweled smooth. This grout will bond to the surface of the concrete even though 1/8 in. thick and is very economical base on which to place cork carpet, rubber tile, linoleum, etc.

It is a fine insulating base for terrazzo, having little or no expansion and contraction.



West High School, Erie, Pa.
Over 50,000 sq. ft. of Naylegrip was placed in this building

Continued on next page

"Naylegrip" Slabs

"Naylegrip" Slabs make an ideal roof deck which can be removed and replaced as often as desired, without injury to the slabs or the steel; can be temporary or permanent construction. Having a 15-lb. asphalted asbestos waterproof paper bonded to the concrete slabs by a special process, the slabs can be placed, joints pointed with asbestos plastic cement, giving a near waterproof covering to the structure until the weather is favorable for the regular waterproofing which can be applied immediately or at the contractor's convenience. Slabs are made in standard sizes: 1⅜x30x48 in. and 1¾x30x48 in.

To Architects

When specifying "Naylegrip" Concrete, always include the steel covered float, the steel tee-bars for screeds, a measure, as furnished by the National Naylegrip Co., Inc., holding 3½ cu. ft. of coke breeze, used as a filler. These are furnished at no cost to the constructor with every estimate having one carload of compound. Less than one car, at cost, only.

Services and Supervision

We train men in the placing of our materials. Constructors not versed in the use of nailing concrete have supervision at the beginning of their first operation.

We furnish special metal covered floats 3 in. wide and 7 ft. 6 in. long for use in placing "Naylegrip" Concrete.

Economical shipping area for the slab roofs, 100 miles from manufacturing plants.

Naylegrip Compound has an economical shipping area of 2000 miles.

Users of "Naylegrip"

The Permanesque Homes of America Incorporated of Cleveland, Ohio, have adapted "Naylegrip" as a standard base on which to place linoleum, rubber tile, wood floors and garage floors.

"Naylegrip" after having once been used as a building material has never been omitted from the specifications of the builder or architect, to our knowledge.

Korkene Insulating Blocks

Korkene, as manufactured by the National Naylegrip Co., Inc., resembles cork. Korkene is fire resisting and is especially useful in the insulating of roof decks, exterior walls, and partitions, especially between apartments, etc.

Manufactured by special process in blocks: 1¾x12x30 in., 1⅜x12x30 in., 2x12x24 in., 3x12x24 in., 4x12x24 in.

Korkene will hold nails and screws and can be nailed to exterior walls at the mortar joint with special case hardened nails and can be laid by carpenters much faster than masons can lay the smaller and heavier blocks with mortar.

Special instructions, prices and samples supplied on application.

Nailbond

An economical and all-mineral nailing concrete of unusual strength, being very easy to mix and float to a smooth surface for nailing base; has a crushing strength of from 800 to 1200 lb.; receives nails, screws, tacks, etc.; weighs approximately 96 lb. per cu. ft. The inserted nail is securely bonded to the concrete itself, making it very difficult to withdraw. It holds the attached material securely in place.

Nailbond Compound is manufactured and packed in waterproof bags of 2 cu. ft. each.

Portland cement and sand are added to the mix at the building site in the proportions as noted in the following schedule and are available in any part of the world.

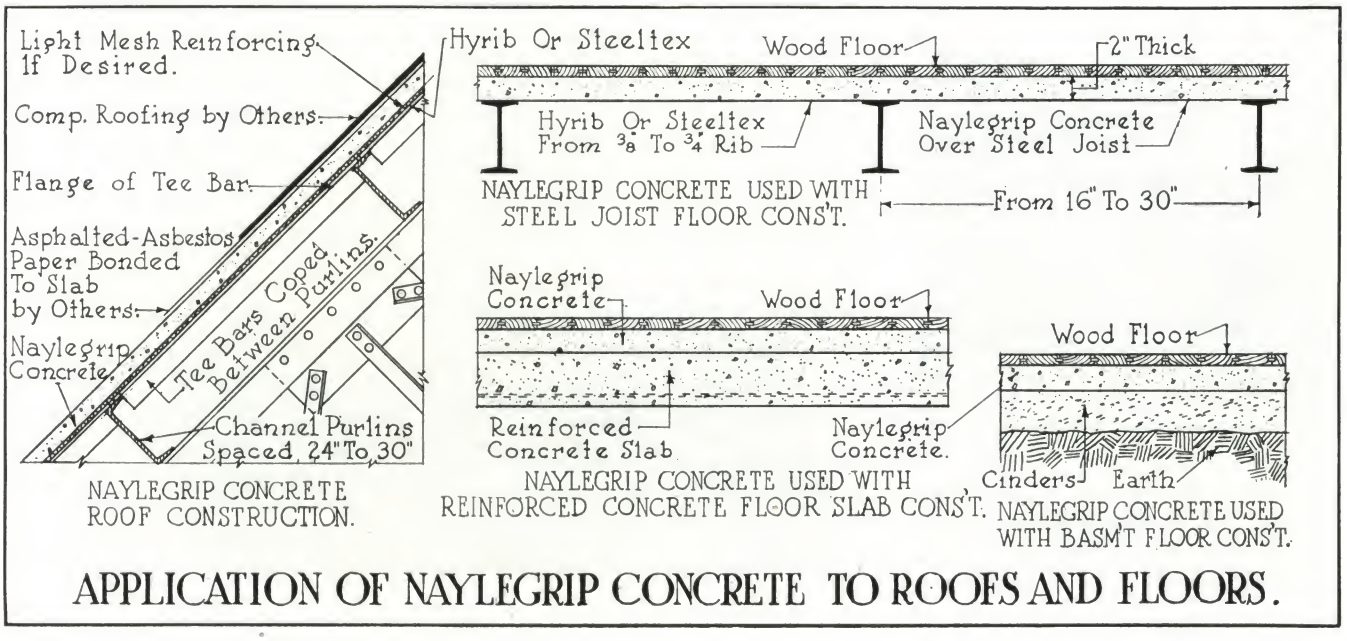
Mixing schedule of quantities and sizes of aggregate:

1 bag of Nailbond—2 cu. ft.

1 bag of portland cement—1 cu. ft.

2½ to 3 cu. ft. fine sand, passing through a ⅛-in. mesh.

Nailbond is desirable in localities where coke breeze is not easily obtainable. Nailbond is fireproof and may be made in blocks or used for mortar joints in brick or tile where nailing grounds, etc., are desired, as the mixture works easily under the trowel.



APPLICATION OF NAYLEGRIP CONCRETE TO ROOFS AND FLOORS.

POROTE MFG. CO.

Manufacturers of Lightweight Concrete Products

346 Riverside Avenue
NEWARK, N. J.

Product

PRECAST POROTE SLABS for roofs and floors.

POROTE FILL (cast on site) for floor and roof insulation.

RIB STEEL ROOFS and FLOORS.

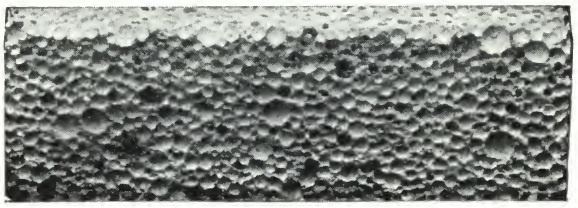
Also Porete-Nailfill Nailing Concrete.

Porete is covered by United States patents.

For our page on Precast Concrete Decks for Stadiums, etc., see Manufacturers' Index.

What Porete Is

Porete is portland cement concrete of uniformly honeycombed structure and combines the durability of concrete with the lightness of wood. It is made of portland cement and sand only. Porete is made of a very rich cement mix and the reinforcing metal is thoroughly coated and protected against corrosion.



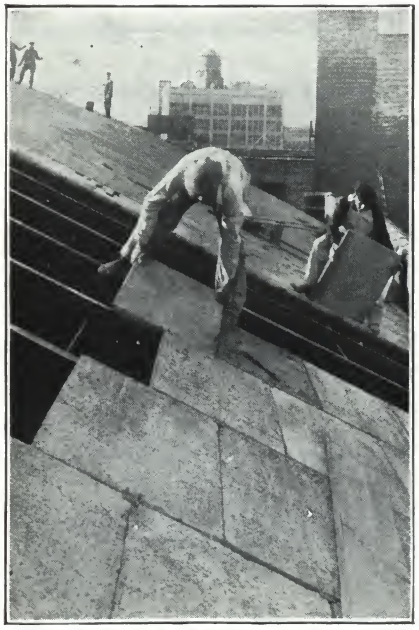
Full Size Structure of Porete

Porete has about one-third the weight of solid concrete.

On account of the air cells which it contains, it is a good heat and sound insulator and a better fire resisting material than solid concrete, because of its low heat conductivity. Its permanency is equivalent to that of concrete and its strength improves with age.

Porete Roofs—2 Ft. 8-In. Span

Porete roof slabs, 24x32x1¼ in. thick, are laid on steel purlins at 2 ft. 8-in. centers and are fastened to them with heavy metal clips. After all the slabs are laid, a thin cement grout is worked into the rough surface and this roof deck is then ready for the waterproofing which is ordinarily a tar and felt roof.



Laying Porete Slabs

Porete for Steep Roofs, Used As a Base for Slate Tile or Metal Roofing—Where slate, tile or metal roofing has to be nailed up, the Porete slabs are covered with ½ in. of Porete Nail Finish. This is a mixture of portland cement and sand with a fibrous fireproof mineral material. This finish forms a tough resilient sheet which becomes integral with the Porete, greatly adding to its initial strength.

Advantages—Porete roof slabs are a factory controlled product, accurately reinforced. In combination with a cement finish, which is applied in the field, they make a lighter fireproof roof than any other material. Porete roofs can be adapted to any roof design, flat or slanting. They are easily erected—even in cold weather.

They weigh only 7 lb. per sq. ft., which is one-half as much as any other fireproof roof. A Porete roof will carry a live load of over 50 lb. per sq. ft. with a factor of safety of five. Buildings covered with Porete will cost less to heat, because Porete is a good heat insulating material.

Porete roof decks present a clean smooth stone finish on the underside. Due to their light weight there is a saving in the steel of the supporting trusses, especially on the larger spans.

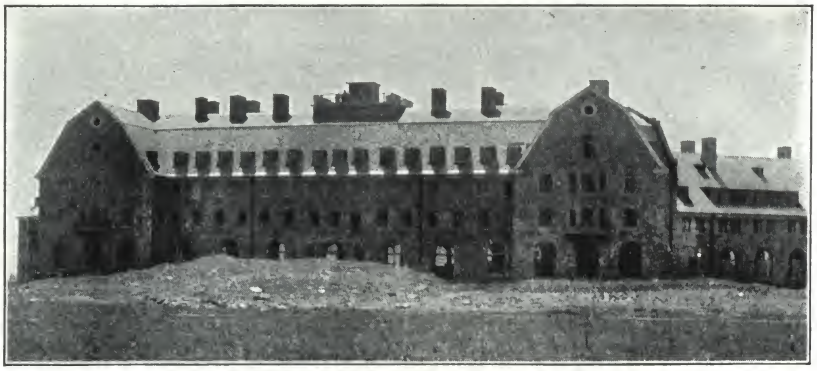
CHANNEL PURLINS FOR POROTE-SLAB ROOF

Purlins Spaced 2'-8" c.c.

Weight per Sq. Ft. of Purlins 3 lbs. + Porete 7 lbs. + Waterproofing 5 lbs. = 15 lbs. Total

Live Load 30 lbs. per Sq. Ft. Total 45 lbs. per Sq. Ft.					Live Load 40 lbs. per Sq. Ft. Total 55 lbs. per Sq. Ft.				
Span in Feet	Section Modulus Required	Section	Section Modulus of Channel	Wt. of C per sq. Ft. of Roof	Span in Feet	Section Modulus Required	Section	Section Modulus of Channel	Wt. of C per sq. Ft. of Roof
6	0.40	3"×4.1 C	1.1	1.54 lbs	6	0.49	3"×4.1 C	1.1	1.54 lbs
7	0.55	"	"	"	7	0.68	"	"	"
8	0.72	"	"	"	8	0.88	"	"	"
9	0.91	"	"	"	9	1.11	"	"	"
10	1.12	4"×5.4 C	1.9	2.02 "	10	1.38	4"×5.4 C	1.9	2.02 "
11	1.36	"	"	"	11	1.66	"	"	"
12	1.62	"	"	"	12	1.98	"	"	"
13	1.90	"	"	"	13	2.32	5"×6.7 C	3.0	2.51 "
14	2.20	5"×6.7 C	3.0	2.51 "	14	2.69	"	"	"
15	2.53	"	"	"	15	3.10	"	"	"
16	2.88	"	"	"	16	3.52	6"×8.2 C	4.3	3.07 "
17	3.25	6"×8.2 C	4.3	3.07 "	17	3.97	"	"	"
18	3.64	"	"	"	18	4.46	"	"	"
19	4.06	"	"	"	19	4.96	7"×9.8 C	6.0	3.67 "
20	4.50	7"×9.8 C	6.0	3.67 "	20	5.50	"	"	"
21	4.96	"	"	"	21	6.06	"	"	"
22	5.45	"	"	"	22	6.65	8"×11.5 C	8.1	4.31 "
23	5.95	"	"	"	23	7.27	"	"	"
24	6.48	8"×11.5 C	8.1	4.31 "	24	7.92	"	"	"
25	7.03	"	"	"	25	8.59	9"×13.4 C	10.5	5.02 "
26	7.61	"	"	"	26	9.30	"	"	"

For purlin table where the deflection is restricted, and for other loads, write us.



Roof on Sky Top Lodge, Canadensis, Pa.
ROSSITER, MULLER, MORTIMER & FOSTER, Architects

Continued on next page

For Steep Tower and Mansard Roofs—Porete has become a standard roof slab material for fireproof buildings.

Roofs exposed to strong winds and the elements at great heights demand a roof-deck to which tile, slate, copper or lead roofing can be nailed with safety and with perfect assurance that the tile and slate will not be blown off.

Porete will give a nailing base that is easy and economical to erect and that combines very light weight, strength and good heat insulating value.

The heavy finish which is applied in the field bonds the roof slabs into a monolithic sheet.



Porete Roof Installations
(Left) Hotel Savoy-Plaza, New York, N. Y.
McKim, Mead & White, Architects
(Center) Sherry-Netherlands, New York, N. Y.
Schultz & Weaver, Architects
(Right) Hotel Pierre, New York, N. Y.
Schultz & Weaver, New York, N. Y.

Porete Roofs on Pressed Steel Joists or Trussed Bar Beams

The joists can be set farther apart than in usual construction and 25% less steel is required.

The slabs are fastened to the joists with nails or wire clips. In combination with these joists Porete provides a good looking, strong, durable, lightweight concrete roof in which the reinforcing metal is well protected from rusting.

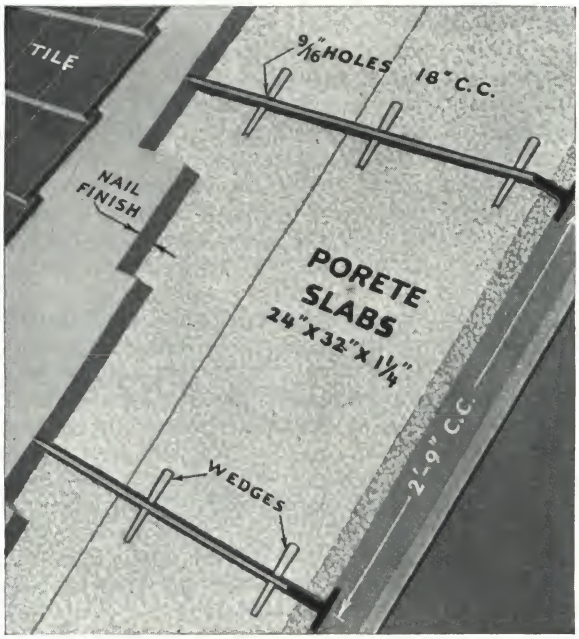
Porete Roofs—Long Span

Purlin Slab Construction—This is a combination of a 5 to 6-ft. long channel slab and the 2 ft. 8-in. span Porete slab. This roof is 1½ in. thick and weighs 12 to 15 lb. per sq. ft.

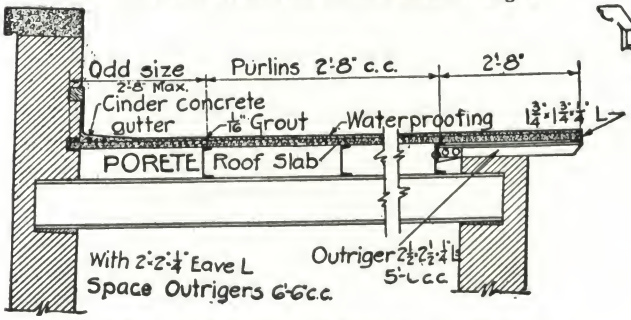
Flat Slab Construction—Consists of 4 to 6-ft. long precast slabs provided with a finish coat in the field. Thickness of roof 2⅛ to 3 in. Weight 11 to 16 lb. per sq. ft.

We recommend this roof where high insulating value is required.

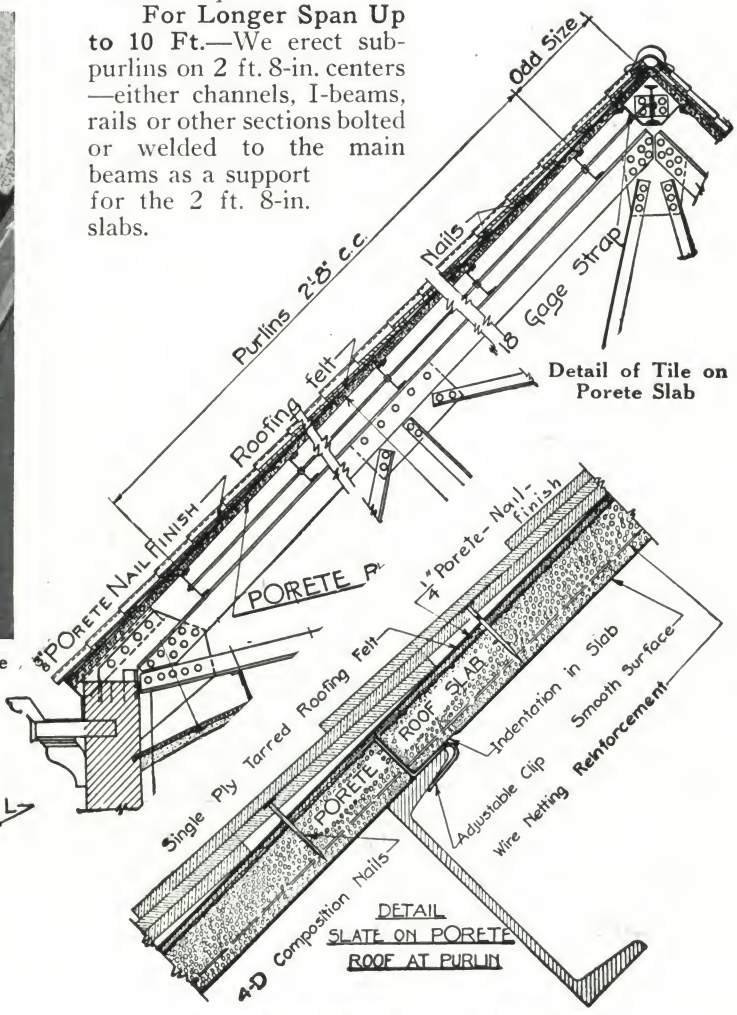
For Longer Span Up to 10 Ft.—We erect sub-purlins on 2 ft. 8-in. centers—either channels, I-beams, rails or other sections bolted or welded to the main beams as a support for the 2 ft. 8-in. slabs.



On Very Steep Roofs Porete Slabs Are Laid in Tee Irons and Held Down with Steel Wedges



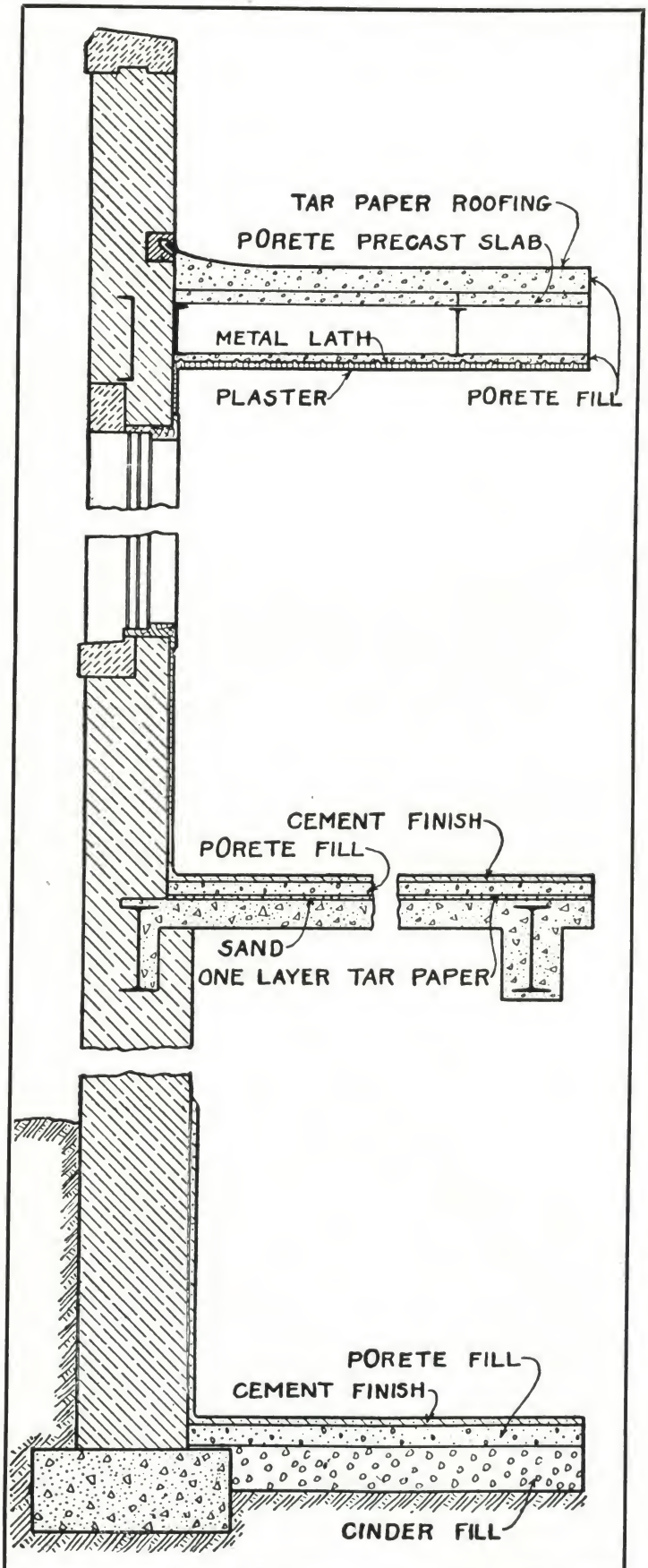
Detail of Flat Roof; Parapet and Overhang



Detail of Tile on Porete Slab

Detail of Slate on Porete at Purlin

Continued on next page



Typical Building Construction with Porete Fill

Porete Fill

Porete Fill (cast in situ) is a light weight aerated portland cement fill poured on the job. This material requires a special mixer in which a foam is beaten up and mixed with portland cement and fine sand. The result is a foamy, aerated, jellylike slurry of bubblestone which, after it is poured on the job, sets the same as concrete.

This method is essentially different from others in use and gives a positive uniform and true aeration of the concrete. The weight of the wet mixture is checked continuously on a scale. The weight per cubic foot of the final material, or in other words the porosity, is predetermined.

This light weight fill is not made to hold nails. For Nail-Fill ask for our special circular.

Floor-fill Application

This Floor-fill is usually applied by our own men. Where preferred we supply the mixer operated by our own mechanic and the necessary materials.

This Floor-fill can be made in any weight from 19 to 90 lb. per cu. ft. We recommend the following weights:

For Structural Slabs and Beams—60 to 70 lb. per cu. ft. Compressive strength 600 to 900 lb. per sq. in. This material is used and figured in the same way as reinforced concrete.

For Floor-fill on Top of Structural Slabs—Weight 45 to 50 lb. per cu. ft. Compressive strength 300 to 400 lb. per sq. in.

The purpose of this fill is to provide: An insulation against heat and sound; a medium in the space where conduits, pipes and sleepers are placed and a support for the floor finish.

This fill can be poured to any thickness. It is cast either direct on the concrete slab or on top of a ¼ or ½-in. sand bed covered with tar paper. The sand fill prevents any cracks from finding their way from the concrete slab to the top finish.

There is an increasing demand for Porete Fill particularly where pipes and conduits have to be embedded. It eliminates rapid deterioration of the pipes through dampness. The Porete Fill insures an ideal material for the embedding of such pipes.

For heat and sound insulation, particularly in hospitals, apartments and hotels where the transmission of noise from one floor to another is objectionable, Porete Fill is unsurpassed. Its cleanliness, fireproofness and permanency make it particularly desirable in this class of buildings.

Porete Fill reduces the dead load about one-half and requires less structural steel to carry it.

As a bed for Terazzo-finish, this fll is preferable to ordinary 1:4 mix. On the morning after it has been applied is still soft enough so that it can easily be cut with trowel for reception of dividing brass strips.

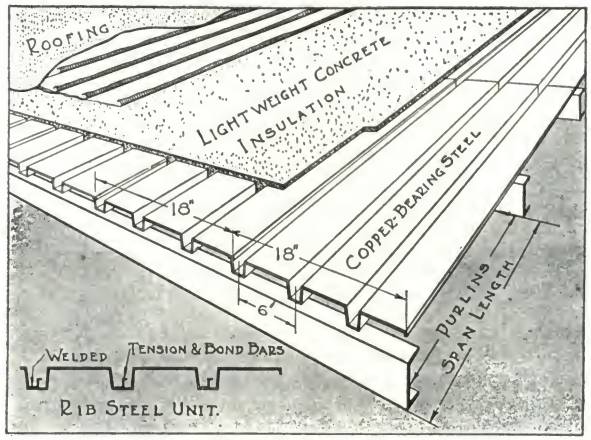
For Insulating Fill on Roofs—Weight 30 to 35 lb. per cu. ft. Compressive strength approximately 150 to 200 lb. per sq. in. 2.6 in. of this fill are equal to a 1 in. thickness of cork.

For Insulating Steam Pipes and Refrigeration Lines—Approximately 19 lb. per cu. ft. Compressive strength approximately 40 lb. per sq. in.

Continued on next page

Rib Steel Roofs and Floors

Porete Rib Steel roofs and floors are constructed of ribbed, copper bearing steel sheets, 20 to 24 gauge, covered with a layer of solid concrete or lightweight, nailable, insulating concrete. The ribs formed in the steel sheets are designed as individual beams capable



Rib Steel Roof Slab Construction

of sustaining the required loading of 40 to 120 lb. per sq. ft. depending on the width of the span, as shown in the table following. The ribs are 1½ in. deep on standard and 2 in. deep on super sheets and are spaced 6 in. on centers.

These copper bearing rust resisting sheets are laid directly on structural steel purlins and securely fastened to the same with clips. After the sheets have been laid and fastened to the supporting steel, a layer of lightweight insulating concrete is applied on top in plastic form, care being taken so that the depressions are entirely filled. If this layer is to be used as a nailing base for tile, slate, copper or other shingle type roofing, it is made 1½ in. thick; otherwise 1 in. After this layer of concrete is set, it will add additional rigidity and strength to the sheets.

Zee-bar reinforcing rods are welded in the bottom of the ribs. These bars, when embedded in concrete, will serve as additional reinforcing and they also make a mechanical bond between the sheets and the concrete.

All steel sheets are painted in the shop as may be required for different classes of work. The waterproofing on Porete Rib Steel roofs is done in the same way as on concrete roofs built up with felt and asphaltum. Porete Rib Steel decks can be used on steep as well as on flat roofs.

RECOMMENDED CONSTRUCTION SPECIFICATIONS FOR GIVEN SPAN OF RIB STEEL ROOFS AND FLOORS

Span, in feet	4	6	8	10	12
Gage	24	24	22	22	20
Corrugations, in. deep	1½	1½	1½	2	2
Safe live load, lb. per sq. ft. with 1-in. solid cement finish (dead load 15-20 lb. per sq. ft.)	120	90	65	55	45
Safe live load, lb. per sq. ft. with 1½-in. light weight nailable concrete finish (dead load 9-15 lb. per sq. ft.)	120	75	50	.....	.....

Advantages of Rib Steel Construction—*Roofs* —Rapid erection, light weight for long spans, great strength and stiffness, permanency, good heat insulation value and very good appearance underneath.

Floors—If used on a floor there is an additional advantage that standard steel construction can be used with spans from 4 to 6 ft. The finished wood floor can be nailed directly to the Porete Nail Finish of the Rib Steel sheets.



Applying Concrete on Rib Steel Sheets

Co-operative Service

It is advisable to consult the Engineering Department of Porete Mfg. Co. when laying out the steel for Porete roofs and floors. Estimates will be gladly furnished. An experienced force is always ready to make Porete installations anywhere in the United States.

A Few Representative Porete Installations and Their Architects

Hospitals

Miriam Osborne Home, Harrison, N. Y., Crow, Lewis & Wick
Hospital Buildings, Asyla, N. J., Walter W. Sharpley
Community Hospital, Glen Cove, N. Y., Peabody & Brown
Crawford-Allen Memorial Hospital, North Kingston, R. I., York & Sawyer
Soho Hospital, Belleville, N. J., Sutton & Sutton
State Hospital, Hillsdale, N. J., Guilbert & Betelle

Schools and Churches

Andover Academy, Andover, Mass., Chas. A. Platt
Yale University, New Haven, Conn., James Gamble Rogers
Princeton University Chapel, Princeton, N. J., Cram & Ferguson
Irving Auditorium, Philadelphia, Pa., Horace Trumbauer
St. Mary's Church, Jersey City, N. J., Robt. J. Reiley
Duke University, Durham, N. C., Horace Trumbauer
St. Nicholas Church, New York, N. Y., O'Connor, Delany & Schultz
Penn State College, State College, Pa., Chas. Z. Kaluder
Lehigh University, Bethlehem, Pa., Vischer & Burley
Nyack High School, Nyack, N. Y., Ernest Sibley
English Lutheran Church, Brooklyn, N. Y., Bertram Grosvenor Goodhue Associates
Art Museum, Montclair, N. J., Goodwillie & Moran
Adelphi College, Garden City, N. Y., McKim, Mead & White
Cathedral, Altoona, Pa., Geo. I. Lovatt
Universalist Memorial Church, Washington, D. C., Allen & Collens
2 Schools, Scarsdale, N. Y., Rossiter & Muller
National City Christ Church, Washington, D. C., T. Russell Pope

Theaters, Hotels, Banks, Office Buildings and Residences

Strand Theater, Atlantic City, N. J., Hoffman-Henon Co.
Theater, Worcester, Mass., Thomas W. Lamb
Berkshire Theater, Brooklyn, N. Y., Harrison G. Wiseman
Essex County Trust Co., East Orange, N. J., Dennison & Hirons
New Netherlands Hotel, New York, N. Y., Schultz & Weaver
Sky Top Lodge, Canadensis, Pa., Rossiter, Muller, Mortimer & Forester
Plandome, L. I., N. Y., F. A. Godley Residence
New York Life Insurance Co. Building, New York, N. Y., Cass Gilbert
Horace Bushnell Memorial, Hartford, Conn., Helmle & Corbett
H. E. DuPont Residence, Winterthur, Del., A. E. Ives
Stillman-Rockefeller Residence, Greenwich, Conn., Noel & Miller

Industrial Buildings, Power Plants and Garages

Power Plants, Atlantic City, N. J., Scranton, Pa. and Rockford, Ill., American Gas & Electric Co., Engineers
Virginian Railway Power Plant, Narrows, Va., Gibbs & Hill
Radio Corporation of America, Skinner & Cook
Fulton Water Works, Fulton, N. J., Hazen & Whipple
Nazareth Cement Co., Nazareth, Pa., Ford, Bacon & Davis
Philadelphia & Reading Grain Elevator, Philadelphia, Pa., Fegles Construction Co.
Walker Gordon Milk Co., Plainsboro, N. J., Private Plans
Lawrence Portland Cement Co., Thomaston, Me., Burrell Engineering & Construction Co.

H. H. ROBERTSON COMPANY

Robertson Protected Metal (RPM) for Roofing, Siding, Flashings

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CAN.; ELLESMERE PORT, CHESHIRE, ENG.

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BALTIMORE, MD. BIRMINGHAM, ALA. BOSTON, MASS. BUFFALO, N. Y. PHILADELPHIA, PA. CHICAGO, ILL. CLEVELAND, OHIO PITTSBURGH, PA. DETROIT, MICH. HAVANA, CUBA HOUSTON, TEX. JACKSONVILLE, FLA. ST. LOUIS, MO. LOS ANGELES, CAL. NEW YORK, N. Y.

AGENCIES

ALLENTOWN, PA. BUTTE, MONT. CHARLESTON, W. VA. DENVER, COLO. EASTON, PA. EL PASO, TEX. HOUGHTON, MICH. LITTLE ROCK, ARK. MILWAUKEE, WIS. MINNEAPOLIS, MINN. NEW HAVEN, CONN. PORTLAND, ORE. RICHMOND, VA. ST. PAUL, MINN. SALT LAKE CITY, UTAH SAN FRANCISCO, CAL. SCRANTON, PA. SEATTLE, WASH. SYRACUSE, N. Y. WASHINGTON, D. C.

ENGLAND, ELLESMERE PORT, CHESHIRE: Mersey Iron Works

CANADA: H. H. ROBERTSON CO., LTD., TORONTO, ONT., AND MONTREAL, QUE.

Products

Robertson Protected Metal (RPM) for Roofing, Siding; Flashings, General Building Trim, Ducts, etc. Also available in Skylights and Ventilators. (Robertson Protected Metal is protected by United States Patent No. 1,277,755. September 3, 1918; other United States and foreign patents issued and pending.)

For Robertson V-Beam Protected Steel Roof Decks and V-Beam Roofing, Glazing Construction, Skylights, Monitor, Sidewall and Special Sash, Double Glazing, and Ventilators, see Manufacturers' Index.

Robertson Protected Metal (RPM)

Robertson Protected Metal (RPM) is a *protected* steel roofing and siding material which is made proof against rust and corrosion by a series of external coatings. Protected by these permanent coatings, it is able to withstand the severest conditions found in and around industrial plants, including acids, alkalies, moisture, smoke, gases, fumes and condensation.

The protective coatings are shown on the cutaway drawing below. They are: (1) asphalt; (2) asbestos felt, and (3) a heavy waterproofing envelope.

TRADE-MARK

Advantages—RPM eliminates the need for periodic painting and other maintenance expense. It is highly resistant to severe corrosive conditions. It is easily erected. Buildings covered with it can be readily enlarged, remodeled, or taken down altogether, moved and re-erected.

Gauges—All RPM sheets can be furnished in 26 to 18 gauges.

Completely Pre-fabricated—RPM is cut-to-fit before it leaves the factory. All special pieces are pre-fabricated to your exact requirements and thus there is little or no need for cutting and fitting on the job. Where necessary, RPM sheets are accompanied by erection diagrams showing exactly where each special sheet is to go.

Erection—RPM can be easily erected by unskilled workmen. If it is not convenient to have your own workmen erect it, the Robertson Construction Department has its own erection crews which will handle the job for you.

20% Wider Than Commercial Corrugated Sheets—The Robertson Protected Metal Sheets are approximately 20% wider than commercial corrugated sheets. This reduces the number of side laps, and thus provides a greater effective erea and an efficient building covering

Standard Corrugated Roofing Sheets—In stock lengths of even feet from 5 to 12 ft. inclusive. Available also in odd lengths as specified. 33 in. wide, 12½ corrugations, each corrugation 2½ in. wide and ½ in. deep. They have an average covering width of 29¾ in., allowing 1½ corrugations side lap.

Standard Corrugated Siding Sheets—In stock lengths of even feet from 5 to 12 ft. inclusive. Available also in odd lengths, as specified. 33¼ in. wide, 13 corrugations. An average covering width of 30⅞ in., allowing side lap of one corrugation.

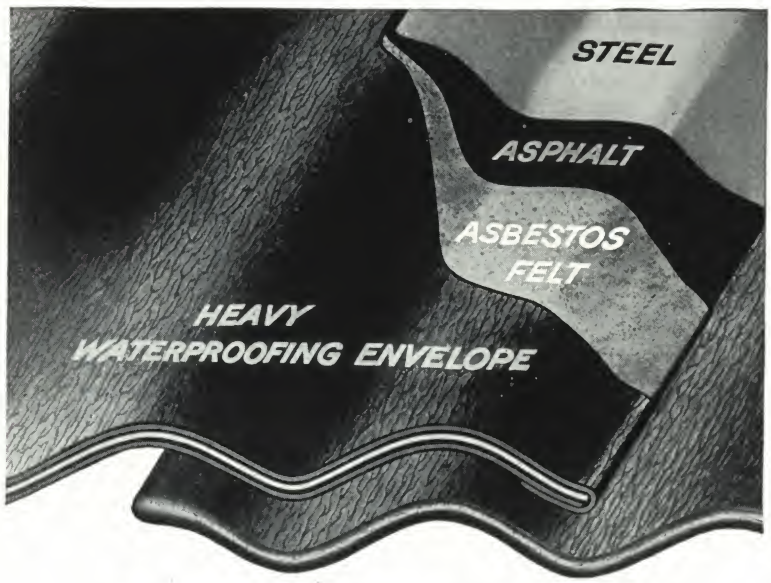
Standard Mansard Sheets—In stock lengths of even feet from 5 to 12 ft. and intermediate lengths when desired. 33 in. wide, with six beads (each nominally 2½ in. wide). They have an average coverage of 30 in.

Standard Flat Sheets—Much used for interior sheathing, also for making ventilating flues, ventilators, acid fume ducts, hoods, conveyor boxes, light partition walls, etc., 36 in. wide (also less than 36 in. for special purposes). Even foot lengths from 5 to 12 ft. inclusive. Also available in odd lengths, as specified.

Fasteners—The standard method of fastening RPM is with metal straps around the purlins or girt, bolted to the RPM sheets. Even the straps used in fastening are protected against rust and corrosion, being completely encased in corrosion-proof coverings. These straps are of 18-gauge steel, ¾ in. wide. The bolts used in fastening are sherardized and have a special mushroom shaped head designed to make a tight and permanent joint.

In special cases for fastening siding sheets where the legs of the girts face up, there is a clip and bolt fastening. The clip slips over the leg of the girt and is bolted to the RPM sheets. The clip and bolt are sherardized.

For applying RPM on wood, there are special nails with mushroom heads.



Cutaway Section of Robertson Protected Metal (RPM)

Showing the steel core sheet and the three layers of external coatings which make it rust and corrosion proof and permanently take the place of paint

Continued on next page

How to Use the Drawings That Follow

We are presenting here a series of full page drawings which make the detailing and erection of Robertson Protected Metal (RPM) very simple. These drawings have two purposes, which are—

(1)—*To Help You Incorporate RPM Details into Your Drawings*—Use these drawings and the information they call for as a guide to the dimensional information you should indicate on your own blueprints. Then send these blueprints to us and you can be sure your whole job will be detailed most economically. Note the question marks on the drawings. These mark the essential dimensions. In every place where there is a question mark please insert the dimension you are planning there. In other places you will find specific requests to "give sizes." At these places, too, give dimensions.
By giving all these measurements you can prevent the waste of material and save yourself time, labor and trouble.

(2)—*To Help You in Erection of RPM*—These drawings show users of RPM how the material should be applied, how to fit special sections like ridges, corners, door jambs, window sills, etc.; how to apply flashings to these locations; how to install sash in the walls and in the monitors; how to apply louvers; how gutters should be built; how stacks and ventilators should be installed in the roof, and similar information.

The Purpose of the Drawings

The First Two Pages—These are general drawings which illustrate the four types of buildings most often used in industry. They give comparatively complete cross-sections of these buildings and act as an index to the pages of enlarged details which follow. (The complete sidewall is shown in only one, inasmuch as the sidewall structure would be relatively the same in all.)

The Last Five Pages—These are enlarged drawings to show "close-ups" of various vital spots on the buildings which were pictured on the first two pages of drawings, together with sections not shown on those index pages.

Reference Marks

The Meaning of the Numbers—The large numbers spotted about at different sections on the first two pages indicate that enlarged details of those sections are shown on the succeeding pages. They act as keys to the enlargements. For instance, you find a numeral 4 at the ridges of the buildings on the first two pages. That indicates that an enlarged detail of the ridge is to be found under No. 4 among the details on the following pages. Turning to those details you find one marked No. 4. It illustrates how the roofing joins at the ridge, how the ridge roll is applied, and shows the information you should give as to the placement of purlins, pitch of roof and other dimensions.

The Importance of the Question Marks—Bear in mind that every question mark on the drawings means that the engineer or architect should indicate on his own drawings the dimensions he is planning at that point.

Important Specifications

The Importance of Specifying Roof Pitch—(See detail No. 3.) Errors in specifying roof pitches cause more mistakes in the filling of roofing and siding orders, than any other single factor. Many misconceptions have arisen as to the exact meaning of certain popular terms which are often used to express pitch of roofs. Terms such as "⅓ pitch" or "½ pitch" or "⅛ pitch" are dangerous because the man who reads them may place a different interpretation upon them than the man who wrote them.

The pitch is a matter of such vital importance that it should not be subjected to any possible misinterpretation. A mistake in indicating it may mean the cutting of all beveled gable end sheets on the wrong angle, may mean very large errors in computing the area to be covered, and may mean the making of wrong ventilator bases and other sections.

Detail No. 3 on second page following shows a simple, practical method of determining the roof pitch, and a method which eliminates all chance of error. All it requires from you is two simple measurements, i.e., the vertical distance between the top and bottom chords at the inside face of the column, and the vertical distance between the same chords, 24 in. farther into the building.

RPM is suitable for any roof pitch on which other corrugated sheets can be used. No corrugated sheets should be used on roofs with a slope of less than 2 in. to the foot. When pitch is less than 4 in. to the foot, both sides and end slopes should be laid in asphaltic cement. (Manufactured by the H. H. Robertson Company.)

For flat roofs with built-up roofing, see the section on Robertson V-Beam Protected Steel Roof Deck. (For pages see Manufacturers' Index.)

The Importance of Specifying Purlin and Girt Spacings—In order to obtain the greatest possible economy in applying Robertson Protected Metal Roofing and Siding Sheets to steel framework, the length of the sheets must be based on the exact spacings of purlins and girts. This matter of the spacings is therefore fundamental in the preparation of the covering material, yet it is frequently overlooked in ordering roofing and siding. On each of these drawings, *wherever purlins or girts are indicated, the question marks call attention to the need for figures on the spacings.*

Wherever it is possible, purlins and girts should be so spaced that sheets of even-foot lengths can be used. This makes economies possible. In laying out purlins and girt spacings bear in mind that the standard end lap of the RPM sheets is 6 in. for roofing sheets and 4 in. for siding sheets.

Ideal Purlin and Girt Spacings—If you have not already laid out your purlins and girts, the following tables give you the best spacings to use in order to obtain the most effective and most economical use of RPM and structural steel:

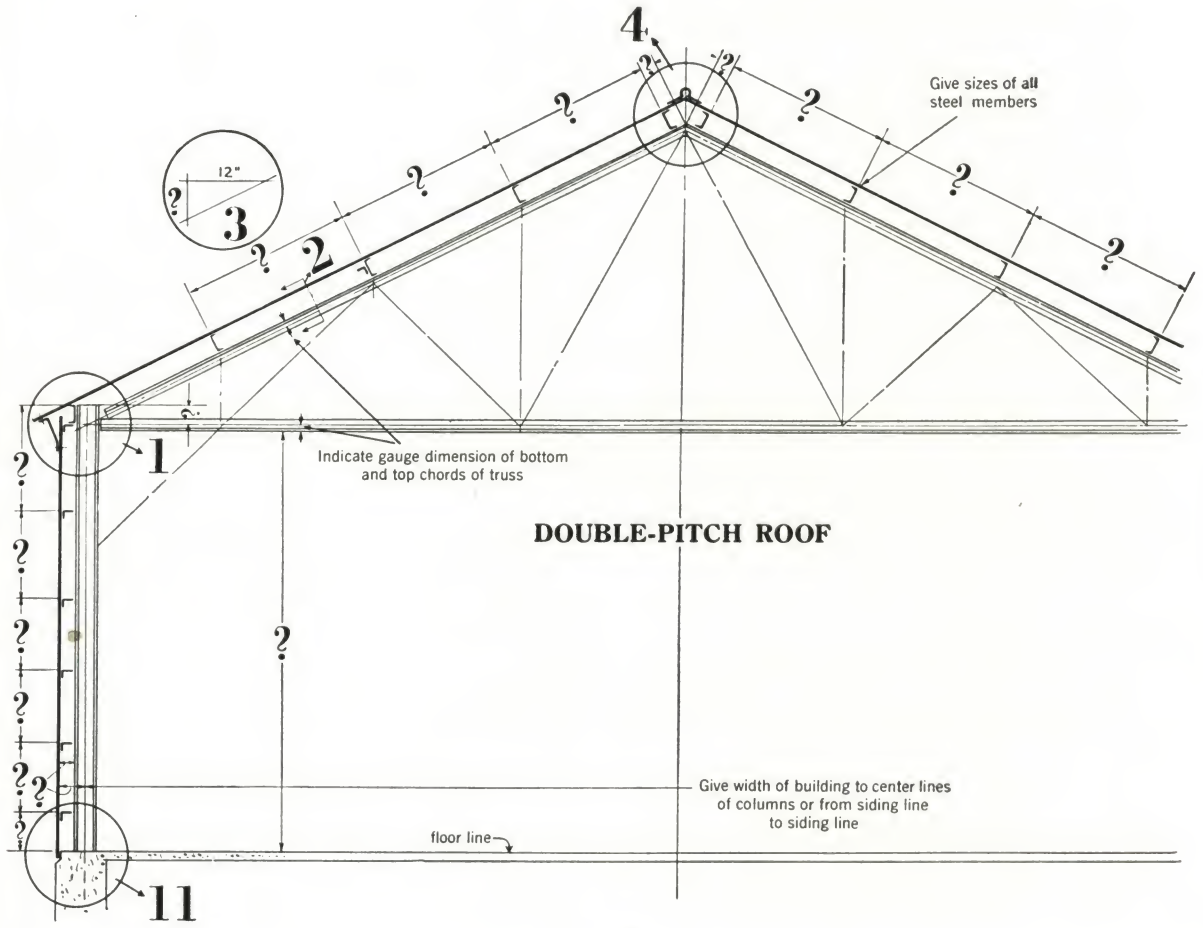
	Length of span, ft.	Length of span, in.	Gauge of sheet
For corrugated sheets on roof structures having a rise of 4 in. or more in 12 in., supporting purlins may be spaced as listed in this table.	4	9	24
	5	9	22
	6	6	20
	7	6	18

	Length of span, ft.	Length of span, in.	Gauge of sheet
Where the roof has a rise of not less than 2 in. in 12 in. and not over 4 in. in 12 in. and the side and end laps of corrugated sheets are laid in fiber cement the supporting purlins may be spaced as listed in this table.	4	3	24
	5	3	22
	6	3	20
	7	3	18

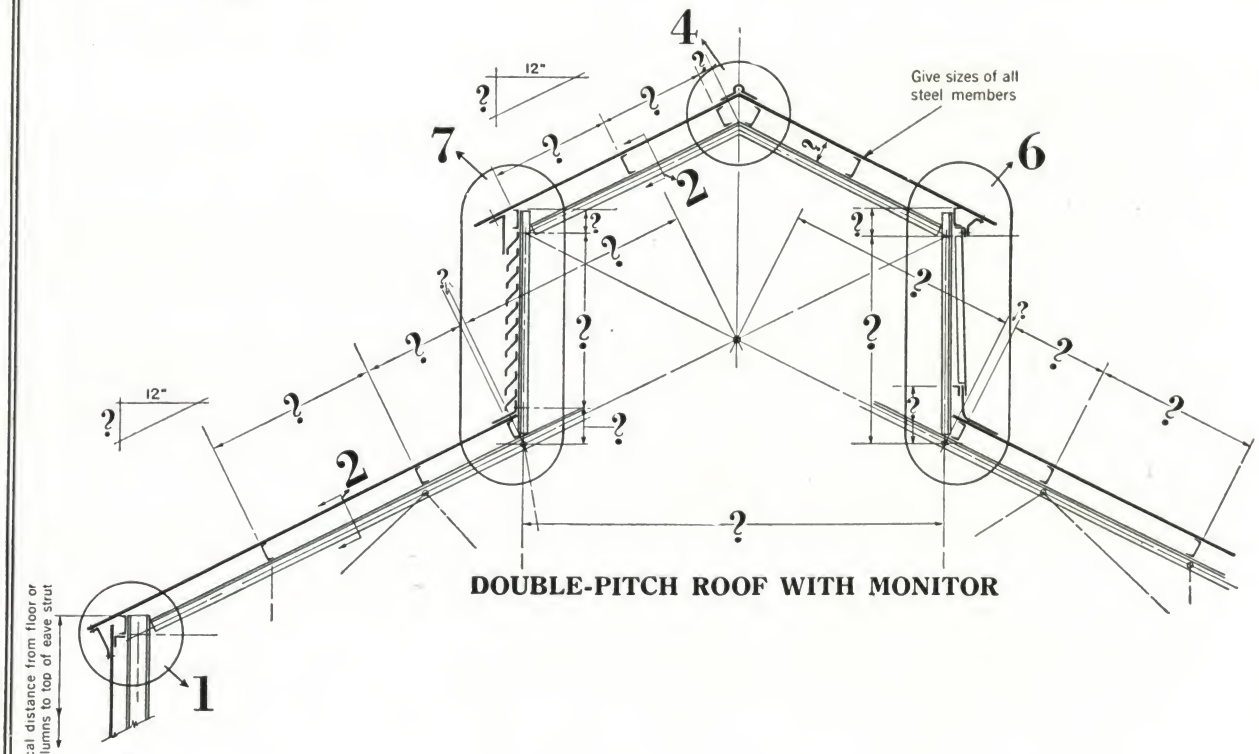
	Length of span, ft.	Length of span, in.	Gauge of sheet
For Corrugated Robertson Protected Metal Sheets used for Siding, the supporting girts may be spaced as listed in this table.	4	10	24
	5	10	22
	6	8	20

The Importance of Giving the Sizes of All Steel Members—The size of the steel members and the size of their bracings, if any, are important because these sizes determine the character and size of the fasteners for the roofing and siding sheets. All orders and specifications, therefore, should give these dimensions.

Continued on next page



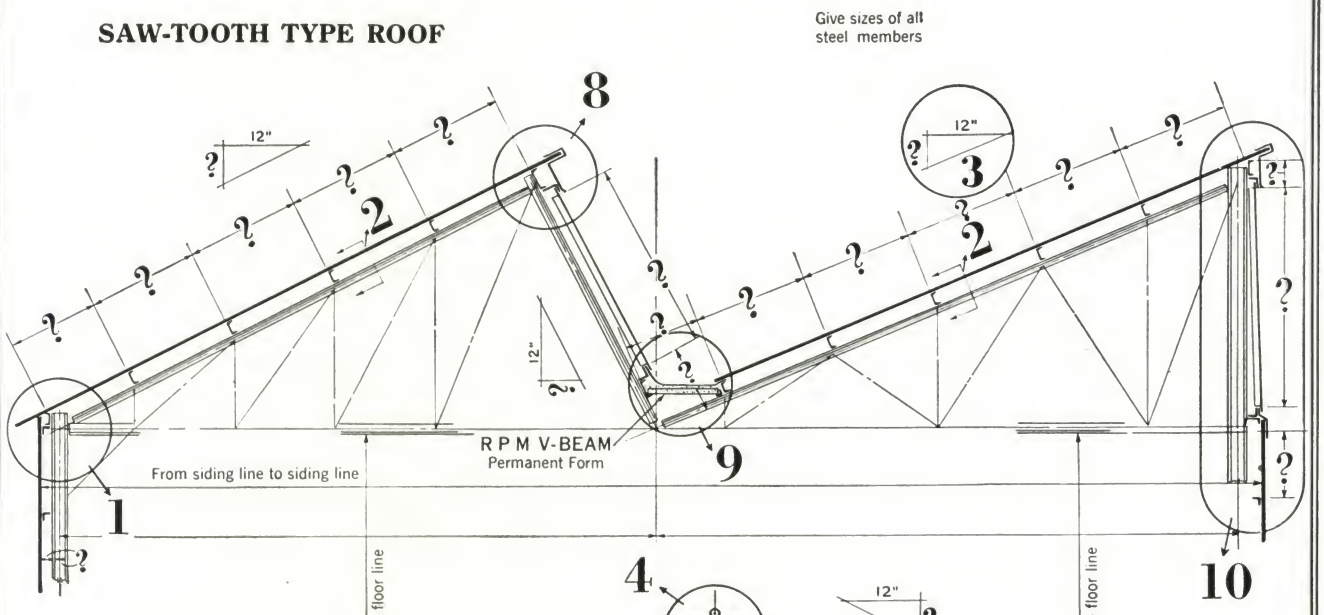
DOUBLE-PITCH ROOF

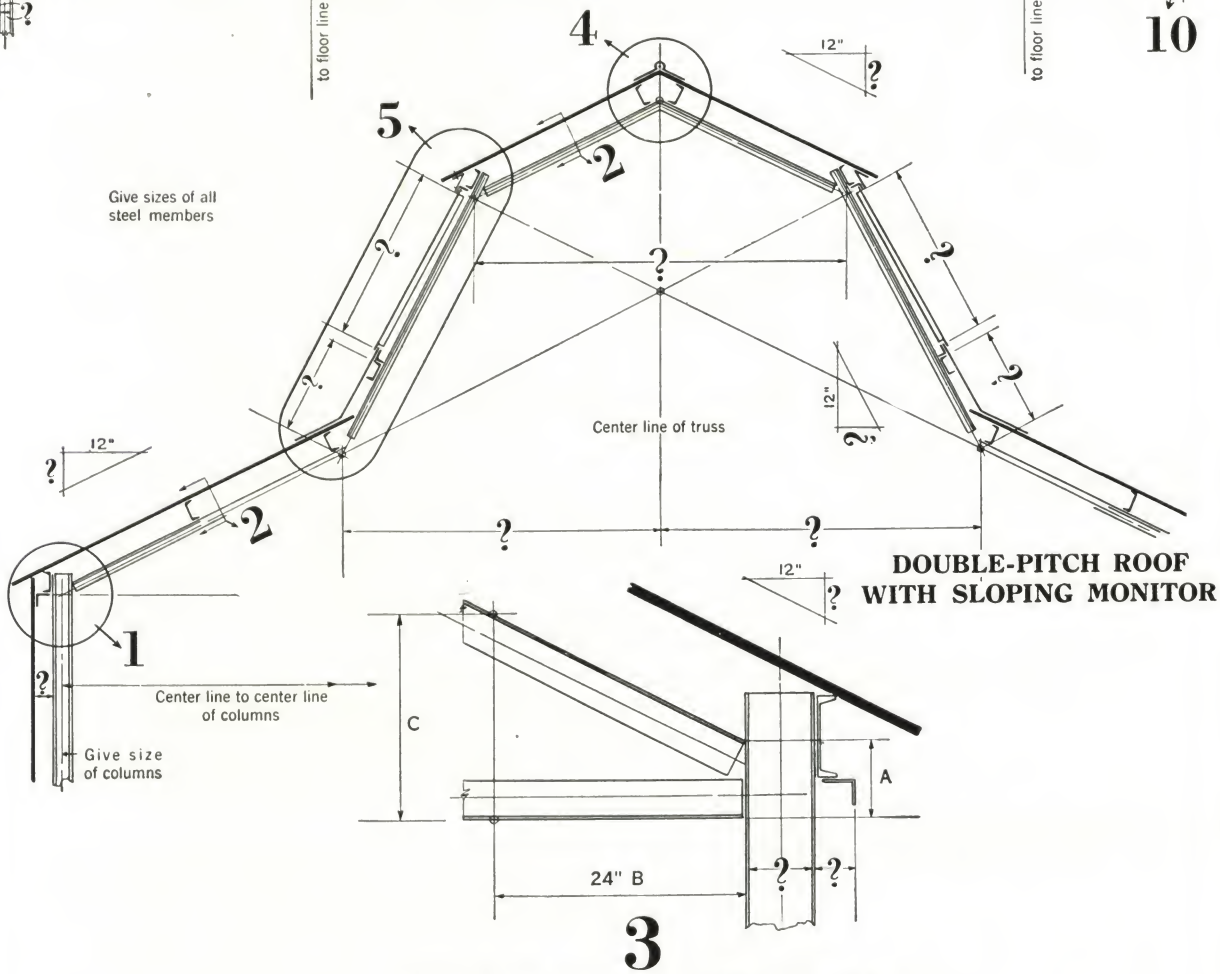


DOUBLE-PITCH ROOF WITH MONITOR

Continued on next page

SAW-TOOTH TYPE ROOF





DOUBLE-PITCH ROOF WITH SLOPING MONITOR

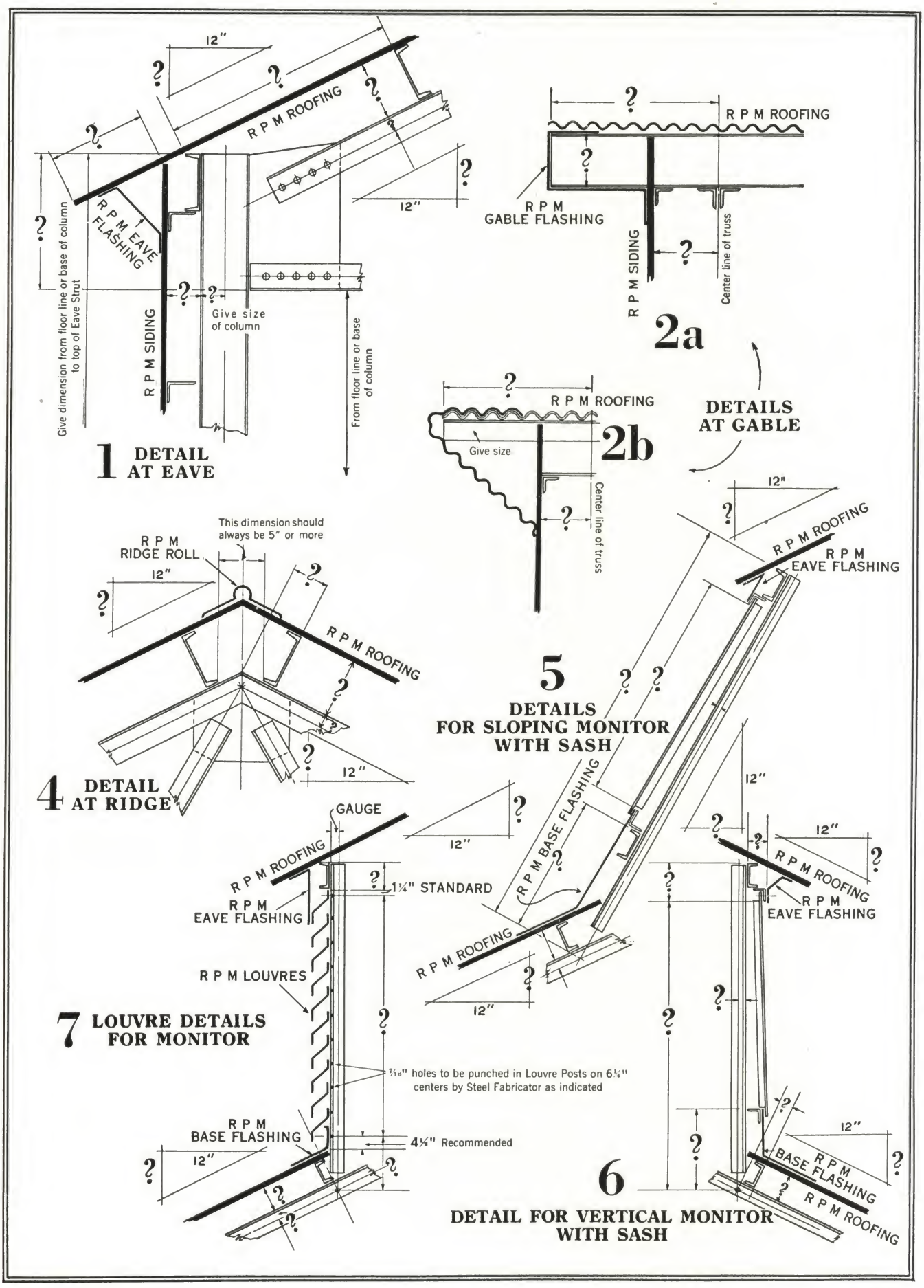
DIAGRAM SHOWING METHOD OF DETERMINING ROOF PITCH

(1) Determine vertical distance (A) between top and bottom chords

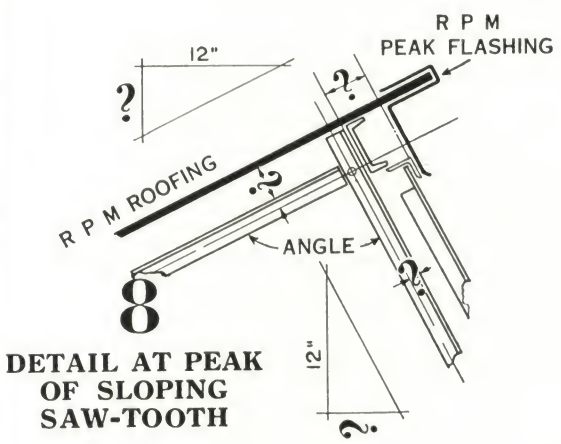
(2) Measure Two feet back from inside face of column (dimension B)

(3) Determine vertical height (C) from bottom to top chords

Continued on next page

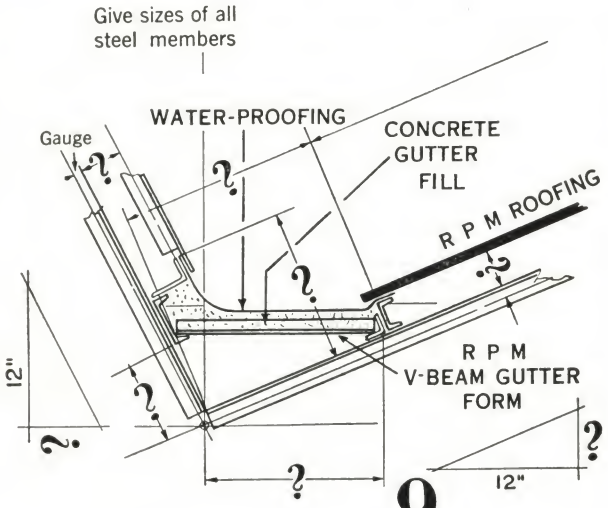


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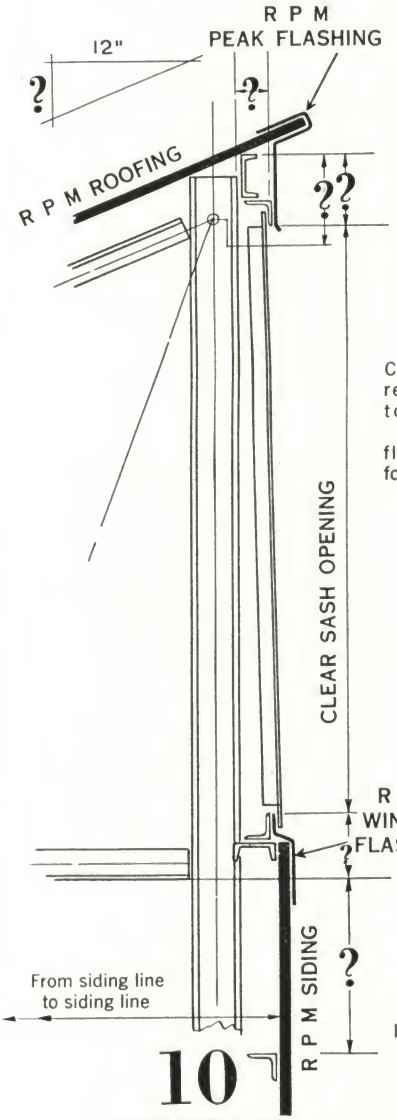
8

DETAIL AT PEAK OF SLOPING SAW-TOOTH



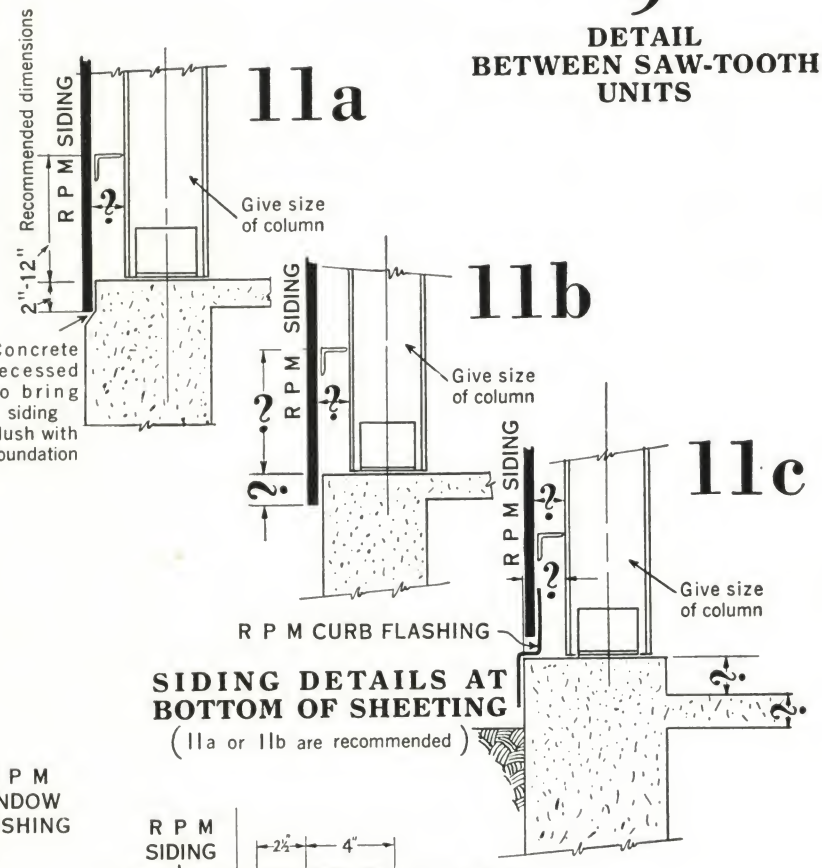
9

DETAIL BETWEEN SAW-TOOTH UNITS



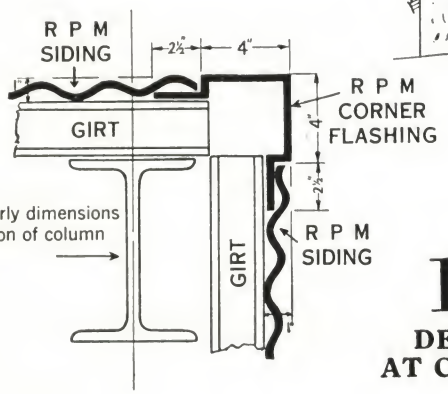
10

DETAILS OF SAW-TOOTH UNIT WITH VERTICAL SASH



SIDING DETAILS AT BOTTOM OF SHEETING

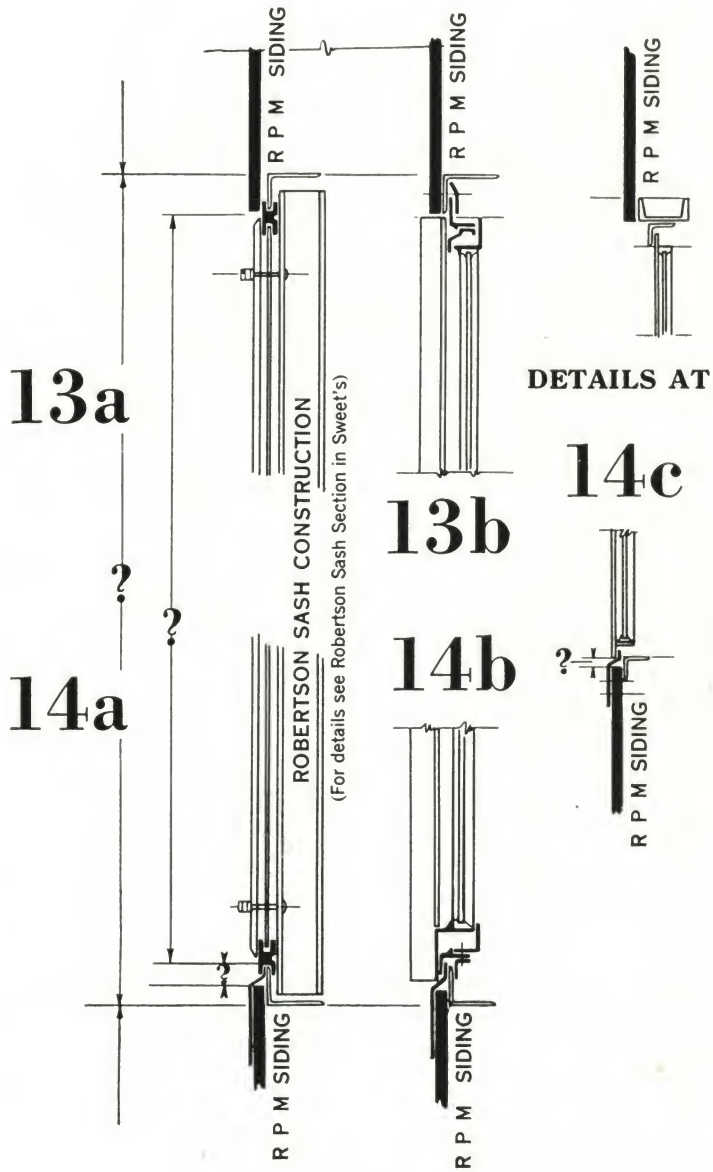
(11a or 11b are recommended)



12

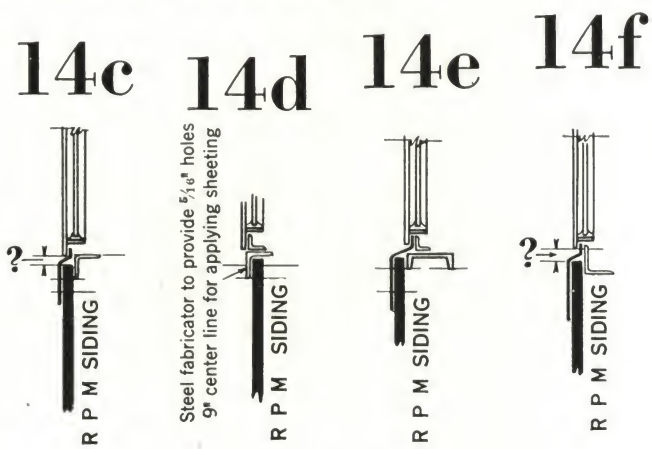
DETAIL AT CORNER

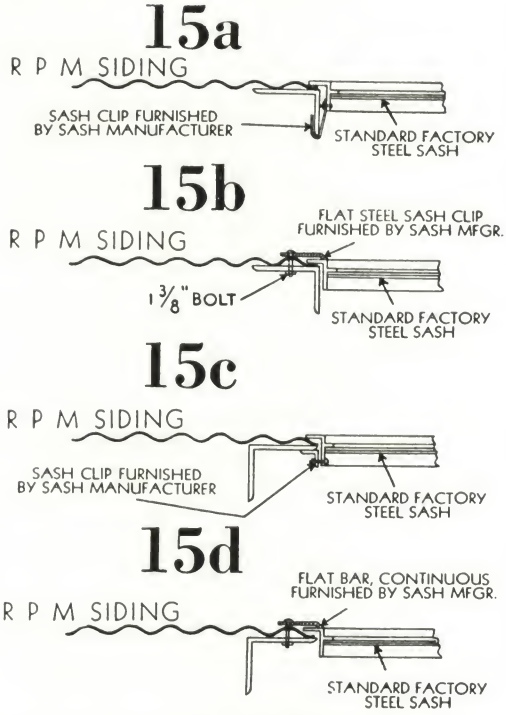
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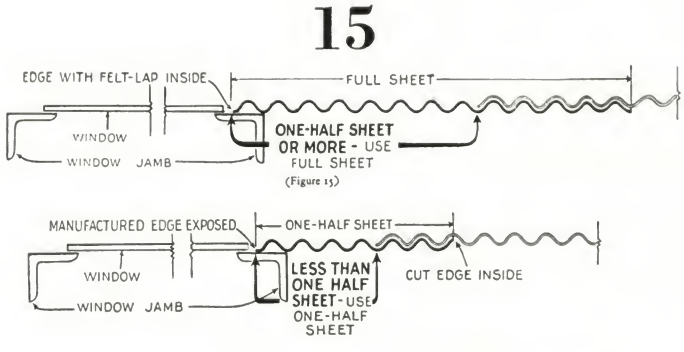


DETAILS AT WINDOW HEADS

DETAILS AT WINDOW SILLS



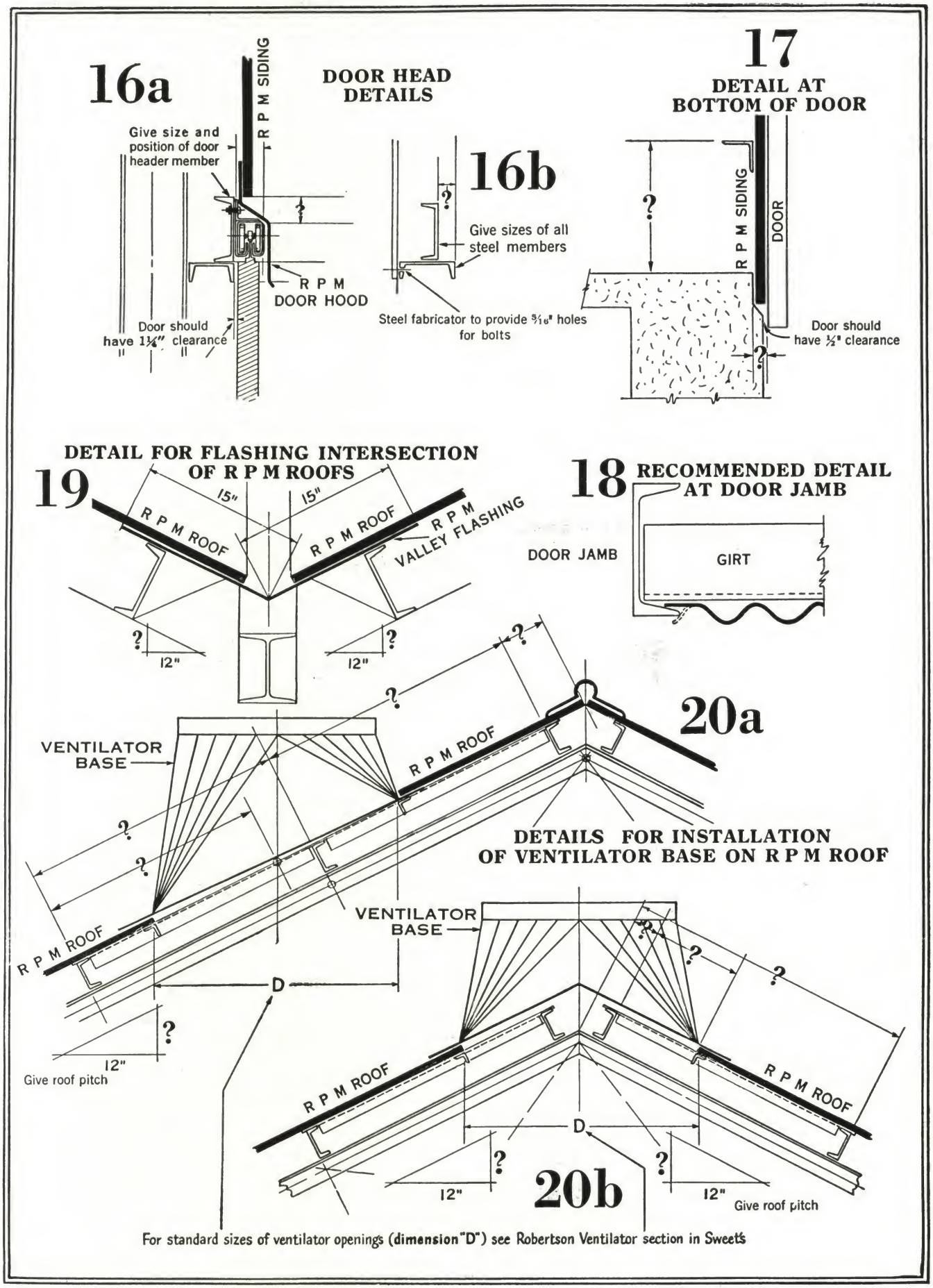




RECOMMENDED PROCEDURE FOR JUNCTURE OF R P M SIDING WITH SASH

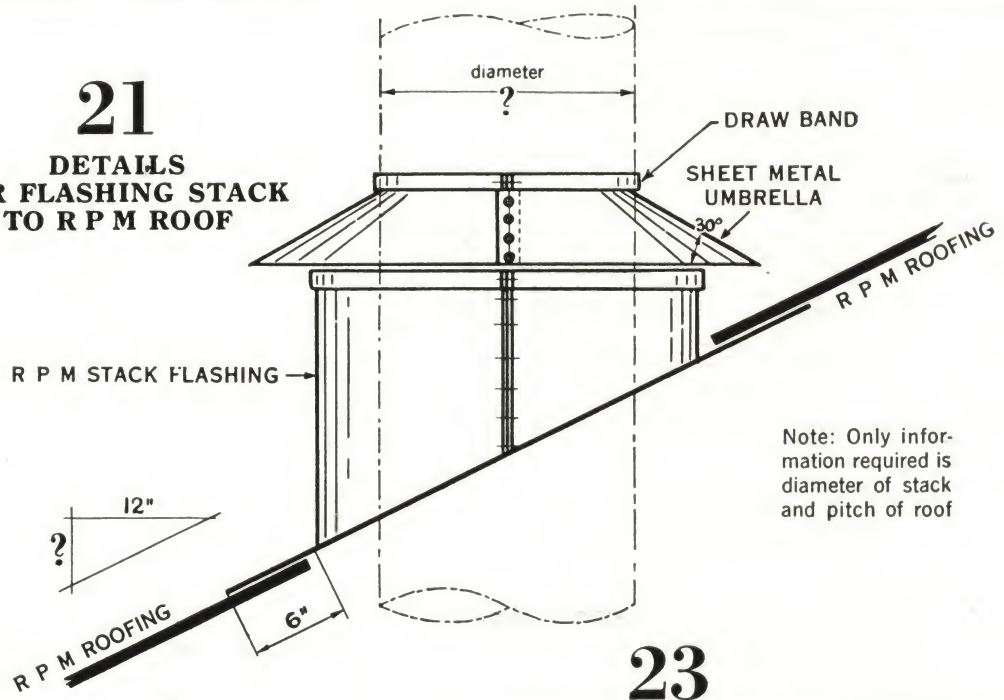
15a HAS PROVEN THE MOST SATISFACTORY OF THE FOUR SKETCHES SHOWN—SKETCH 15b HAS ALSO BEEN VERY SATISFACTORY.

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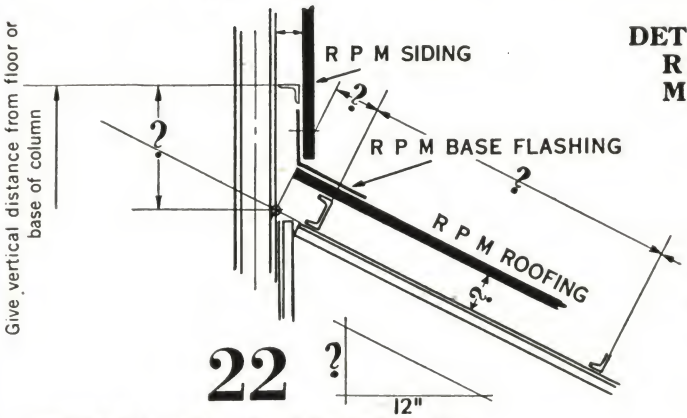
Continued on next page

21
DETAILS FOR FLASHING STACK TO R P M ROOF

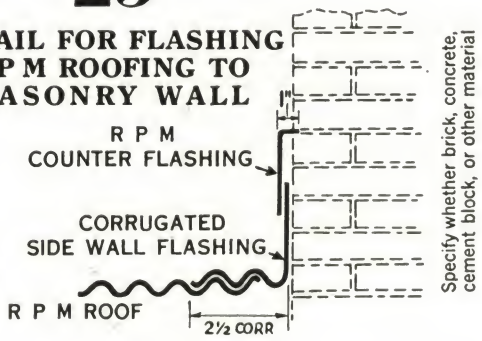


Note: Only information required is diameter of stack and pitch of roof

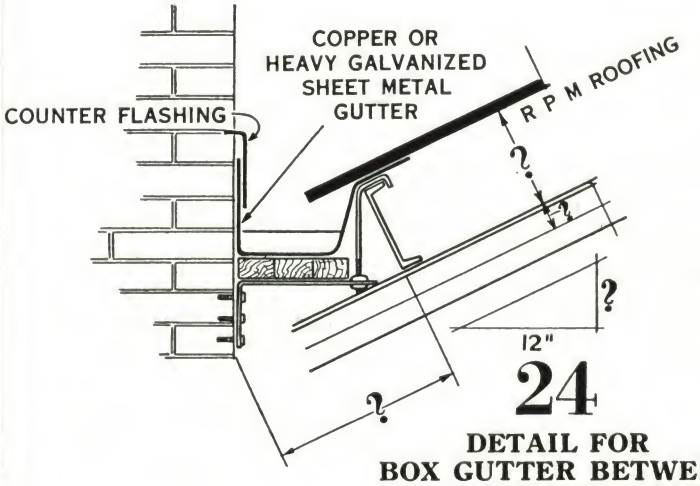
22
DETAIL FOR FLASHING AT JUNCTURE OF R P M ROOFING AND R P M SIDING



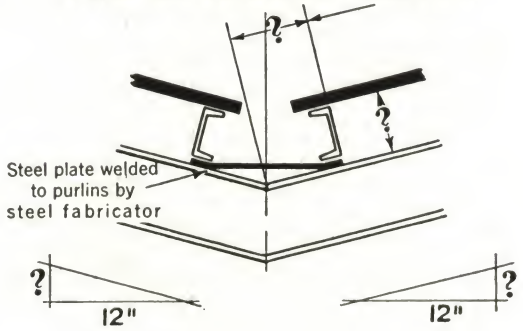
23
DETAIL FOR FLASHING R P M ROOFING TO MASONRY WALL



24
DETAIL FOR BOX GUTTER BETWEEN R P M ROOFING AND MASONRY WALL



25
DETAIL OF STEEL PLATE VALLEY GUTTER BETWEEN TWO R P M ROOF SLOPES



AMERICAN SHEET METAL WORKS

MANUFACTURERS OF

The Patterson Clip (Patented)

TELEPHONE
GALVEZ 3191

NEW ORLEANS, LA.

AGENCIES

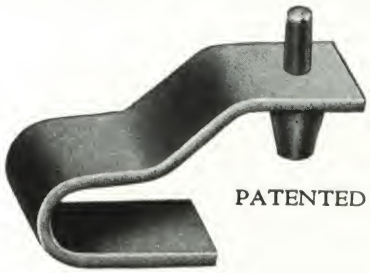
ATLANTA, GA., Conklin Tin Plate & Metals Co.
BALTIMORE, MD., The Kahl-Holt Co.
Lyons, Conklin & Co., Inc.
BEAUMONT, TEX., E. L. Wilson Hardware Co.
BIRMINGHAM, ALA., The Geo. F. Wheelock Co.
BOSTON, MASS., Joseph T. Ryerson & Son, Inc.
BUFFALO, N. Y., Beals, McCarthy & Rogers, Inc.
Joseph T. Ryerson & Son, Inc.
CAMBRIDGE, MASS., Joseph T. Ryerson & Son, Inc.
CHARLOTTE, N. C., Southern Engineering Co.
CAMDEN, N. J., Joseph T. Ryerson & Son, Inc.
CHICAGO, ILL., A. M. Castle & Co.
Joseph T. Ryerson & Son, Inc.
CINCINNATI, OHIO, The Edwards Mfg. Co.
Joseph T. Ryerson & Son, Inc.
CLEVELAND, OHIO, The J. Kinsner & Son Co.
Joseph T. Ryerson & Son, Inc.
COLUMBUS, OHIO, Vorys Bros., Inc.
DALLAS, TEX., The Edwards Mfg. Co. of Texas
Wyatt Metal & Boiler Works
Moncrief-Lenoir Mfg. Co.
DENVER, COLO., Goldberg Bros.
DETROIT, MICH., Joseph T. Ryerson & Son, Inc.
EL PASO, TEX., Momsen-Dunnegan-Ryan Co.
EVANSVILLE, IND., International Steel & Iron Co.
George L. Mesker & Co.
FORT WORTH, TEX., Fort Worth Structural Steel Co.
GALVESTON, TEX., Black Hardware & Supply Co.
HOUSTON, TEX., Moncrief-Lenoir Mfg. Co.
Peden Co.
INDIANAPOLIS, IND., Tanner & Co.
Follansbee Bros. Co.
JACKSON, MISS., Mississippi Steel & Iron Co.
JACKSONVILLE, FLA., J. G. Christopher Co.
JERSEY CITY, N. J., Joseph T. Ryerson & Son, Inc.
LANCASTER, PA., Raub Supply Co.
LITTLE ROCK, ARK., Arkansas Foundry Co.
LOS ANGELES, CAL., Emil Brown & Co.
LOUISVILLE, KY., Dehler Bros. Co.
LUBBOCK, TEX., Moncrief-Lenoir Mfg. Co.
MEMPHIS, TENN., Follansbee Bros. Co.
MILWAUKEE, WIS., Joseph T. Ryerson & Son, Inc.
MOBILE, ALA., Mobile Steel Co.
MONROE, LA., Monroe Hardware Co.
Mississippi Steel & Iron Co.
NASHVILLE, TENN., Phillips & Buttorff Mfg. Co.
NEW YORK, N. Y., Joseph T. Ryerson & Son, Inc.
OMAHA, NEB., Ceco Steel & Wire Co.
PHILADELPHIA, PA., Joseph T. Ryerson & Son, Inc.
PORTLAND, ORE., Pacific Metal Co.
RICHMOND, VA., Gordon Metal Co.
ST. LOUIS, MO., Clark Wells Metals Co.
Joseph T. Ryerson & Son, Inc.
ST. PAUL, MINN., St. Paul Corrugating Co.
SAN FRANCISCO, CAL., A. M. Castle & Co.
SAN ANTONIO, TEX., San Antonio Machine & Supply Co.
SAVANNAH, GA., Southern States Iron Roofing Co.
SEATTLE, WASH., A. M. Castle & Co.
SHREVEPORT, LA., Shreveport Blow Pipe & Sheet Iron Works
SYRACUSE, N. Y., H. E. Hessler Co.
TAMPA, FLA., Eagle Roofing & Art Metal Works
TOLEDO, OHIO, The Bostwick Braun Co.
HONOLULU, HAWAII, The Islands Welding & Supply Co.

For our page on Leakproof Louvers, see Manufacturers' Index

The Patterson Clip (Patented)

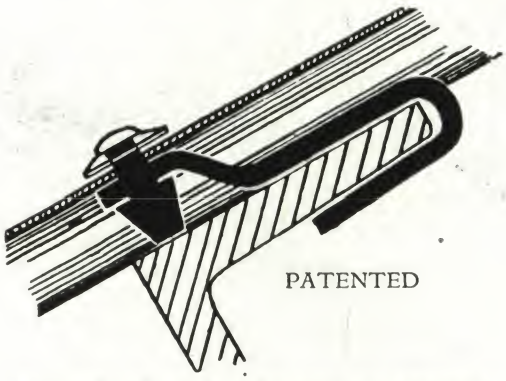
A clip for fastening sheet metal corrugated roofing and siding to steel structures at a large saving in cost over the old methods.

The Patterson Clip has been in successful use for many years in every state in the country and in a number of foreign countries. Many of the largest buyers of corrugated roofing use the Patterson Clip method exclusively.



Material and Size—Made of No. 12x⅝-in. open hearth steel, galvanized after fabrication.

Method of Application—In putting the roofing or siding on the steel structure, a helper on the inside sets the clip in place. The mechanic on the outside quickly draws the rivet of the clip through the metal with a *rivet set*. No previous punching of the sheet is necessary. He then places a burr or washer over the rivet and flattens or mashes the rivet firmly in place. The steel structural shapes act as a dolly.



Full Sized Sectional View Showing Patterson Clip Fitted Over Flange of Purlin and Corrugated Roof Sheet

All Play Eliminated—The clip thus applied is firm and eliminates all play between the corrugated sheet and the structural shape. This was not possible by the old method where one end of the strap was riveted to the corrugated siding or roofing, the strap then passed around the structural shape and the other end riveted to the roofing. The old method made it impossible to wrap the strap closely enough to take up all play.

Appearance—Patterson Clips present a neat and finished appearance, another advantage over the old method.

Cost—The cost of installation due to less riveting and less handling is appreciable, and in many cases has been figured as about one-half that of the old method. Also, Patterson Clips cost per thousand no more than the old devices.

Prompt Shipments

Patterson Clips are carried in stock in the cities listed above and are shipped on the same day orders are received.

They are packed and shipped as follows:
1000 per box, shipping weight 72 lb.
500 per box, shipping weight 36 lb.
250 per box, shipping weight 19 lb.

The net weight is 15 clips per lb. Rated as fourth class freight.

Samples and Prices

Upon request, samples and prices of the Patterson Clip, will be sent promptly and without obligation.

BLAW-KNOX COMPANY

Steel Roof Sheathing

2074 Farmers Bank Building, PITTSBURGH, PA.

NEW YORK, N. Y., Canadian Pacific Building
CHICAGO, ILL., Peoples Gas Building
BOSTON, MASS., 605 Statler Building
PHILADELPHIA, PA., 906 Widener Building
BIRMINGHAM, ALA., Brown-Marx Building
BUFFALO, N. Y., Genesee Building
CLEVELAND, OHIO, 526 Union Building
DETROIT, MICH., Lincoln Building
BALTIMORE, MD., Bayard and Warner Streets

EXPORT DIVISION: Blaw-Knox International Corp., Canadian Pacific Building, NEW YORK, N. Y.
LONDON, ENGLAND, New Oxford House, Hart Street, HOLBORN, W.C. 1

PARIS, FRANCE, 1 Rue de Clichy
MILAN, ITALY, 6 via S. Agnesse, 6
DUSSELDORF, GERMANY, 17, Bismarckstrasse

For other products, see Manufacturers' Index

Blawsteel Roof Sheathing

Blawsteel Roof Sheathing has been developed with the idea in mind of giving to the building industry a more satisfactory sheathing than any heretofore produced for buildings designed with flat roofs.

Blawsteel Galvanized Sheathing is light in weight, strong, firesafe, and impervious to dampness. It will not shrink or crack; will not burn; is easily and cheaply erected and is economical.

Strength—Standard Blawsteel Sheathing will carry a roof load of 65 lb. per sq. ft. on standard purlin spacing with a factor of safety of 4, with less than allowable deflection for plastered ceilings. It will carry 100 lb. per sq. ft. with only $\frac{3}{16}$-in. deflection.

The usual roof load required by city building codes is 40 lb.

Standard purlin spacing is 3 ft. 10½ in. which is the most economical spacing.

Blawsteel Sheathing is furnished, however, in heavier gauge; so that the same roof load can be carried over greater spaces between purlins.

Permanence—Blawsteel Sheathing is made of copper-bearing galvanized steel. It is galvanized, because galvanizing is the best coating that has yet been found to protect steel, and it is intended that Blawsteel Sheathing shall last as long as the building on which it is used.

STANDARD CHANNEL PURLINS FOR 40 LB. PER SQUARE FOOT LIVE LOAD
Factor Safety 4. Stress 18,000 Lb. per Sq. In.

Bay length, ft.	Span c. to c. purlins				
	3 ft. 10½ in.	4 ft. 10½ in.	5 ft. 10½ in.	6 ft. 9 in.	7 ft. 9 in.
16	6-in. channel 8.2 lb.	7-in. channel 9.8 lb.	7-in. channel 9.8 lb.	8-in. channel 11.5 lb.	8-in. channel 11.5 lb.
18	7-in. channel 9.8 lb.	8-in. channel 11.5 lb.	8-in. channel 11.5 lb.	9-in. channel 13.4 lb.	9-in. channel 13.4 lb.
20	7-in. channel 9.8 lb.	8-in. channel 11.5 lb.	9-in. channel 13.4 lb.	10-in. channel 15.3 lb.	10-in. channel 15.3 lb.
22	8-in. channel 11.5 lb.	9-in. channel 13.4 lb.	10-in. channel 15.3 lb.	10-in. channel 15.3 lb.	12-in. channel 20.7 lb.
24	9-in. channel 13.4 lb.	10-in. channel 15.3 lb.	10-in. channel 15.3 lb.	12-in. channel 20.7 lb.	12-in. channel 20.7 lb.

Blawsteel Longspan Roof Sheathing

The most economical design for steel sheathing is a short purlin span (not over 3 ft. 10½ in. to 4 ft. 10½ in.).

Occasionally a little weight can be saved in the purlins by spacing them farther apart, but this generally requires heavier steel sheathing and structural steel is cheaper per pound than steel sheet. It is advisable therefore, to space purlins, if possible, on 3 ft. 10½-in. centers, which gives the cheapest construction and at the same time a stronger and more rigid roof.

If it is desirable for other reasons to place the purlins farther apart, the Blawsteel Longspan Sheathing can be used. In this sheathing the integral reinforcing ribs are 1⅞ in. deep (instead of 1¼ in.) and are opened at the top 1 in.

BLAWSTEEL ROOF SHEATHING
Safe loads, lb. Deflection at center of sheet

Span, ft. in.	Gauge	Safe load, lb. per sq. ft.	Deflection, in.			
			Load 20 lb. per sq. ft.	Load 30 lb. per sq. ft.	Load 40 lb. per sq. ft.	Load 50 lb. per sq. ft.
3 6	24	76	.047	.058	.069	.081
4 0	24	60	.069	.086	.102	.120
4 6	24	46	.098	.122	.152	.177

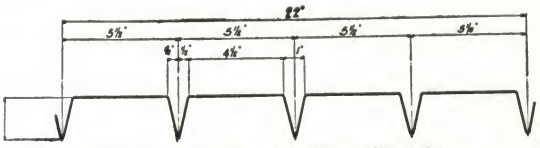
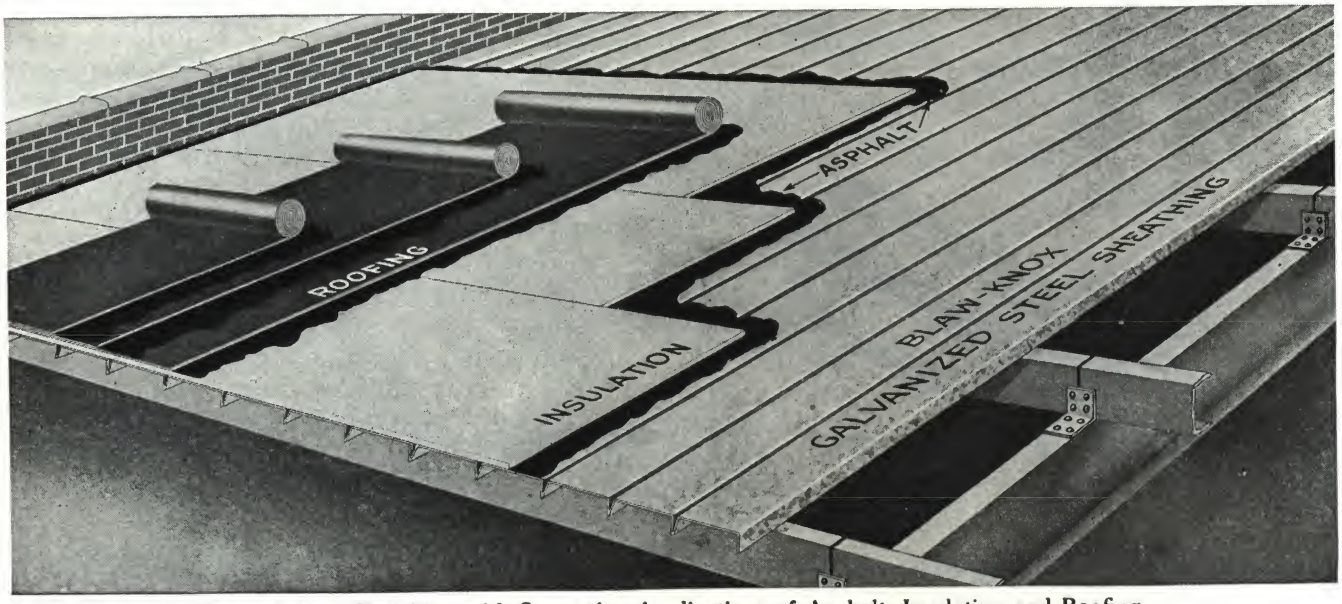


Diagram of Longspan Roof Sheathing

Blawsteel Longspan Sheathing should be used on all purlin spans over 4 ft. 6-in. centers and can be used when made from 20 gauge material on spans up to 7 ft. 6-in. centers. 18 gauge Longspan Roof Sheathing will span from 7 ft. 6 in. to 8 ft. 6 in.



Blawsteel Roof Sheathing with Successive Applications of Asphalt, Insulation and Roofing

Fenestra

HOLORIB

STEEL ROOF DECKS

Detroit Steel Products Company
2250 E. Grand Boulevard
Detroit, Michigan

HOLORIB INSULATED ROOF DECK

Applied Under Governing Specifications with Insulation and Waterproofing

Manufactured by

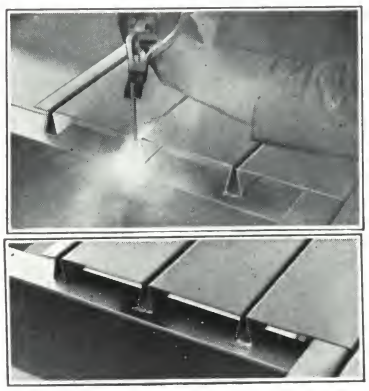
DETROIT STEEL PRODUCTS COMPANY

HOLORIB INSULATED ROOF DECK DIVISION

2250 EAST GRAND BLVD.
DETROIT, MICH.

BALTIMORE, MD., 1017 Fidelity Bldg.
BIRMINGHAM, ALA., 2431 Avenue "A" So.
BOSTON, MASS., 38 Chauncy Street
BUFFALO, N. Y., 818 Stock Exchange Bldg.
CHICAGO, ILL., 1017-19 Conway Bldg.
CINCINNATI, O., 703 Fountain Square Bldg.
CLEVELAND, O., 1740 E. 12th Street
DALLAS, TEX., 410 Construction Bldg.
DETROIT, MICH., 605 Stevens Bldg.
INDIANAPOLIS, IND., 321 Hume-Mansur Bldg.
KANSAS CITY, MO., 609 Interstate Bldg.
LOS ANGELES, CAL., 448 So. Hill Street
NEW YORK, N. Y., 650 Graybar Bldg.
NEWARK, N. J., 1027 Broad Street
OAKLAND, CAL., 63rd and Doyle Streets
PHILADELPHIA, PA., 402 Guarantee Trust Bldg.
PITTSBURGH, PA., 1011 Empire Bldg.
SAN FRANCISCO, CAL., 526-28 Hunter-Dulin Bldg.
SEATTLE, WASH., 1411 4th Avenue Bldg.
WASHINGTON, D. C., 715 Barr Bldg.

Fenestra
HOLORIB
ROOF DECKS FLOOR FORMS



Above—Welding deck to purlin
Below—The completed welds



Workmen laying 97,000 sq. ft. of Holorib Roof Deck by the welding process at the plant of Babcock & Wilcox Tube Co., Beaver Falls, Pa.

TYPICAL HOLORIB INSTALLATIONS

Building	Location	Squares	Building	Location	Squares
Illinois Bell Telephone Co.	Chicago, Ill.	270	Packard Motor Co.	Detroit, Mich.	382
Kingston High School	Kingston, Pa.	501	Dr. Phillips Packing Co.	Orlando, Fla.	317
New Mexico State University	Albuquerque, N. M.	370	Columbus Auditorium	Columbus, O.	365
Freihofer Theatre	Upper Darby (Phila.) Pa.	332	Oliver Farm Equipment Co.	Des Moines, Ia.	3180
			Celotex Company	Marrero, La.	843
Columbus Railway, Power & Light Co.	Columbus, O.	320	U. S. Navy Hangars	Coco Sola, C. Z.	955
White Company	Syracuse, N. Y.	390	General Electric Co.	Peterboro, Ont.	970
Rockford Drop Forge Co.	Rockford, Ill.	200	Canadian Potteries Ltd.	St. Johns, N. B.	1397
			New York Power & Light Co.	Albany, N. Y.	970

PRODUCT

Holorib Reinforced Steel Roof Plates which form the rigid and permanent base of a completely insulated and waterproofed unit.

Holorib Deck Plates are fabricated from copper-bearing or galvanized steel sheets reinforced by self-contained triangular ribs rolled into the sheet longitudinally, which are anchored or welded to the purlins by specially formed anchor clips. The sheets dovetail and interlock securely together both on sides and ends, forming a deck through which there is no asphalt drippage.

Narrow span 24 gauge Holorib sheets are rolled with triangular ribs 3/4 in. deep spaced 3 1/4 in. on centers. They are specially designed for structural purlins or light joists spaced approximately 4 ft. Wide span Holorib sheets are fabricated from 22, 20 or 18 gauge sheets with triangular ribs 1 1/2 in. deep, and will cover with unusual rigidity purlin spacings as high as 8 ft. 6 in.

All Holorib sheets are dip-coated and oven-baked at the factory with a steel gray finish forming a tough protective film. By this process no metal in the Holorib sheet is left bare.

The angles forming the rib of the Holorib sheet are less acute than in other decks. There is no distortion of the metal.

ADAPTABILITY

Holorib steel deck construction is applicable to flat, pitched, or bowstring truss roofs, and the proper gauge Holorib sheets are fabricated for those purlin spacings which are most economical in the use of structural steel. It is especially adapted to all types of commercial and industrial buildings, including airplane hangars, theatres, and auditoriums.

OUTSTANDING ADVANTAGES

A long-lived roof, requiring a minimum of maintenance.

Its light weight reduces the requirements of the structural steel—(one square foot of Holorib weighs approximately 5 lbs., including insulation and water proofing).

Carries required loads over wide purlin spacing with ample factors of safety.

Makes a firm, smooth and inherently dry mopping surface for the application of insulation and roofing felts. Stays water-tight years longer because of the perfect combination of the materials employed.

Quickly laid. Speeds the completion of the building.

May be laid in any weather men can work—nothing to pour—nothing to freeze—nothing to dry out.

Unaffected by atmospheric changes. Expansion and contraction are negligible.

Saves winter fuel. Provides cooler interiors in warm weather.

Saves insurance. Takes a fire-proof rating when used over incombustible contents.

Telescoping end laps made over the purlins form tight interlocking joints.

May be welded in place forming a rigid yet self-adjusting foundation for insulation and waterproofing.

Lower in cost than any other type of fire-resistive roof of the same insulating efficiency.

Provides attractive ceilings. It is not a dust collector.

May be used as a highly satisfactory floor with or without concrete.

INSULATION

Holorib Engineers recommend that insulation be applied over their steel roof deck. Our experience indicates most satisfactory results with the pressure-resisting types of insulation full-mopped with hot asphalt. Final waterproofing is accomplished with built-up felts, preferably with a surface finish of slag, gravel, or asbestos. Slate or tile may be successfully applied over Holorib decking. On steep surfaces, Holorib Division will furnish at slight additional cost a new type of self-expanding nail which anchors the insulation to the deck without penetrating the sheet itself. These nails are also of Holorib manufacture.

The insulation applied to Holorib steel deck plates effectively retards the passage of heat in either direction. In this respect the Holorib roof unit with 1 in. of insulation is equal to 24 in. of solid concrete in heat retarding value. This effective insulation reduces fuel consumption and may be taken into account in reducing the amount of radiation and size of the heating plant.

Dry steel will not rust. The insulation applied over Holorib *entirely prevents condensation* caused by the warm air within the building meeting a surface chilled by a colder exterior temperature. As a result, the Holorib roof deck always remains at approximately room temperature well above the dewpoint of the interior air. Accumulation of

Continued on next page

moisture due to a temperature difference is absent.

With the Fenestra Holorib deck protected with paint from below and insulation above, no injurious corroding action is possible.

With high humidities and temperatures, from 1½ to 2 in. of insulation should be applied in broken joint construction. The ceiling should be given at least two field coats of paint.

In the average heated buildings, such as machine shops and garages, schools and auditoriums, a 1-in. thickness of insulating material will return a substantial dividend in fuel saved annually, and will prevent any possibility of condensation.

SPECIFICATIONS

1. The roof deck shall be of copper-bearing steel sheets dip painted and oven baked after fabrication, manufactured by The Holorib Division of the Detroit Steel Products Co., Detroit, Mich., and shall be capable of withstanding a distributed live load of ———without permanent deflection on the spans. All end laps shall be not less than 2½ in. in length, made over the purlins, and shall be of the interlocking or telescoping type. The sheets shall be securely fastened every 12 in. on center to the purlins with Holorib clips.

2. The insulation shall be of the pressure resisting type—if more than one thickness, it shall be applied in sheets with broken joint construction.

(a) On roof surfaces having a pitch less than 3 in. in 12 in., the insulation shall be mopped solidly to the Holorib roof deck with hot asphalt having a melting point from 155 to 160° Fahr., a penetration of 10 at 32° Fahr., and a ductility of 25 at 77° Fahr.

(b) On roof surfaces having a pitch 3 in. in 12 in. or more, the hot asphalt shall be mechanically stiffened by the addition of 10 lb. of short asbestos fibre to each 100 lb. of asphalt to avoid slipping or creeping. The insulation shall be fastened with *Holorib expanding nails.*

3. The waterproofing shall be of the built-up bituminous type for flat or pitched roofs. (On steep pitched roofs slate, tile, or asbestos shingles may be installed.)

The built-up roofing shall be first-class in every respect, the surface finish to be slag, gravel, asbestos, or asphalt. [Where a built-up asphalt waterproofing is used, not less than four plies of all rag felt equal to U. S. Government Standard Specification No. 86 should be specified.]

WIDE-SPAN DECK—Where slate, tile, or asbestos shingles are used, the insulation shall be securely fastened to the Holorib deck by using four Holorib expanding nails to each 10 sq. ft. in addition to being cemented with mechanically stiffened asphalt as above described. After the insulation is applied, a 15-lb. saturated felt shall be cemented on in hot asphalt, after which the tile or slate to be applied shall be nailed directly into the waterproofing and insulation.

24-GAUGE HOLORIB—Where slate, tile, or asbestos shingles are used with 24-gauge Holorib, the first ply of insulating material shall be mopped solidly to the Holorib deck and additionally secured with 1-in. American Felt Roofing nails driven into the openings between the ribs; the second layer of insulating material shall then be mopped to the first and, in addition, shall be securely nailed to the first ply with clinch nails.

4. Saddles to carry water to outlets are to be formed from a material satisfactory for this purpose. Poured saddles *are to be formed over the insulating material* which has been further waterproofed with one ply of felt or one heavy mopping of asphalt. *In no case should gypsum or concrete saddles be built over the bare deck.*

5. One field coat of paint shall be applied to the underside of Holorib immediately after erection. (This work is part of the painting contract.)

ERECTION AND ENGINEERING SERVICE

The Holorib Division of Detroit Steel Products Company produces the steel sheets, fastening clips, and (1) will contract to erect the steel deck with their own field force, or (2) furnish superintendence at a moderate charge so that the deck may be applied by the general contractor, or (3) will co-operate with capable and responsible roofing contractors so that the architect and owner may be relieved of all responsibility for the permanence and stability of the roof unit.

Holorib Steel Deck should be erected after all walls, coping and structural steel are in place.

Clips are designed to fasten properly to varying sizes and types of purlins. With 24 gauge and lighter the riveting type with prongs which pierce both upper and lower sheets is employed. With 22 gauge and heavier either piercing or nonpiercing clips may be used. The fact that the sheets are pierced has no bearing on their permanence as they are sealed in hot asphalt and are under the insulation.

The holding power of all clips is far in excess of possible inside wind pressure. Non-piercing clips are made of spring steel with an individual holding power not less than 175 lbs. Piercing clips will carry heavier loads.

Two clips of either type are used per sheet per purlin, spaced alternately 6 and 12 in. apart.

Where Wide-Span deck plates are specified, single starting ribs are furnished to support the Holorib along the sides of the building. With 24 gauge, as the ribs are only approximately 3 in. apart, these starting ribs are unnecessary.

Under average conditions a crew of four men will erect 2500 sq. ft. of Holorib daily.

Framing

Framing and structural steel are not part of Holorib Steel Deck, unless so specified.

Welding

At slight extra cost Holorib may be electrically welded to the purlins. Because of its telescoping end lap, Holorib roof deck is easily welded from above. Each individual weld has a holding power tested to 500 lbs. pull without failure. The shape of the rib and the method of erection automatically takes care of any contraction or expansion.

Continued on next page

Bearings

The ends of Holorib sheets must always be supported. Wall bearings should be either raggle, corbel, or purlin spaced approximately 4 in. from the wall. Plans should show details of these sections.

Vents, Stacks and Sumps

Holorib is readily cut around vents, but if over 8 in. in diameter, angle bracing should be provided by the steel fabricator, as unsupported decking will not carry these loads.

Curbs and Sidewalls

Framing angles both top and bottom should be provided, punched 9 in. on center with $\frac{7}{16}$-in. holes. Holorib is furnished cut to proper size and is bolted to these angles.

Eaves and Gables

Eave struts should be punched 9 in. on center with $\frac{7}{16}$-in. holes if overhang (limited to 12 in.) is desired. Overhang at the gable (sides) must be supported with lookouts or purlin extensions.

Closures, Flashing and Edging

Closures, flashing and edging are generally applied after the insulation is in place and are properly a part of the roofing or sheet metal contract (not roof deck) but when the construction of a building is such to require sheet metal to complete the application of the deck proper Detroit Steel Products will furnish this material. Our proposal will be specific as to the material we will furnish.

Paint

Unless otherwise specified, all Holorib plates are manufactured from copper-bearing steel dip coated in a priming coat of battleship gray paint baked on.

On special order we will fabricate aluminum, galvanized, or lead-coated Holorib.

Aluminum Holorib requires no paint as sheets will not corrode except under any extraordinary conditions.

Since a coating of 1 oz. of zinc per sq. ft. is, we believe, no better protection than that afforded by dip-painting, the additional cost of tight coat galvanized deck plates is not altogether justified as the requirement of field painting is not eliminated. To galvanize after fabrication is impractical on account of the additional excessive charges.

We cannot guarantee that lead-coated sheets (Terne-plate) will not contain pinholes.

ENGINEERING DATA

Deflection Tests

The deflections shown are the result of tests made on bare sheets by the Testing Materials Laboratory and by qualified Engineers of the Case School of Applied Science of Cleveland. Tests made after the application of insulation indicate average 15% greater rigidity.

PURLIN SPACINGS

Ga.	Dist. Load Lbs. Per Sq. Ft.	4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
24	30	.151	.170	...	...	...	...	...	...	...	...
24	40	.190	.247	...	...	...	...	...	...	...	...
24	50	.230	.310	...	...	...	...	...	...	...	...
22	30	...	...	...	.013	.050	...	...	...	...	...
22	40	...	...	.006	.038	.118	...	...	...	...	...
22	50	.010	.062	.145	.200	...	...	...	...	...	...

PURLIN SPACINGS

Ga.	Dist. Load Lbs. Per Sq. Ft.	4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
20	30	...	...	...	...	.031	.071	.103	.300	...	...
20	40	...	...	...	.014	.106	.162	.237	.450	...	...
20	50	...	...	.008	.025	.143	.201	.290	.550	...	...
18	30	...	...	...	...	...	...	...	.230	.265	.285
18	40	...	...	...	...	...	...	...	.310	.350	.380
18	50	...	...	...	...	...	...	...	.405	.440	.485

All tests were made with standard stock sheets of copper-bearing low carbon content steel sheets.

	24G	22G	20G	18G
Section Modulus*	.0134	.0912	.1050	.1207
Moment of Inertia	.0061	.0820	.0942	.1078

*Based on rib sections with a top flange two and one-half times the width of the base.

Thermal Conductivity of Holorib

The following table gives the thermal conductivity of Holorib roofs, including in each case a standard composition roofing:

1. Holorib without insulation ..... 0.781 B.t.u.
2. Holorib and ½-in. insulation ..... 0.358 B.t.u.
3. Holorib and 1-in. insulation ..... 0.232 B.t.u.
4. Holorib and 1½-in. insulation ..... 0.172 B.t.u.
5. Holorib and 2-in. insulation ..... 0.136 B.t.u.
6. 2-in. Plank (1¾ in. net) D. & M. when new and joints tight ..... 0.345 B.t.u.
7. 3-in. Plank (2¾ in. net) D. & M. when new and joints tight ..... 0.256 B.t.u.
8. 2½-in. Poured Gypsum on plasterboard ..... 0.354 B.t.u.
9. 3-in. Poured Concrete ..... 0.610 B.t.u.
10. 1⅝-in. Cement Tile ..... 0.680 B.t.u.

Insulation referred to above may consist of such pressure-resisting materials as cork, Celotex, Insulite, J-M Board, etc. The values of the thermal conductivity are in terms of B.t.u. (British thermal units) per sq. ft. per hour, per degree difference between inside and outside temperature. They are taken from data published by the American Society of Heating and Ventilating Engineers Guide (1930 Edition).

Holorib insulated construction forms almost an air-tight blanket; there are no cracks to permit leakage of heat.

Plank decks dry out and warp, permitting large heat losses.

Uninsulated metal decks have practically no heat stopping value.

Comparative Roof Weights

Holorib:	Lb. per sq. ft.
Waterproof covering	1.5
1-in. insulation	1.5
Steel deck	1.6 to 2.9
Total approximately	5 lb.
2-in. plank	8
3-in. plank	11
3-in. gypsum	18
Precast concrete	18 to 25
3-in. poured concrete	38

Add 3 to 5 lb. per sq. ft. if slag or gravel is used.

SIZES, WEIGHTS, LOADS OF HOLORIB DECKS

Sheet sizes, in.		
	24 gauge*	4 ft. 3 in. to 10 ft. 3 in. Multiples of 3 in. 16¼-in. covering capacity.
	18, 20, 22 gauge†	5 ft. 3 in. to 10 ft. 3 in. Multiples of 6 in. 18⅛-in. covering capacity.

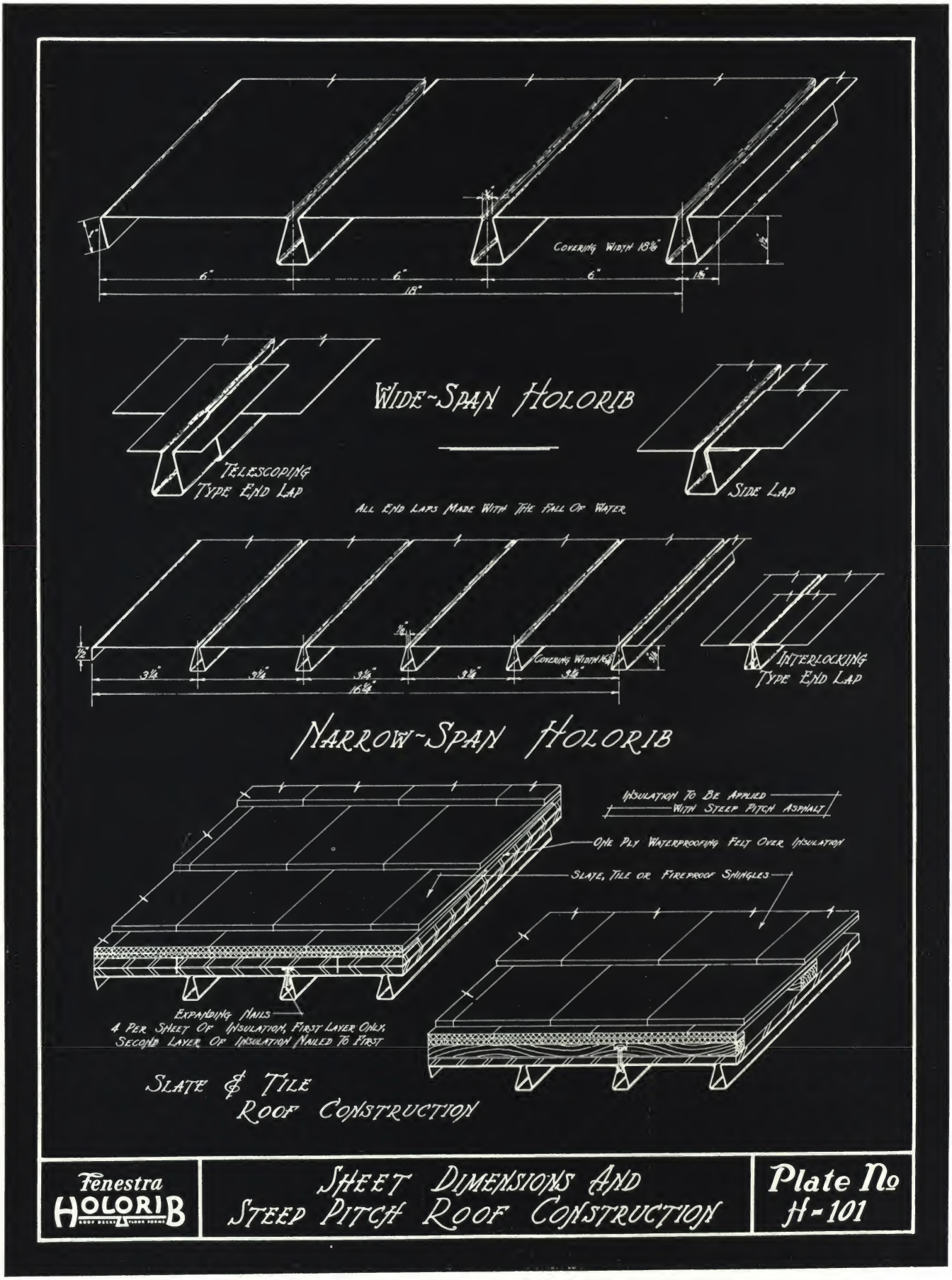
*All laps are made on purlins.
†All telescoping end laps are held within 3 in. of purlins.

Descriptive Data			Safe Carrying Loads, Holorib Roof Deck			
Gauge	Rib size, in.	Shipping wt. per 100 sq. ft. with clips	Gauge	Type	Purlin Spacing	Safe load lb. per sq. ft.
26*	¾	130 lbs.	26*	Special	2'0"—3'0"	.....
24	¾	170 lbs.	24	Standard	4'0"—4'6"	45—40
22	1½	235 lbs.	22	Wide-span	4'6"—5'0"	50—45
20	1½	285 lbs.	20	Wide-span	5'6"—6'3"	50—45
			20	Wide-span	6'6"—7'0"	45—40
			20	Wide-span	7'0"—7'6"	40—30
18	1½	345 lbs.	18	Wide-span	7'6"—8'6"	45—35

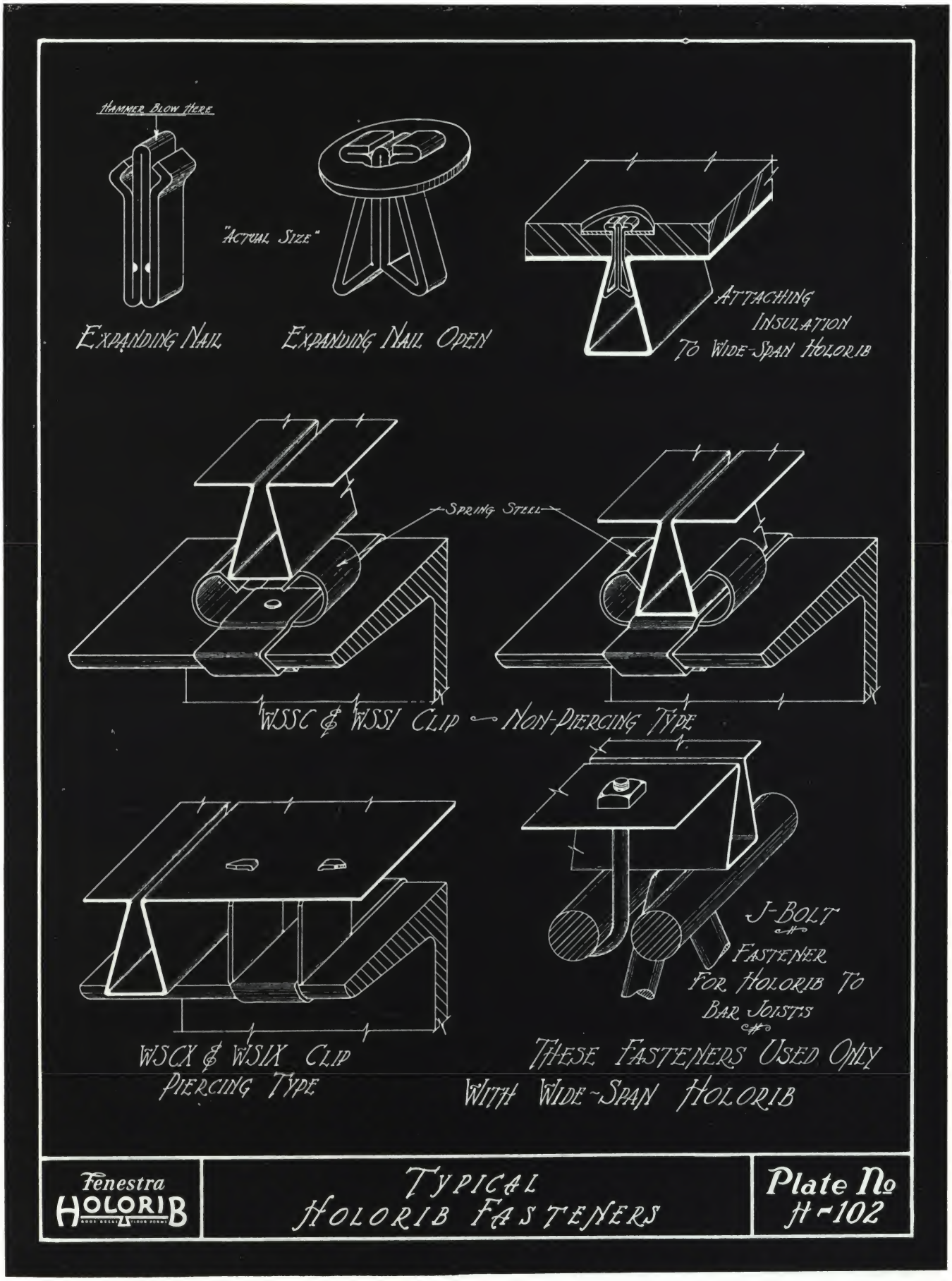
*Applied inverted for concrete floor forms. Send for complete literature. C. L. 36,000 lb. Classed "Iron & Steel Roofing N. O. I. B. N." 5th C. L., 4th L. C. L.

Add 15 lbs. per square to allow for crating on export shipments. Galvanized or aluminum sheets furnished on special order.

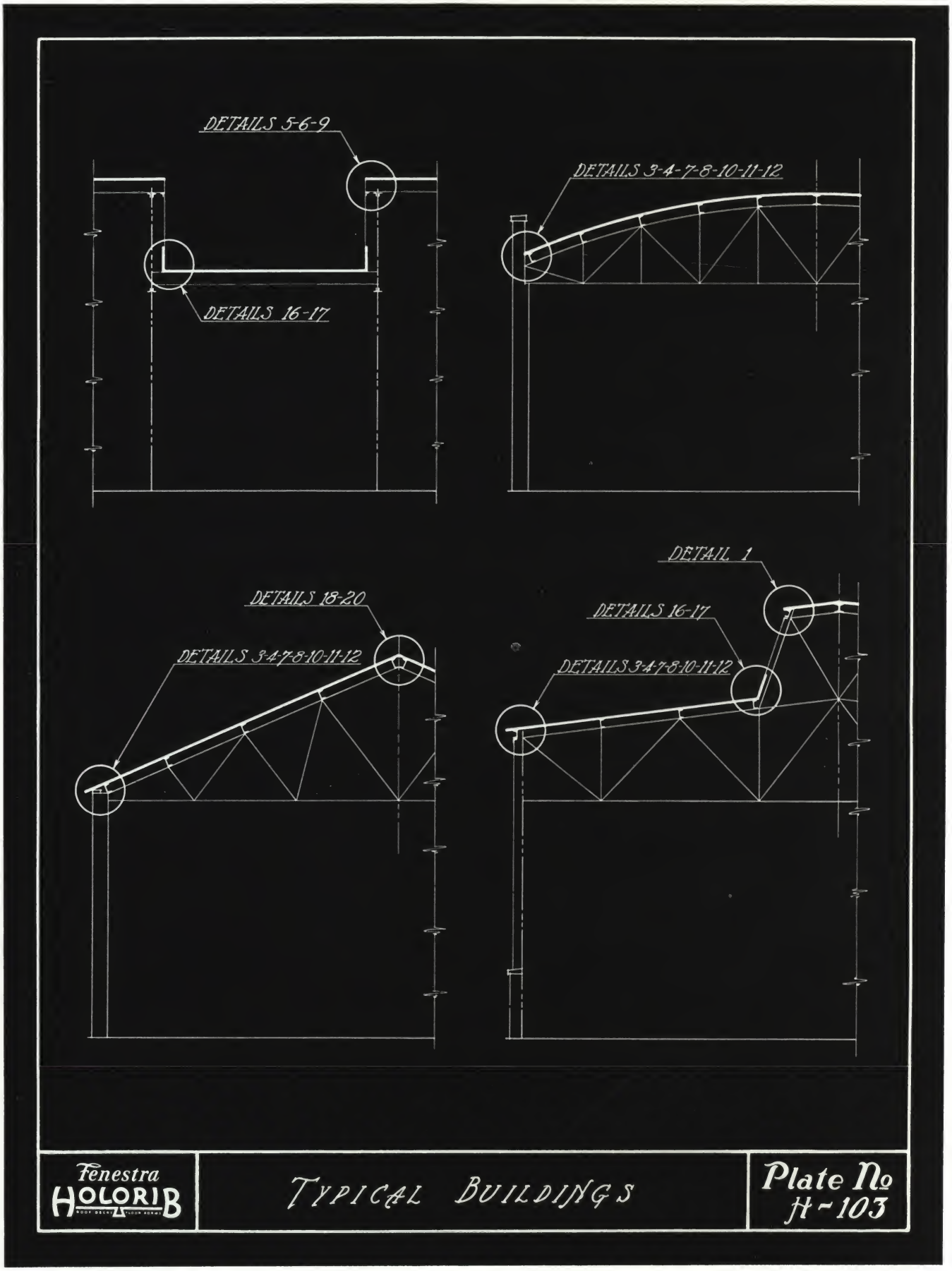
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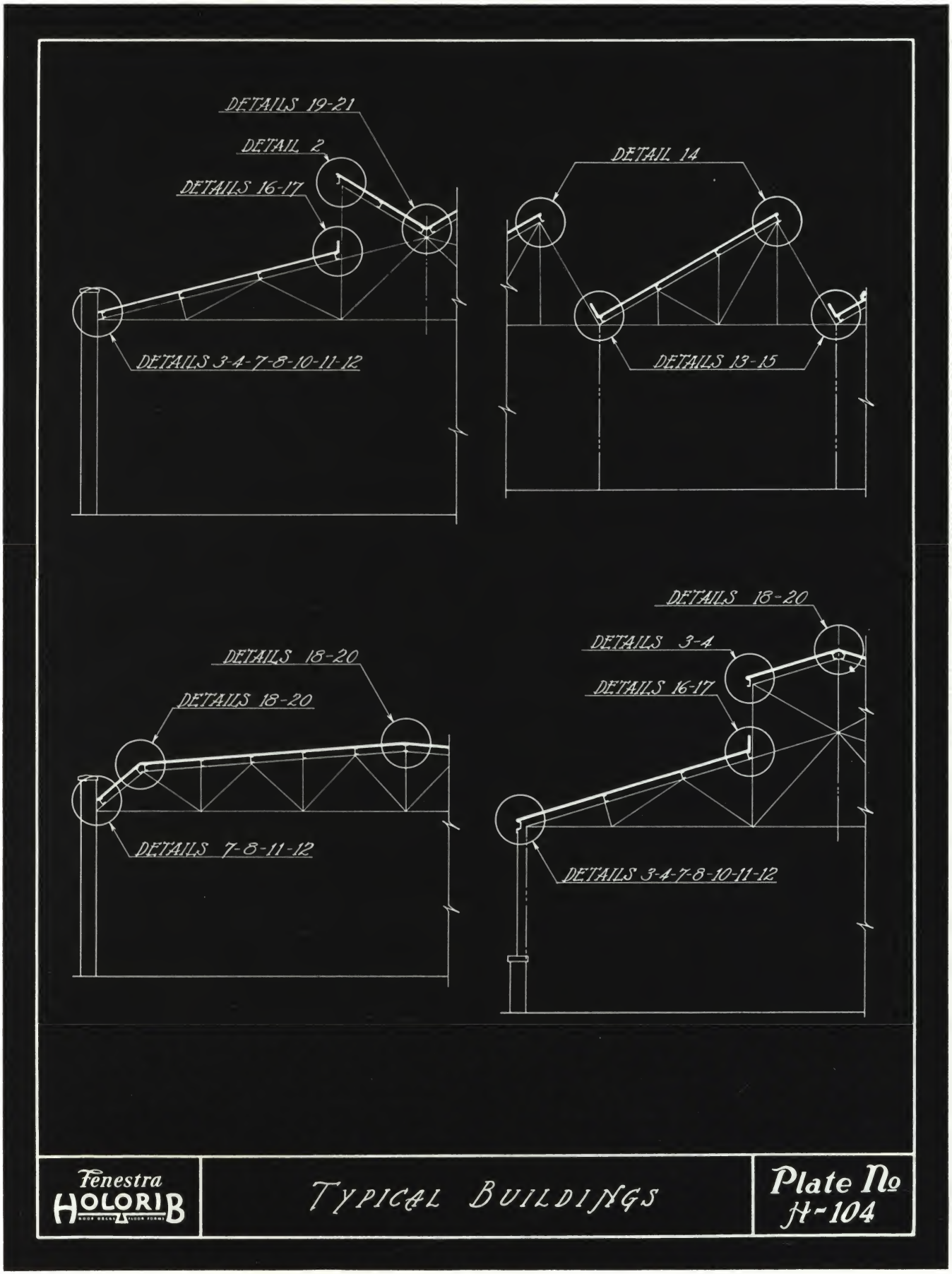
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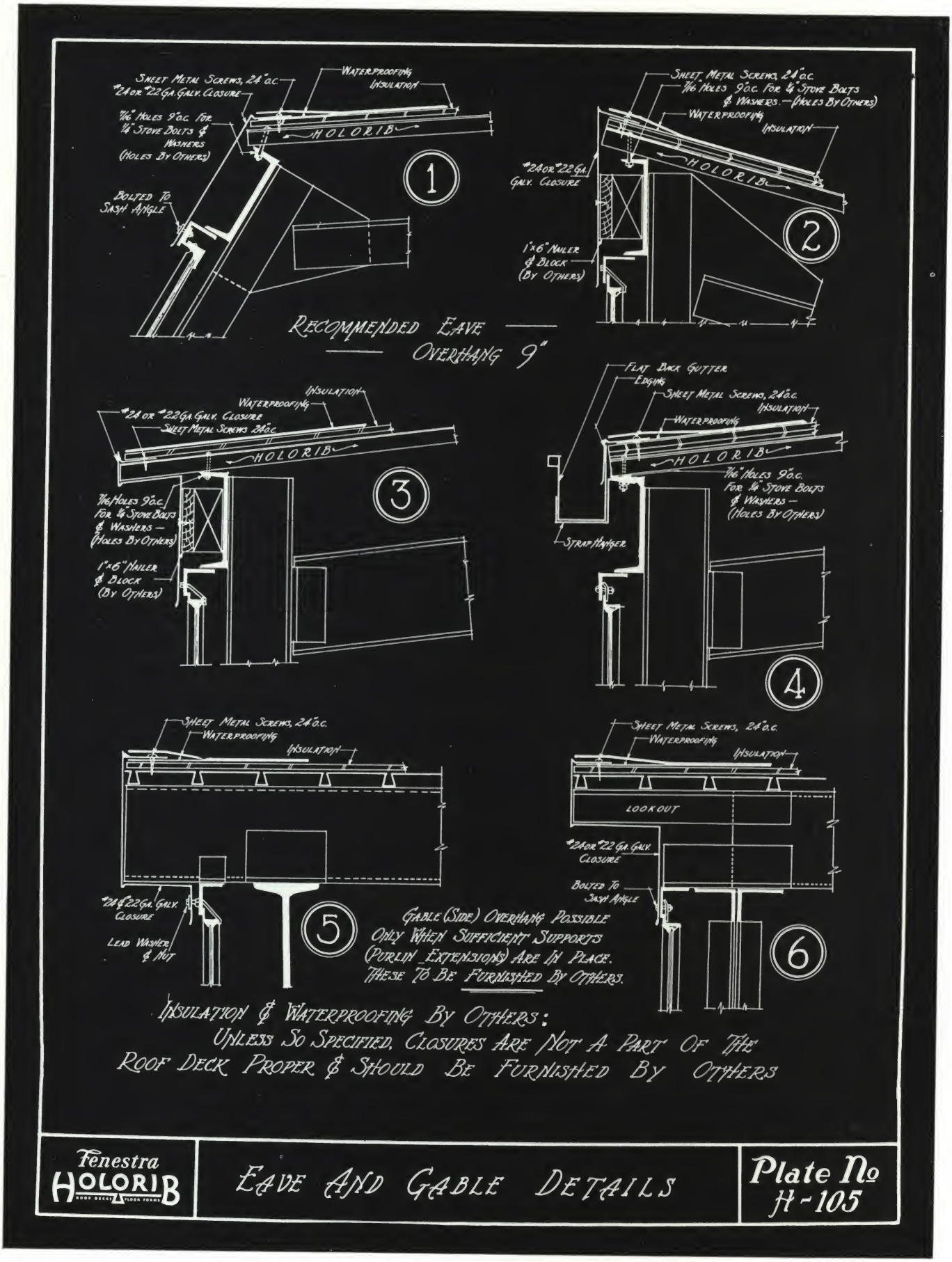
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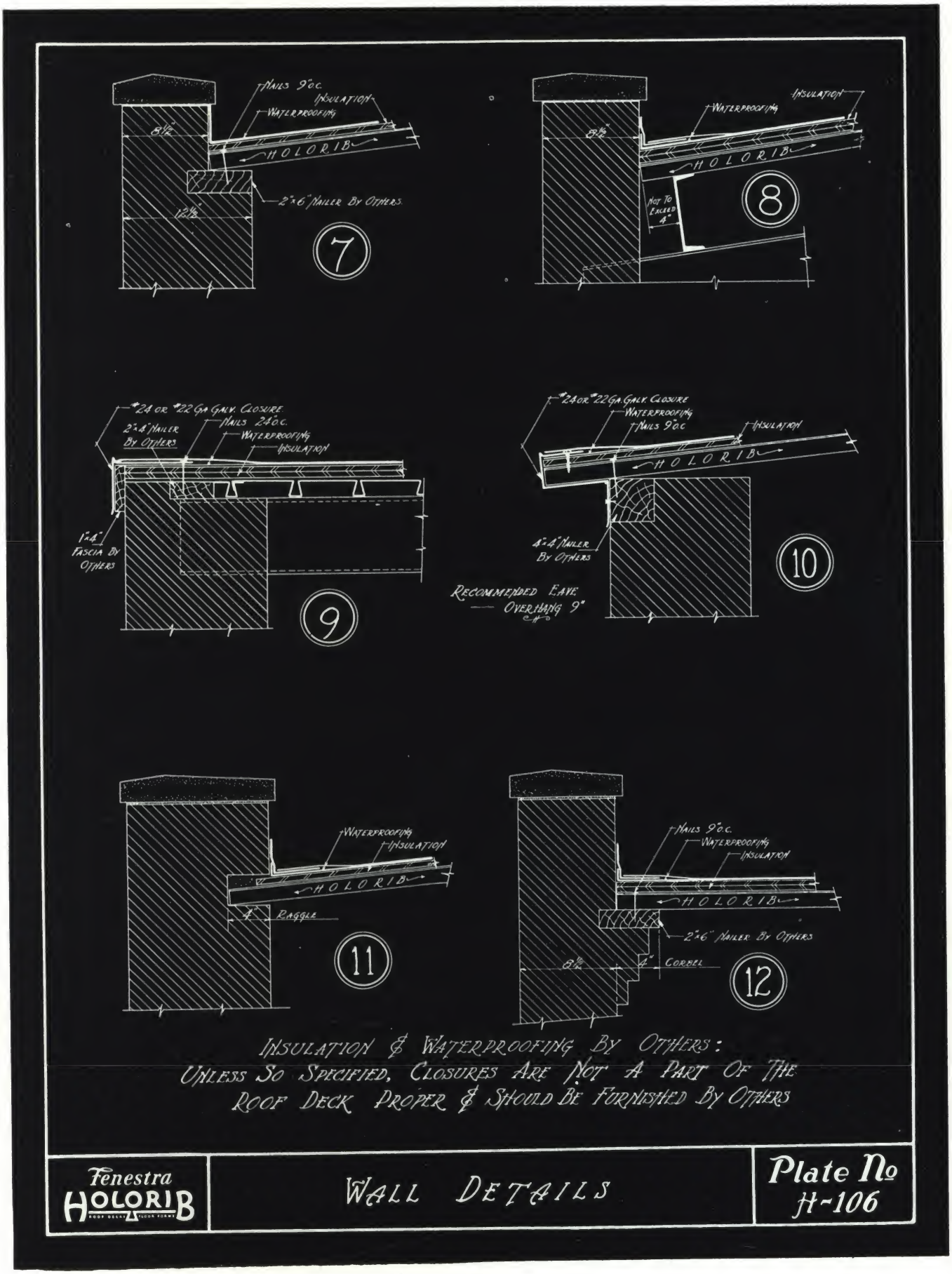
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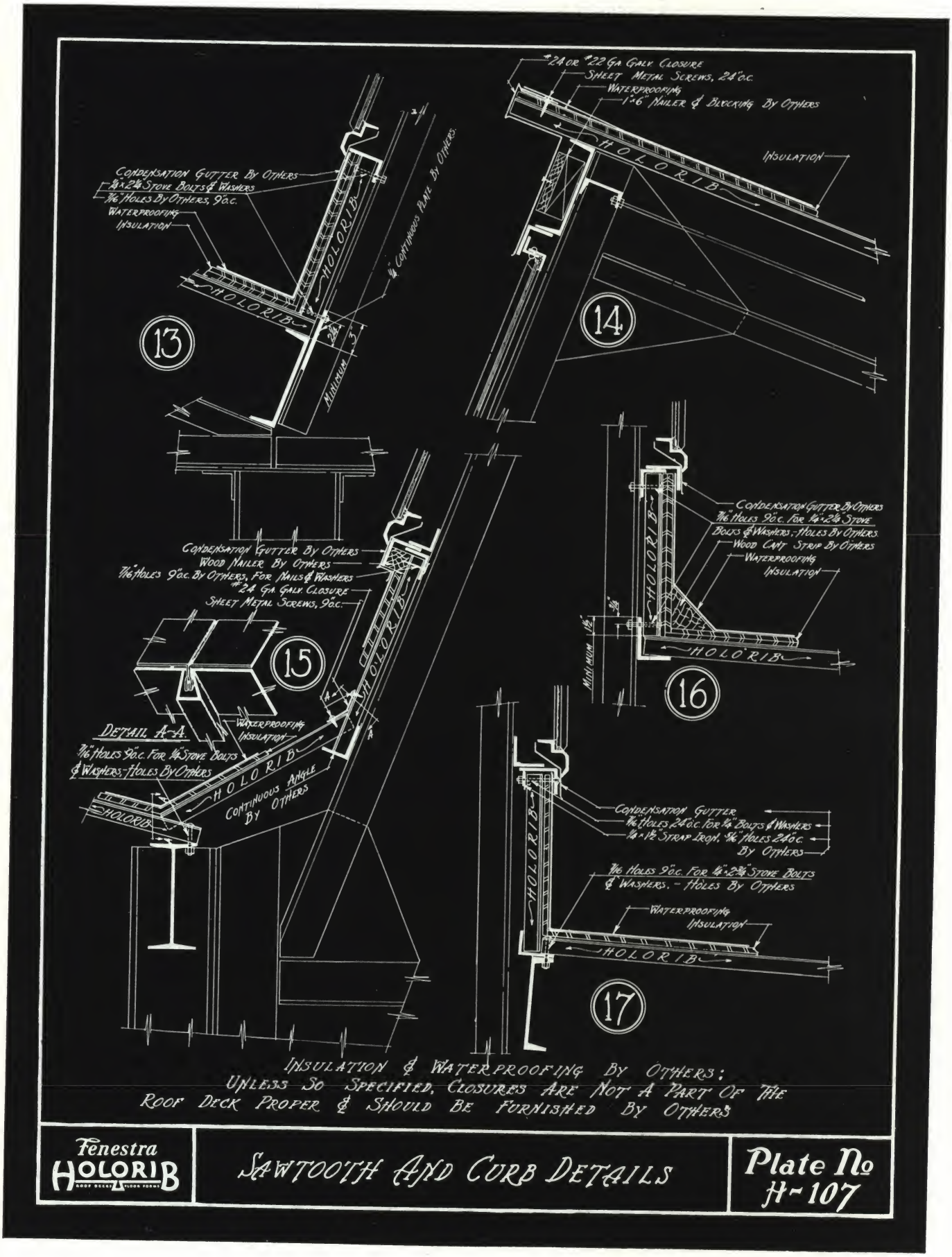
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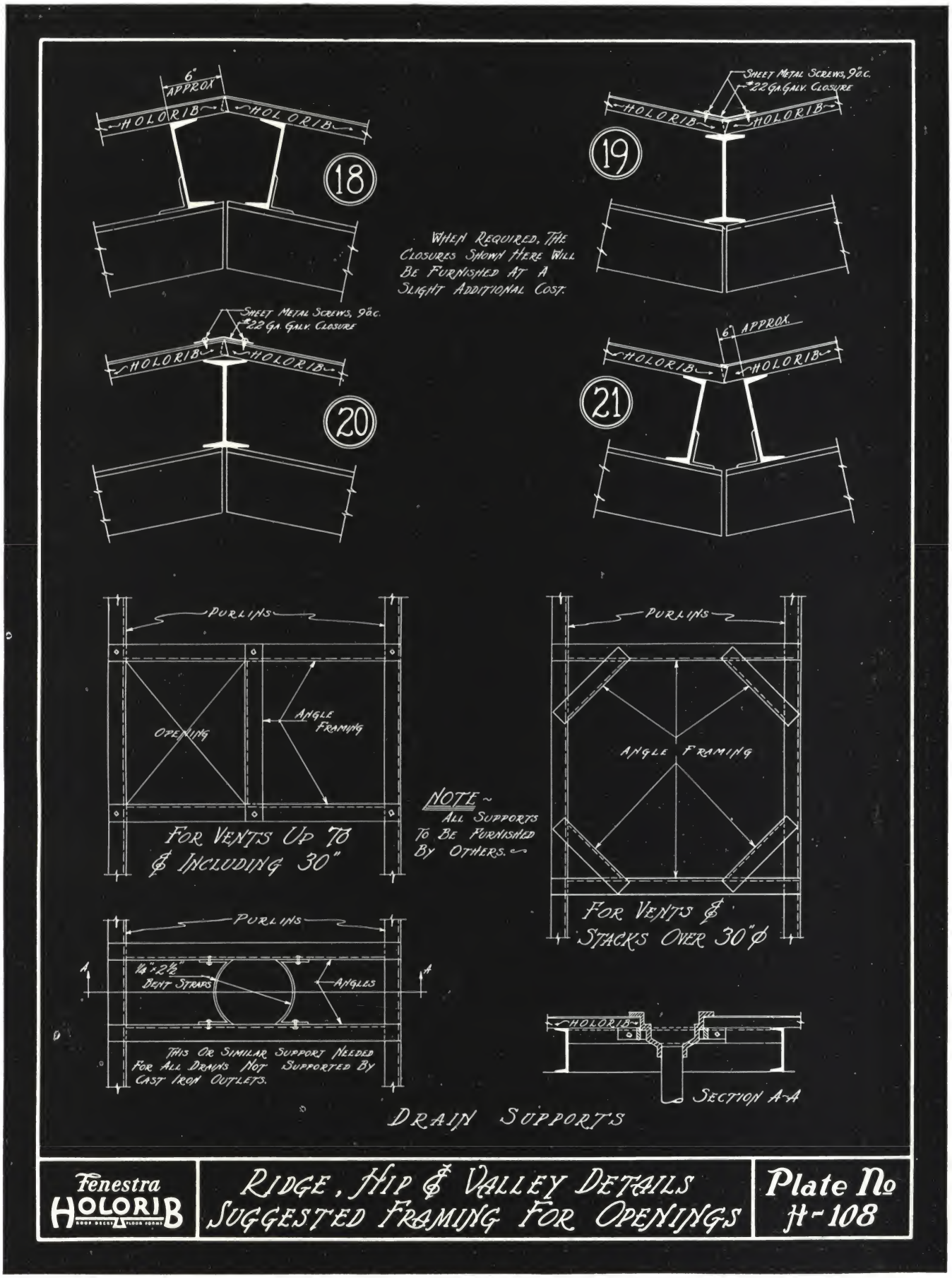
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6" APPROX
HOLORIB
HOLORIB
18
SHEET METAL SCREWS, 9" O.C.
#22 GA. GALV. CLOSURE
HOLORIB
HOLORIB
19
WHEN REQUIRED, THE CLOSURES SHOWN HERE WILL BE FURNISHED AT A SLIGHT ADDITIONAL COST.
SHEET METAL SCREWS, 9" O.C.
#22 GA. GALV. CLOSURE
HOLORIB
HOLORIB
20
6" APPROX.
HOLORIB
HOLORIB
21
PURLINS
OPENING
ANGLE FRAMING
FOR VENTS UP TO & INCLUDING 30"
NOTE ~ ALL SUPPORTS TO BE FURNISHED BY OTHERS.
PURLINS
ANGLE FRAMING
FOR VENTS & STACKS OVER 30"ϕ
PURLINS
1/4" x 2 1/2" BENT STRAPS
ANGLES
A
A
THIS OR SIMILAR SUPPORT NEEDED FOR ALL DRAINS NOT SUPPORTED BY CAST IRON OUTLETS.
HOLORIB
SECTION A-A
DRAIN SUPPORTS
Fenestra HOLORIB ROOF DECKS FLOOR FORMS
RIDGE, HIP & VALLEY DETAILS SUGGESTED FRAMING FOR OPENINGS
Plate No H-108

Fenestra

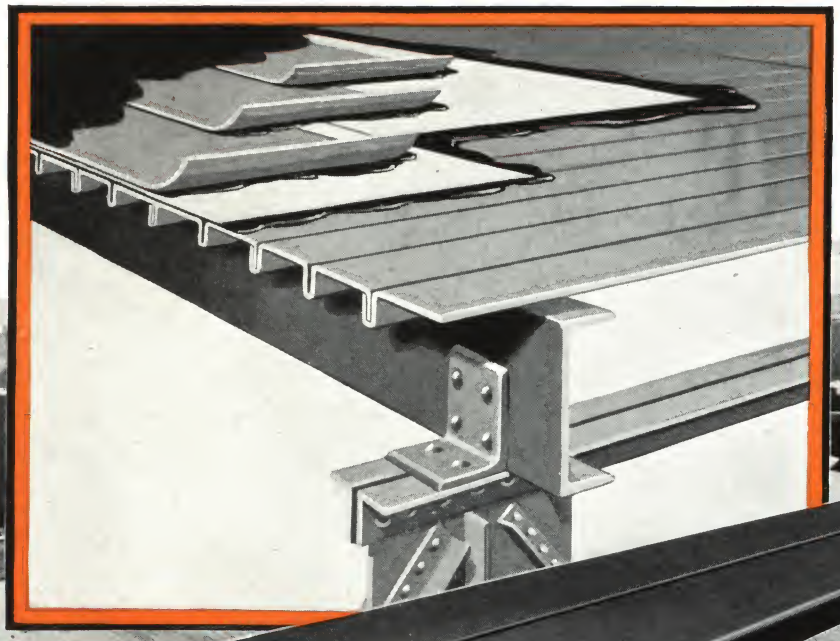
HOLORIB

STEEL ROOF DECKS

Detroit Steel Products Company
2250 E. Grand Boulevard
Detroit, Michigan

MAHON

STEEL ROOF DECK



THE R. C. MAHON COMPANY
DETROIT, MICHIGAN

THE R. C. MAHON COMPANY

Manufacturers of the Mahon Steel Roof Deck

DETROIT, MICH.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

MAHON STEEL ROOF DECK.

For Mahon Permanent Steel Floor Forms, Kalamein and Tin Clad Doors, Rolling Steel Doors and Cast Iron Roof Sumps, see page numbers in Manufacturers' Index.



Mahon Steel Roof Deck for Every Type of Roof

The Mahon Steel Roof Deck, details of which are set forth in these pages, offers a roof suited to practically any type of building calling for either flat, pitched or arched roof construction. Mahon Deck Plates can be furnished curved to fit arched roofs—minimum radius 36 ft.

Architects and engineers will find that the Mahon Steel Roof Deck greatly simplifies roof design, and builders will appreciate the ease with which the roof can be applied. It has advantages in structural simplicity which permit rapid erection and consequently lower the cost of construction.

The laying of a Mahon Steel Roof Deck is one of the simplest operations that you have ever witnessed.



Installing Mahon Steel Roof Deck on the Latrobe Electric Steel Co. Plant, Latrobe, Pa.

The work, due to the ingenious design of parts, can proceed swiftly and is done entirely from the upper side of the roof. Every plate of a Mahon Steel Roof Deck interlocks with the preceding unit. There are no end fittings—the ends being lapped one over the other. All lap joints occur directly over purlins. All clips are installed from the top as the plates are put in place.

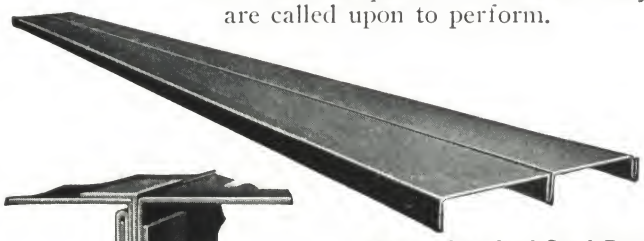
The Mahon Steel Roof Deck consists of one standard roof plate and three standard clips by which the plates are fastened together and to the supporting framework.

Material

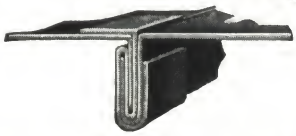
Mahon Steel Roof Deck is furnished in 18 and 20 gauge, in special, tight-coated galvanized copper bearing steel and requires no painting or maintenance whatsoever. It can also be furnished in copper bearing steel painted if desired. Mahon has established 20 gauge as a minimum for roof deck plates as a result of exhaustive tests which indicate this as the lightest material that can be safely and economically utilized. Weight impacts would be likely to seriously affect roofs of lighter gauge.

Standard Assembling Clips

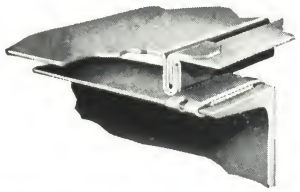
The laying of a Mahon Steel Roof Deck requires only the installation of the steel clips by which the plates are fastened together as they are assembled, and by which they are fastened to the supporting structural steel. Mahon clips have been designed primarily for simplicity, and they have in every instance a strength more than adequate for the work they are called upon to perform.



Mahon Standard Steel Roof Deck Plate



Intermediate Clip Locking Roof Deck Plates Together Midway Between Purlins

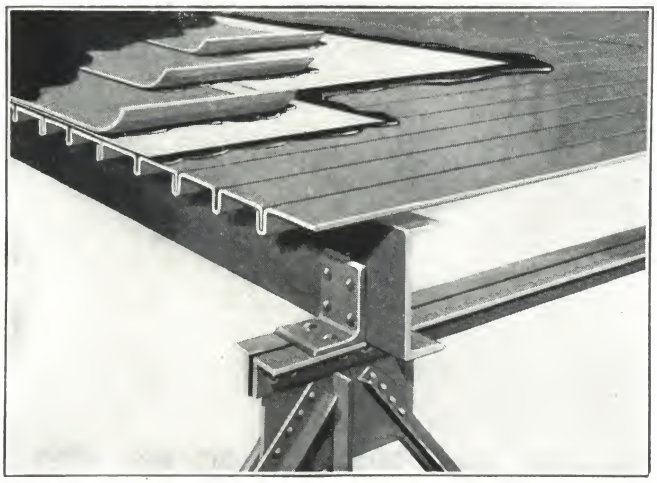


Beam or Purlin Clip for Attaching Roof Deck Plates to Beam or Channel Purlins



Flashing Clip for Attaching Flashing to Roof Deck Plates

There is not in the design of the Mahon Steel Roof Deck any part which can work up, become loose or in any way act to rupture the insulation or roofing material.



Cross Section of Mahon Steel Roof Deck Showing Application of Insulation and Waterproofing

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An Integral Unit Roof

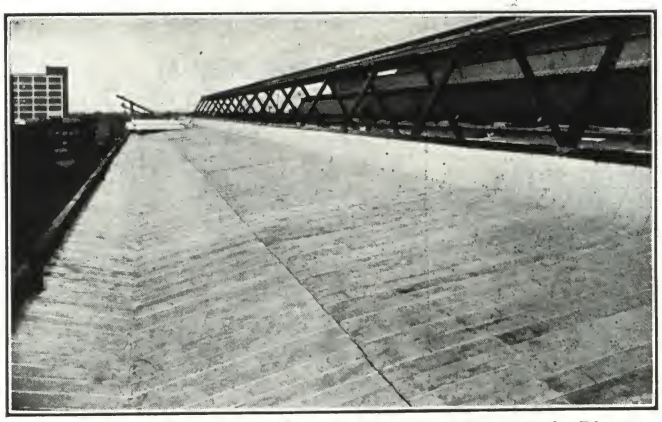
The Mahon Steel Roof Deck when installed functions as a single steel plate, the separate units becoming an integral part of one interlocking whole when assembled.

A feature of the Mahon Steel Roof Deck which makes for extra rigidity and strength is the location of all end lap joints directly over purlins. The minimum end lap is 2 in. No unsightly laps or joints are visible from the underside of the Mahon Deck.

All plates in the Mahon Deck lay 12 in. wide when installed, ribs 1½ in. deep are 6 in. on centers. Every second rib where the plates interlock provides three thicknesses of metal. Each deck plate is locked with special clips to the adjoining plate at intervals of approximately 2 ft. 0 in. between purlins to prevent deflection of individual plates due to localized loading. This feature eliminates the possibility of loosening the bond between insulation or roofing material applied to the deck.

Universal Application

The unusual lightness of the Mahon Steel Roof Deck fits it for use on buildings of every type, including buildings with unusually long spans, such as auditoriums, gymnasiums, and the like. Designers will also find this type of roof deck admirably suited to factories,



Mahon Steel Roof Deck Installed on the Hupmobile Plant, Detroit, Mich.
Note the deck-formed saddles adjacent to the parapet wall

office buildings, hotels, apartments, hospitals, and schools.

The fact that a Mahon Steel Roof Deck can be insulated to exactly the degree required for the type of occupancy makes it an ideal construction for any type of building.

Expansion and Contraction

Expansion and contraction difficulties have been entirely obviated in the design of the Mahon Steel Roof Deck. Note in the center rib an ample allowance for lateral expansion and contraction, and also that longitudinal expansion and contraction of the plate is provided for in the lap joints.

These factors mean that bulging positively cannot occur in a Mahon Steel Roof Deck, and that no injury to insulation or composition roofing can occur through expansion or contraction.



Underside of Mahon Steel Roof Deck
Note the clean, even appearance and the absence of end joints

Monitor Flashings

The projecting ribs on the plates of the Mahon Steel Roof Deck can be cut and the sheet turned up to make flashings under monitor windows, curbs, etc.

Saddles

On many types of buildings, where Mahon Steel Roof Deck is employed, built-up saddles are unnecessary. Saddles may be created by warping the roof deck (as illustrated in detail No. 17). This is accomplished by setting the purlins in the drainage section at the desired angle to produce ridges and valleys—usually an angle of ¼ in. to the foot is sufficient. No extra roof deck plates are required and it does not involve cutting or fitting. Saddles for either sloping or vertical face sawtooth buildings may be economically built from Mahon Steel Roof Deck plates cut to fit (as illustrated in details Nos. 18, 19, 20). This system of roof drainage has worked out very successfully on a number of installations where it was adaptable. To meet conditions where the aforementioned methods are not practical, saddles may be built from any material of a permanent nature—in which case we recommend the application first of a layer of asphalt or tarred felt on the steel deck proper, the same to be cemented to the deck with asphalt or pitch. This should be mopped on top with asphalt or pitch, over which the saddle fill may be installed.

Caution—We do not recommend the use of cinders for saddle fill. However, if cinders are to be used, under no consideration should this material be laid next to the steel deck. The sulphuric content of cinders is detrimental to steel, and for the protection of the deck, where cinders are to be used, we would recommend that at least two plies of roofing felt be laid with pitch or asphalt over areas of the deck to be covered with cinders.

Insulation

The Mahon Steel Roof Deck is a complete structural unit, and requires no insulation for stiffness or rigidity—these factors being amply provided for in the deck itself. In the case of unheated structures such as loading docks, warehouses and the like, insulation is not necessary. In buildings that must be heated or where condensation is a problem we recommend the use of insulation of any approved type—amount of insulation will be governed by the type of occupancy.



Mahon Steel Roof Deck Installed on the Tennis Arena at the Brookline Country Club, Brookline, Mass.

Composition Roofing

Any standard composition roofing can be used over the Mahon Steel Roof Deck. Asphalt roofing may be preferable from a standpoint of weight. Sheets should

Continued on next page

be mopped solid similar to roof construction over concrete.

Fire Safety

No matter what type of occupancy a building is designed for, building codes in centers of population demand fire safety. Mahon Steel Roof Deck provides the utmost in fire safe roof construction, and will obtain for the owner a low insurance rate.

Specification for Mahon Steel Roof Deck

(A) **Work Included—**

All roof surfaces shown on plans as steel deck.

(B) **General—**

Steel Deck shall be as manufactured by THE R. C. MAHON COMPANY, 8650 Mount Elliot Avenue, Detroit, Mich., or equivalent, meeting fully this manufacturer's standard of quality.

(C) **Materials—**

(C1) ***Deck Plates—***

(C1a) Deck plates shall be of tight-coated, galvanized copper bearing steel.

(C1b) Deck plates shall not exceed 12 in. in width reinforced with webs or ribs not less than 1½ in. deep spaced not to exceed 6 in. on centers, so constructed as to allow for expansion and contraction.

(C1c) Minimum gauge of steel for plates shall be 20 gauge for spans up to and including 7 ft., and 18 gauge for spans over 7 ft. up to and including 8 ft.

(C1d) Deck plates shall be capable of withstanding a distributed live load of 40 lb. per sq. ft. without permanent deflection on the above maximum spans.

(C2) ***Attachment Clips—***

Furnish steel clips adapted to permanent attachment of plate ribs to each roof purlin spaced 12 in. on centers. Furnish interlocking clips for securing adjoining deck plates together midway between purlins.

(D) **Erection—**

All end laps of deck plates shall be made directly over roof purlins, with a minimum overlap of 2 in.

Deck plates shall be secured to each purlin every 12 in. on centers by steel clips fastened to the deck ribs.

Each deck plate shall be secured to the adjoining plates by interlocking clips set at intervals of approximately 2 ft. 0 in. between purlins.

Note: These interlocking clips create lateral continuity and prevent one sheet from deflecting below the level of those adjoining.

Engineering Data

Light Weight—

As indicated before, the weight of Mahon Steel Roof Deck is such that it permits considerable economies in construction. The Mahon 20 gauge deck weighs 2.5 lb. per sq. ft. and the 18 gauge deck weighs 3.25 lb. per sq. ft. The total weight of roof will depend on the type and amount of insulation and the type of roofing material used.



300,000 Sq. Ft. of Mahon Steel Roof Deck Are Utilized in This Building
Millions of square feet are now in use on various types of buildings



Mahon Steel Roof Deck Installed at the Durant Motor Plant, Lansing, Mich.

Deflection—

Load tests for deflection carried out by the Perry Testing Laboratories, Detroit, Mich., on the Mahon Steel Roof Deck with live loads of 30 and 40 lb. per sq. ft. showed no permanent deflection in either 18 or 20 gauge deck.

Results of these tests are as follows:

DEFLECTION IN INCHES—18 GAUGE—NO INSULATION

Purlin spacing	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"
Live load, 30 lb. per sq.ft.	.083	.105	.156	.232	.325	.431	.554
Live load, 40 lb. per sq.ft.	.104	.134	.202	.354	.398	.573	.732

DEFLECTION IN INCHES—18 GAUGE—1 INCH INSULATION

Purlin spacing	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"
Live load, 30 lb. per sq.ft.	.061	.095	.125	.181	.235	.271	.354
Live load, 40 lb. per sq.ft.	.088	.129	.162	.237	.317	.392	.512

DEFLECTION IN INCHES—20 GAUGE—NO INSULATION

Purlin spacing	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	.....	.....
Live load, 30 lb. per sq.ft.	.098	.115	.167	.251	.338	.....	.....
Live load, 40 lb. per sq.ft.	.112	.144	.220	.320	.447	.....	.....

DEFLECTION IN INCHES—20 GAUGE—1 INCH INSULATION

Purlin spacing	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	.....	.....
Live load, 30 lb. per sq.ft.	.061	.088	.143	.213	.229	.....	.....
Live load, 40 lb. per sq.ft.	.079	.124	.192	.270	.338	.....	.....

The method used in making these tests is clearly illustrated in the line diagram. All deflection readings were taken at "C" midway between purlins "A"-"B." Readings were taken at each rib and a mean deflection established.

Purlin "A" in the diagram is movable to test deflection at various purlin spacings.

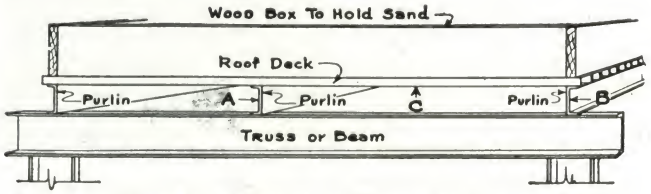


Diagram Illustrating Method of Testing Mahon Steel Roof Deck for Deflection

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Standard Length Plates

Mahon Steel Roof Deck is rolled from special tight-coated, galvanized copper bearing steel sheets and can be furnished in either 18 or 20 gauge in any length up to 12 ft. 4 in.

Standard plates are carried in stock for immediate shipment in 20 gauge, in lengths of 6 ft. 2 in., 7 ft. 2 in., 8 ft. 4 in., 10 ft. 4 in., 11 ft. 6 in. and 12 ft. 4 in.

Standard 18 gauge plates are carried in stock in lengths of 8 ft. 2 in. only.

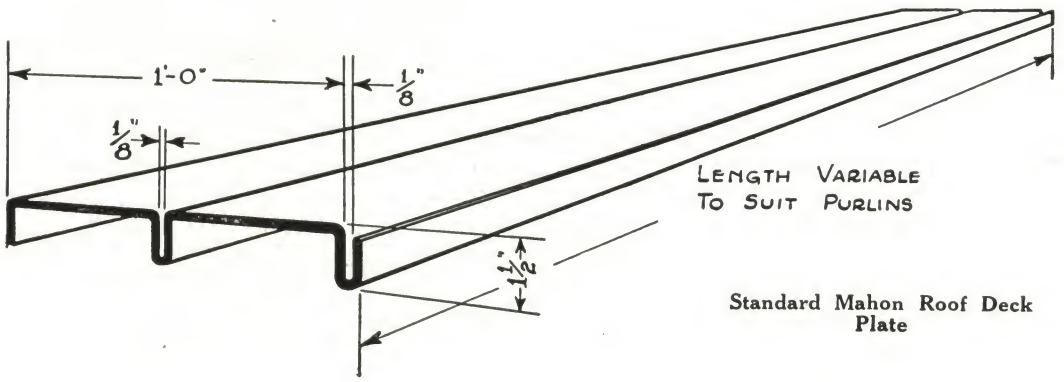
Purlin Spacing

The 20 gauge deck plates should not be used for purlin spacings exceeding 7 ft.

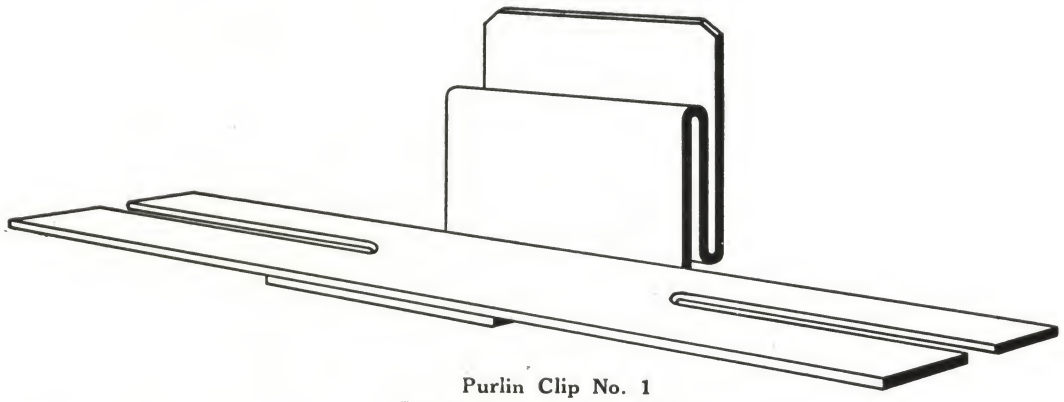
We recommend that the maximum purlin spacing for 18 gauge deck plates be limited to 8 ft.

STANDARD DECK PLATES RECOMMENDED FOR VARIOUS PURLIN SPACING

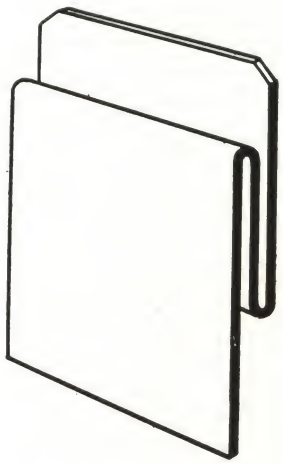
Purlin spacing	Plate lengths
to 4′-0″	8′-2″ or 12′-4″
4′-0″ to 5′-0″	5′-2″ or 10′-4″
5′-0″ to 6′-0″	6′-2″ or 11′-6″ or 12′-4″
6′-0″ to 7′-0″	7′-2″
7′-0″ to 8′-0″	8′-2″ or 8′-4″



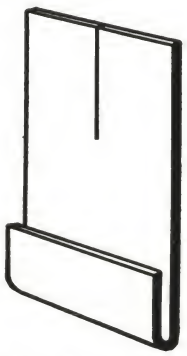
Standard Mahon Roof Deck Plate



Purlin Clip No. 1
For attaching roof neck plates to I-beam or channel purlins



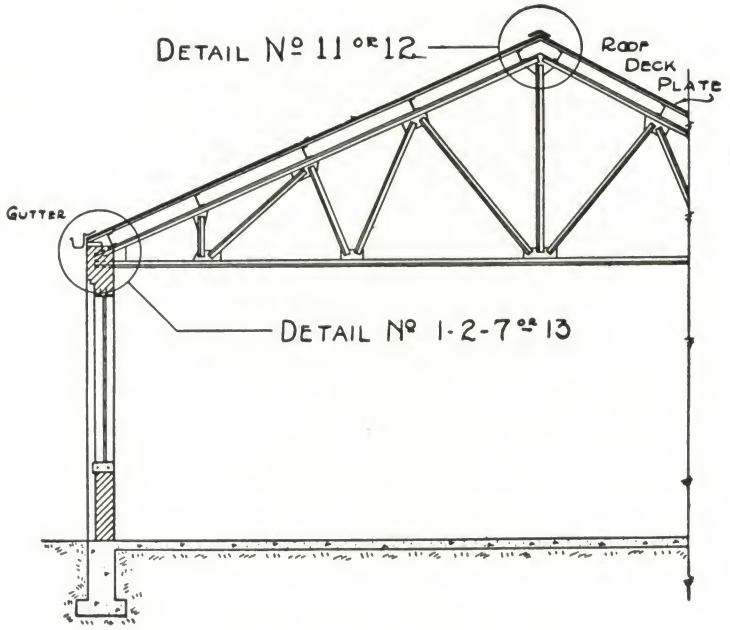
Intermediate Clip No. 2
For locking roof deck plates together midway between purlins



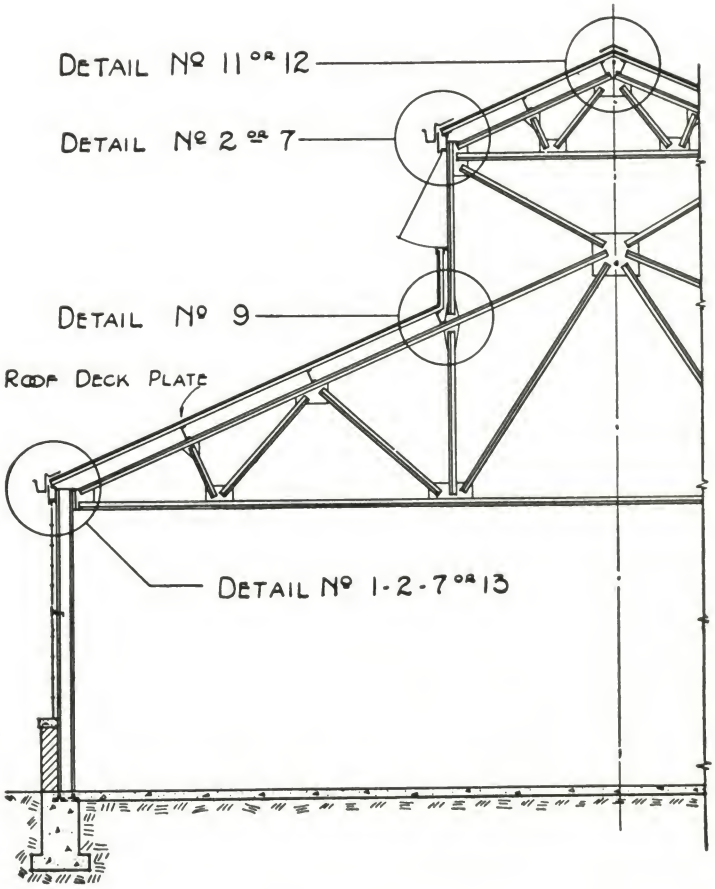
Flashing Clip No. 3
For attaching flashing to roof deck plates

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MAHON STEEL ROOF DECK



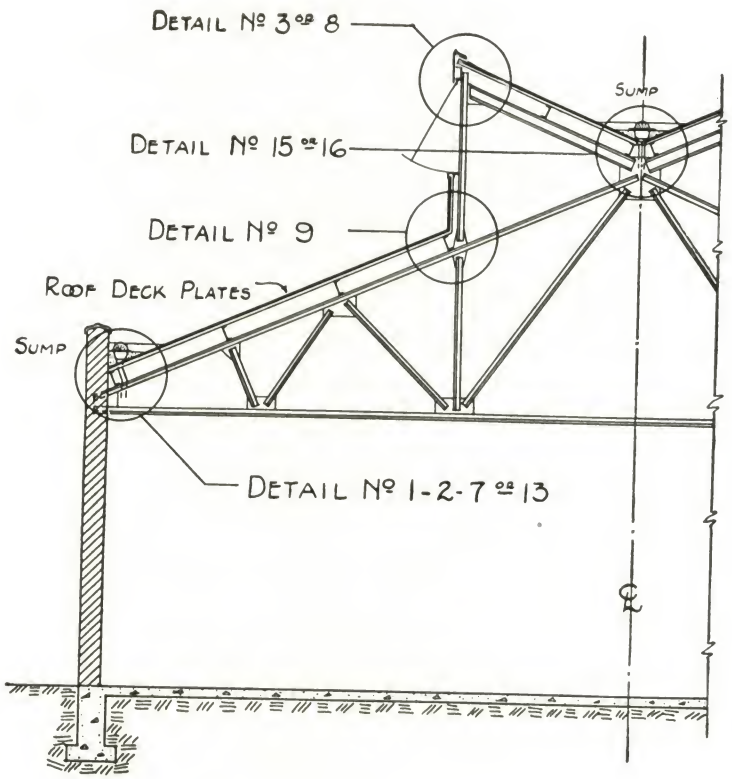
Application Pitched Roof



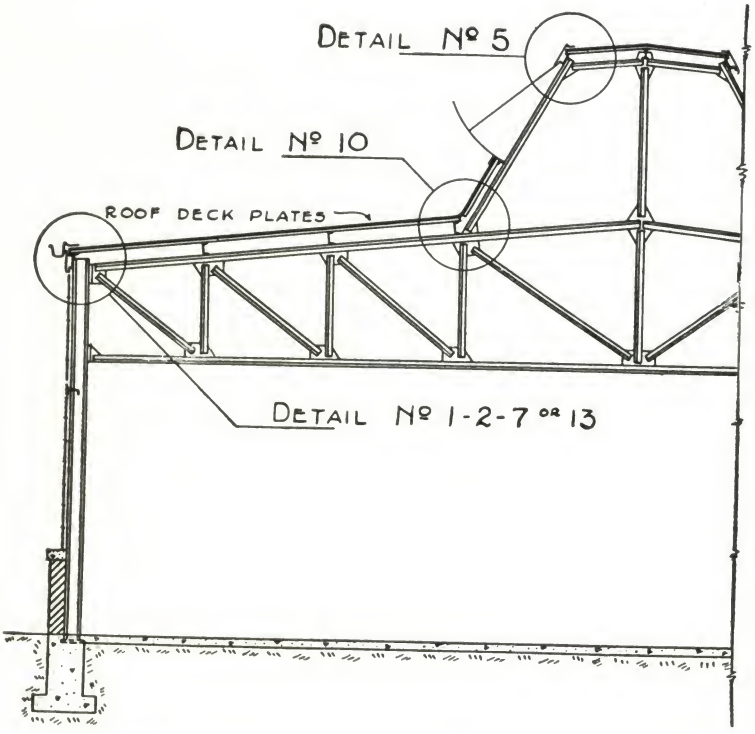
Application Pitched Roof—Monitor

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MAHON STEEL ROOF DECK



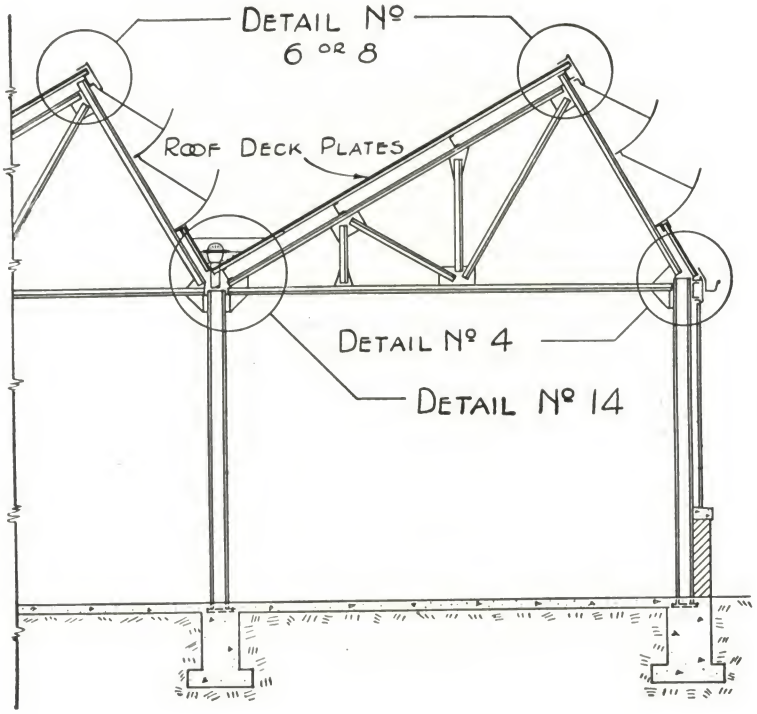
Application Pitched Roof—Valley Monitor



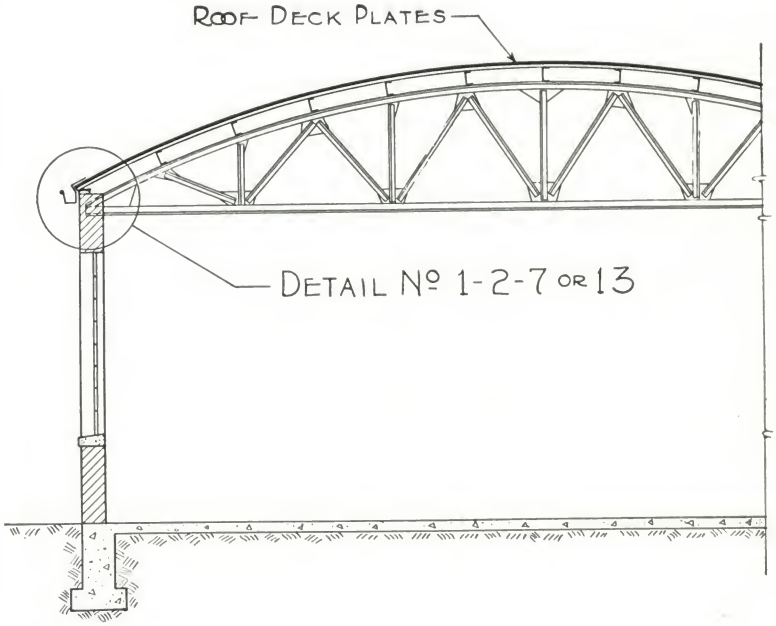
Application Flat Roof—"A" Frame

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MAHON STEEL ROOF DECK



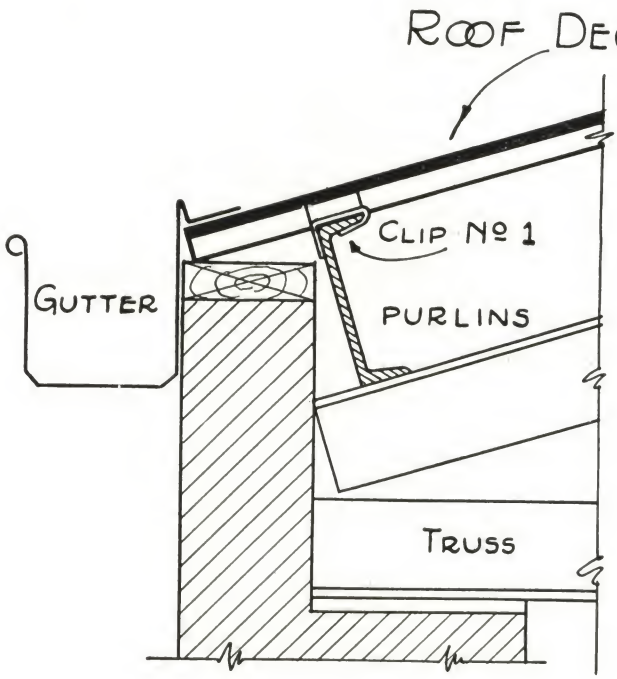
Application Typical Sawtooth



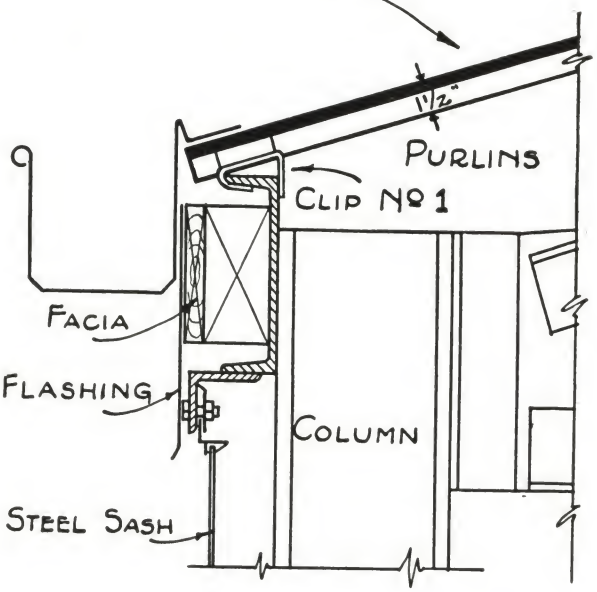
Application Mahon Curved Roof Deck Plates on Bow-String Truss Roof

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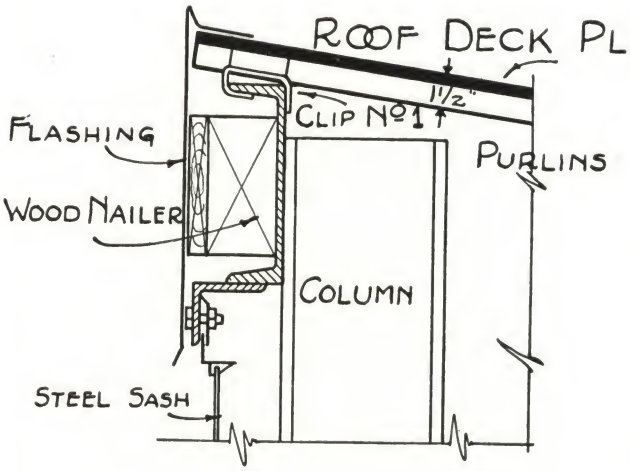
MAHON STEEL ROOF DECK



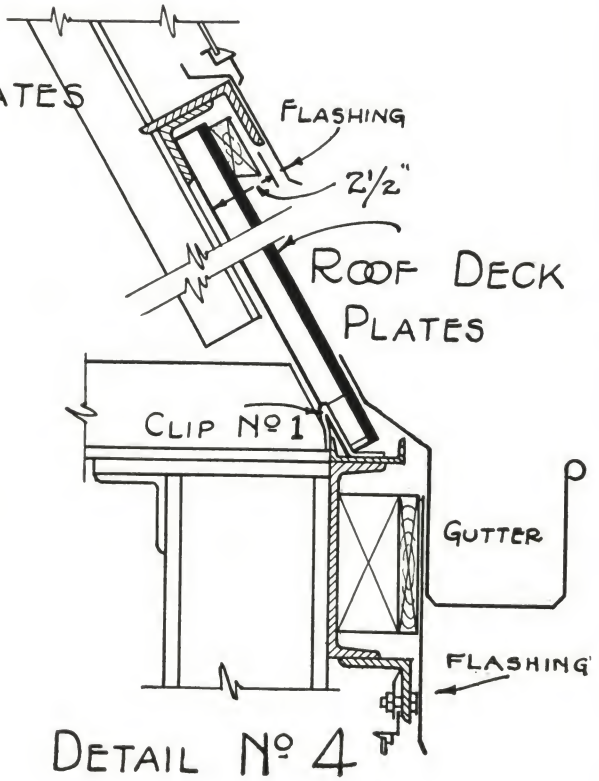
DETAIL Nº 1



DETAIL Nº 2



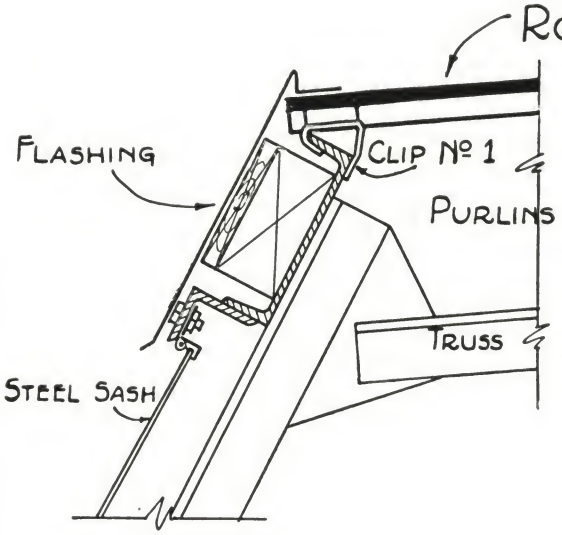
DETAIL Nº 3



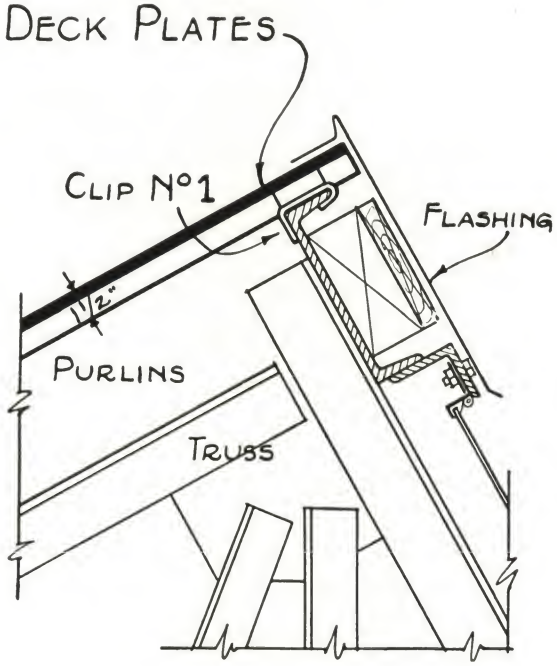
DETAIL Nº 4

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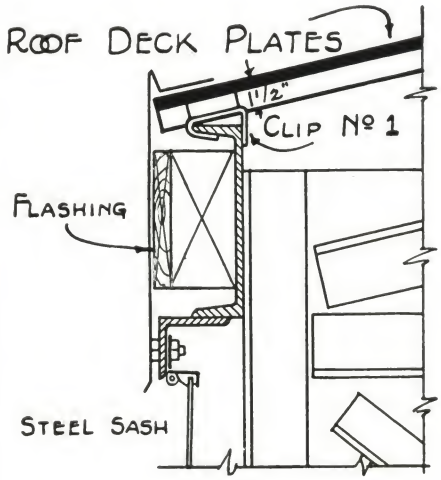
MAHON STEEL ROOF DECK



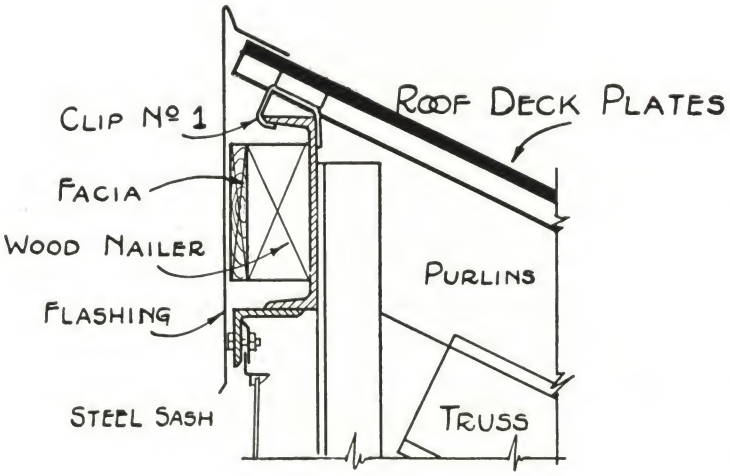
DETAIL Nº 5



DETAIL Nº 6



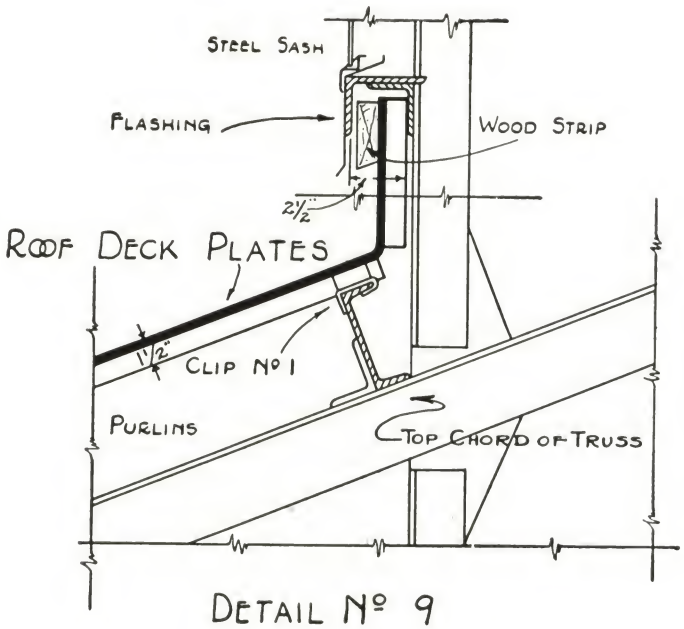
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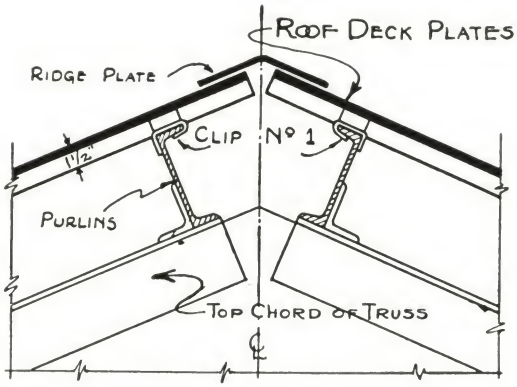
DETAIL Nº 8

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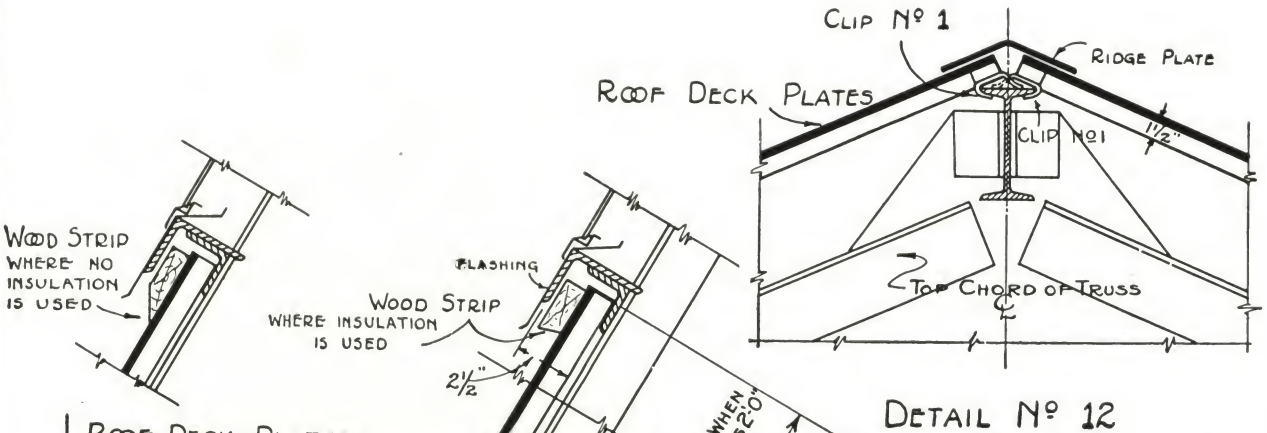
MAHON STEEL ROOF DECK



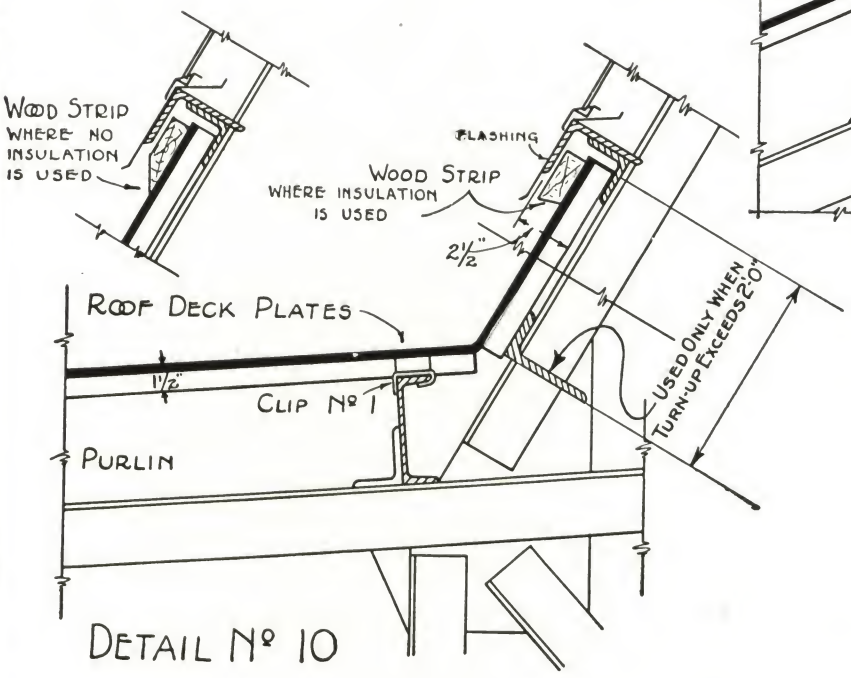
DETAIL Nº 9



DETAIL Nº 11



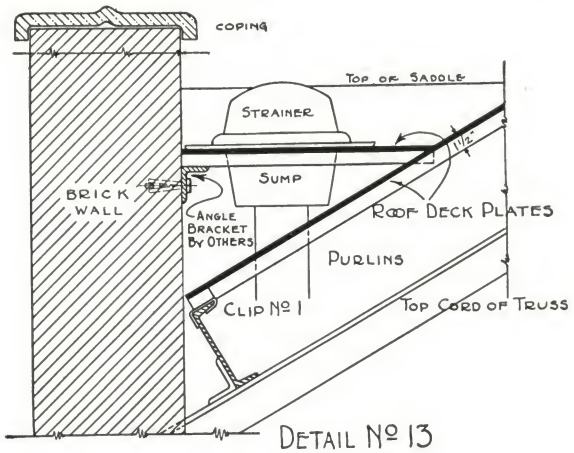
DETAIL Nº 12



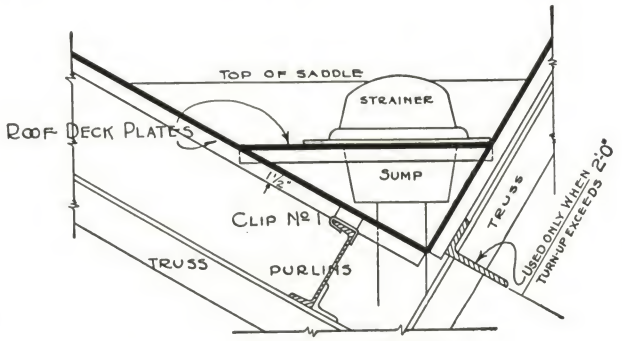
DETAIL Nº 10

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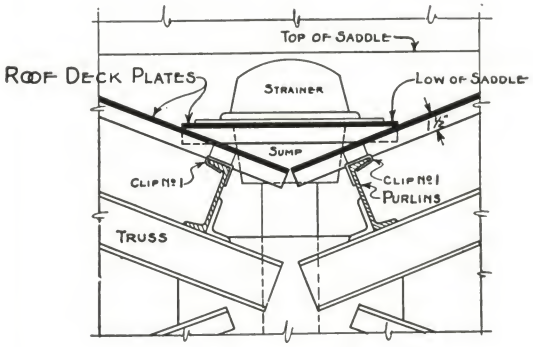
MAHON STEEL ROOF DECK



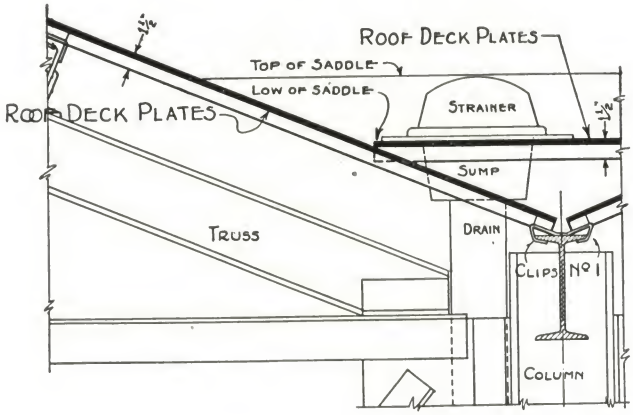
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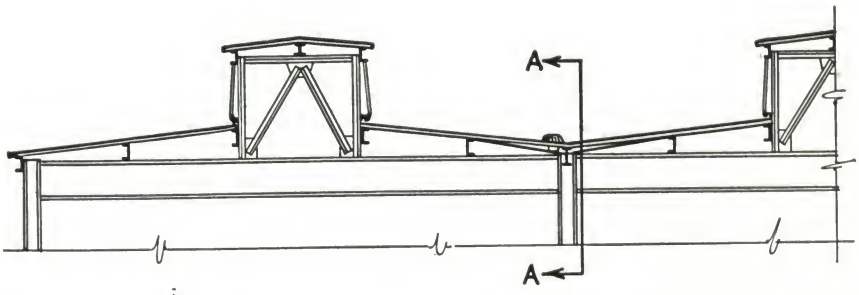
DETAIL Nº 14



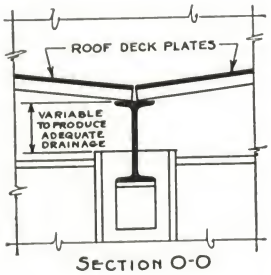
DETAIL Nº 15



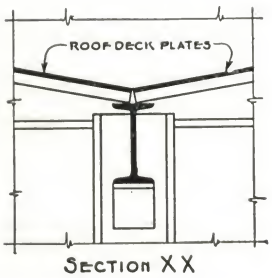
DETAIL Nº 16



SECTION A-A



SECTION O-O



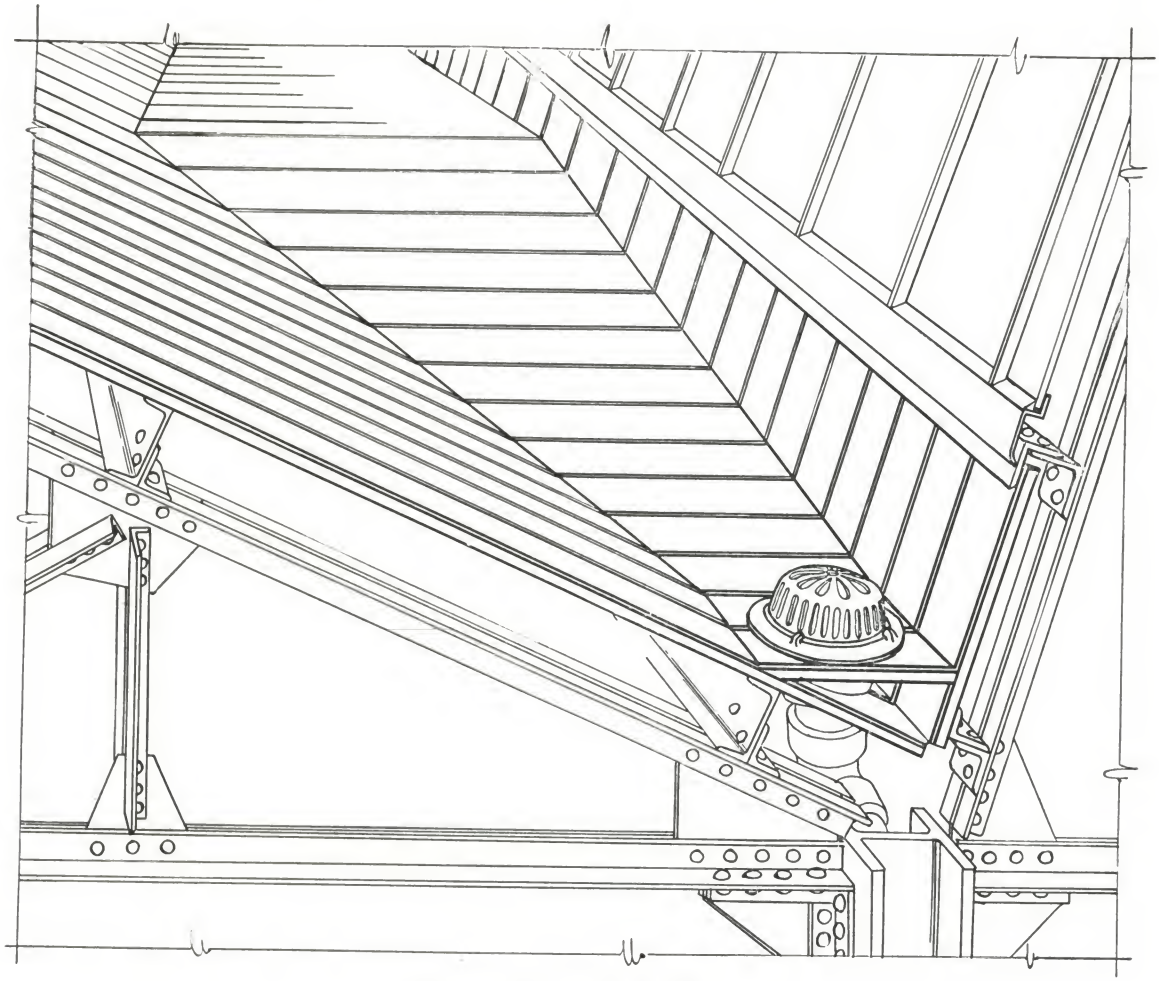
SECTION XX

DETAIL Nº 17

METHOD OF WARPING MAHON STEEL ROOF DECK TO FORM DRAINAGE VALLEYS

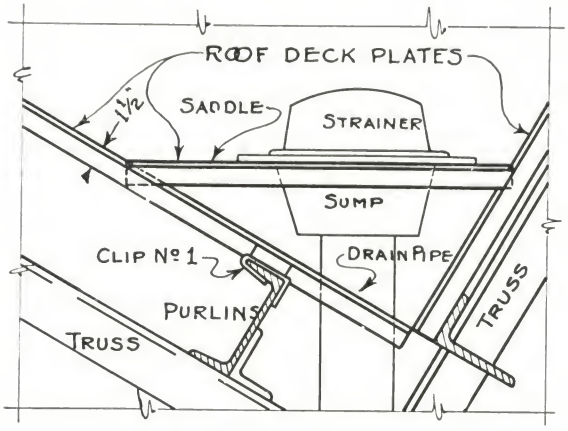
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MAHON STEEL ROOF DECK



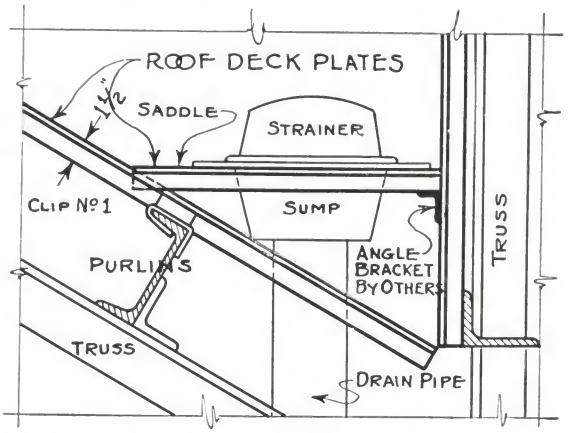
DETAIL No 18

METHOD OF BUILDING SADDLES IN SAW TOOTH CONSTRUCTION WITH MAHON STEEL ROOF DECK PLATES CUT TO FIT



DETAIL No 19

WHERE BOTH FACES OF SAW TOOTH SLOPE INSTALL AS ABOVE

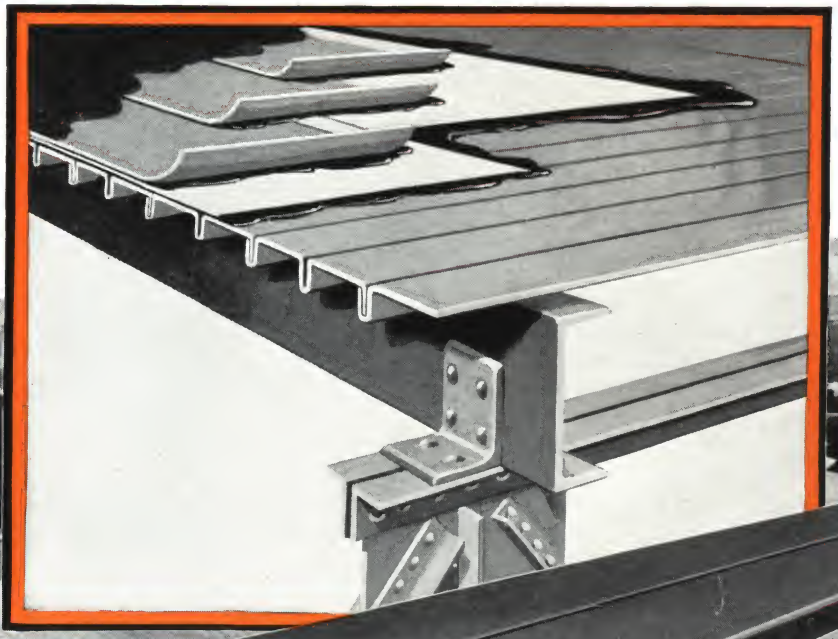


DETAIL No 20

FOR SAW TOOTH WITH VERTICAL FACE ANGLE BRACKET IS USED

MAHON

STEEL ROOF DECK



THE R. C. MAHON COMPANY

DETROIT, MICHIGAN

PAN METAL ROOF DECK CO.

AKRON, OHIO

Product

PAN METAL ROOF DECK.

Description

The Pan Metal Roof Deck is an improved galvanized metal form designed especially for roof construction, which has earned the approval of architects, engineers and builders everywhere. Galvanized sheets will last longer, hence their use for this purpose.

Pan Metal Roof Deck consists of pressed metal units as illustrated in the sectional details herein shown, and has no sharp folded members to take on rust. Weather does not stop progress of construction. Pan Deck can be erected in any climate the year around.

Insulation made in 12, 24, 36 or 48-in. widths will center on the wood cleats in pans. *Insulation is nailed to wood cleats,* spaced 12-in. center or four nails to every square foot. The sheets are formed under a powerful press, insuring uniform pans that will nest neatly, and they are made to lay 24-in. centers up to 12 ft. 2 in. long.

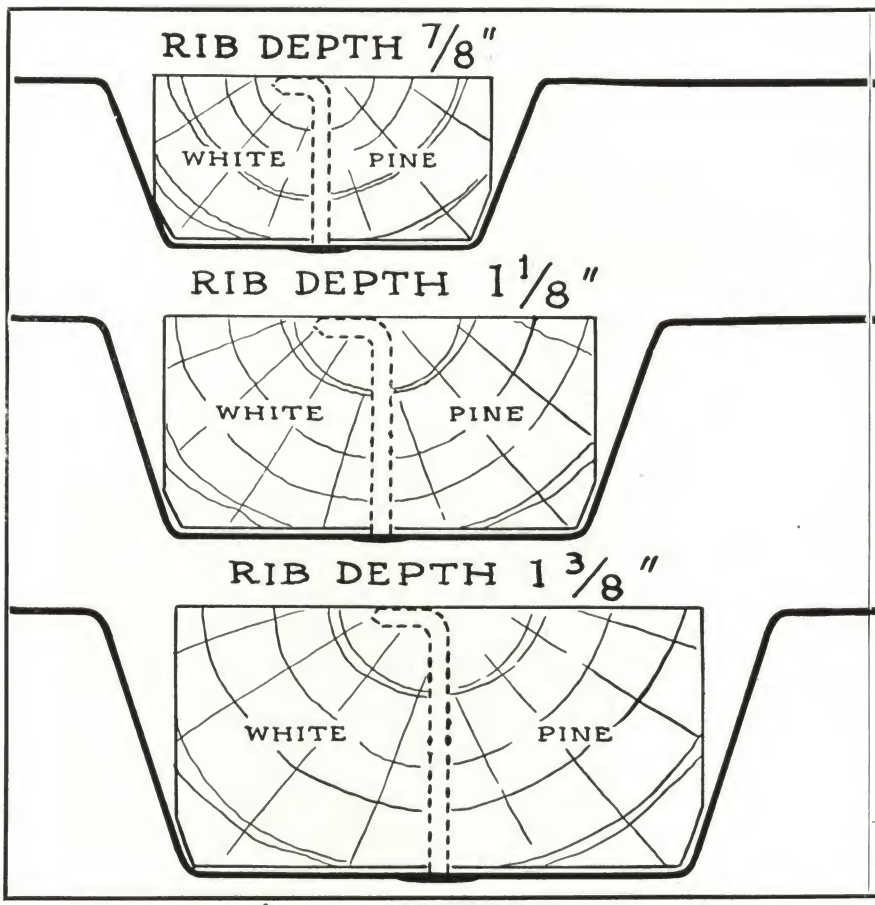


Diagram of Pan Deck Showing Light Metal Joist, Wood Cleats, Method of Insulating and Roofing

Pan Decks are tested to carry loads as shown in the table below

SIZES AND LOADS, PAN METAL ROOF DECKS

Live carrying load (without deflection) per sq. ft. Dead load approximately 5 lb. per sq. ft.



No.	Purlin Spacing	Gauge	Load, lb.
1	3 ft. 0 in.	26	50
2	3 ft. 6 in. to 4 ft. 0 in.	24	50
3	4 ft. to 4 ft. 6 in.	22	50
4	4 ft. 6 in. to 5 ft. 0 in.	20	50
5	3 ft. 6 in.	26	75
6	3 ft. 6 in. to 5 ft. 0 in.	24	75
7	5 ft. 0 in. to 6 ft. 6 in.	22	60
8	6 ft. 6 in. to 8 ft. 0 in.	20	50
9	4 ft. 0 in.	26	100
10	4 ft. 0 in. to 6 ft. 0 in.	24	100
11	6 ft. 0 in. to 7 ft. 0 in.	22	175
12	7 ft. 0 in. to 8 ft. 0 in.	20	200

Nos. 9, 10, 11 and 12 used for flooring as well as for roof decks.

IRONCLAD COPPER STEEL ROOF

EXCLUSIVE MANUFACTURERS
HALL-HODGES COMPANY, INC.
807-813 Citizens Bank Building
NORFOLK, VA.

Ironclad Roofs

Ironclad Copper Steel Roof Sheets are designed for unusual strength in roof deck construction. This design permits a longer span between purlins without a corresponding excess of weight, and to be practically as inexpensive as good wood construction.

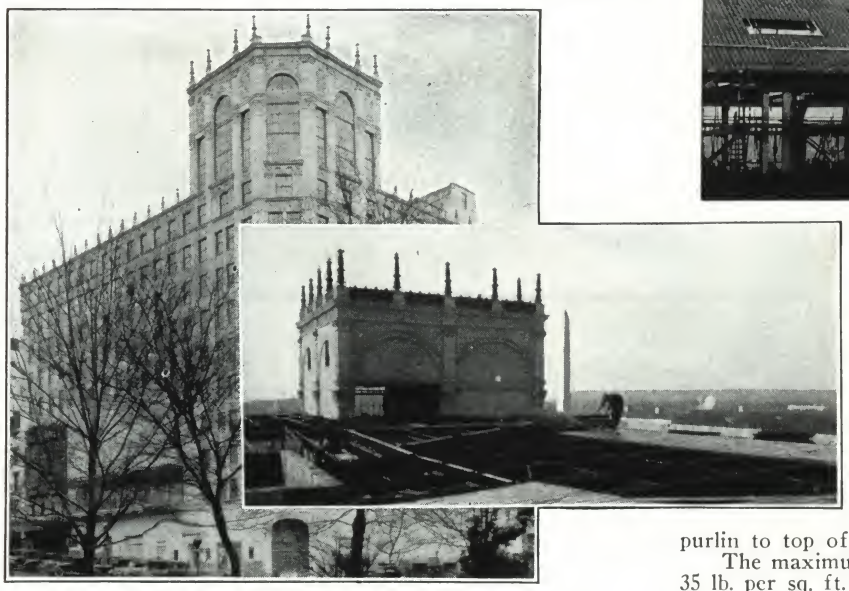
Ironclad Copper Steel Roof Sheets provide ample support for a generous thickness of insulating material. The permissible longer spans between purlins (approximately 6 to 8 ft.) and the light weight of Ironclad (approximately 7 lb. per sq. ft. including steel purlins) effect substantial savings in the cost of the supporting framework.

The unusual strength and permissible longer spans are due to the deep rib and the seat construction. The deep ribs assure strength and the seat assures rigidity under all conditions. In forming the Ironclad sheet, the metal is never bent to a degree injurious to the steel.

Steel roofing, because of its strength, economy in cost, fire resisting qualities and long lived service, has earned merited recongition in all types of construction.

Ironclad for All Types of Roofs

Ironclad Copper Steel Roof Sheets are adaptable to any type or shape of roof. They have been most successfully used for roofing theaters, hospitals, industrial buildings, hangars, etc. Ironclad may be used on flat, sloping, gable, hip, French, sawtooth and special types of roofs.



Ironclad Roof on Earl Theatre, Washington, D. C.

Advantages of Ironclad Roofs

Spans—Ironclad will span from 6 to 8 ft. between purlins, requiring a very small amount of structural support per square foot of roof.

Weight—Due to its deep rib and effective seat, Ironclad is very strong but light in weight.

Expansion and Contraction—The effective methods of fastening Ironclad distribute expansion and contraction over the entire roof area uniformly.

Permanency—Ironclad is made of rust resisting copper steel with a baked-on coat of paint, or can be supplied in galvanized copper steel.

Unusual Conditions—Ironclad fastenings, clips and other appurtenances take care of even unusual conditions.

Economy—Ironclad Roofs are practically as cheap in place as good wood construction. They are easily and quickly placed, effecting a saving in time and labor. Light weight and longer span save money on framing.

Ironclad Roof Application

(1) The ends of the sheets always come over supports and lap over as much as desired, but never less than 2 in. Side laps are a full rib deep (2 in.) and make a waterproof joint.

(2) The sheets rest on pressed steel seats which support the sheets on the flat portion between ribs and not on the rib. These seats act as spacers and rigidly hold the roof to the purlins, and also act as stiffeners for the ribs. The seats are provided with bent sides fitting closely and clamping to the purlins for their entire length.

(3) The sheet is fastened to the seat with our special metal clip or hardened steel screws.

(4) Over the top of the steel deck, insulation of any of the many well-known brands of insulating boards or porous gypsum insulation is placed, after thoroughly mopping the surface of the roof with asphalt. Over the insulation, which can be any thickness desired, waterproofing in the form of built-up roofing, slate, or tile, is placed on any type roof on any slope desired.

(5) On steep slopes metal screws and washers are furnished to hold the insulation and wood nailing strips for nailing the slate or tile.



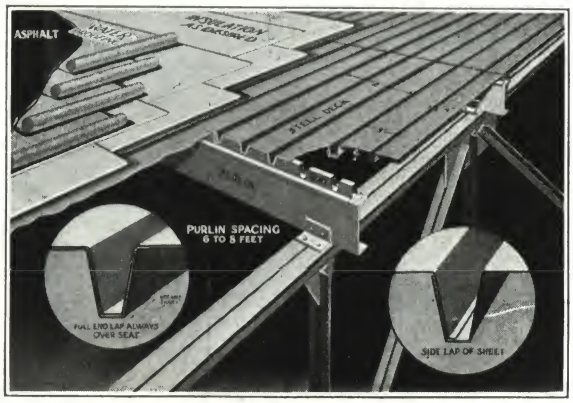
Ironclad Used on Sloping Roof

Designing Information

Ironclad Copper Steel Roof Sheets are furnished in 24, 22, 20, 18 and 16 gauge. Each sheet is 2 ft. wide and lengths are 5, 6, 7 or 8 ft. and lap is optional but should not be less than 2 in.; consequently each Ironclad sheet covers a roof area equal to its own length in feet less 2 in. (or the lap allowed) multiplied by 2 ft., or the full width of the formed sheet. Ribs are full 2 in. in depth, spaced 8 in. center to center. The seats are 2¼ in. in depth so the distance from top of purlin to top of deck is 2¼ in. plus thickness of sheet used.

The maximum span for 24 gauge sheet with a live load of 35 lb. per sq. ft. is 4 ft. 10 in., 5 ft. 10 in. for 22 and 6 ft. 10 in. for 20 gauge.

Ironclad with insulation and built-up roof on top of purlins weighs approximately 5 lb. per sq. ft.



Typical Roof Construction Showing Ironclad Roof Deck

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Specifications

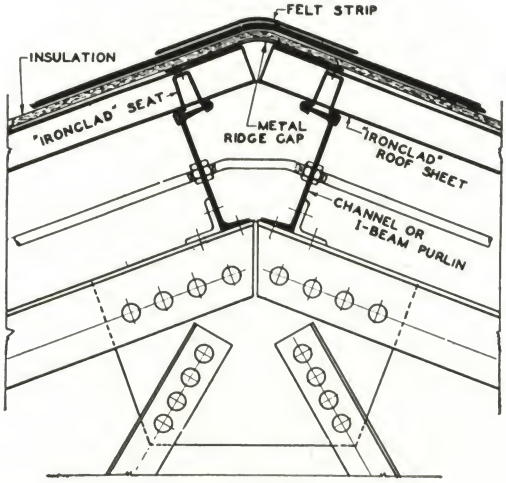
Roof Sheathing—The roof sheathing shall be Ironclad Copper Steel Plates with ribs not less than 2 in. deep or more than 8 in. from center to center of ribs. The plates shall be supported by pressed copper steel seats securely held to the purlins. All joints shall come over supports. The ribs shall be formed with bends not exceeding 90° and all corners shall have a radius of not less than twice the thickness of the sheet. The sheet shall be fastened to the pressed steel seats with clips or other suitable means, permitting expansion and contraction without deformation of the sheet. The sheets shall overlap at the ends for their entire width and depth, not less than 2 in. and for their entire length not less than the depth of one rib.

The sheets shall be made of.....gage metal to fit purlin spacing of.....ft.....in. Sheet materials for the roof shall be coated with a baked-on shop coat of preservative paint.

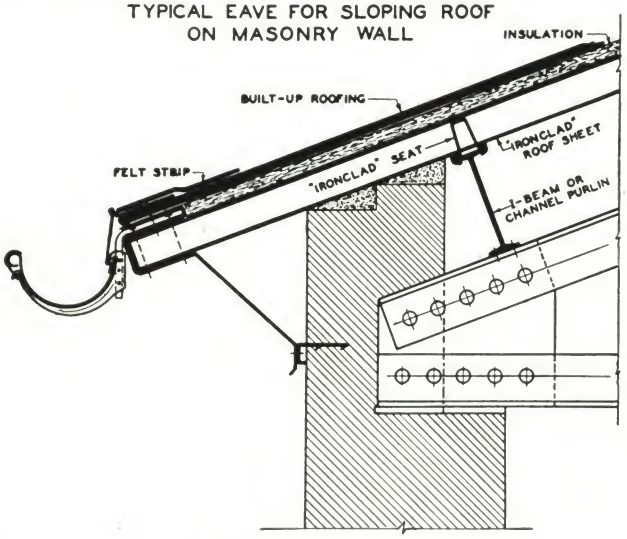
Insulation—The sheathing shall be insulated with.....of a thickness of not less than.....embedded in high temperature asphalt, and on slopes over 3 in. to the foot shall be fastened with metal screws and washers, using not less than one screw for each 4 sq. ft. of insulation.

Waterproofing—(Usual type of specification). If slate or tile roofing is to be placed over the insulation, suitable nailing strips shall be fastened through the insulation into the roofing sheet with metal screws.

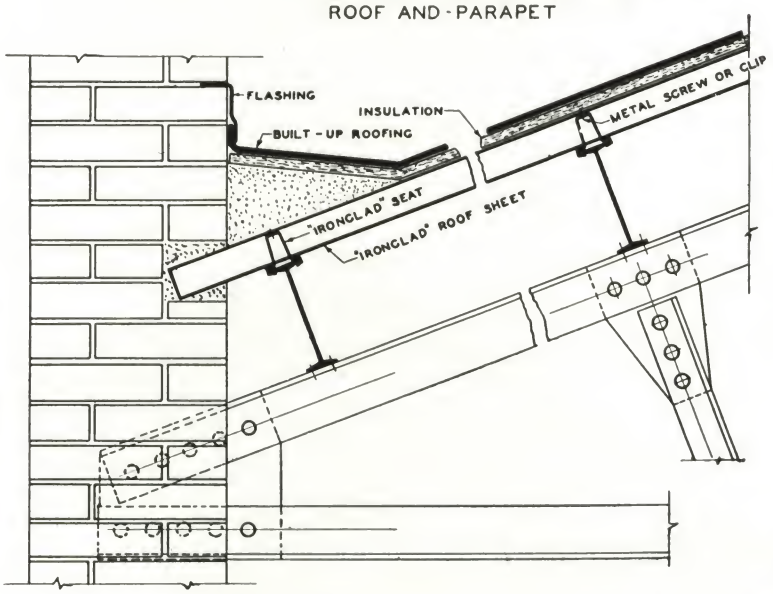
TYPICAL RIDGE



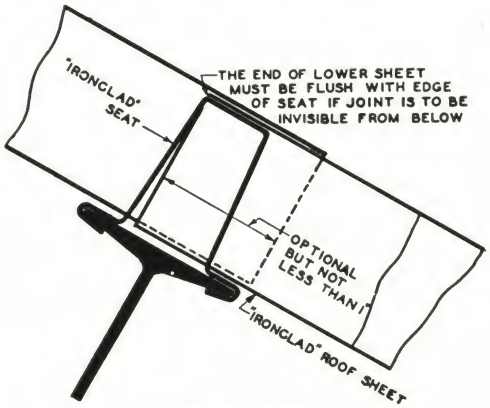
TYPICAL EAVE FOR SLOPING ROOF ON MASONRY WALL



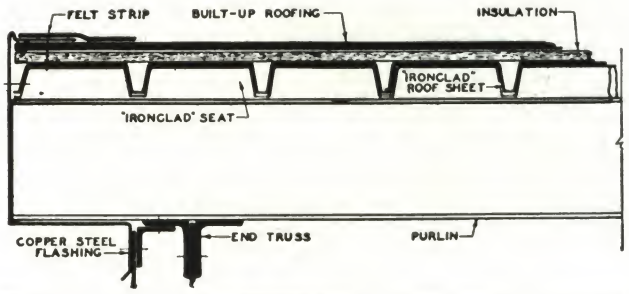
TYPICAL GUTTER DETAIL WITH ROOF AND PARAPET

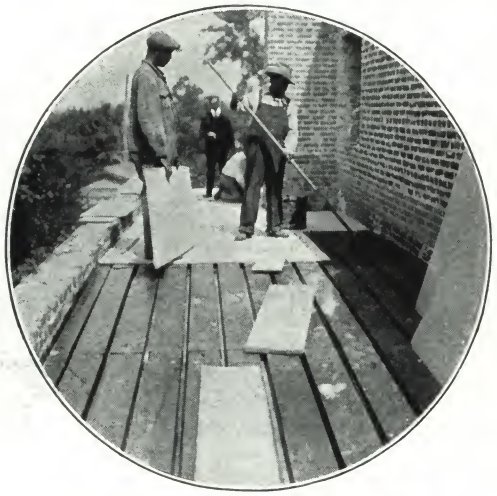


CONNECTION OVER SEAT



TYPICAL GABLE





Laying Insulation Over Ironclad Roof

H. H. ROBERTSON COMPANY

Robertson Protected Steel Decks, Under Insulated and Built-up Roofs, and V-Beam Roofing

PITTSBURGH, PA.

FACTORIES: AMBRIDGE, PA.; SARNIA, ONT., CAN.; ELLESMERE PORT, CHESHIRE, ENG.

DISTRICT OFFICES

BALTIMORE, MD. BOSTON, MASS. CHICAGO, ILL. DETROIT, MICH. HOUSTON, TEX. LOS ANGELES, CAL.
BIRMINGHAM, ALA. BUFFALO, N. Y. CLEVELAND, OHIO HAVANA, CUBA JACKSONVILLE, FLA. NEW YORK, N. Y.
PHILADELPHIA, PA. PITTSBURGH, PA. ST. LOUIS, MO.

AGENCIES

ALLENTOWN, PA. EL PASO, TEX. MILWAUKEE, WIS. RICHMOND, VA. SCRANTON, PA.
BUTTE, MONT. EASTON, PA. MINNEAPOLIS, MINN. ST. PAUL, MINN. SEATTLE, WASH.
CHARLESTON, W. VA. HOUGHTON, MICH. NEW HAVEN, CONN. SAN FRANCISCO, CAL. SYRACUSE, N. Y.
DENVER, COLO. LITTLE ROCK, ARK. PORTLAND, ORE. SALT LAKE CITY, UTAH WASHINGTON, D. C.

ENGLAND, ELLESMERE PORT, CHESHIRE: Mersey Iron Works

CANADA: H. H. ROBERTSON CO., LTD., TORONTO, ONT., AND MONTREAL, QUE.

Products

Robertson V-Beam Protected Steel Roof Decks for use under insulated or built-up roofs; Robertson V-Beam Roofing for use as a self-contained roof without additional insulation.

TRADE-MARK

Robertson V-Beam Roofing and Siding Sheets are protected by United States Patent No. 1277755, September 3, 1918; other United States and foreign patents issued and pending.

For Robertson Protected Metal (RPM) Roofing and Siding, Glazing Construction, Skylights, Monitor, Sidewall and Special Sash, Double Glazing and Ventilators, see Manufacturers' Index.

Uses of Robertson V-Beam Sheets

The Robertson V-Beam Sheet is a protected steel sheet corrugated into deep, angular V-shapes which give it greater strength than some other forms of corrugation.

Its action under load compares closely to the laws of beam deflection. (For the manner in which V-Beam sheets are protected from corrosion, see section entitled "Elimination of Corrosion.")

The V-Beam sheets are used:

(1) As a steel deck under insulation and built-up roofing.

(2) As a self-contained roof without insulation or built-up roofing.

(3) As a permanent form for concrete slab work.

Types of Construction

Robertson V-Beam Steel Decks can be used on all types of industrial buildings and factories, on commercial garages, powerhouses, airplane and dirigible hangars, etc.

As a permanent form for concrete, it is used for concrete slab roofs, floor construction, bridge floors and sidewalks, shipping platforms, conveyor bridge decks and other purposes.

General Advantages of the Steel Roof Deck

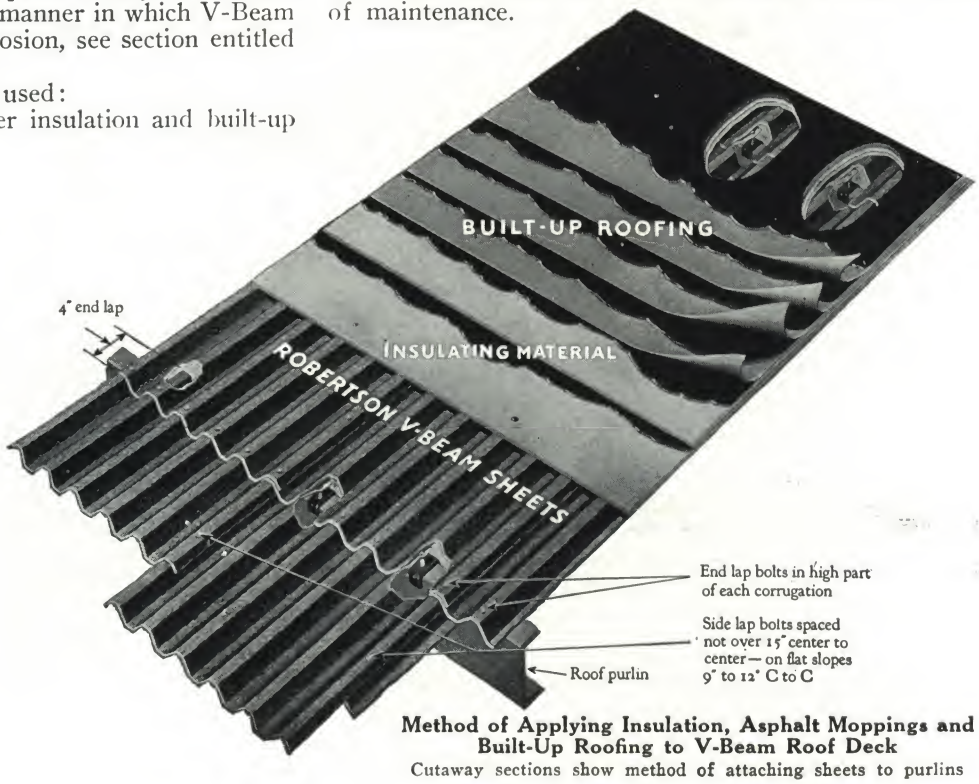
The steel deck has won wide popularity for use under insulation and built-up roofing (1) because it is lighter than many of the older forms of deck construction; (2) because it will not absorb moisture and will not warp or swell; (3) because there is no movement of the deck to cause stretching or splitting of the built-up coatings.

Specific Advantages of the Robertson V-Beam Steel Deck

The Robertson V-Beam Protected Steel Sheets have removed the susceptibility to corrosion which was the only weakness of the steel deck. They have given the steel deck these advantages:

(1) **Rust and Corrosion Proof**—They make a roof deck that is rust and corrosion proof even in the presence of destructive chemicals, smoke, steam, etc.

(2) **No Maintenance Required**—They make a roof deck that does not require painting or other forms of maintenance.



Method of Applying Insulation, Asphalt Moppings and Built-Up Roofing to V-Beam Roof Deck
Cutaway sections show method of attaching sheets to purlins

Continued on next page

(3) Greater Strength—They provide greater strength. This makes it possible to span wider purlin spacings, thus reducing the number of supporting purlins required and reducing the amount of structural steel.

Elimination of Corrosion

The Robertson V-Beam Roof Deck is made of Robertson Protected Metal (RPM) and possesses the same freedom from corrosion that has made RPM a favorite material for roofing and siding of industrial buildings. Robertson V-Beam Roof Decks need no paint because they are protected by the only unfailing method of rustproofing, which is *permanent external coatings.* There are three layers of these external coatings on each Robertson V-Beam Sheet. They are: (1) asphalt; (2) asbestos felt, and (3) a heavy waterproofing envelope. Both asphalt and asbestos are inert in the presence of chemical agencies and moisture. Coverings last indefinitely. These coatings cover sheets completely—top, bottom, sides and ends.

Contraction and Expansion

The core sheet of the V-Beam Steel Deck is steel and it therefore has the same co-efficient of expansion as the structural steel of the building. The external coatings on the sheets are semi-plastic and adhere firmly to the sheets during expansion and contraction. The corrugated design of the sheets enables them to take up all the movement of expansion and contraction without disturbing the insulation or the built-up roofing.

Condensation

Sufficient thicknesses of insulating board can be applied to provide any desired degree of insulation. The Robertson V-Beam Deck itself has great natural insulating value because of the external layers of coating on each sheet. The heat insulating value of all Robertson Protected Metal is more than twice that of unprotected metal. (The actual difference is: Rpm: 0.9 B.t.u. per hour per square foot, for each degree of temperature difference; unprotected metal: 2.13 B.t.u.)

COEFFICIENTS OF THERMAL CONDUCTIVITY OF VARIOUS FORMS OF ROBERTSON PROTECTED METAL CONSTRUCTION AS COMPARED WITH TWO OTHER FAMILIAR FORMS OF CONSTRUCTION

Form of construction	*Coefficient
(1) RPM Roofing; all forms of corrugations; used without other composition roofing or insulating materials—	
Laps not cemented	.90
Laps cemented	.80
(2) RPM Siding; all forms of corrugations; used without other materials; laps, standard construction	.80
(3) RPM Roofing or Siding; 2 sheets RPM with insulating board between—	
With ½-in. insulating board	.26
With ¾-in. insulating board	.22
With 1-in. insulating board	.18
With 1½-in. insulating board	.14
With 2-in. insulating board	.11
(4) RPM Roofing as a deck sheet with composition roofing and insulating board—	
With ½-in. insulating board	.28
With 1-in. insulating board	.20
With 1½-in. insulating board	.16
With 2-in. insulating board	.13
(5) RPM Cover Sheet; roofing or siding; closely-spaced purlins or girts supporting insulating board, exposed on inside, with RPM Cover Sheet outside to weather—	
With ½-in. insulating board	.37
With 1-in. insulating board	.24
With 1½-in. insulating board	.18
With 2-in. insulating board	.14
(6) Corrugated Unprotected Steel Roofing, conventional construction	2.13
(7) 1⅜-in. or ⅞-in. Rough Roofing Boards with ready roofing	about 1.0

*The coefficients given above are B.t.u., absorbed, transmitted and emitted, per square foot, per hour, per degree F. temperature difference outside and inside air, and are for still air conditions.

Note: The values given will vary ± 10% depending upon the perfection of workmanship in construction, and upon the men and methods of making the determination of the coefficient.

Values given in items 3 to 5 do not include the insulating effect in the low corrugation under the insulating board, an air space which exists over 80% of the entire area of the RPM and which has value as an insulator.

Gauges and Spans

Robertson V-Beam Sheets are available in the following gauges—24, 22, 20 and 18. The spans over which the various gauges should be used to secure the utmost economy are given below:

Length of span, ft. in.	V-Beam Sheet	
	Gauge	Length, ft.
4 9	24	10
5 3	24	11
5 9	24	12
6 6	24	12
7 6	22	12
8 6	20	12
9 6	18	12

Note: The figures above are based on a 30-lb. load, with a limiting deflection not exceeding 1% of the span length.

Lengths

Robertson V-Beam Sheets are standard in even foot lengths from 5 to 12 ft. and are also available in intermediate lengths when required.

Weights

Dead load (V-Beam roofing, uninsulated) 3 to 5 lb. per sq. ft.

Dead load (V-Beam roofing, insulated) 5 to 7 lb. per sq. ft.

Building Codes

Robertson V-Beam Sheets conform to the laws of beam calculations and can therefore be designed to meet any building code requirements.

Width, Covering Area, Laps

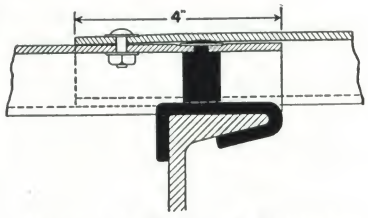
The cross-section on the next page shows the width, net covering width, and lap of the Robertson V-Beam sheets.

Erection

Erection of V-Beam sheets is done by the roofer or sheet metal man, or, if you wish, by erection engineers of the H. H. Robertson Company. The same workmen can frequently apply the insulation and waterproofing as well as erecting the V-Beam sheets. Complete erection instructions will be furnished by the Robertson Company to the local contractor or roofer.

Method of Fastening V-Beam Sheets

The fastening method developed for use with Robertson V-Beam Sheets is extremely strong and durable. The V-Beam Sheets are attached to the purlins with rivet clips, which hook around the purlins as illustrated in the cross-section. The rivets are drawn through the high corrugations of the sheets with a simple riveting tool and hammer.



Method of Fastening Robertson V-Beam Sheets to Roof Purlins

The hook end of the rivet clip fastens under top leg of the purlin. The other end of the clip is bent down over the purlin with a hammer. All rivet heads are covered by the adjoining sheets

Applying Insulation and Built-up Roofing

The usual procedure for applying insulation and built-up roofing is followed. Stiff board insulations are recommended. If one layer of insulating material is used, it is bolted directly to the V-Beam Sheets. If additional layers are used, the multiple layers are stapled together or are monolithic and are mopped with asphalt and bolted to the deck as a unit.

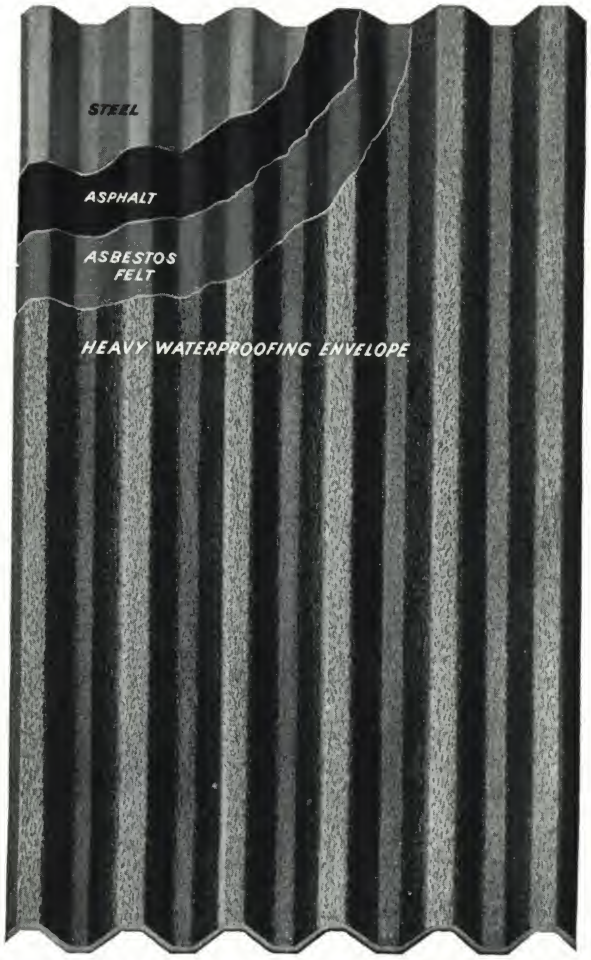
The upper layer of insulation is mopped with asphalt to receive the first layer of built-up roofing. The successive layers of built-up roofing are applied in the usual manner. Complete specifications for application of insulation and built-up roofing will be sent on request.

Continued on next page

V-BEAM SHEETS AS SELF-CONTAINED ROOFS WITHOUT INSULATION

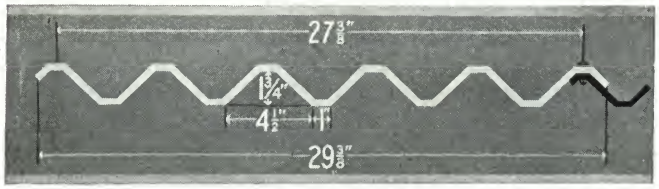
The V-Beam Sheets are being widely used in place of ordinary forms of corrugations for roofs without insulation or built-up roofing. They are being chosen (1) because the sheets with their deep angular V-shaped corrugations, are one of the strongest forms of corrugated metal that has been developed (see load-carrying tables at right); (2) because the shape of the corrugations makes a roof of very attractive appearance, and (3) because of the greater drainage capacity of the corrugations.

They are used in buildings where the architect or engineer wishes to reduce the number of purlins, either for lightness or appearance, in buildings with long spans without requiring intermediate purlins. The strength of the sheets permits savings in the structural steel and in the weight of foundations, etc.



Robertson V-Beam Sheet

Showing the protective coverings on the steel sheet which prevent corrosion. These sheets are supplied in even foot lengths, from 5 to 12 ft. inclusive. Intermediate lengths can be furnished wherever required



Dimensional Details of the Robertson V-Beam Sheet

Note that the steel is nowhere bent back upon itself. None of the bends involve "drawing" in the steel.

The standard sheet is 29⅜ in wide, with a net covering width of 27⅜ in.

In addition to their strength, the Robertson V-Beam Sheets have complete freedom from corrosion even in plants where fumes, acids and other destructive agencies are prevalent. The V-Beam Sheets need no painting nor other maintenance to keep them free of corrosion.

Further information about the use of V-Beam Sheets on sloping roofs will be sent on request.

TABLES OF LOAD-CARRYING CAPACITIES OF ROBERTSON V-BEAM SHEETS

Gauge U.S.S.	26	24	22	20	18
Thickness of core sheet	0.01875″	0.025″	0.03125″	0.0375″	0.050″
Net wt. per sq. ft. mat'l area	1.75 lb.	2.10 lb.	2.40 lb.	2.75 lb.	3.40 lb.
Moment inertia for section. For 12″ width	0.1298″⁴	0 1731″⁴	0.2164″⁴	0.2597″⁴	0.3462″⁴
Section modulus for section. For 1'0″ width	0.1384″³	0.1854″³	0.2307″³	0.2768″³	0.3690″³

TABLE NO. 1—FOR USE WHERE SIMPLE BEAM CONDITIONS EXIST

Span lengths	D	Safe loads—pounds per square foot uniformly distributed				
4′ 0″	.14	58	77	96	115	154
4′ 6″	.18	46	61	76	91	122
5′ 0″	.22	37	49	62	74	98
5′ 6″	.26	31	41	51	61	81
6′ 0″	.31	26	34	43	51	68
6′ 6″	.36	22	29	36	44	58
7′ 0″	.42	19	25	31	38	50
7′ 6″	.48		22	27	33	44
8′ 0″	.55		19	24	29	38
8′ 6″	.62			21	26	34
9′ 0″	.70			19	23	30
9′ 6″	.78				20	27
10′ 0″	.86					25
10′ 6″	.95					22

NOTE: 26 gauge sheets are not recommended for general use. They may be sanctioned in special cases, when Robertson Engineers have the opportunity to approve of the conditions of service.

D = Deflection in inches at center of span under the tabular loads shown to the right.

Basis of Above Table

The load values are calculated on the basis of $M = \frac{1}{8}wl^2$ using a fibre stress of 10,000 lb. per sq. in.

The deflections were obtained from the results of an exhaustive series of load tests. Within the limits of twice the tabular loads, deflections will be directly proportional to the loads. These load tests were made under conditions approximating actual service conditions as closely as possible.

TABLE NO. 2—FOR USE WHERE SEMI-CONTINUOUS BEAM CONDITIONS EXIST

(For description of semi-beam conditions, see Note A below)

Span lengths	D	Safe loads—pounds per square foot uniformly distributed				
4′ 0″	.18	72	96	120	143	193
4′ 6″	23	57	76	95	113	152
5′ 0″	.28	46	61	77	92	122
5′ 6″	.33	38	51	63	76	101
6′ 0″	.39	32	42	53	63	85
6′ 6″	.45	27	36	45	55	72
7′ 0″	.53	23	31	38	47	62
7′ 6″	.60		27	33	41	55
8′ 0″	.69		23	30	36	47
8′ 6″	.78			26	32	42
9′ 0″	.88			23	28	37
9′ 6″	.98				25	33
10′ 0″	1.08					31
10′ 6″	1.19					27

NOTE: 26 gauge sheets are not recommended for general use. They may be sanctioned in special cases, when the Robertson Engineers have the opportunity to approve of the conditions of service.

D = Deflection in inches at center of span under the tabular loads shown to the right.

Basis of Above Table

The load values are calculated on the basis of $M = 1/10wl^2$ using a fibre stress of 10,000 lbs. per sq. in.

The deflections were obtained from the results of an exhaustive series of load tests. Within the limits of twice the tabular loads, deflections will be directly proportional to the loads. These load tests were made under conditions approximating actual service conditions as closely as possible.

Note A: Where multiple spans exist, requiring the use of single sheets over each span, and where ends of sheets are securely anchored to

Continued on next page

the supports and to each other; or where multiple spans exist and one sheet length may extend over two or more spans and be securely anchored to the several supports; or, where a combination of these conditions exist, the experimental data yielded the fact that there was a consistent increase in strength beyond the simple beam conditions which was worth considering, and that the bending moment could be calculated viz.: $MB = \frac{1}{10.6} Wl$ and the deflection viz.: $d = \frac{4 \quad W \quad l^3}{384 \quad E \quad I}$. To simplify calculations, besides getting an additional factor of safety, Table No. 2 has been calculated using $MB = \frac{1}{10} Wl$ and $d = \frac{5 \quad W \quad l^3}{384 \quad E \quad I}$.

V-BEAM SHEETS AS PERMANENT FORMS FOR CONCRETE SLAB WORK

The V-Beam sheets offer many advantages when used as a permanent form on steel beam supports for roofs, floors, etc. Among these advantages are:

(1) Construction is rapid.

(2) Carpenters are eliminated, the danger of fire from wood-forms is removed, and shrinkage and warpage are prevented.

(3) The deep V-corrugations eliminate one-half or more of that portion of a concrete slab which is in tension (which is, of course, the weakest portion of concrete). There is a saving of as much as 20% to 40% in the quantity of concrete, with a corresponding saving in the dead weight on the framework, and economies in the structural steel and the foundations.

(4) The space required for storage and work space for form work is reduced.

(5) The V-Beam Sheets provide a good temporary protection over other work and equipment, and the actual concrete slab work can thus be delayed until the most favorable time for it.

(6) Since there are no forms to be stripped away, the work is not delayed.

(7) There is no leakage of grout through form cracks.

(8) No finishing is required on the underside of the slab; and there is no spalling or dusting of the ceiling to spoil products in process of manufacture.

(9) The V-Beam Sheet is corrosion-resistant and can be used where chemical conditions are bad.

(10) The high corrugations permit wiring, piping, etc., to be placed in the plane of floor slab and yet to be accessible. This increases the overhead clearances.



TABLES SHOWING SLAB DESIGN AND LOAD CARRYING CAPACITIES FOR CONCRETE SLABS USED WITH ROBERTSON V-BEAM SHEETS AS PERMANENT FORMS

Distance center to center of supports, ft. in.	Dead load of V-beam and concrete in lb. per sq. ft. uniformly distributed (see sketch)	Gauge of V-beam required to carry dead load and expected deflection under the quiescent dead load		Slab reinforcing		Live load carrying capacity of slab only, lb. (V-beam takes all dead load)	Estimating data		Equivalent slab of ordinary wood-form work to carry same live load plus dead load			
		Gauge	Deflection, in.	Size of rods	Size of mesh		Cu. yd. of concrete per 100 sq. ft. weather area	Reinforcing rods and mesh per 100 sq. ft. weather area	Slab thickness, in.	Cubic yd. per 100 sq. ft. weather area	Reinforcing per 100 sq. ft. weather area, lb.	Dead load on supporting construction, lb.
4 0	35	24*	.07	⅜ in. round spaced 5¼ in. c. to c.	Across corr. No. 12 wires 4 in. ctrs. Parallel to corr. No. 14 wires 8 in. ctrs.	420	.77	Rods 95 lbs. Mesh A.S.&W. Co. No. 036P, 17 lb.	3⅜	1.05	110	42
4 6	35	24*	.11			330	.78		3⅜	1.05	110	42
5 0	36	24*	.17			270	.79		3½	1.10	110	44
5 6	36	22*	.19			225	.80		3½	1.10	110	44
6 0	37	22*	.28			185	.81		3½	1.10	110	44
6 6	37	20*	.31			160	.81		3⅝	1.15	115	46
7 0	38	20*	.43			135	.82		3⅝	1.15	115	46
7 6	38	18*	.42			120	.83		3⅝	1.15	115	46
8 0	39	18*	.57			105	.84		3¾	1.20	115	48
8 6	39	18*	.73			95	.85		3¾	1.20	115	48

*These spans and gauge combinations will permit of a man working on top of green concrete slabs if he uses reasonable care without causing a deflection that will become permanent. The criterion for this is that, under semicontinuous beam conditions, a deflection of approximately 1¼% of the span length will represent a stress in the core sheet that is beyond the yield point.

Continued on next page

Flashings

A large percentage of the troubles with built-up roofs occur in connection with the flashings against parapet walls, chimneys, ducts and around the head of downspouts. A complete system of special Robertson Protected Metal flashings has been developed to provide watertight fittings at every possible source of trouble. Some of these flashings are illustrated in these pages. The special value of each type of flashing is pointed out in the captions under them. There are also special flashings for use in joining Robertson V-Beam Roofing Sheets to corrugated walls. Illustrations and descriptions of these flashings will be sent on request.

Sheets and Flashing Ready for Erection

Robertson V-Beam Sheets are completely engineered before shipment. They are cut to fit and ready for immediate erection. Little or no cutting on the job is necessary. Wastage of material is avoided and delays in erection are eliminated.

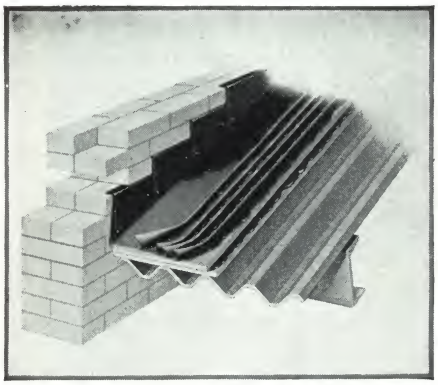
Estimates and Proposals Furnished

Robertson engineers will be glad to go over your blueprints and advise you what savings in your structural sheet can be made through the use of Robertson V-Beam Sheets.

They will prepare for you a revised layout of roof purlins for the new arrangement. Recommendations will be made as to the length and gauge of V-Beam Sheeting that will meet the load-carrying requirements and complete specifications and cost estimates will be submitted.

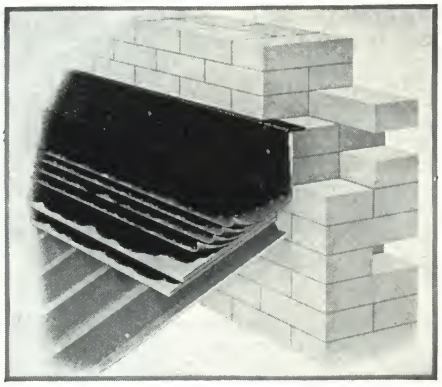
Information Needed When Ordering

On our pages on Robertson Protected Metal (see Manufacturers' Index) we have illustrated the type of information and the measurements which should be included in an order for all forms of Robertson Protected Metal (including Robertson V-Beam Sheets). If this information is given in ordering, shipments can be made to you much faster.



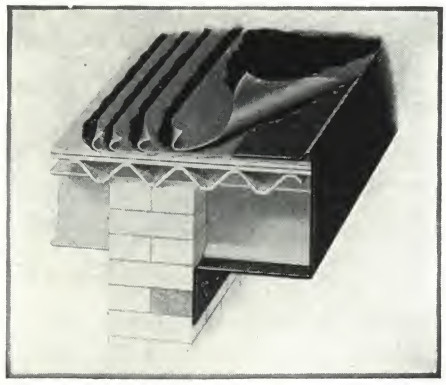
RPM Standard Stepped Counterflashing

Designed for use against brick parapet walls, gable walls, fire walls, etc. Note how it fits in between the bricks. It is fastened with nails and fiber cement. Illustration shows how the layers of built-up material are mopped up against the brick wall before the flashings are applied



RPM Standard Counterflashing

For use where V-Beam Roof Decks meet a brick wall at right angles. The flashing is fitted in between the bricks. As in the case of the stepped counterflashing, the felt layers of the built-up roof are mopped up against the brick wall before the counterflashing is applied



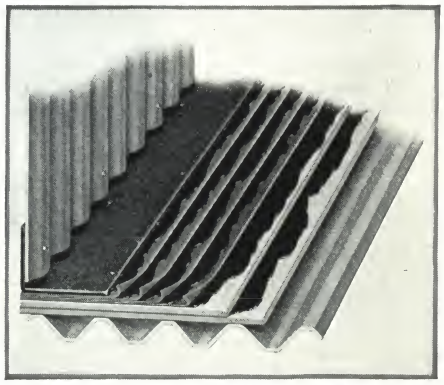
RPM Standard Gable Flashing

The flashing is bolted through the waterproofing and insulation to the V-Beam Roof Sheets. To fasten the flashing to the brick wall, wood blocks (placed by the masonry contractor) are inserted in place of bricks at certain intervals, and the gable flashings are attached by nails to the wood blocks



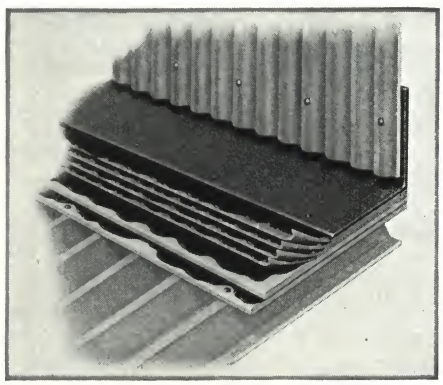
RPM Standard Eaves Flashing

This flashing is bolted to the V-Beam Sheets in the high parts of the corrugations. The lower part of the flashing is nailed to the wood "nailer" (placed in the brick by the masonry contractor). The top layer of felt is mopped over the eaves flashing



RPM Standard Sidewall Flashing

Used to make a watertight union where an adjoining corrugated sidewall parallels the corrugations of the V-Beam Roofing Sheets; as, for example, in cases where the roof meets the wall of a higher adjoining building



RPM Standard End Wall Flashing

Used when a corrugated sidewall meets the Robertson V-Beam Roof at right angles to the corrugations; as, for example, at the upper edge of a lean-to, or at the base of a monitor

SAINT PAUL CORRUGATING CO.

ESTABLISHED 1885

Manufacturers of Rib Type Steel Roof Decking

3-23 West Water Street, SAINT PAUL, MINN.

CABLE ADDRESS
"COR-SHEL"
(W. U. Code)

Products

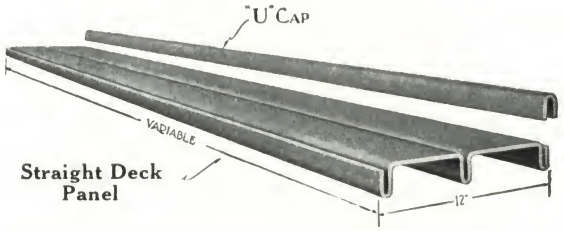
SAINT PAUL RIB TYPE STEEL ROOF DECKING.
For our Skylight page, see Manufacturers' Index.

Saint Paul Steel Roof Decking

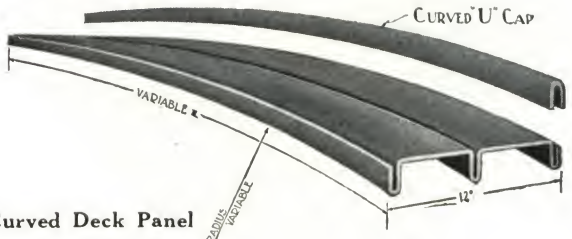
One of the best bases for built-up roofing. Particularly light in weight.

Resists Fire—Fire insurance companies understand the fire resisting value of Saint Paul Steel Decking and may be expected to grant credits from standard rates when it is used.

Contraction and Expansion—Expansion and contraction are fully allowed for. Panels 12 in. wide are joined together by a U-rib which takes care of any expansion and contraction that may occur.



Straight Deck Panel



Curved Deck Panel

Ends Lapped—Standard lappage allowed for end joints is 2 in. Lapping ends over ends makes the best end joint. Lapped end joints are mopped with asphaltum and sealed tight, thereby preventing leaks and the dropping of asphalt during hot weather.

Construction Information—Every panel has reinforcing ribs 6 in. on center, adding greatly to the strength. A purlin clip is supplied at every point where a longitudinal joint crosses a supporting purlin. They tie the decking to the steel supports. Intermediate clips are spaced 14 to 15 in. on centers and tie adjoining panels and the U-ribs to each other. Enough intermediate clips and purlin cleats are furnished to tie all joints every 14 or 15 in., that is, purlin clips wherever joints cross purlins, and intermediate clips between purlin ties.

Decking is furnished in straight panels for flat roofs and can be curved to any practical radius for curved roofs. All members are die formed, insuring true formations and uniformity in all parts. Curved sections are first formed straight and are then curved to the required radius. Laying curved sections requires no more labor than laying straight panels. Panels are interchangeable and uniform. Because of the thickness of No. 18 gauge steel, one end of each panel is formed enlarged to permit easy lapping. Nos. 20, 22 and 24 gauge are formed as illustrated unless otherwise specified.

Length of panels, either straight or curved, is determined by the spacings between roof purlins. Spacings of roof purlins average from 4 ft. 6 in. to 5 ft. on centers. Standard practice is to make panels long enough to span three purlins plus 2 in. for laps.

Estimates—Supplied on the following classes of material:

(1) Cold rolled open hearth box annealed black steel copper bearing (dipped in gray metallic primer paint).

(2) Dead soft tight coated copper-alloy galvanized steel.

(3) "Gohi" galvanized, or black pure iron.

When the elements of interior moisture, smoke and acid fumes are not present, material (1) can be specified.

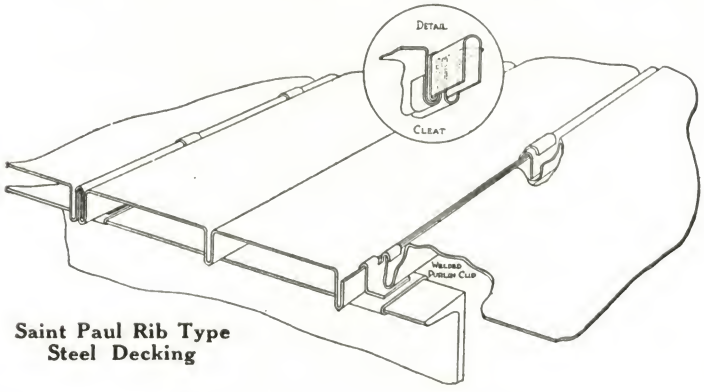


Steel Roof Decking with Roofing Applied

Where there is considerable interior moisture but an absence of smoke and acid fumes, material (2) is recommended.

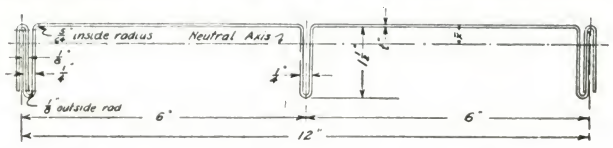
Where excessive interior moisture is found and this is mingled with smoke or acid fumes, material (3) should be used.

Material (1) if painted with acidproof paint at regular intervals will take care of any condition.



Saint Paul Rib Type Steel Decking

PROPERTIES OF SECTIONS AND TABLE OF SAFE LOADS



PROPERTIES OF SECTIONS.

US Std gage	t in	Area sq in A* sq in	A* sq in	ȳ in	I_x in⁴	S_x in³	wt. lbs per sq ft	M_{allow} in lbs	V_{allow} lbs
18	.05	.0621	.5200	.421	.2814	.2492	4.0	3990	5200
20	.0375	.0708	.3896	.417	.2124	.1894	3.0	3030	3896
22	.0312 5	.1255	.3248	.413	.1767	.1580	2.5	2530	3248
24	.025	.0867	.2596	.405	.1393	.1243	2.0	1990	2596

* A_x = Area of web; straight portions only
** Based on f_s = 16000 lbs per sq in
*** Based on f_s = 10000 " per sq in
All above values for 12" section

SAFE LOADS FOR SIMPLE SPANS UNIFORMLY LOADED
BASED ON EXTREME FIBER STRESS OF 16 000 LBS PER SQ IN.

Span ft. in	Gage of Decking 18	20	22	24
	Safe Loads in lbs per sq ft			
3 - 0	291	222	185	146
3 - 6	213	162	135	107
4 - 0	162	123	103	81
4 - 6	127	97	81	64
5 - 0	102	78	65	51
5 - 6	84	64	53	42
6 - 0	70	53	44	35
6 - 6	59	45	37	30
7 - 0	50	38	32	25
7 - 6	43	33	27	22
8 - 0	38	29	24	19
8 - 6	33	25	21	16
9 - 0	29	22	18	14

Weight of decking (no insulation or covering) has been deducted in above values.

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Permanent Building Products Including Metal Roof Decks

YOUNGSTOWN, OHIO

Offices and Warehouses in Principal Cities—For list see our pages on Steel Windows

Products

METAL ROOF DECKS.

For other Truscon Products, see pages in this edition on Concrete Reinforcing Steel, Steel Joists, Standardized Buildings and Structural Steel, Steel Doors, Steel Windows and Metal Laths and Accessories, as listed in Manufacturers' Index.

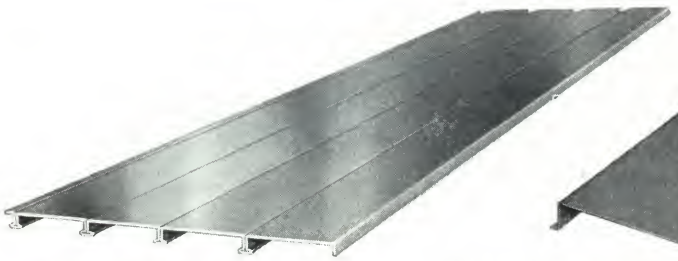
Strong, Economical Roof Decks

Truscon Steeldecks—Ferrobord, I-Plates and Ferrodeck—meet perfectly the requirements of any building for which a strong, light-weight, fireproof, insulated roof deck is desired.

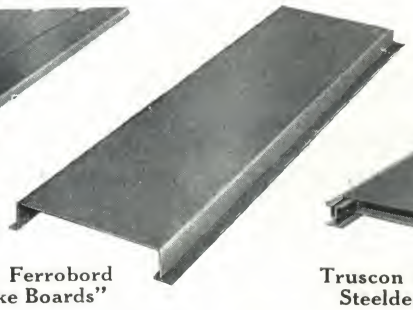
For any spacing of purlins, for a new building or replacing an old roof, Truscon furnishes a type of fireproof roof deck that is quickly erected at economical cost and effects savings in the supporting structural work.

Good Insulating Qualities

Truscon Steeldecks provide a smooth, solid surface for the application of insulation and roofing materials. Truscon Steeldecks, insulated to any degree, reduce fuel costs, prevent condensation and maintain desirable air conditions. The use of Truscon Steeldecks eliminates any possibility of damage to the built-up roofing due to expansion and contraction. They cannot warp or shrink and there are no bulges or waves, protrusions, holes or open spaces to interfere with the proper construction of built-up roofing or cause breaks as the workmen walk over it. Write for complete information, literature and quotations.



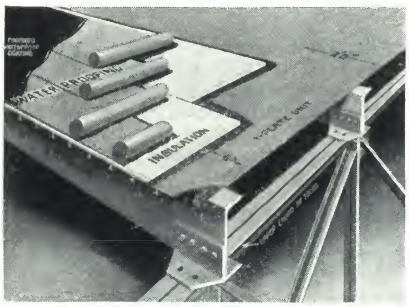
Truscon I-Plates Steeldeck Roof



Truscon Ferrobord "Laid Like Boards"



Truscon Ferrodeck Steeldeck Roof

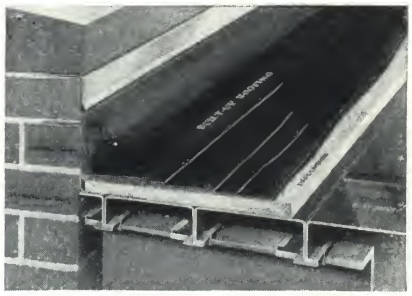


Truscon I-Plates Roof Construction

The I-Plate Type of Truscon Steeldeck is a roof so formed that each sheet is a unit itself, capable of carrying loads between the members of the roof structure.

The I-Plates are manufactured of 18-gage and 20-gage steel sheets with I-Sections formed in the sheets longitudinally. On one outside edge a complete I-Section is formed; on the other a flange of about ½ in. is formed to fit down between the webs of the adjacent I-Sections, giving a smooth finished surface.

I-Plates are applied directly over roof purlins and are spliced together by means of sleeve splice clips that telescope over the ends of the I-Sections and wrap around the top flange of the purlins.

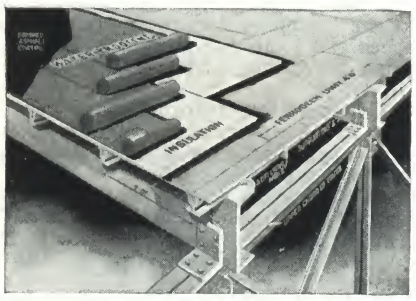


Truscon Ferrobord Roof Construction

The Ferrobord Type of Truscon Roofdeck is a roof so formed that each sheet firmly interlocks with the adjoining sheets to form a continuous deck over the entire roof.

Ferrobord is rolled from 18 and 20-gage Armco ingot iron with a finished width of 6 in. and any desired length. An interlocking rib is formed on the outer edge of each sheet, forming a structural supporting member at 6-in. intervals across the deck, when interlocked with the outside rib of the adjoining sheet.

Ferrobord is applied directly to the roof supporting steel and is fastened to the structural members with purlin clips that firmly lock the Ferrobord sections together and clamp over the flanges of the structural roof members.



Truscon Ferrodeck Roof Construction

The Ferrodeck Type of Steeldeck Roof is an assembly of subpurlins and reinforced roof sheets. The subpurlins with their "U" shaped tops are formed by welding specially bent 18-gage channel sections back to back. The Ferrodeck roof sheets, either 18 or 20 gage, are fabricated with two edges flanged over about 1 in. at 90 degrees. To erect Ferrodeck, the subpurlins, at 2-ft. centers, are fastened to the roof framing with spring clips. The roof sheets are then placed over the subpurlins so that the flanged over edges of adjacent sheets fit side by side into the openings along the tops of the subpurlins. The reinforcing members on the bottom sides of the sheets are utilized to anchor the sheets to the subpurlins.

BRICK, STONE AND ARCHITECTURAL TERRA COTTA

American Black Granite Co.....A527–528
American Blue Stone Co.....A619
American Enameled Brick & Tile Co.....A466–468
American Kerament Corp.....A634
Appalachian Marble Co., Inc.....A558
Athena Brick Corp.....A469
Atlantic Terra Cotta Co.....A652–654
Bates Bros. Seam-Face Granite Co., Inc.....A534–535
Belden Brick Co.....A470–472
Bloomington Limestone Co.....A588–589
Briar Hill Stone Co.....A620–624
Building Stone Association of Indiana, Inc.....A586
Carthage Marble Corp.....A559
Cast Stone Institute.....A630–633
Cold Spring Granite Co., Inc.....A529–533
Conkling-Armstrong Terra Cotta Co.....A655
Cook, Watkins & Patch, Inc.....A536
Corning Terra Cotta Co., Inc.....A656
Deacon Brothers, Inc.....A537
Decorative Stone Co.....A636–645
Deery, John J., Co., Inc.....A560
Dolben & Co.....A538–539
Economy Concrete Co.....A646–647
Edinger, Edward, Co.....A587
Federal Seaboard Terra Cotta Corp.....A657
Finzer Bros. Clay Co.....A474–478
Fiske & Co., Inc.....A473
Fletcher, H. E., Co.....A541–542
Galloway Terra Cotta Co.....A658–659
Georgia Marble Co.....A561–580
Glen-Gery Shale Brick Co.....A479–480
Goss, John L., Corp.....A540
Granite Mfrs. Assn. of Mount Airy.....A544–545
Granite Railway Co.....A543
Hanley Co.....A481–482
Harrison Granite Co. Inc.....A546
Haskel, S., & Sons, Inc.....A547
Hoosier Sandstone Co.....A625–626
Hydraulic-Press Brick Co.....A484–487
Indiana Limestone Co.....A591–616
Ketcham, O. W.....A666
Medal Brick & Tile Co.....A488–489
National Building Granite Quarries Assn.....A499–526
National Terra Cotta Society.....A648–651
New England Granite Works, Inc.....A548
New York Architectural Terra-Cotta Co.....A660–663
North Star Granite Corp.....A549
Northwestern Terra Cotta Co.....A664–665
Old Virginia Brick Co.....A483
Paterson Fire Brick Co.....A490
Perry Bros. Granite Co.....A554
Plymouth Quarries Inc.....A550–553
Rackle, Geo., & Sons Co.....A635
Shawnee Stone Co.....A590
Southwest Onyx & Marble Co.....A581–582
Standard Marble Works Co.....A583
Stark Brick Co.....A491–495
Stone Mountain Granite Corp.....A555
Sullivan Granite Co.....A556
Sweeney, J. E.....A617
Taylor Stone Co.....A628–629
Vermont Marble Co.....A584–585
Victor Oolitic Stone Co.....A618
Washington, George, Stone Corp.....A627
Western Brick Co.....A496–497
Woodbury Granite Co., Inc.....A557
Wyandot Clay Products Co.....A498

AMERICAN ENAMELED BRICK & TILE COMPANY

INCORPORATED 1893

Manufacturers of Enameled Brick
Dealers in Face Brick

TELEPHONES
LEXINGTON 1883, 1884, 1885

Graybar Building, 420 Lexington Avenue
NEW YORK, N. Y.

CABLE ADDRESS
"AMEREBRICK"

AGENTS IN ALL PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

TRADE AM-EN MARK

The Last Word in Enameled Brick

Products

ENAMELED and PORCELAIN BRICK: White, Mottled and Standard Colors in Standard Sizes and Ornamental Shapes. (See plates.) We are the largest manufacturers of this commodity in North and South America.

Territory

The business operations of this firm cover North and South America, Europe, Asia and Australia.

Personal Representatives

For the convenience of our customers in the United States and Canada, we have, in order to keep in closer touch with them, located representatives in all the principal cities to attend personally to inquiries, orders and deliveries.

Dispatch of Shipments

Factory and office are in constant telephone connection with each other, and we have a local telephone exchange connecting every department of the factory for quick and systematic dispatch of business.

Shipping Facilities

Our works, located but an hour's travel from the New York Office, are situated so as to enable shipping over two of the largest railroads—the Pennsylvania and the Central of New Jersey, and their connecting lines. We are also situated on tide water, so that shipments can be made by vessel for the coastwise and export trade.

Precaution Against Delay

Every part of our factory, including machinery, has its duplicate, which prevents any possibility of delay caused by breakdowns, should they occur.

Capacity

Our present capacity is 12,000,000 brick per annum, which will be increased as occasioned by the demand.

Stock

The average stock on hand at our factory is more than 2,000,000 brick, giving a large assortment for immediate shipment.

Illustrations of Stock Designs

Much delay is saved by use of stock design of moulded brick. In the two following pages are shown designs that we recommend as being most satisfactory in manufacturing results. We try to keep a stock of these on hand, in standard colors. These designs are chosen to reduce manufacturing difficulties and delays to a minimum; to enable composite mouldings to be made up; and to enable prompt filling of orders.

Send for plates and actual paper reproduction depicting decorative possibilities of enameled brick.

Details Required for Special Arch Brickwork

When ordering special arches, please consult the accompanying cuts and give all necessary information as to details. Furnish details as far as possible in advance of the time the arches will be required. We should be allowed from 4 to 6 weeks' time to make up arch brick to conform with detail. We keep no arches in stock.

We can not always guarantee uniformity of shade in arches as in regular deliveries of first quality plain stock brick, therefore strongly recommend the use of stock specials for lintels of doors and windows. (See study of window opening on second page following.)

Colors—In Bright Enameled or Dull Porcelain Finish

In addition to our regular white and standard colors, such as our sage green, red brown, black, etc., we have made a specialty of mottles in the following colors:

Gray, brown, black, mixed gray and black, which give an excellent appearance for both interior and exterior work, having a finish more on the type of marble than enameled brick.

If you have in mind, at any time, a particular color, shade or finish of enameled brick for interior or exterior purposes, advise us of your ideas and requirements and we will be pleased to submit samples.

Uniformity of Shade of Our Product

We guarantee uniformity of shade in all first quality deliveries to the limit of practicability. Colors and effects giving most uniform results are, in order of uniformity, white, mottled gray, mottled brown, mottled black, sage green and red brown. Other colors follow in irregular positions.

We will try on orders of moderate size, or on larger orders if ample time be given, to match in shade the moulded and stretcher stock, but can not always guarantee to uniformly shade shipments of specials, particularly on rush shipments.

Cleaning

Enameled brick are best cleaned with some alkaline solution, such as caustic soda or sodium carbonate. This cleans the enamel and does not affect the cement or lime mortar.

Acids

Sulphuric, nitric, or hydrochloric acids, even in concentrated form, will not affect our glazes; but if used as a wash, even when diluted, they will attack the cement or lime mortar.

The only commercial acids which will attack and destroy our enamel are hydrofluoric and hydrofluorsilicic.

Special Features and Advantages

Architectural Beauty—Our large assortment of speckled brick and solid colors, outside of the well-known plain white, make a strong appeal to the aesthetic sense, offering unlimited architectural possibilities.

Sanitation—Having an absolute impervious surface, our enameled and matt glaze brick are the essence of sanitation.

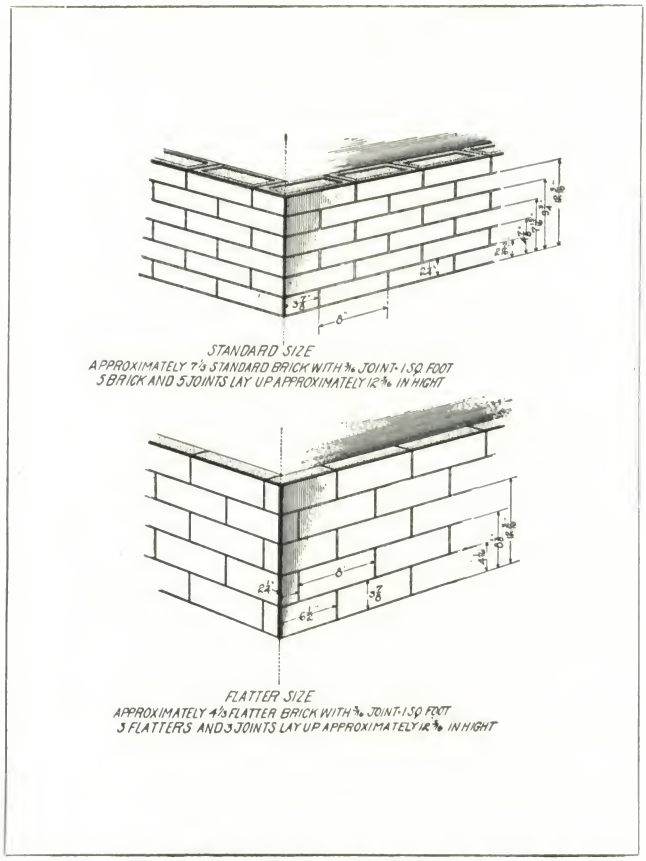
Economy—The first cost of enameled brick is the last as they can never become dislodged from vibration or settling of the building. Enameled brick can be bonded in and used as a part of the bearing walls, cheapening the cost of construction considerably by eliminating 4 in. of common brick or back-up tile.

Light Reflection Power—The light reflection power of our white enameled and white matt glaze brick is 78% as against 44% for ordinary face brick.

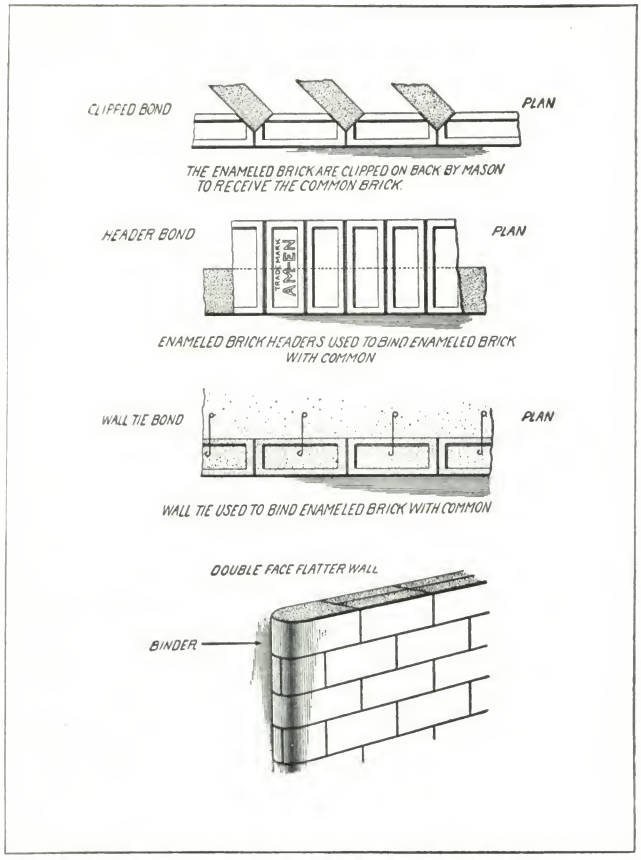
Service

We carry a large stock at all times, including, of course, innumerable specials as illustrated on the following pages. Our modern and advanced equipment places us in a position to turn out specials other than stock shapes within one week's time, whereas heretofore from four to six weeks were required.

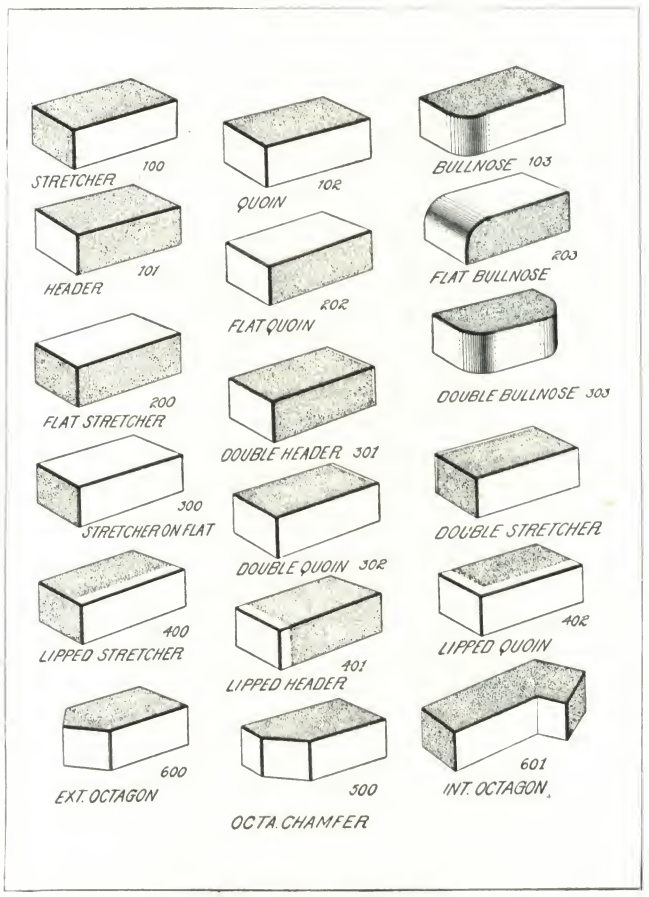
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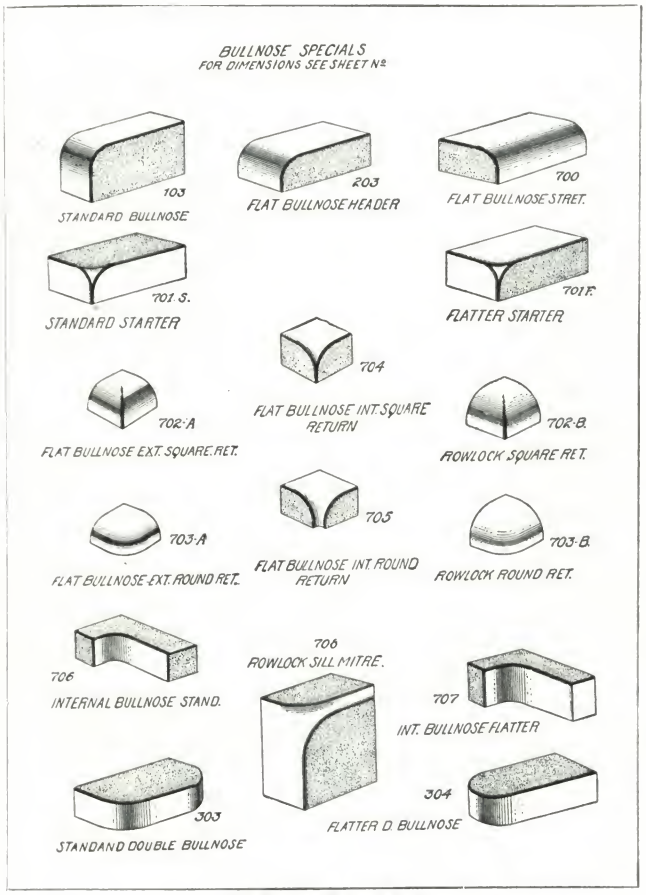
Comparison of Sizes Showing Number of Bricks Per Square Foot
All dimensions are approximate



System of Bonding or Tying Enameled Brick to Common Brick or Concrete Backing, Also Method of Bonding Flatter Brick for Partitions

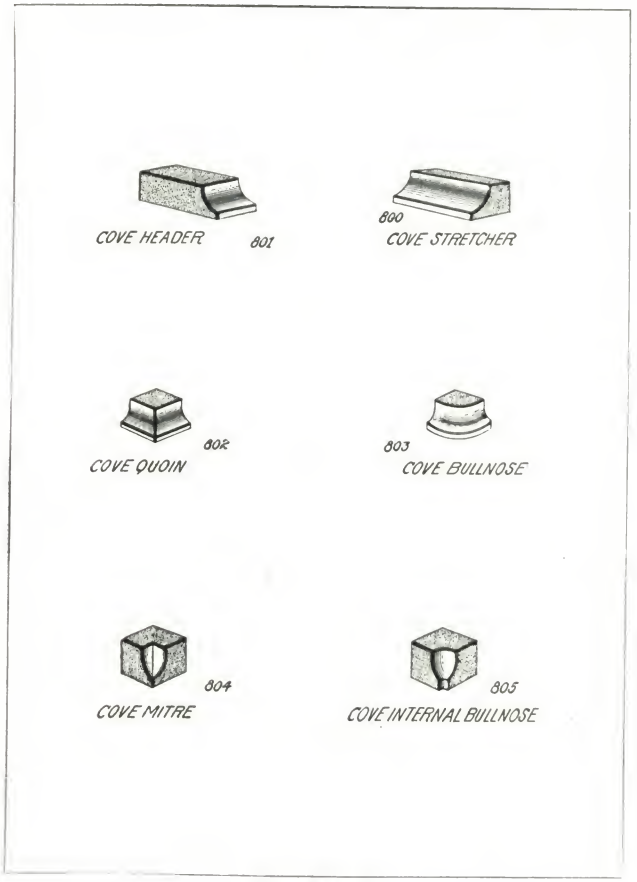


Illustrations of Types
For projection and dimensions see next page

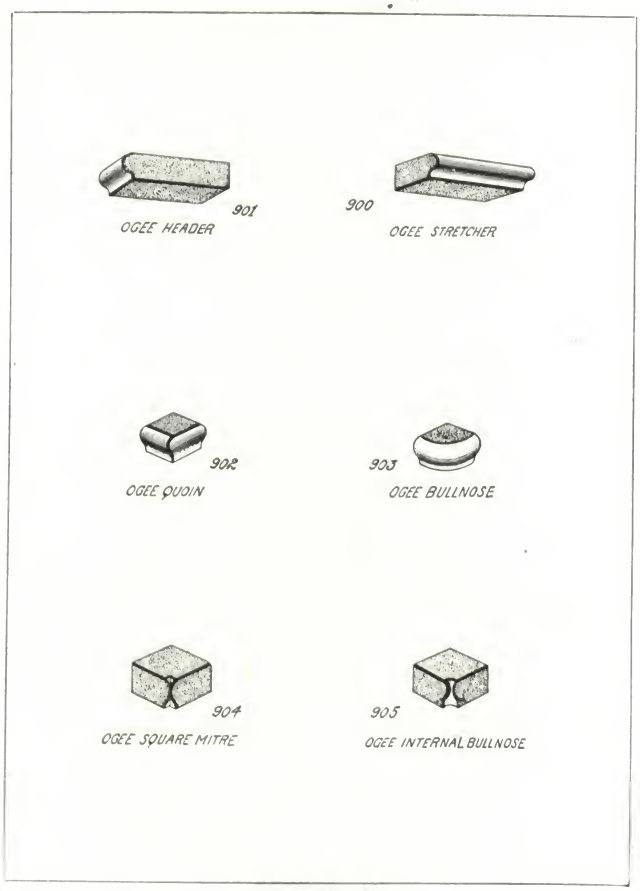


Bullnose Specials
For projection and dimensions see next page. All brick shown have 2-in. radius

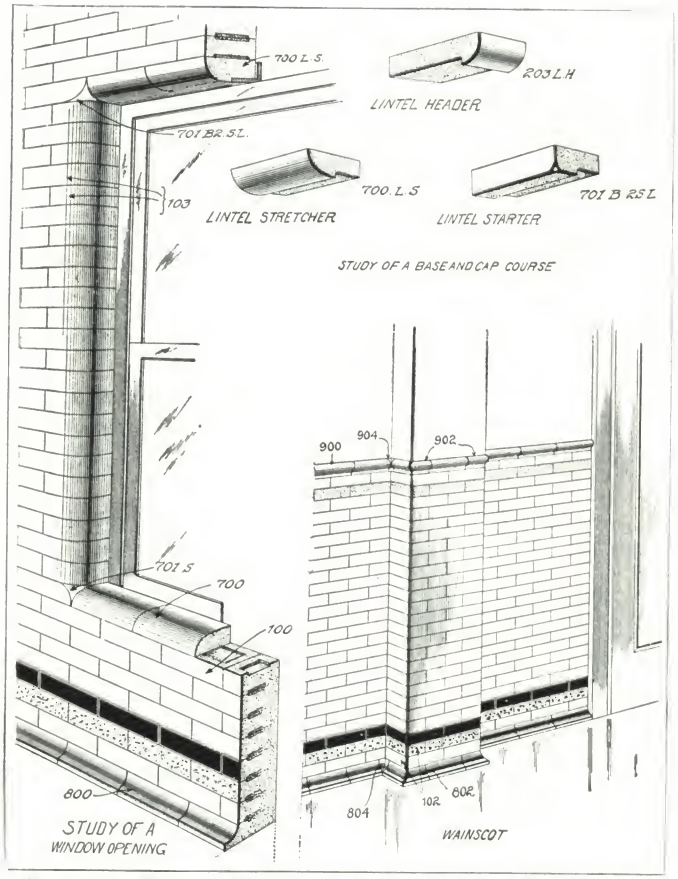
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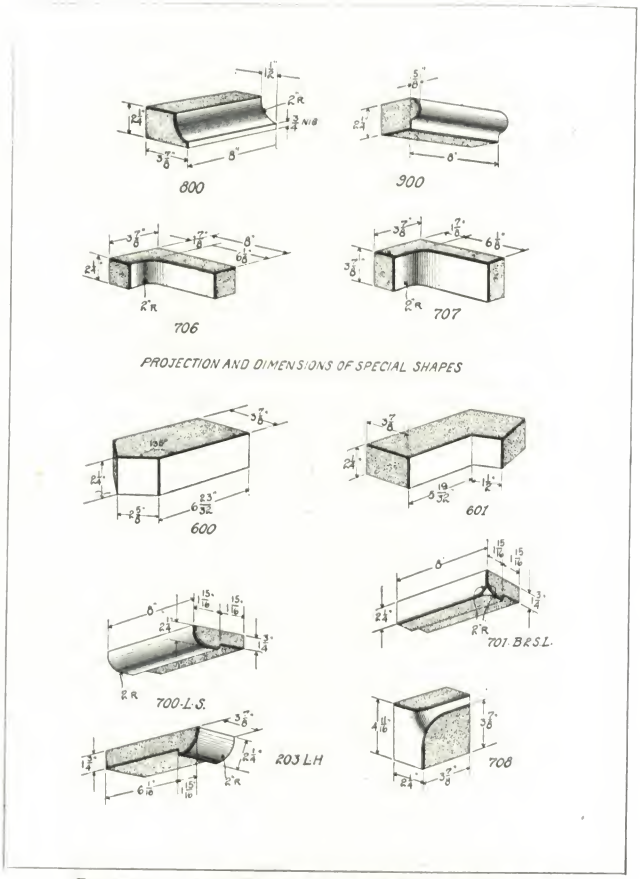
Cove Mould
For projection and dimensions see cut below



Ogee Mould
For projection and dimensions see cut below



Study of a Window Opening and of a Base and Cap Course
For projection and dimensions see next cut



Projection and Dimensions of Special Shapes

THE ATHENA BRICK CORPORATION

Manufacturers of Glazed Products

NELSONVILLE, OHIO

Sales Representatives in All Principal Cities of the United States and Canada

Glazed Products

ATHENA GLAZED BRICK. SALTILE.
SANITARY FLOOR BRICK. WAINSCOT BRICK.

General Properties of Glazed Materials

All shades of our standard products are burned at a high temperature; thoroughly vitrified and glazed; moistureproof and acidproof; will not craze, crack, or peel; will stand heavy crushing strain and always stay fresh and clean.

Athena Glazed Brick

Size—2¼x8x3⅞.

Description—Made of high grade fire clay burned in four different shades of gray (101), buff (103), orange (104), maroon (102), thoroughly vitrified and glazed on face and ends, rich in both color and glaze.

We carry in stock approximately 70 different kinds of shapes in the above mentioned shades, such as cove base and cap mould stretchers with internal and external returns; bullnoses, both internal and external, with sill and jamb mitres and returns, and many others.

Special shapes made on order requiring approximately three weeks to manufacture.

Uses—This product is used for facing both interior and exterior walls where a beautiful sanitary and permanent wall is desired.

Principal Places—Garages, office and factory buildings, prisons, power plants, acid vats, packing plants, subways, food product plants, laboratories, freight and passenger stations, schools, hospitals, gymnasiums, swimming pools.

Wainscot Brick

Size—8x4x1⅜.

Description—Made only in shades of gray (101) and buff (103), and a stock of bullnose suitable for exterior corners is the only shape carried in stock.

Uses—The smooth, glazed face makes this product especially desirable for the lining of packing plants, corridors, and any other place where sanitary conditions are required and has been used extensively for floors in packing houses and food product plants.

Only one side is glazed and either side may be used; the unglazed side being suitable for promenade decks and sunroom floors.

Sanitary Floor Brick

Size—8x3⅞x1⅜.

Description—Made in maroon shade (102).

Uses—The heavy glazed, rough texture surface makes this product ideal and it is used extensively for floors in packing plants, storage warehouses, foundries, and various other places where a good flooring is desired that will stand up under heavy trucking strain and at the same time afford sanitary conditions that are not obtainable through use of other floor brick or cement.

Only one side is glazed and by using the glazed surface you have a brick that is impervious, sanitary and easily cleaned, while the other side, which has a matt surface, is used for walks, porch floors, etc., and has a very beautiful appearance.



Saltile

Size—4¾x8x3⅞.

Description—We carry in stock such standard shapes as bullnose, cove base stretchers and returns, cap mould stretchers and returns, and sill and jamb mitres, in Gracasts, Bufcasts and in straight shades of gray (101), buff (103), orange (104), maroon (102).

Uses—This product is suitable for use in any of the places that salt glazed brick can be used, and is cheaper in price and lighter in weight. However, due to the larger size of the unit, a wall as beautiful as standard brick cannot be produced, as it is practically impossible to lay them as accurately as the smaller unit.

Samples, Prices, etc.

Samples, prices, and cuts of the various shapes carried in stock will be furnished upon request either direct from our plant or by our nearest sales representative.

ESTABLISHED 1885

THE BELDEN BRICK CO.

Manufacturers of "Belden Brick"

GENERAL OFFICES
CANTON, OHIO

NEW YORK OFFICE: 15 East 26th Street

DETROIT OFFICE: 2212 Book Tower

FACTORIES
CANTON, SOMERSET, UHRICHSVILLE and PORT WASHINGTON, OHIO

DISTRIBUTORS IN ALL PRINCIPAL CITIES

Product

"Belden Brick," registered U. S. Patent Office, are manufactured in five modern factories by an organization which has been successfully established for 45 years. "Belden Brick" are made of the finest shales and plastic fire clays in this section of the country, which is recognized as having the purest clays to be found.



To prevent substitution with consequent disappointment all "Belden Brick" are branded

We own shale and clay reserves sufficient to insure the production of 90,000,000 "Belden Brick" per year for more than 100 years to come.

Service

Having served the architect and builder with "Belden Brick" since 1885, we know the importance of service. We never take an order for delivery sooner than we can fulfil it or for something we are not sure we can make. You can feel sure when you place an order for "Belden Brick" that your requirements are going to be taken care of. Thirty million is a normal stock of "Belden Brick" for us to carry.

When you want samples, a panel, or a representative, please write or wire; we will take care of you very promptly.

Color

Most face brick are satisfactory structurally; the thing, however, that is of deep concern is color and texture.

Because "Belden Brick" are made in five modern factories out of the finest of shales and plastic fire clays we are able to make them in all colors from black to white and to blend these colors to procure the most charming combinations of shades. Since all colors are first drawn and piled separately, it is a simple matter to mingle them according to the requirements of the architect.

Black, all shades of chocolate and brown, buff and orange and pink, gray, gray speckled, buff speckled, reds, blues, greens, red hearts. Here is color rampant or subdued, to interpret your desires completely.

Texture

All material filling an important decorative function must rely on texture as well as color. "Belden Brick," therefore, are made with the same care and thought regarding texture as color. The variety is almost without limit, a texture to fit any design or type of building: smooth, sand finish, sand finish clinker, vertical scored, vertical matt (end cut), matt, all the standard textures, plus "Bel-Tex" and "Span-Tex," two beautiful and original textures developed by ourselves and given the mark of approval by the architects.

Size

The changes that have taken place in the size and style of buildings of recent years call for a variety of sizes in face brick—there is no reason why the unit used in the very large building should be the same size as the one used in the residence. We have successfully manufactured sizes up to 5x12-in. face. On account of the design of the machinery used in manufacturing it is very difficult to work in units longer than 12 in. When you have any problems to work out, our representatives will welcome the opportunity to consult with you.

Special Shapes and Arches

We carry in stock 45° octagons and 2-in. bullnose and are prepared to make promptly all shapes and arches. It is necessary that full size details be supplied.

Floor Brick

What is more beautiful for the den, the porch, the drive, the pergola than a rugged, deep red floor brick? We manufacture these with base course and special shapes for step risers and tread. They are also used largely for store rooms, restaurants, dairies, packing plants and other places where a highly acid resisting product is necessary.

Literature

If you do not already have our catalogue showing color plates, illustrations of a few of the fine buildings in which "Belden Brick" have been used, treatise on efflorescence and wet walls, etc., please ask for it.

Continued on next page



"BELDEN BRICK" Number 6 Blend



"BELDEN BRICK" Number 130 Blend

Continued on next page



"BELDEN BRICK" Shades 70 to 79 F Medium Range



"BELDEN BRICK" Foliage Blend

FISKE & COMPANY, INC.

Manufacturers of Face Brick—Sole Manufacturers of "Tapestry" Brick

18 Newbury Street, BOSTON, MASS.

BRANCH OFFICE: 17 West 46th Street, NEW YORK, N. Y.

Products

FACE BRICK: FISKE MILTON REDS, DARLINGTON GRAYS, "TAPESTRY," "TAPESTRY" ANTIQUES, "WALDORF GRAYS," "CALEDONIAN," GENUINE HARVARD WATER-STRUCK BRICK and other high grade Face Brick.

Also Fire Brick and Brick Specialties.

Trade Names and Patents

"Tapestry" Reg. U. S. Pat. Off.
"Fiske" Reg. U. S. Pat. Off.
"Caledonian" Reg. U. S. Pat. Off.
"Waldorf Grays" Pat. and Reg. App. for.

To protect our customers against substitution of inferior products, these trade-marks are branded on our bricks.

"Waldorf Grays"

A new Fiske brick which in the opinion of architects is the first real match for limestone. Developed especially for the new Waldorf-Astoria. Available in oversize as well as standard sizes, smooth or stone finish.

"Darlington Gray"

A beautiful smooth surfaced brick, gray with large or small manganese specks as desired. Furnished in uniform shades of clear gray (tunnel kiln). Fiske "Darlington Grays" with the distinctive gray background they offer are increasingly popular.

Fiske B. F. 5

This is another tunnel-kiln brick furnished in a clear shade of a delicate cream buff.

Fiske B. F. 43

The same brick as the B. F. 5 with a slight color range towards the clear gray.

"Fiske" Brick

A face brick with smooth face in grays and buffs, or end-cut rough texture in full range of colors and clear reds.

"Caledonian" Brick

A horizontal rough texture side-cut face brick burned to either clear colors or a range of shades.

"Tapestry"

This brick is too well known to the architectural profession to require detailed description. Its rough texture, end-cut face and flashed shades have become so popular that in many instances the name "Tapestry" has been applied to all brick approaching this description. Architects know that there is only one "Tapestry" Brick—that to get "Tapestry" Brick color effects "Tapestry" Brick must be used.



"Tapestry" Brick

To protect both the architect who is building for distinction and the owner who takes pride in having the best, we mark each brick with the name "Tapestry."

"Tapestry" Antiques

A variation of Fiske "Tapestry" Brick. These are, as the name implies, irregular bricks that might have come from an old English wall. Their shape and extra-flashed colors make "Tapestry" Antiques ideal for certain work.

Fiske Brick Colors

Fiske colors cannot be copied.

Individual deposits of raw material, expert, specialized firing, painstaking selection for shade and range make possible brick that no one else can duplicate. By the same token your order with Fiske can *always* be duplicated. An example of this is shown in an addition to the Union Trust Company Building, Providence, R. I., where the architect, George Frederick Hall, last year matched the Fiske Brick he used when he built the original structure 21 years before.



Waldorf-Astoria Hotel, New York
SCHULTZE & WEAVER, Architects
Fiske "Waldorf Grays" were developed especially for this famous hostelry

Pastel Shades

FISKE & COMPANY, INC., has pioneered so many new developments in brickwork that architects will not be surprised to learn Fiske Brick are now available in a wide range of new solid colors. The turquoise blues, coral pinks, greens, blacks and other soft pastel shades of these brick make possible many new and interesting effects. The colors are not glazed inasmuch as they are obtained by the treatment of the clay itself, the same clay so well-known in other Fiske Brick. Architects interested in colored brickwork should investigate this newest addition to the Fiske line.

Fiske Service (Since 1864)

Fiske service starts with the order and follows through till the final brick is laid. With large plants and unequalled facilities for filling every order on schedule FISKE & COMPANY, INC., offers the architect a welcome relief from delivery worries. You can count on Fiske Brick being on the job when, as and how you want them.



View of a Fiske Tunnel Kiln

THE FINZER BROS. CLAY CO.

Manufacturers of Finzer Face Brick for Interior and Exterior Use

SUGARCREEK, OHIO
(THE CLAY CITY)

Products

Forestblend Face Brick, a peculiarly distinctive, highlighted texture in a full range of colors.

Finzer Face Brick, a complete line in many widely varied colors including smooth face, wire cut matt, sand finish and salt glaze.

Plant Location and Shipping Facilities

All three Finzer plants are located on the line of the Wheeling and Lake Erie Railroad with direct connections to New York Central, Erie, Pennsylvania, Baltimore and Ohio and Nickel Plate Railroads.

Special Advantages

Forestblend and Finzer Face Brick are manufactured in three modern plants located at Sugarcreek, Ohio. The clay and shale deposits are universally acknowledged for their purity and beauty. Being one of the few plants equipped to mix fire clay and shale we are enabled to produce colors and shades not possible in many other plants. All brick are carefully graded for color and perfection. Any desired ranges and combinations may be shipped without extra charge.

Textures

Forestblend and Finzer Face Brick are offered in smooth, Forestblend (rough matt), wire cut matt, sand finish and salt glaze.

Forestblends

The registered name Forestblend applies to a peculiar highlighted texture (rough matt in classification) obtained by patented machines. Available in a variety of colors unequalled in any other range. The chart indicates the width of range.

CHART OF FORESTBLENDS

Colors	No.
Manganese gray, uniform shade	400
Manganese gray, slight range	405
Warm gray, wide range flecked with ironspots including toasted faces	455-F
Golden buffs, uniform shade	480
Golden buff, wide range	486
Light red tangerine	455-E
Dark red tangerine	455-B
Reds, light	420
Reds, medium	440
Reds, dark	445 & 450
Reds, wide range	460
Browns and blues	455-A
Dark greens and russets	455-C
Dark greens, russet, purple and red polychromes	455-CX
Orange, light	491
Orange, dark	492
Orange and green polychrome	493
Light green and russets	494

All Forestblends are rough matt texture.
Note: Any of the above colors can be blended together in any proportions the architect desires, thus affording a splendid opportunity of designing blends for any particular work. Flowing colors are readily worked out with the above shades.

Finzer Buffs and Grays

Especially interesting ranges in buffs, ivories, ironspots in uniform or mingled grays. The buffs range from light straw through golden to chocolate brown while the gray range though more limited includes shades from light pearl to battleship.

CHART OF FINZER BUFFS AND GRAYS

Color	No.	Texture	Shade
Clear buffs	320	Smooth	Uniform
Clear buffs, one header slightly flashed	330	Smooth	Uniform
Courts slight range light gray, fine speck	60	Smooth	Uniform
Light gray, fine speck	65	Smooth	Range
Light gray, medium speck	70	Smooth	Uniform
Light gray, large speck, small percentage flashed ends	70A	Smooth	Range
Light gray, large speck	75	Smooth	Uniform
Medium dark, small speck	80	Smooth	Uniform
Medium dark, small speck	81	Smooth	Uniform
Dark gray, small speck	82	Smooth	Uniform
Dark gray, small speck	83	Smooth	Uniform
Dark gray, small speck	84	Smooth	Range
Golden buff	380	Smooth	Uniform
Golden buff	381	Smooth	Range
Brown, flashed, flecked with ironspots	385	Smooth	Range
Dark brown, flashed	387	Smooth	Range
Buff hearts	392	Smooth	Range
Green and orange polychrome	393	Smooth	Range
Green and brown range	394	Smooth	Range
Clear buff	220	Vertical score	Uniform
Clear buff, one header slightly flashed	230	Vertical score	Uniform
Golden buff	280	Vertical score	Uniform
Golden buff, one header slightly flashed	281	Vertical score	Range
A range of Salt Glaze finish in shades from Light Buff to Orange	....	.....	.....

Finzer Reds

A complete line in reds from light cherry to deep maroon in matt, smooth, wire cut and vertical score texture.

CHART OF FINZER REDS

Color	No.	Texture	Shade
Light red	20	Smooth	Uniform
Medium red	40	Smooth	Uniform
Dark red, one header flashed	45	Smooth	Uniform
Dark red range	50	Smooth	Uniform
Full range colonial	600	Wire cut	.....

Capacity and Stocks

Yearly capacity 67 million brick. Stocks on hand average 10 to 12 million in 133 colors, shades and textures. Prompt shipments of any amount available on short notice.

Samples

Samples of the textures and colors of Forestblend Face Brick will be sent free of charge upon request.

Specifications

To insure the use of Finzer Bros. Brick, insert the word "Finzer" or "Forestblend" at any place where face brick is called for in the specifications.

The Brick of True Distinction

A new architectural folder containing reproductions of 20 shades and ranges in full natural color together with faithful details of texture, ranges and full information regarding the lines. Copies sent promptly on request.

Continued on next page

A FEW FINZER AND FORESTBLEND SHADES AND RANGES

Shown here are but a few of the Finzer and Forestblend shades and ranges. The variety of colors offered, however, is so wide that the number of range combinations is almost limitless affording the architect suitable colors and variations for any structure.



FINZER SHADE 380

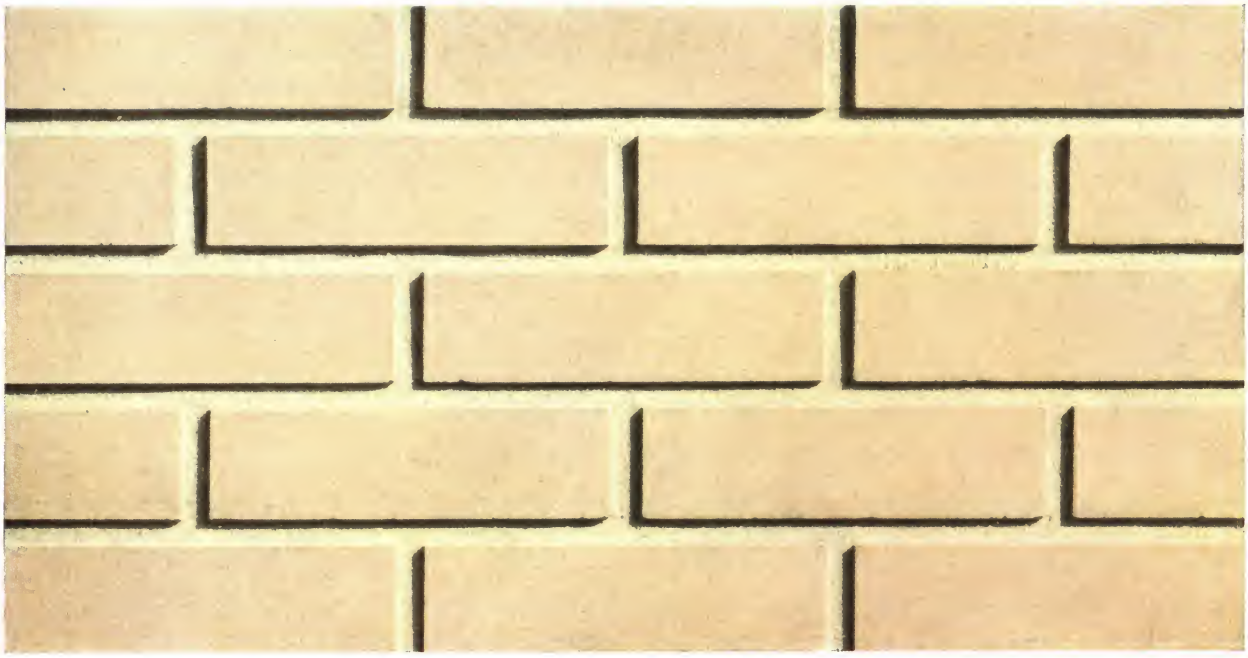
A uniform shade of golden buff in smooth face. A slight range is possible by the addition of lighter or darker brick in the proportions desired. In specifying the range, the shade No. 381 is used. This shade has been very popular where a warmer tone than ivory was desired.



FINZER SHADE 75.

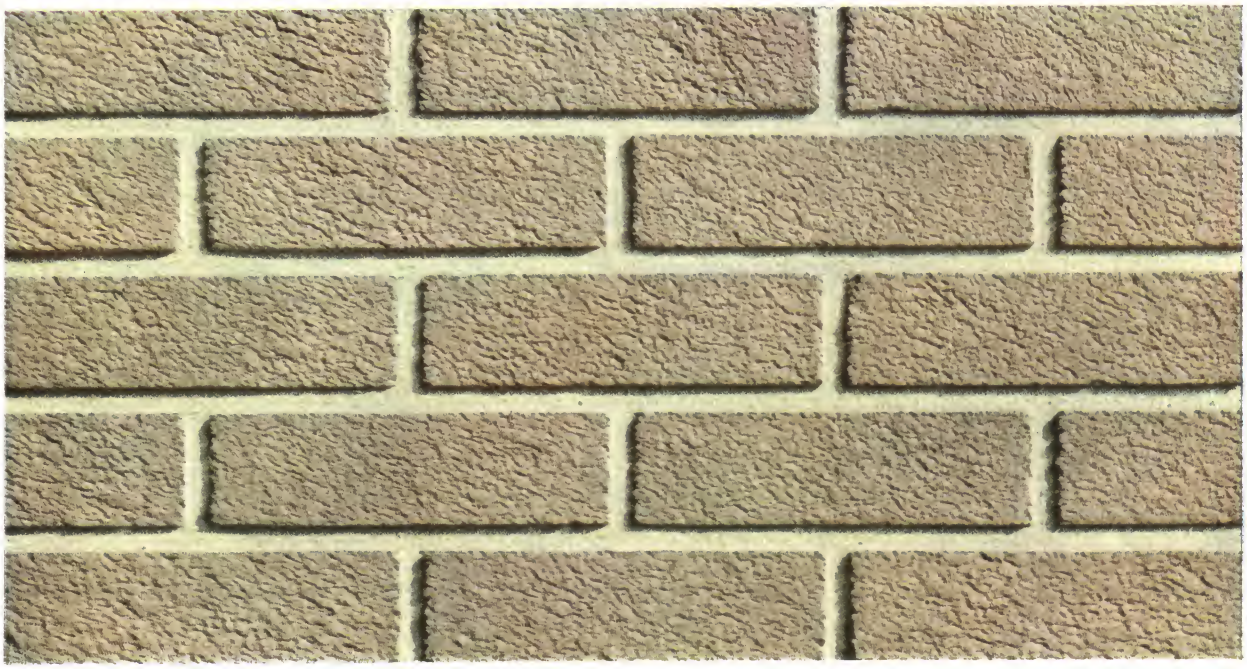
Uniform shade of manganese smooth faced showing a fine sprinkling of ironspots. Shades of lighter or darker grays in uniform or varied ranges are available. The size of the specks is variable if desired. This shade affords a splendid match for stone.

Continued on next page



FINZER SHADE 330

A uniform shade of ivory in smooth face. This shade is also furnished in courts. It shows by test 85% light reflections with a water absorption of approximately 5% in accordance with Ohio State University experimental tests. Specified by architects largely for commercial buildings and large structures.



FORESTBLEND SHADE 400

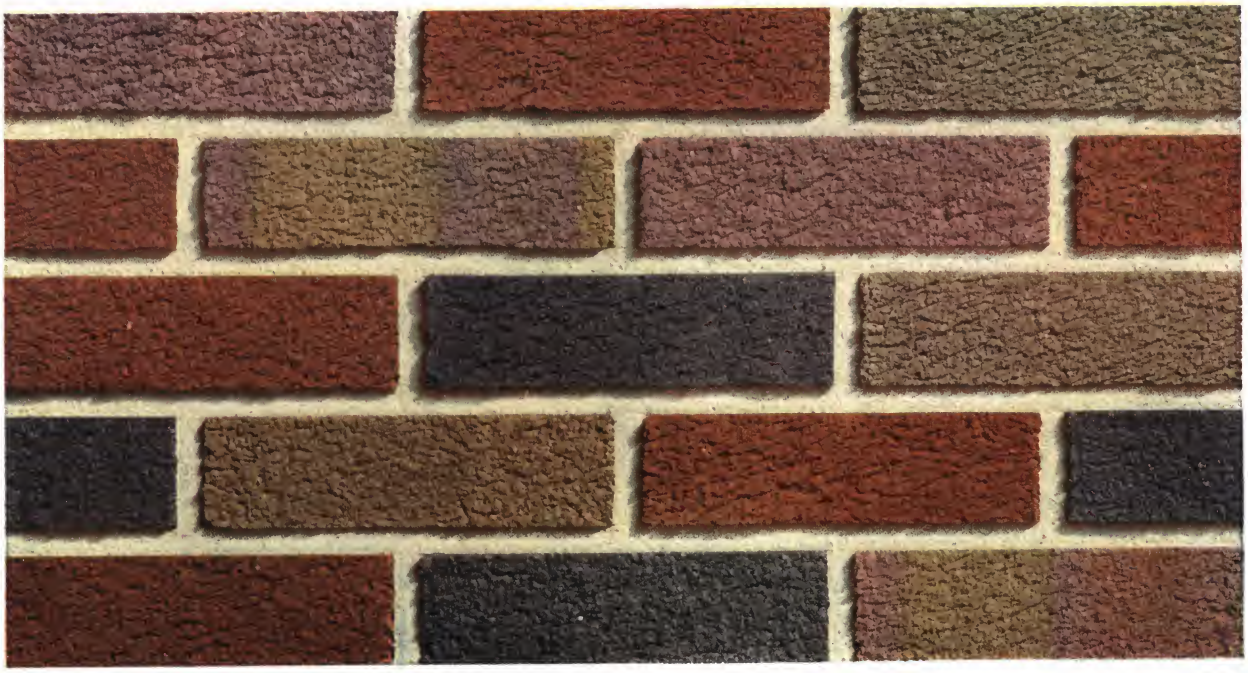
Consists of manganese grays, rough matt texture, in uniform shade. If a varied range is desired it can be readily accomplished by the addition of lighter or darker grays. Shade 400 is particularly adaptable to church, library and theological work.

Continued on next page



FORESTBLEND RANGE 500

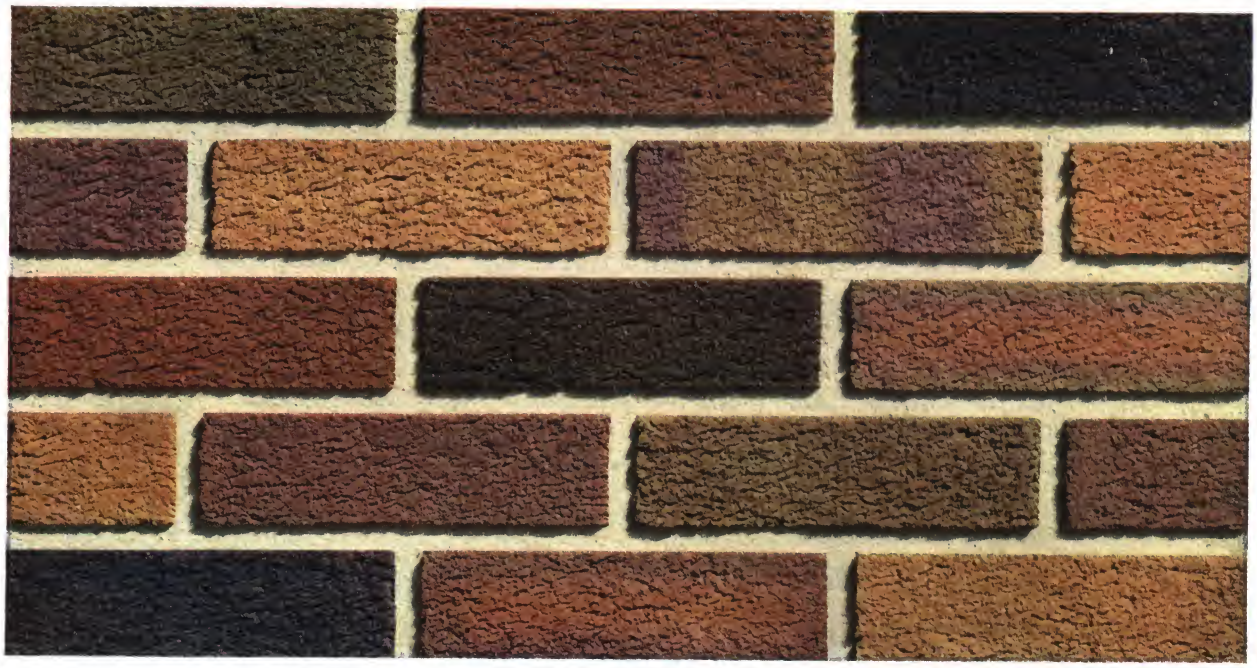
A buff range in Forestblend texture including browns, greens, buffs and orange polychromes. A number of variations are optional by changing the color proportions. A brick well adapted to general use in apartment, school and residence construction.



FORESTBLEND RANGE AC AND 445

Includes blues, browns, reds, greens and polychromes. It differs from the Forestblend Full Range in the absence of tangerines and the addition of a greater proportion of blues and greens. This tends to create a darker tone. This range has proven very popular for all types of structures.

Continued on next page



FORESTBLEND SHADE 455 FULL RANGE

A blending of reds, browns, blues, tangerines, greens and polychromes representing the shades and tints of the autumn forest. Unlimited changes in blending are possible by varying the proportions of the several colors at no additional cost. This range has proven very popular in residence and school work.



FINZER RANGE 385

A smooth faced range of a general tan tone including browns, grays, olives and a proportion of fire flashed brick tending toward polychrome. This range shows a slight sprinkling of ironspots. A unique feature of this brick is its adaptability to either outside or interior work.

IN BUSINESS SINCE 1892

GLEN-GERY SHALE BRICK COMPANY

"One Hundred to One Million Quick"

PHILADELPHIA, PA. READING, PA. HARRISBURG, PA.

FOUR FACTORIES
CAPACITY 100,000,000 ANNUALLY

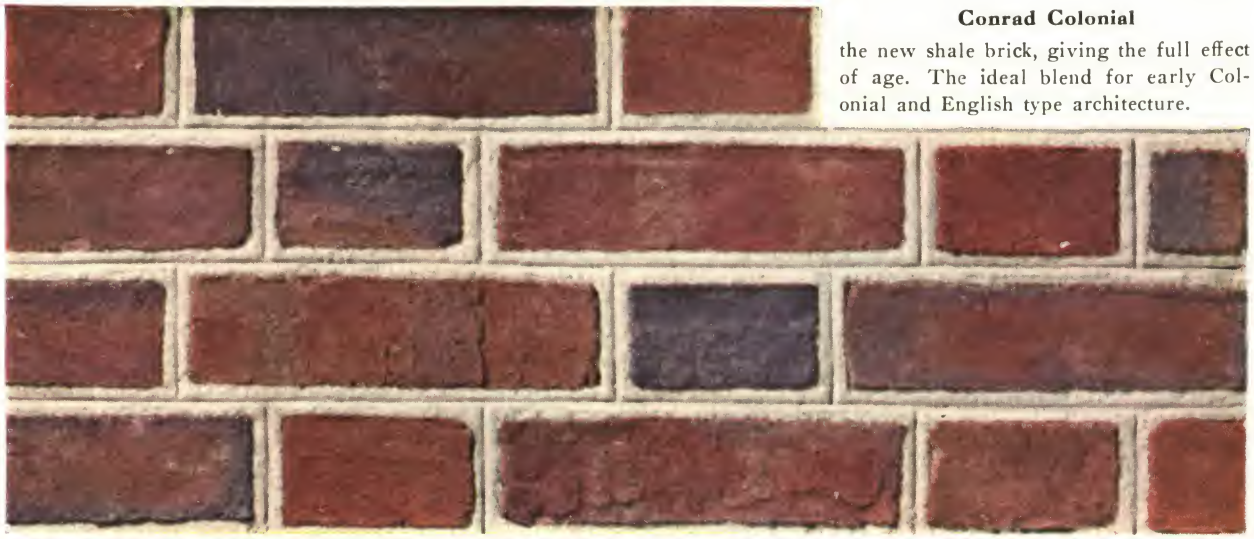
The five famous, colorful blends of Glen-Gery Brick shown on this and the next page have won wide acclaim from architects and contractors far and near. Their distinctive beauty has drawn requests for their specification, and they have been used even in territories quite distant from our factories. Their exceptional quality has made distance of no consequence to the architect who had the greatest interest of his clients at stake.

These blends are combinations of the various colors, carefully calculated to give the effects shown on these panels. Each blend as you will notice has a definite personality of its own, and fills very definite needs. Collectively they give the architect a range of color and finishes much like the artist's palette gives him.

Some of these blends are available in as many as four definite surface textures, including the evenly grained Ruff Tex, illustrated in the Redwood Blend, the beautiful Rolbak finish, illustrated by the Granada Blend, the even texture of Smooth Finish, and even aged Sand Finish Colonial. All colors are burned in at 2000° F., to assure absolute color permanency.

Write for our color portfolio, describing and illustrating in greater detail these five famous Glen-Gery Blends.

If you are interested in factory construction, write for our latest booklet, "The Factory Beautiful." We have served such large industrial companies as Bethlehem Steel Company, Vacuum Oil Company, General Chemical Company, John Roebling and Sons Company and Atlantic Refining Company, furnishing acid-resisting Glen-Gery Blends. At all times we are prepared to ship "One Hundred to One Million Quick."

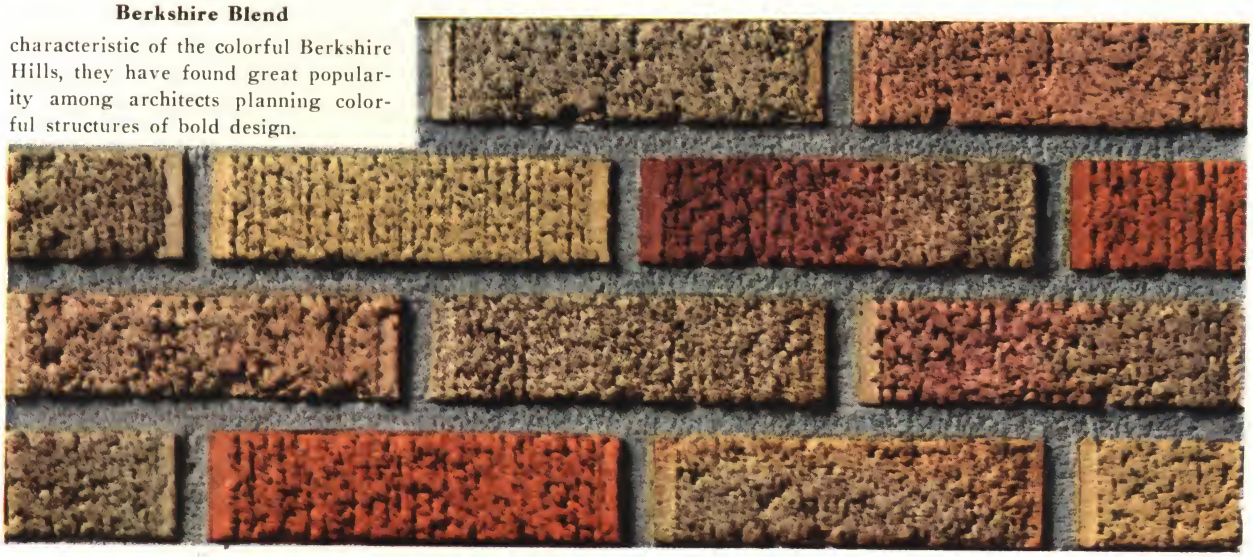


Conrad Colonial

the new shale brick, giving the full effect of age. The ideal blend for early Colonial and English type architecture.

Berkshire Blend

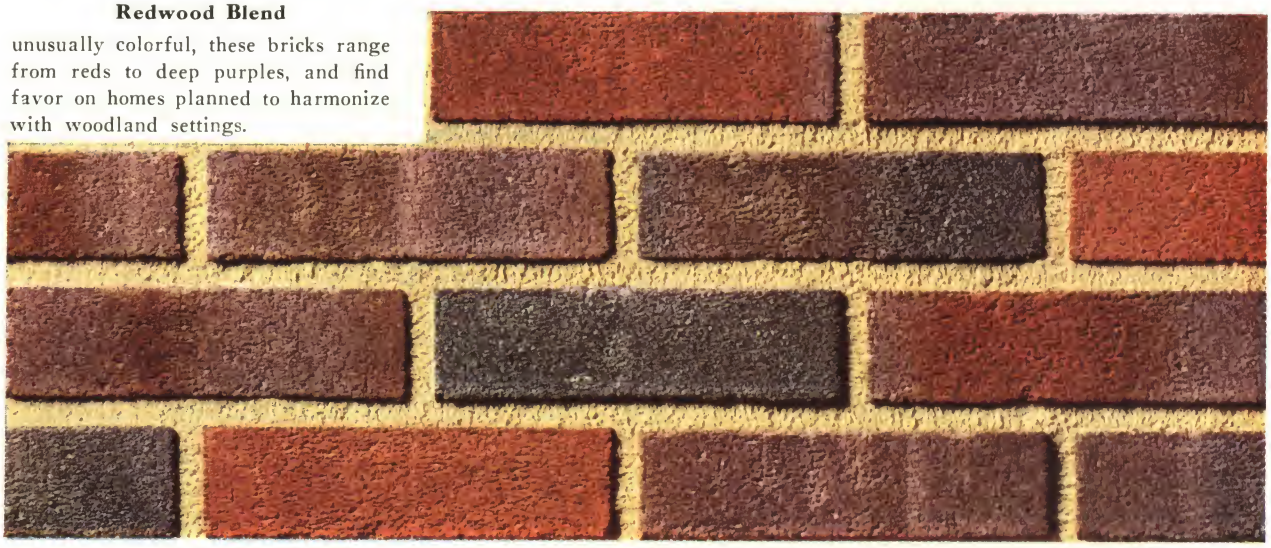
characteristic of the colorful Berkshire Hills, they have found great popularity among architects planning colorful structures of bold design.



Continued on next page

Redwood Blend

unusually colorful, these bricks range from reds to deep purples, and find favor on homes planned to harmonize with woodland settings.





Granada Blend

a blend of brilliant colors, designed to enhance the appearance of buildings of the Spanish type.

Royston Reds

the distinctive shade of red shale brick which has found favor in buildings of formal architecture.



ESTABLISHED 1893

HANLEY COMPANY

Tunnel Kiln Face Brick

BRADFORD, PA.

NEW YORK OFFICE: 565 Fifth Avenue

BOSTON OFFICE: 260 Tremont Street

PLANTS: BRADFORD, PA., SUMMERVILLE, PA.

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

All shades and textures of FACE BRICK in red, gray, brown, golden, tangerine, mottled gray, white and glaze in any color combination desired; COURT BRICK in pure white, glazed and buff; IMPORTED FACE BRICK; HANLEY WHITE GLAZED BRICK and ENAMELED BRICK.

For our pages on Floor Tile, Roofing Tile, Promenade Tile, Packing House Floor Brick and Acidproof Brick, refer to Manufacturers' Index.



TRADE-MARK

Hanley Face Brick—Available in All Colors and Finishes

"Bradford Reds"—(a) Even shades in deep cherry red to a light red.

(b) Rich range of colors including greens, browns, tans, blues and reds. Also "Russets," a new blend containing ⅔ browns, tans. reddish tans and ⅓ red and black.

Hanley Buffs, Grays, Whites, Browns, Goldens and Glazed Brick—(a) Even shades in buff, gray, white, cream, brown, tangerine and golden.

(b) Blends of practically any percentage of these colors which are desired to fit the architect's scheme for color, available in wirecut or dry press.

Made in what is believed to be the largest and most modern tunnel kiln face brick plant in the world, these brick approach perfection in face brick.

Due to the unique process which was initiated in a practical way by the HANLEY COMPANY in 1921, and refined in 1925, brick are no longer burned in the beehive type of kiln with its large amount of manual handling and its resultant poor mechanical quality and heavy breakage.

Imported Face Brick

These handmade face bricks have been used by the most prominent residential architects in the country and if used properly give a beautiful effect. They combine the antique features of a handmade brick with the soft gentle blending hues found only in European clays of yellow, orange, tan and red, in any color proportion desired.

Glazed and Enameled Products

The usage of glazed brick in all colors is growing in usage on buildings of all size.

Office Buildings

Office buildings of the best class in New York, N. Y., now are being built largely of white glazed brick in order to insure a bright clean appearance permanently.

Glazed brick in a vast assortment of colors are being used for trim and decoration, such as spandrels and piers and band courses.

Graduated color schemes and fine shadings, possible only with glazed brick, are all being resorted to in order to make commercial buildings more attractive and washable.

Light Reflection

It has been established in tests run by lighting manufacturers, that a white glazed product, used on the exterior of a building, increases the light at street levels as much as 200%, compared with light conditions when darker, soilable materials are used. This factor has aided greatly in giving daylight to lower floors of buildings in congested sections.

Remodeling with Glazed Brick

Many old dark red brick store fronts can be brightened up like new by simply veneering with glazed brick.

Cost of glazed brick is approximately ⅓ more than face brick and ½ the cost of stone laid in the wall.

Territory Served

Due to the distinctiveness of Hanley Products they are shipped over a wide territory; such products as Hanley Promenade Tile, Glazed Brick, Gray Face Brick and Bradford Reds being sold regularly in 32 States east of the Rockies.

Continued on next page



PURE WHITE GLAZE



MOTTLED TAN GLAZE. Available in either a light or dark tan.



PURE WHITE GLAZE WITH BLACK SPECK. Available in any size speck desired.



AZURE BLUE GLAZE

OLD VIRGINIA BRICK COMPANY

Makers of Real Old Virginy Mould-made Face Brick

KILNS AT
SALEM, VA.

Products

(1) CAVALIERS:

A mould-made age-toned face brick in standard size.

(2) JEFFERSONS:

Made of the same material and in the same mould-made way as the Cavaliers, differing only in being half inch higher.

This is the same size brick used by Jefferson for Monticello. The headers have a squarish look, making the stretchers look shorter.

The laid up result is a wall giving less mortar joints, and an appearance of decided sturdiness.

Five thousand bricks lay up the same as six thousand of standard size.

(3) F. F. VEES:

A standard size, glorified, so-called clinker brick.

Has the characteristic bulges, crazes and seams of clinkers, but a wider variety of surfaces and range of colors.

They are not accidents or dump pile discards, but a regular product—one that, by its very nature, can be turned out in only limited quantities, requiring ordering well in advance of needs.

Facts in General

The outstanding feature of both the Cavaliers and the Jeffersons is the age-old effect they give, both as to color and texture. This is caused by the following four things:

(1) The character of the basic material mined directly from the Blue Ridge Mountains.

(2) The special sand employed in the moulds.

(3) The cherry wood hand-made moulds used.

(4) The three kinds of fuel used in the burning, combined with uniform control of temperatures.

The combination of these four produces a brick leaning towards the rich browns and reds. One having a wonderful gamut in soft time tonings. The mould-made way of shaping them gives just the right amount of natural off-shapeness and softening of edges.



Hand-made Cherry Mould in Which Old Virginia Brick Are Made

Brick Kit

Just so you can see in actuality how a wall of Cavaliers or Jeffersons looks, send for our Brick Kit.

It is a kit of quarter size, half dimension bricks, with compo board strips for the mortar. With them you can literally lay up a wall right on your desk or table and get actual effects. In requesting one of these complimentary Brick Kits, kindly state whether you want them in the Cavalier or Jefferson size miniatures.

Shipments

All OLD VIRGINIA BRICK COMPANY products are shipped directly from our own group of kilns at Salem, Virginia, which is about six miles from Roanoke.



Standard Header and Stretcher, the Proportionate Size Used for the Cavaliers



Jefferson Bricks Are Half an Inch Higher Than the Regular Standard Size



The Brick Kit Brings You Miniature Quarter Size Bricks So You Can See Just the Effects a Wall of Them Gives

HYDRAULIC-PRESS BRICK COMPANY

Manufacturers and Distributors of Hy-tex Brick

ST. LOUIS, MO.

BRANCH OFFICES, EXHIBIT ROOMS AND DISTRIBUTING CENTERS

BALTIMORE, MD., Munsey Building
CHICAGO, ILL., Builders' Building
DAVENPORT, IOWA, Putnam Building
DUBOIS, PA., Deposit National Bank Building
INDIANAPOLIS, IND., Board of Trade Building
KANSAS CITY, MO., Rialto Building
NEW YORK, N. Y., FREDENBURG & LOUNSBURY, Representatives, Architects Building, 101 Park Avenue
OMAHA, NEB., 41st and Lake Streets
PEORIA, ILL., Lehmann Building
PHILADELPHIA, PA., Otis Building
ROSEVILLE, OHIO
SOUTH PARK, OHIO
WASHINGTON, D. C., Colorado Building

AUTHORIZED DISTRIBUTORS IN PRINCIPAL CITIES

Hy-tex Brick

The Standard of Quality in Brick
TRADE-MARK

Products

The HY-TEX BRICK line embraces: Face Brick, Enamel Brick, Salt Glaze Brick, Equitable Brick, Paving Brick, Common Brick and Hollow Building Tile, Swimming Pools and Brick Mosaics.

Hy-tex Face Brick

The Hy-tex color range runs in face brick from the lightest colored creams, grays and buffs to the darkest reds and browns in smooth, semi-smooth and rough textures. It offers literally hundreds of various tones in the gray, buff and red basal colors.

No matter what your requirements, whether for exterior or interior use, you will find in the Hy-tex line just the brick you want.

Specialties

Hy-tex Enamel Brick—Hy-tex Enamel Brick are unexcelled in quality and durability by any similar brick of domestic or foreign manufacture.

Hy-tex Enamel Brick in the White and Ivory shades are absolutely opaque. Hy-tex Enamels will not craze, peel or discolor under the severest climatic tests, as proved by the experience of exacting architects in all parts of the country.

They are made in White, Ivory, Green, Brown, Blue, Jade, Black, Transparent Speckled Buff, Transparent Speckled Brown, and are used extensively for facing large office buildings, theaters, stores, etc., as well as for hospitals, corridors, schools, gymnasiums, laundries, restaurants, bake ovens, garages, engine rooms, outdoor and indoor swimming pools, etc.

Hy-tex Enamel Court Brick—In every way the same brick, as to make and durability, as Hy-tex Enamels, except that, in sorting for first quality, these have been set aside because of slight surface defects which are not noticeable in courts or areas. Unless closely examined, they make the same appearance as Hy-tex Enamels and render exactly the same service. They have been used in many large buildings with complete satisfaction.

Hy-tex Salt Glaze Brick—Hy-tex Salt Glaze Brick, ranging from light straw to golden brown, permit walls of light, medium, dark or mingled shades. Samples on request.

The salt glaze, which forms an integral part of these brick, will not scale or peel under the most severe conditions, and is proof against moisture, dust, smoke, stains, germs, and even acids. These are widely used as exterior brick in business, wholesale and industrial sections of cites, and for interiors where light reflection and bright, clean, sanitary surfaces are desired or necessary, as in corridors, stairways, vestibules, wainscots, light courts, gymnasiums, toilet rooms, engine rooms, food factories, garages, etc.

The cost of Hy-tex Salt Glaze Brick closely approximates that of plastered and painted common brick, while its maintenance cost is less.

Two new shades, Ivory and Green Salt Glaze, have been added; samples on request.

Hy-tex Equitables—Hy-tex Equitables have been used extensively for over fifteen years and the use of this brick in the Chrysler Building, New York, indicates our capacity to serve adequately the architects in all monumental work of this character.

The Hy-tex Equitables present a smooth, impervious surface and wash with the rain to their original clean appearance; and do not craze, scale or discolor under the severest climatic conditions. Suitable for both exterior and interior requirements.

Hy-tex Enamel Swimming Pools

Simplicity of design and strength of construction in the use of Hy-tex Enamels, with the addition of all details—such as scum gutter, life rail, mosaic distance markers and drains—make them a perfect installation. Write for booklet.

Facilities

For over half a century the HYDRAULIC-PRESS BRICK COMPANY have been building the reputation which Hy-tex products enjoy today. During that time the Hy-tex organization has grown from one to twenty-two plants, scattered through the eight great clay-producing states. Branch office and agency distribution insures prompt and efficient service in all parts of the country.

Literature

This Company has issued booklets on Hy-tex Brick, Salt Glaze Brick, Hy-tex Enamel Brick and Equitable Brick; Brick Scales and Tables, a ready and convenient method of determining the number of courses and joints in all brickwork; Color Cards, and other material. For any of the above, apply to nearest branch office.

Continued on next page



Color No. 100



Color No. 128

Hy-tex Equitable Brick









Light Golden, Green

Hy-tex Salt Glaze Brick

Ivory, Dark Golden











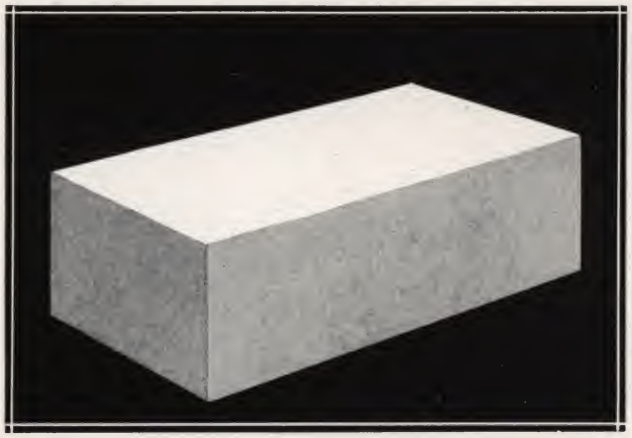


White, Brown, Black

Hy-tex Enamel Brick

Transparent Buff, Green, Blue

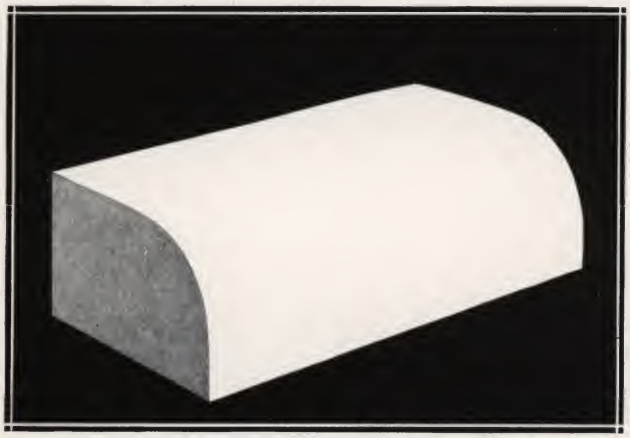
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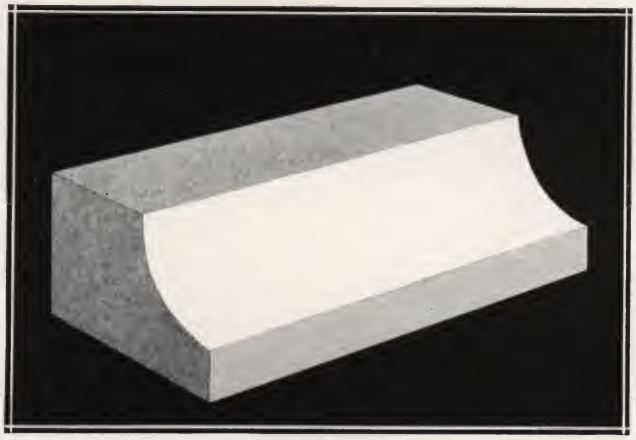
Flatter Stretcher



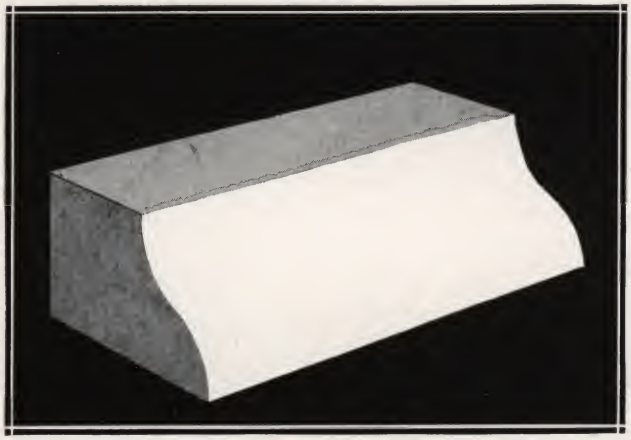
Bullnose External



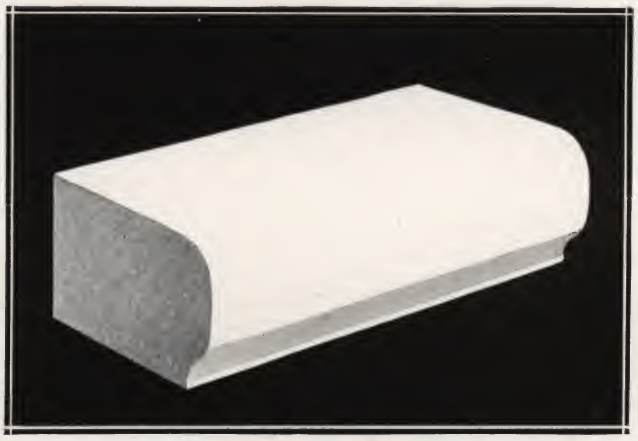
Bullnose Flat Stretcher



Cove Base Stretcher



Ogee Stretcher



Cap Mould Stretcher

Basic Shapes in Hy-tex Enamel Brick

The enameled surfaces and shapes shown here, together with the stretcher shown in the color group, form the seven basic shapes in Hy-tex Enamel Brick. The series is completed by furnishing for the plane surfaces the stretcher and flatter, the quoins, headers, and the over- and under-dipping of the abutting surfaces—either wholly or in part.

For the moulded shapes, in addition to this over- and under-dipping which may be necessary to cover conditions arising in use, there are provided the complementary brick essential to their general use. These are headers, internal and external angle brick, returns and stops.

For detailed information, showing the various brick and combinations thereof, refer to shape book issued by this Company.

LIGHTWEIGHT HAYDITE AGGREGATE FOR CONCRETE AND CONCRETE PRODUCTS

What Haydite Is

Haydite is an inert, uniformly graded product made by burning clay or shale, which, when mixed with the proper quantity of cement, produces strong, lightweight concrete.

Advantages of Haydite

Lightweight—Averaging 30% lighter than natural sand and gravel concrete. The reductions in dead loads in both reinforced concrete and structural steel frame buildings have effected substantial savings in many cases.

Strength — Approaches very closely the strength of natural sand and gravel concrete.

Fire Resistance—Haydite concrete proves to be unusually high in fire-resistant qualities.

Pure and Clean—Haydite is chemically pure and devoid of silt or other impurities.



Auditorium, Central Junior High School, Kansas City, Mo.
CHAS. A. SMITH, Architect
GEO. E. MCINTYRE, Engineer
Interior view showing Haydite reinforced concrete, 60-ft. clear girder spans, flat slab floors

Commercial Sizes of Haydite

Grade "A"—00x$\frac{3}{16}$ in. Used as a fine aggregate in place of natural sand.

Grade "B"—$\frac{3}{16}$x$\frac{1}{2}$ in. Used as coarse aggregate for precast concrete products.

Grade "C"—$\frac{3}{16}$x$\frac{3}{4}$ in. Used as coarse aggregate in reinforced concrete.

HAYDITE CONCRETE DATA—LABORATORY CONDITIONS

Mix	Quantities by volume per cu. yd. of Haydite concrete			Slump, in.	Weight, lb. per cu. ft.	Modulus of Elasticity, E	Ultimate compressive strength, lb. per sq. in.	
	Cement, bags	Haydite (dry)					7 days	28 days
		$\frac{3}{16}$ in.	$\frac{3}{4}$ in.					
1:1½:3	7.07	0.39 cu. yd.	0.78 cu. yd.	5	101	*	1980	2880
1:2 :3	6.70	0.50 " "	0.75 " "	4½	100	*	1698	2835
1:2 :3½	6.14	0.47 " "	0.82 " "	4½	99	*	1598	2460

*Modulus of Elasticity varies from 1,500,000 to 2,000,000.

Coef. of expansion = .0000055. Values for shears, bond, same as ordinary concrete.
Coef. of conductivity (C) = 1.62 B.t.u's per hour per sq. ft. with 1-in. thickness per degree F. difference.
Spec. gravity 2.52; fused at 2400° F., cellular; sharp (cuts glass); resists acids; completely inert.



Equitable Building, Des Moines, Iowa
PROUDFOOT, BIRD & RAWSON, Architects
HARRY HARTUPE, Engineer
In this 18-story structural steel frame building Haydite concrete used for all fireproofing and floor construction

Haydite Aggregate for Concrete Products

Haydite aggregate must always be thoroughly wetted down in the pile before going to the mixer. In this condition the Grade "A" sand size will bulk approximately 18 to 20%. The bulking in Grade "C" coarse size is negligible. Haydite concrete should be mixed a full minute after all materials are in the mixer.

Lightweight Haydite Building Units, in all standard shapes and sizes as required by modern building practice, are now available in many of the larger cities in the Central West. These units embody all the requirements of perfect wall units and are offered to the building trade as lightweight, economical, fire-resistant units for all types of wall construction.

Service

We maintain a service bureau to handle all matters in connection with Hydraulic Haydite.



Dumbarton Bridge, San Francisco, Cal.
HARRINGTON, HOWARD & ASH, Engineers
Haydite concrete used in lift span

THE MEDAL BRICK & TILE CO.

Builders Exchange Building, CLEVELAND, OHIO

PLANTS AT WOOSTER, MALVERN AND CARROLLTON, OHIO DEALERS IN ALL PRINCIPAL CITIES

Products

Medal Face Brick in a variety of colorings and surface textures, including side cut mats, end cut mats, vertical die cut and sanded textures. Available in straight shades or any specified mingling of shades.

Agecrost Oldstyle Brick, for reproducing the effect of antiquity found in classic models of European and Colonial building.

A United States patent has been granted for originality and merit.

Agecrost Oldstyle Medal Brick

This brick has the general aspect of an early, handmade brick plus the effect of long weathering. The influence of its surface treatment upon color is to soften and harmonize the brilliant colorings of the Medal Range and to increase their richness. The surface is neither acutely smooth nor systematically roughened. Minor irregularities of outline are preserved without extremity or affectation.

Squared or Beveled Edges—Agecrost brick are furnished with squared edges, or with edges irregularly beveled or rounded, thus increasing the scope of effects obtainable by different joint treatments. Perhaps the most prized advantage of the beveled brick is the appearance of a smaller face when full mortared, without departure from standard dimensions. Thus a mixture of squared and beveled brick, full mortared, gives the effect of pleasing variety of size and the appearance of undulation in the mortar line, without disturbing actual bedding levels.

Agecrost Window Brick

These brick comprise more than thirty specials from which to erect window openings for metal casement windows or double hung windows in harmony with the general exterior treatment of the building.

The ⅜-in. flange against which the window frame is set gives added security and complete weather protection around the window.

Bulletin and blue prints with full details of single, double and bay windows showing suggested application of trim for veneer and solid wall construction for casement or double hung frames, will be mailed to architects on request.

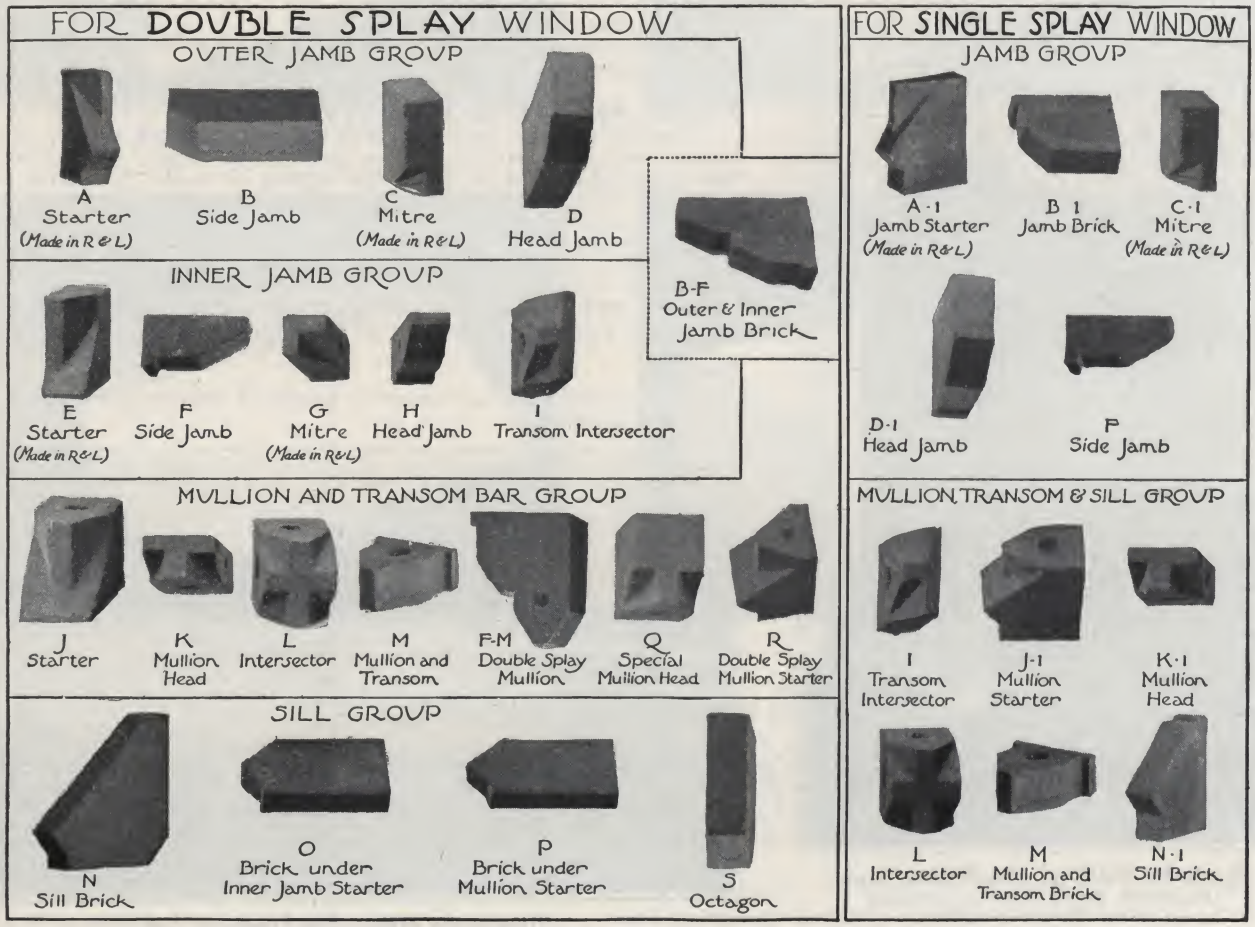
Color Control and Sorting

Medal Brick are offered in a wide variety of colors. An original system of color control is part of the Agecrost technique, yielding a rich assortment of lighter reds, salmons, ochres and orange tints. With these come deep greens, blues and polychromes with dark and medium reds. A separate Malvern range is offered, varying through warm browns into buff and ivory.

All Medal Brick are sorted on coming from the kiln into piles of like color and re-combined in definite color mingles according to specification.

Co-operative Service

Factory representatives in all territories assist Medal dealers to solve special problems. Name of nearest dealer furnished on request.



Agecrost Special Shapes

The architect will find many uses for the above window shapes, aside from window construction. Aside from these shapes, we are especially well equipped to execute orders to your design for specials to construct chimneys, drip moulds, louvers, etc. The Agecrost surface treatment lends itself remarkably well to specials regardless of their shape.

Continued on next page







Balustrade Shapes, Label Mould Louver, and Window Brick, Show a Few of the Special Shapes We Have Executed in Clay







A PAGE OF TEXTURES IN MEDAL BRICK

PATERSON FIRE BRICK COMPANY

(FORMERLY PATERSON CLAY PRODUCTS CO., INCORPORATED 1908)

OFFICE AND FACTORY

CLEARFIELD, PA.

AUTHORIZED DISTRIBUTORS IN PRINCIPAL CITIES

Products

A complete line of light FACE BRICK from Pearl Grays matching limestone to very warm tones of gray; from a uniform shade of Buff to dark Goldens; Salt Glaze Brick and Salt Glaze Double Units.

Shipping Facilities

Shipments are made direct from Clearfield via the Buffalo, Rochester & Pittsburgh Ry. Co. or the New York Central R. R. or the Pennsylvania R. R. and connecting lines, and we enjoy three to four-day freight service both to New York City and to Chicago.

Capacity and Perspective

Our annual plant capacity is 15,000,000 brick and we carry an average of 4,000,000 brick in stock under cover. More than one hundred years' supply of both clay and coal with the management in love with its work assures continuity of product. The principal office is at the plant. The plant is of moderate size, efficiently operated and complete in every respect.

Paterson Pearl Gray

No. 50 shades A-B is a smooth surface face brick pearl gray in color developed by us to meet the demand for a brick to match limestone. This brick is decidedly gray with bluish cast and no trace of buff.

Cathedral Gray

No. 30 Ag is a dark gray smooth brick—warm and sombre with brownish tinge—uniform in color.

New Yorkers

No. 70 A-B is a gray smooth brick with fine manganese speck and background a decidedly true gray—neither light nor dark. Other gray shades—No. 40, No. 60 and No. 80.



St. Augustine Church, Rochester, N. Y.
ARNOLD & STERN, Architects
A. FREDERICHS & SONS CO., Contractors
Cathedral gray brick used for exterior and interior

Buff Brick of Highest Quality

For our buff brick nature has favored us with a unique clay. This clay vitrifies at the *buff* burning temperature and burns to a beautiful light buff color—no grayish tones—and is soft, warm and very uniform in shade. We duplicate the color year in and year out.

These brick, being vitrified, keep clean and nevertheless have an affinity for mortar and knit quickly and permanently with the mortar joint. This is a most important consideration for dry walls and makes these brick equally desirable for exterior or interior use. Brick of this clay are the Buff, Goldens, Courts, Salt Glaze and Cathedral Gray.

No. 20 Ag is a smooth surface brick of uniform light buff color—soft, warm, cheerful; used very extensively for interiors. Undoubtedly among the best in smooth buff brick.

No. 21ABCD (Court Brick). Walls of these brick keep clean so well, being vitrified, that over a period of years the percentage of light reflected is very high, and at all times they present a soft and pleasing appearance.

Harmonious Ranges

Flashing brick with coal in down-draft kilns is the ideal method of producing harmonious ranges in face brick. The colors so produced are live, permanent, non-fading and blended together by the very essential intermediate shades that can be secured only by flashing. This method we use and the following are some of our standard ranges:

No. 26 Golden Side-cut; No. 28 Golden End-cut; No. 66 Gray Side-cut; No. 68 Gray End-cut; No. 51 shades ABCDEF Pearl Gray Smooth Full Range. Other ranges available.

Salt Glaze Brick

Paterson Salt Glaze Brick are made with our selected buff burning clay. The glaze forms an integral part of the brick and does not scale or peel—is moisture, dust and ink proof. These brick are served in a light tan range, dark range and full range. The body of these brick is burned hard before glazing, making it a perfect load bearing unit, and the brick being of the same clay as No. 20 Ag (which see) knits perfectly with the mortar joint, making moistureproof and sanitary walls. All standard and special shapes available.

Salt Glaze Double Unit or Bricktile—A new product designed to lessen the cost of glazed walls. The double unit laid in the wall is two-brick and a mortar joint high and 8 in. long and also standard depth. Standard salt glaze shapes can be and are used with these double units. Double Unit shapes also available.

THE STARK BRICK COMPANY

Manufacturers of Stark Salt-glazed Brick and Salt-glazed Brictile

CANTON, OHIO

FACTORY: EAST CANTON, OHIO

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

STARK SALT-GLAZED BRICK; SALT-GLAZED BRICTILE.

Shipping Facilities

Our plant is located at East Canton, Ohio, on the Wheeling and Lake Erie Railroad.



TRADE-MARK

Stark Salt-glazed Brick

Stark Salt-glazed Brick are of standard size, 3⅞x2¼x8 in. glazed on face, back and both ends. The glaze is a thin coating of glass fused with the body of the brick at a temperature of approximately 2200° F.

Colors—***Shaded Brick***—Brick as near as practicable a single color. These shades are designated by the following numbers: 50, 55, 60, 75, 80, 90 and 95. No. 50 is the lightest and No. 95 the darkest shade.

Mingled Shades—A harmonious mixture of various colored brick designated as:

Gratones—A blend of gray and cream colored brick.

Buftones—A blend of light buff colored brick.

Darctones—A blend of dark buff colored brick.

In addition to above shades and blends we have:

Courts—Brick having small defects. Mingled in shade, light or dark.

Commercials—Brick having larger defects, including factory and kiln marks. This quality is the least expensive and is also free from crooked or warped brick. Mingled in shade, light or dark.

Shapes of Salt-glazed Brick

The illustrations on the following page show the various shapes carried in stock, and include bullnose, cap mould and cove shapes. Special shapes are made to order and require from two weeks to a month to produce.

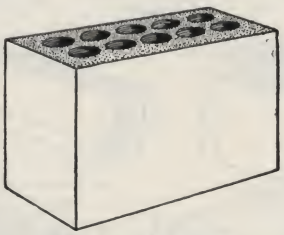
Shipment of the standard shapes can usually be made from stock.

Our plant is the largest salt-glazed brick manufactory in the world, having a normal capacity of three million brick per month.

Stark Salt-glazed Brictile

Brictile is a new salt-glazed product developed by this company, combining the many advantages of glazed brick and tile and eliminating the objectionable features of tile construction.

This unit measures approximately 3⅞x 4⅞x8 in. and is glazed on the 4⅞x8-in. face, back and both ends. Each Brictile is equivalent in wall area to two standard size face brick and a mortar joint. There are ten round holes through the body of the unit, thus reducing the weight and forming desirable anchorage for mortar between the courses. Brictile is a load bearing unit and will pass building code requirements for strength of structure.



Salt-glazed Brictile

Brictile may be used for the same purposes as standard size brick as they furnish their own corner pieces and bonds. Therefore, this single unit can be used for complete wall construction. They can be placed in the wall with one hand by the brick-mason, displacing two standard size face brick and a mortar joint. The savings in labor and mortar are apparent.

Brictile bullnose, cove, cap mould and various fittings can be furnished where desired. The standard size brick shapes may also be used, producing a pleasing and unique results.

Salt-glazed wall construction is now possible where formerly prohibited on account of additional cost. This unit has made possible beautiful, clean walls at minimum cost.

Colors—***Shade Range***—Brictile selected for shade with limited color variation. Furnished in first quality only.

Shade range 50—cream color. Shade range 60—light buff. Shade range 75—medium buff.

Mingled Shades—A harmonious mixture of various colored Brictile. Designated as:

Gratone Brictile—A blend of gray and cream colored Brictile.

Buftone Brictile—A blend of light and medium buff colored Brictile.

Courts—Brictile having small defects. Mingled in shade, light and dark.

Commercials—Brictile having larger defects, including factory and kiln marks. This quality is the least expensive and is also free from crooked or warped Brictile. Mingled in shade, light or dark.

Nature and Uses of Brick and Brictile

Walls constructed of Stark Salt-glazed Brick or Brictile may be cleaned as often as desired, each time restoring the original luster and beauty. Washing with warm water and a good washing powder is probably the easiest and best method. Care should be taken to see that brick are rinsed thoroughly to avoid a cloudy effect when dry.

When cleaning the first time after construction, a dilute solution of sulphuric acid will aid in removing any mortar which may be left on the brick. Again it is important to have the brick thoroughly rinsed.

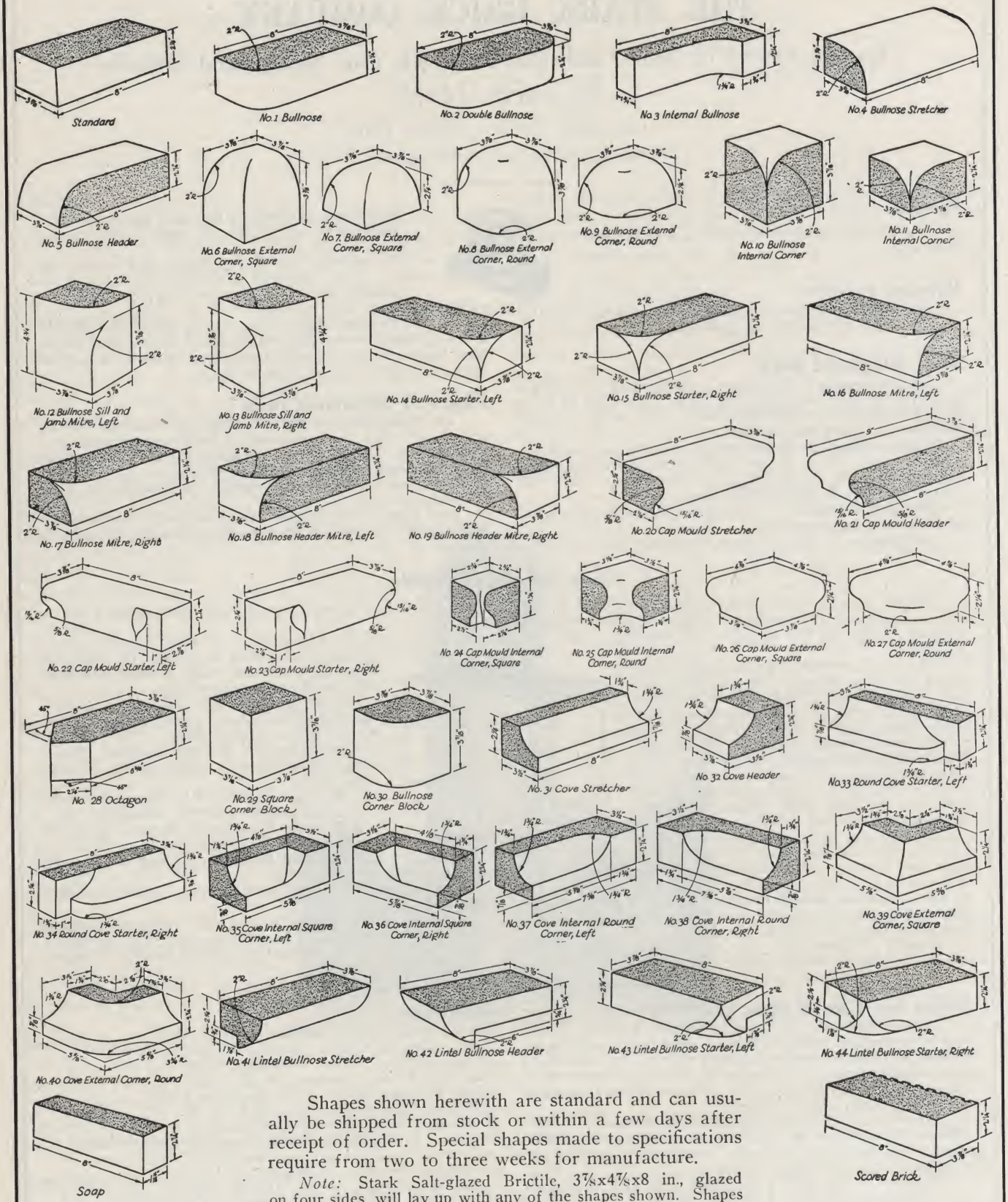
Because of the ease with which they can be cleaned, Stark Salt-glazed Brick and Brictile are used for a variety of purposes such as the interior walls of basements, gymnasiums, power houses, schools, lavatories, creameries, food product plants, laboratories, industrial plants, filling stations, and any place where interior face brick are used.

They can also be used effectively in fireplaces, where the glaze makes them easy to keep clean.

References

Ford Administration Building, Detroit, Mich.
Taylor-Allderdice High School, Pittsburgh, Pa.
Minnesota State Prison, Stillwater, Minn.
Sing Sing Prison, Ossining, N. Y.
Shady Hollow Country Club, Massillon, Ohio
Hell Gate Powerhouse, New York, N. Y.
Providence High School, Providence, R. I.
Prince of Wales Public School, Hamilton, Ont., Canada.
American Tobacco Company, Reidsville, N. C.
St. Michael's College, Santa Fe, N. M.
Robert Gould Shaw School, Boston, Mass.
West Texas Utilities Co. Powerhouse, Quanah, Tex.
Boys' Catholic High School, Frankford, Philadelphia, Pa.
Girls' Catholic High School, Philadelphia, Pa.
Y.M.C.A. (for Reading Co.), Reading, Pa.
Y.M.C.A., Dayton, Ohio
Swift & Company, Chicago, Ill., and Los Angeles, Calif.
Merriman Avenue Fire Station, Asheville, N. C.

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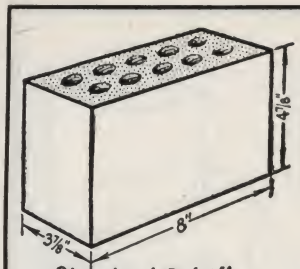


Shapes shown herewith are standard and can usually be shipped from stock or within a few days after receipt of order. Special shapes made to specifications require from two to three weeks for manufacture.

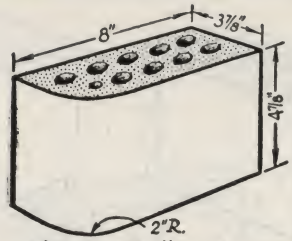
Note: Stark Salt-glazed Brictile, 3⅞x4⅞x8 in., glazed on four sides, will lay up with any of the shapes shown. Shapes and sizes of Stark Salt-glazed Brictile will be found on the following pages.

STANDARD SHAPES AND SIZES OF STARK SALT-GLAZED BRICK

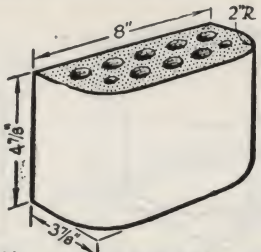
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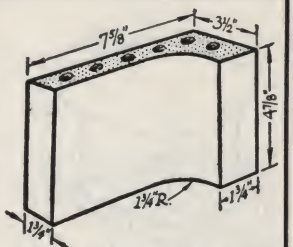
Standard Brictile



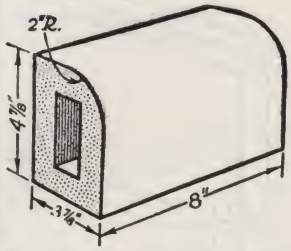
No.101–Bullnose



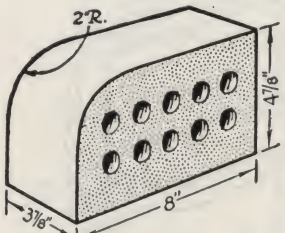
No.102–Double Bullnose



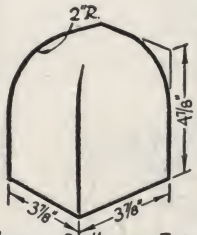
No.103–Internal Bullnose



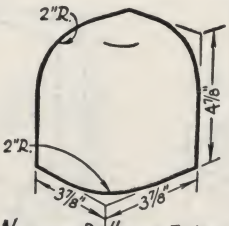
No.104-Bullnose Stretche.



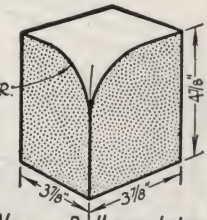
No.105–Bullnose Header



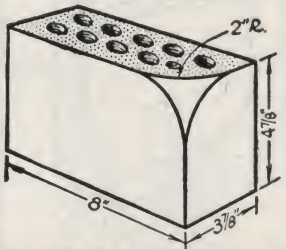
No.107-Bullnose External Corner-Square



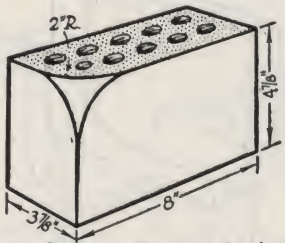
No.109–Bullnose External Corner–Round



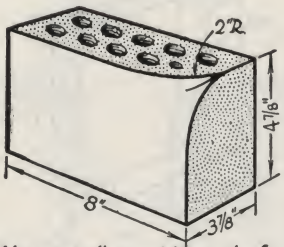
No.111–Bullnose Internal Corner



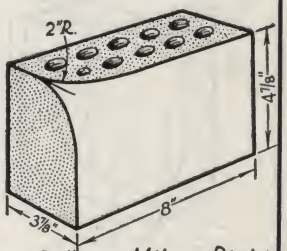
No.114-Bullnose Starter–Left



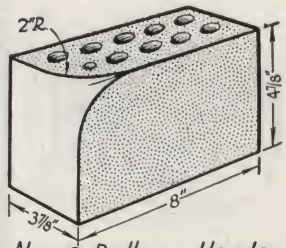
No.115–Bullnose Starter–Right



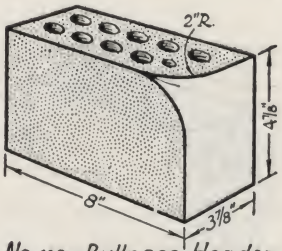
No.116-Bullnose Mitre–Left



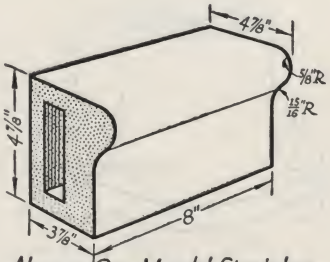
No.117–Bullnose Mitre–Right



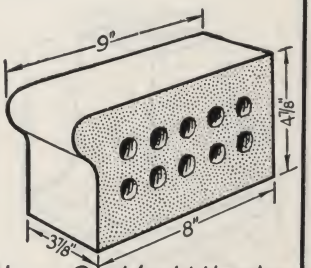
No.118–Bullnose Header Mitre–Left



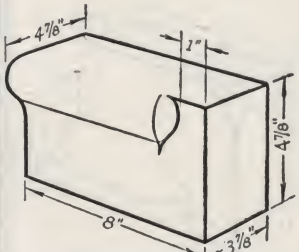
No.119–Bullnose Header Mitre–Right



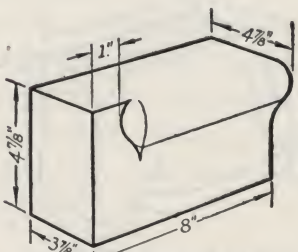
No.120–Cap Mould Stretcher



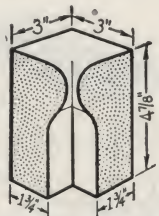
No.121–Cap Mould Header



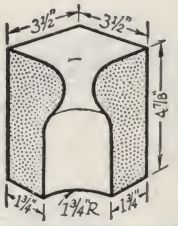
No.122–Cap Mould Starter–Left



No.123–Cap Mould Starter–Right



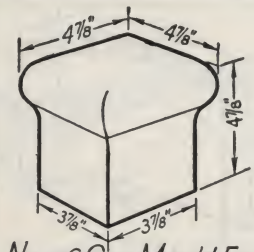
No.124–Cap Mould Internal Corner–Square



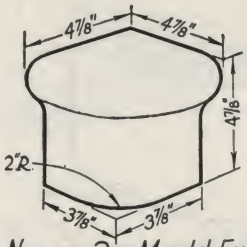
No.125–Cap Mould Internal Corner–Round

STANDARD SHAPES AND SIZES OF STARK SALT-GLAZED BRICTILE

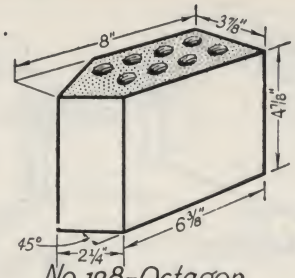
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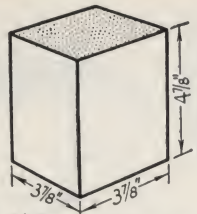
No. 126 Cap Mould External Corner–Square



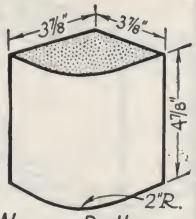
No. 127–Cap Mould External Corner–Round



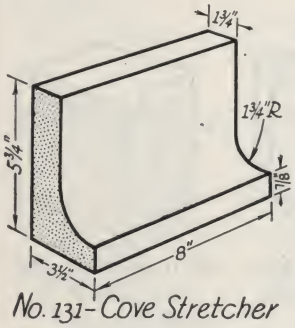
No. 128–Octagon



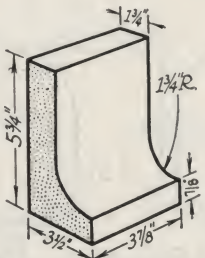
No. 129–Square Corner Block



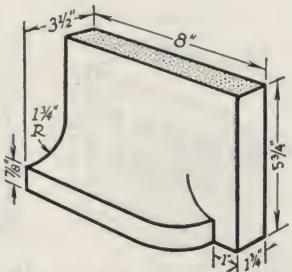
No. 130–Bullnose Corner Block



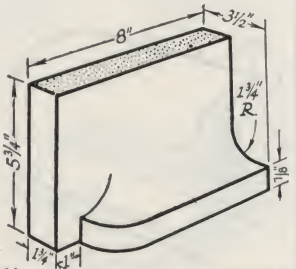
No. 131–Cove Stretcher



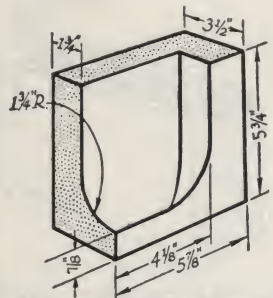
No. 132–Cove Header



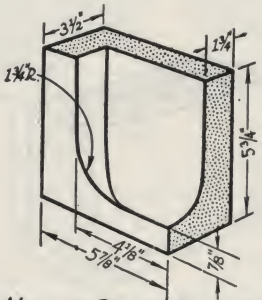
No. 133–Cove Starter–Left



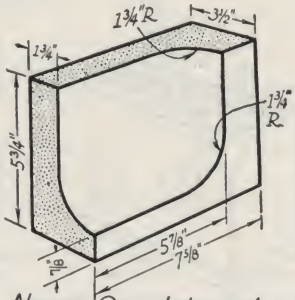
No. 134–Cove Starter–Right



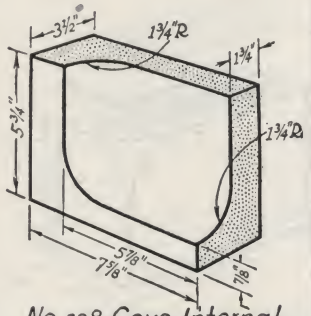
No. 135–Cove Internal Square Corner–Left



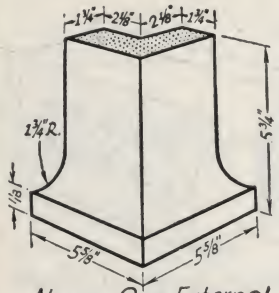
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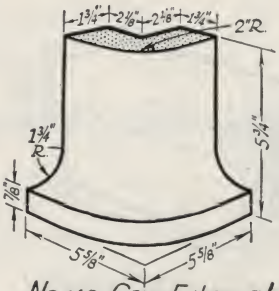
No. 137–Cove Internal Round Corner–Left



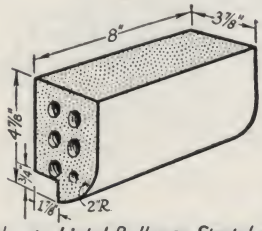
No. 138–Cove Internal Round Corner–Right



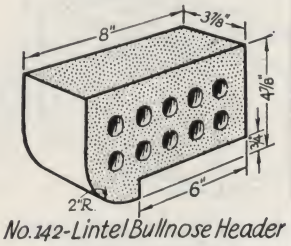
No. 139–Cove External Corner–Square



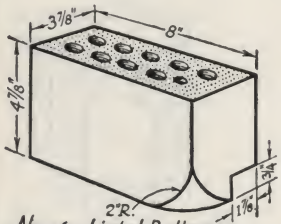
No. 140–Cove External Corner–Round



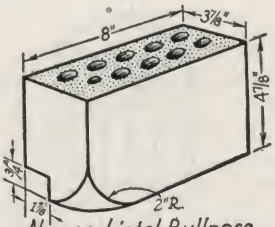
No. 141–Lintel Bullnose Stretcher



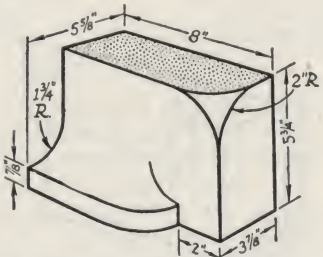
No. 142–Lintel Bullnose Header



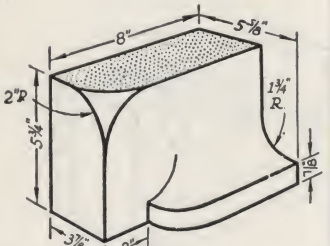
No. 143–Lintel Bullnose Starter–Left



No. 144–Lintel Bullnose Starter–Right



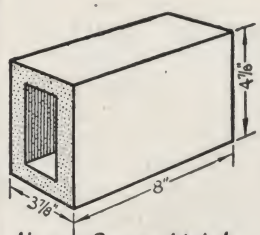
No. 145–Cove and Bullnose Starter–Left



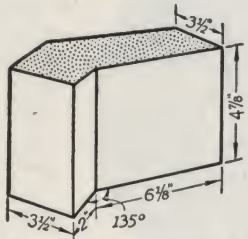
No. 146–Cove and Bullnose Starter–Right

STANDARD SHAPES AND SIZES OF STARK SALT-GLAZED BRICTILE

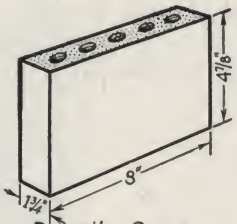
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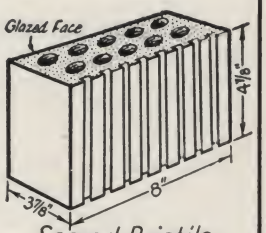
No. 147–Square Lintel or Sill Block



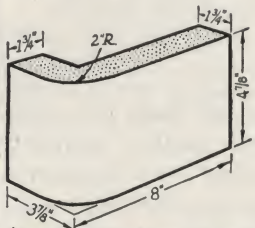
No. 148–Internal Octagon



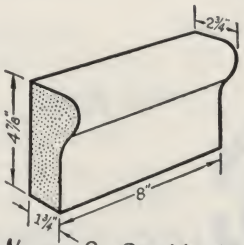
Brictile Soap



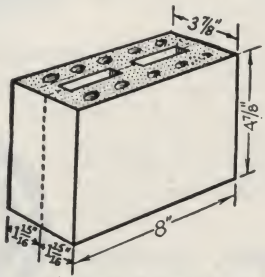
Scored Brictile



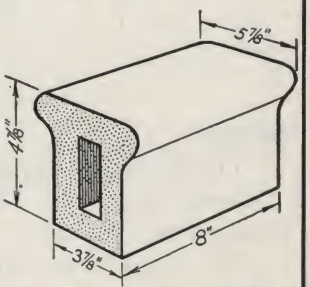
No. 101-S–Bullnose Soap



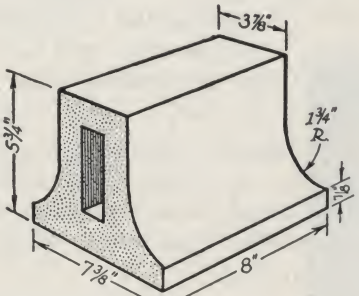
No. 120-S–Cap Mould Stretcher Soap



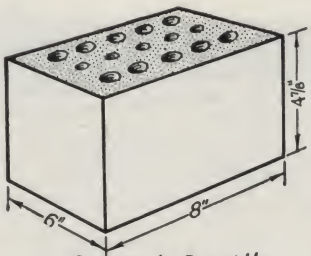
Kerfed Brictile



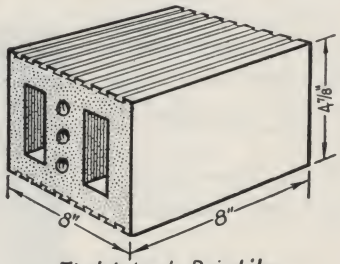
No. 120-D–Double Cap Mould Stretcher



No. 131-D–Double Cove Stretcher



Six-Inch Brictile



Eight-Inch Brictile

Brictile Size Advantages

1. One unit for all—Stretcher, Header and Corner Block.
2. Manufactured from fireclay, insuring uniform size.
3. Eight-inch length enables mason to lay with one hand.
4. Most economical glazed material made.
5. All square edges—can be laid with ¼" spread joint.
6. Vertical holes through body anchors mortar. Perfect bond.
7. Units when laid will not float regardless of conditions.
8. Fractional length or width pieces easily cut on job by mason.
9. Units load bearing—will pass code requirements.
10. Can be furnished with one side scored for plastering or faces glazed—4-inch wall.

WESTERN BRICK COMPANY

Manufacturers of Face Brick, Common Brick, Western "Haydite" and Featherweight Building Units

OFFICE AND FACTORIES
DANVILLE, ILL.

REPRESENTATIVES IN ALL PRINCIPAL CITIES OF THE MIDDLE WEST

Facilities

The WESTERN BRICK COMPANY'S annual producing capacity is 120,000,000 brick and tile at its two plants.

The shale and clay supply for these factories is practically inexhaustible; fuel supply is owned by the company in sufficient quantities to last at least twenty-five years.

TRADE-MARK

Shipping facilities are unequalled, as the product is distributed from Danville over seven railroads. Plants have side track room for about 75 cars.

A total of over 2,100,000,000 brick have been manufactured and marketed during the past thirty years.

Face Brick

In order to simplify our lines for architects, we have developed various standard blends. To meet the demand for a distinctive type of brick giving that age old effect now so much in demand, we have produced, Early American "Homespuns," Old English "Homespuns" and Verde-Antique "Homespuns." These blends are replete in reds of various hues, and the verde-antique are blended with a moss green brick. For those who prefer lighter tones, Old Italian Cloisters and Spanish "Homespuns" in buffs, grays and pinks may be specified. Other interesting blends are University Blend, Cloisters, Doric Chicago Blend, Mossblende, Country Club Blend, Empire 501 Persian Blend and Fernblende.

WESTERN STANDARD FACING BRICK

Colors	Gothic stippled	Doric stippled	Westex matte	Cloister smooth sanded	Semi-glaze smooth	Empire texture, scratched and rolled	Westex Persian matte
Black to brown	971	871	841	410	.....	.....	.....
Brown	972	872	842	420-422	.....	521	520
Brown to tan	.....	873	843	.....	1073	.....	.....
Tan	.....	874	844	.....	1074	.....	.....
Purplish brown	973	.....	.....	.....	.....	.....	.....
Reddish brown	974	.....	.....	423	.....	531	540
Brown edge, red center	.....	.....	.....	430	.....	.....	.....
Dark wine red	940	.....	.....	440	.....	541	.....
Medium red	950	.....	.....	450	.....	551	550
Light red	955	.....	.....	435	.....	.....	.....
Yellowish red	956	.....	.....	460	.....	.....	.....
Tan to golden buff	.....	876	846	.....	1076	.....	.....
Golden buff	.....	877	847	717	1077	.....	.....
Pinkish buff	.....	878	848	718	1078	.....	.....
Pink	.....	879	849	719	1079	.....	.....
Light gray to buff undertone	.....	.....	.....	716	.....	.....	.....
Dark gray	.....	.....	.....	713	.....	.....	.....

Special combinations of above standard shades can be arranged.

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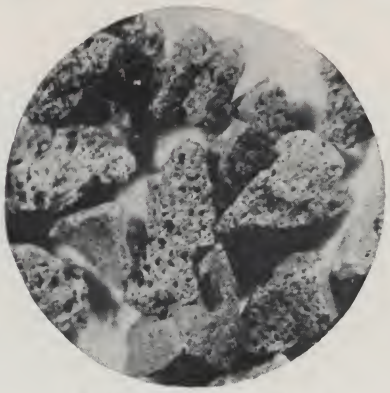
WESTERN "HAYDITE"

The Ideal Lightweight Aggregate

Western "Haydite" is a lightweight burned clay aggregate specially manufactured for use in concrete.

Western "Haydite" is produced from exactly the same shales as are used in the manufacture of the various grades of Western Brick, which have been used in many important buildings throughout the middle west during the past 30 years.

Western "Haydite" is burned in clinker form and then ground, screened and graded into standard commercial sizes.



Note Cellular Structure

Owing to its extreme lightness, 50 lb. per cu. ft., it is the ideal aggregate for such pre-cast products as wall units, roof tile, laundry trays, burial vaults, conduit tile, lighting standards, telegraph poles and sewer pipe.

In reinforced concrete an appreciable saving in steel area can be effective due to the fact that concrete composed of cement, natural sand and Western "Haydite" coarse aggregate weighs approximately 110 lb. per cu. ft. or 25% to 30% less than ordinary concrete.

Absolute control of the sizing and grading; completely inert; free from all impurities; a preservative of metal; non-corrosive. An unlimited supply of the proper shales and fuel for many years to come together with adequate manufacturing facilities, make Western "Haydite" the ideal, dependable lightweight aggregate.

Western Brick Company maintains a service bureau to handle all matters in connection with Western "Haydite." Send for complete structural tests.

FEATHERWEIGHT "HAYDITE" BUILDING UNITS

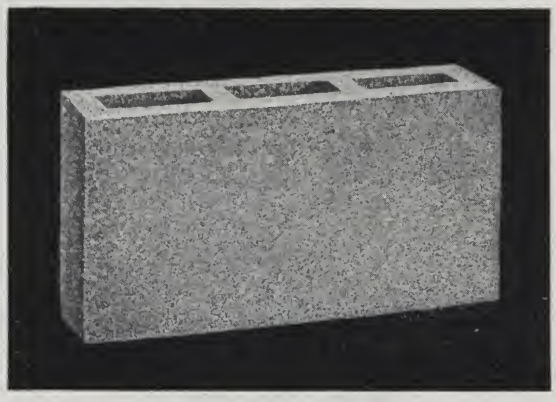
Made of Western "Haydite"

Featherweight "Haydite" building units embody all the requirements of perfect wall units and are offered to the building trade as light weight, economical, fire resistant units for all types of wall construction.

Lightweight—57 lb. per cu. ft. of wall weight.

Strength—All units heavy load bearing, meeting strength requirements of all local and State building codes.

Fire Resistant—Fire resistance qualities have been completely established by Underwriters' Laboratories, Inc., of National Board of Fire Underwriters.



Featherweight "Haydite" Building Unit
4x8x16 inches

Nailing and Cutting—Nails are readily driven through wood trim into the unit and channeling and cutting for water pipes and conduits can be done without breakage.

Insulation—Low rate of heat conductivity.

Capillarity—The cellular structure gives "Haydite" concrete a low capillarity.

Sound Insulation—Unequaled among fire resistant materials in the reduction of sound transmission through plastered walls.

High in efficiency in the absorption of sound and especially adapted to the interior walls of auditoriums, churches and theatres, with unplastered surface.

Apply Plaster and Stucco Direct

Plaster and stucco are applied direct to the unit without lathing or furring. The unit being mechanically perfect, a large saving in amount of plaster can be made, only a thin straightening coat being necessary.

Shapes and Sizes

The unit is made in all standard shapes and sizes required by modern building practice.

Tests

Tests of this unit have been made by Underwriters' Laboratories, Inc.; University of Illinois; Purdue University; University of Wisconsin; Robert W. Hunt Company; Pittsburgh Testing Laboratory; Riverbank Laboratories and Armour Institute.

Literature

Complete booklet treating all phases of the unit is available upon application to any authorized manufacturer or distributor of Featherweight "Haydite" Building Unit listed herein.

Authorized Manufacturers and Distributors of the Featherweight "Haydite" Building Units

Made of Western "Haydite"

APPLETON, WIS., Gochnauer Concrete Products Co.
ARLINGTON HEIGHTS, ILL., Arlington Concrete Products Co.
AURORA, ILL., Gifford-Wood Construction Co.
BATESVILLE, IND., Herman L. Steinkamp
BLOOMINGTON, ILL., Apfield Concrete Works
BLUE ISLAND, ILL., Chicago Haydite Building Units Co.
CHAMPAIGN, ILL., Nelsen Concrete Culvert Co.
DANVILLE, ILL., Western Brick Company, Block Dept.
DAVENPORT, IOWA, Northwest Davenport Cement Block Co.
DECATUR, ILL., W. G. Traver Supply Co.
ELMHURST, ILL., Elmhurst-Chicago Stone Co.
FORT WAYNE, IND., Acker Cement Product & Supply Co.
GARY, IND., Calumet Supply Co.
GRAND RAPIDS, MICH., S. A. Morman & Company
INDIANAPOLIS, IND., Spickelmier Fuel & Supply Co.
KALAMAZOO, MICH., Kalamazoo Haydite Tile Co.
KANKAKEE, ILL., Shidler Construction Material Co.
LA GRANGE, ILL., E. L. Ramm Company
MILWAUKEE, WIS., Best Block Company
MUNCIE, IND., M. L. Dague & Sons
OAK PARK, ILL., Concrete Building Units Co. Inc.
PEORIA, ILL., Michigan Silo Company
PONTIAC, ILL., F. N. Smith & Son
RACINE, WIS., Julius Sorenson & Sons
ROCKFORD, ILL., Crumb-Colton & Company
WAUKEGAN, ILL., Babcock Concrete Block Co.

THE WYANDOT CLAY PRODUCTS CO.

UPPER SANDUSKY, OHIO

REPRESENTED IN ALL LEADING CITIES OF THE UNITED STATES

Product

FACE AND COMMON BRICK also DOUBLE COMMONS.
STANDARD SIZE, 4x5x12-IN. and 5x8x12-IN. HOLLOW WARE.
SIDEWALK and TERRACE BRICK.

Composition and Manufacture of Wyandot Brick

An all-clay, genuinely sand molded brick, made from yellow clay which burns red. Variety and color flashing obtained by the location of brick in the kilns. Brick is burned to the fusion point of the clay. Made by the same process as the handmade brick of years ago, but by machinery. Old-fashioned box molds lined with sand are used. This sand is part of the surface of brick, burned in and cannot rub off.

Ranges—*Old Colony*—varying shades of red, brown and gunmetal.

Sarouk—rose pink, bronze with rose hearts, lavender-blue.

Burgundy—deep wine red, plain and with purple-blue flashings.

Moss Rose—all one-color pink, with occasional very slight kiln flashing.

Sun-Tan—all one-color brownish red.

Wyandot Red—all one-color red, no flashing.

Elm—greenish-tan, tan and tan with pink flashing.

Russet—light red and brown—deeper red flashing.

Commons—*Hard Line*—Not selected for color—vitrified—suitable for all outside purposes.

Backups—suitable for inside work only.

Contour and Texture—A slight irregularity of contour relieves it of any mechanical exactness. It has a soft, velvety exterior over a flinty interior. Mortar adheres very readily to this surface.

Moisture Absorption—Tests from 1% to 5%.

Special Shapes—45° octagons, water tables, headers, stretchers, inside and outside returns, carried in stock.

Any type of special shape made from architects' blue prints.

Shipping Facilities

Factory is located on the Hocking Valley R. R. and the main line of the Pennsylvania.



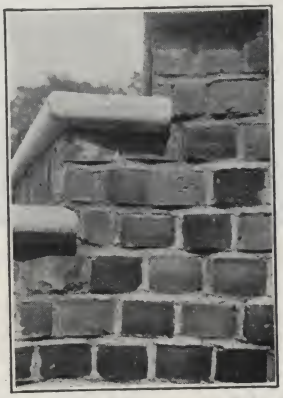
Masonic Home, Utica, N. Y.
KINNE & FRANK, Architects



West High School, Columbus, Ohio
HOWARD DWIGHT SMITH, Architect



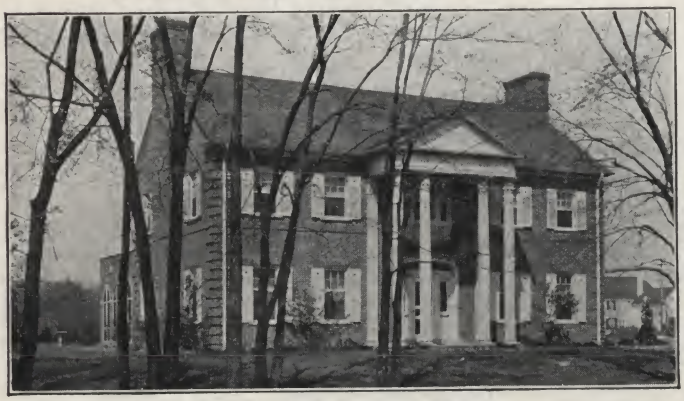
Auditorium, Glencoe High School, Chicago, Ill.
J. ARCHIBALD ARMSTRONG, Architect



Detail Wyandot Sand Molded Brickwork
RINDGE AND RINDGE, Architects



Bank, Dansville, N. Y.
TILGHMAN, MOYER CO., Architects



Residence, Columbus, Ohio
J. EDGAR OUTCAULT, Architect



Residence, Toledo, Ohio
FRANK J. FORSTER, Architect

ARCHITECTURAL GRANITE

N° 1 OF THE GRANITE SERIES 3RD EDITION 1931



NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION, INC., BOSTON, MASS.

FOREWORD

The widespread introduction of machine processes during the past decade has practically revolutionized the granite industry. This has resulted in speeding up production, substantial reductions in cost and new possibilities for economic use.

The transition from slow, expensive hand work to speedy, efficient machine production is still under way, and promises even greater development for the future. Knowledge of what has and can be done in the production and finishing of granite for architectural purposes is more essential now than ever before if full advantage is to be taken of its aesthetic and economic possibilities.

This catalogue, "Architectural Granite," has been prepared as one of the services of the Association to provide architects, designers, specification writers and prospective users of granite with up-to-date information. Certain facts are also presented relative to the Association, its members and their granites which we believe will be informative and useful. Much of the information is general in application to practically all granites, but the descriptions and color reproductions of specific granites are confined to those quarried and manufactured by member companies.

Architects and prospective users of granite are invited to make free use of the many services of the Association. These services represent the combined information and experience of the industry and are made possible by the co-operation and support of a representative group of granite producers who believe that such services are beneficial alike to architects, users and producers of granite.

In addition to being incorporated complete in the 1931 Edition of SWEET'S ARCHITECTURAL CATALOGUE, "Architectural Granite" is published by the Association in booklet form, copies of which will be sent upon request.

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PRODUCTS OF MEMBER COMPANIES

GRANITE—Rough, Dressed and Polished—for Commercial, Public, Monumental and Residential Buildings; for Memorials, Ornamental Public Improvements, Landscape Work, Mausoleums and Monuments.

GRANITE—Rough and Dressed—for Bridges, Dry Docks, Sea Walls, Foundations and similar construction.

GRANITE—Ashlar, Rubble, Flagging, Riprap, etc.

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NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION

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F. FAIRFIELD McCANN, Field Representative

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Branch Office, New London, Conn.

COOK, WATKINS & PATCH, INC.
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Sales Office, Boston, Mass., 77 Summer Street
Sales Agents:
New York, N. Y., 286 Fifth Avenue, A. Le Poidevin & Co., Inc.
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Middle Western Territory, Wm. H. Mitchell, 30 Church Street, New York, N. Y.
North Western Territory, Clark H. Grunewald, 314 Eitel Building, Seattle, Wash.
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KITTREDGE QUARRIES
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WOODBURY GRANITE CO., INC.
Burlington, Vt.

ASSOCIATE MEMBER

A. LE POIDEVIN & CO., INC., 286 Fifth Avenue, NEW YORK, N. Y.

Continued on next page

INFORMATION REGARDING THE ASSOCIATION OF INTEREST TO THE ARCHITECT AND SPECIFICATION WRITER

The Association and Its Purpose

The chief aim of this Association is to further the use and sale of granite for building purposes by extending the knowledge of its many qualities and merits, and by establishing means of closer co-operation between producers of granite and architects and general building public.

Real Service to Architects

The Association, through its Research and Information Bureau and its field men, offers a convenient and unbiased service to architects and others interested in the use of granite for permanent construction.

This service is freely offered wherever it may assist in the logical and proper use of granite or help to solve the economic and aesthetic problems which may arise when the use of granite is under consideration.

Research and Information Bureau

This department has been developed to collect and disseminate useful and reliable information concerning granite. This information is being gathered constantly from within and without the industry and the Association has become the clearing house for the best information available.

Study and research is being carried on concerning the different granites available for architectural uses, the chemical and physical properties of granite, problems in economic detailing and production, experience and good practice in actual use.

Architects, and others interested in the use of granite, are invited to make use of the services of this department freely and all requests for information pertaining to granite will receive willing and careful attention.

Field Service of the Association

Qualified representatives of the Association are in the field calling upon architects for the purpose of making available the facts and information accumulated by the Research and Information Bureau. Timely and unbiased information may be had through the field service. Economic points as to design, detail and specification of granite work may be discussed and quickly settled.

The field men will be glad, when requested, to obtain information which may not be immediately available, and to assist the architect and specification writer in every way possible in connection with the use of granite.

The Association can render most valuable service when a project is in its preliminary or initial stages. The architect need not hesitate to discuss a project with our representative at any time, and if for any reason he wishes to avoid premature publicity he need only so indicate and the matter will be treated as strictly confidential until such time as information concerning the project may be properly reported to our member companies.

Service of Representatives of Member Companies

The member companies of the Association maintain sales offices and representatives in many of the larger cities. These men are experts on granite and well qualified to render definite and valuable services to architects and specification writers in their districts.

Accurate and reliable information may be secured by consulting these representatives when any specific project is under consideration, and they are always willing to furnish samples of their granites or to submit preliminary or final estimates upon specific work.

Permanent Exhibits of Granite and Finishes

The Association maintains permanent exhibits of the various standard building granites, produced by its member companies, at the following convenient addresses:

Architects Samples Corp., 101 Park Avenue, New York
Master Stone Cutters Assn., Architects Building, 17th and Sansom Streets, Philadelphia
National Building Granite Quarries Association, 31 State Street, Boston

Here will be found the various colors and textures from which architects may make selections of granite for any specific project. Here also are displayed complete sets of samples illustrating the regular building granite finishes, which the Association has adopted as standard. The selection and specification of finish for any specific job by reference to these standards, will assure definite and mutual understanding as to just what is wanted.

A model "Study in Granite" is included in the New York exhibit, illustrating the possibilities of combining various colors and textures, using standard granites.

Architects and the general building public are invited to inspect these exhibits when considering the selection of materials or finish.

Securing Estimates and Samples

The Association does not quote prices, but requests for preliminary or final estimates on granite work will be transmitted to interested members and estimates promptly obtained.

Plans and specifications for specific work may be sent in to the Association office and made available to its members for estimating purposes. Architects and contractors are invited to avail themselves of this service, which has proved its value and frequently produces bids which might not otherwise have been secured.

Requests for samples will be transmitted to members producing the kind and quality of granite desired, and information will be furnished as to where specific colors and qualities of granite may be obtained, whether produced by Association members or non-members.

The Association Code of Ethics

The Association stands for fair practice in bidding and advocates that bids, tendered in good faith in accordance with plans and specifications, should be fairly considered and used, both as a matter of principle and in order that the best interests of all parties concerned may be assured.

Uniform Proposal and Contract Forms

Uniform Proposal and Contract Forms for granite work have been prepared and adopted by the Association. The terms and conditions are fairly standardized and the equity of both parties has been carefully studied and protected.

These printed Association forms have been in use for several years and have met successfully the test of application. Two forms of contract are provided, one for the granite work "Set in Place" and one for the work "f.o.b." These Contract Forms are recommended by the Association for general use on granite work, and copies will be sent for inspection upon request.

Responsible Competitive Estimates

The Association, through its reports to members concerning prospective work and bids desired, stimulates competitive bidding, backed up by responsible concerns operating the best organized and equipped plants in the granite industry.

Continued on next page

Architects and contractors, who advise the Association concerning bids desired, undoubtedly will secure a larger number of responsible, competitive bids, with a minimum of effort and expense. Requests for bids, with information as to closing dates, are transmitted to the member companies upon receipt, and bids are sent direct to architect or contractor by those bidding.

The Association has no control over or responsibility for prices made or quoted by its members, and has no knowledge as to who are bidding or the amounts bid until after the bids are delivered and opened by the recipient on the date set for closing.

Financial and Production Responsibility of Individual Members of the Association

To meet successfully the demands of modern building construction, the granite producer must fulfill very definite requirements as to financial responsibility, type of organization, and adequacy of quarries and finishing plants.

Association members have been and are the leaders in developing their financial organization and production facilities to meet these exacting requirements. They can furnish unquestionable references as to past performance and responsibility, and are entitled to preferential consideration wherever building granite is under consideration.

In granite, as in other materials, bids are submitted and contracts undertaken by concerns which lack the experience and ability to execute them satisfactorily, and whose quarries and plants are inadequate to meet the requirements. These facts should be carefully considered when awarding the granite contract. Bids tendered by Association members should receive especial consideration on the ground that contracts based upon them will be satisfactorily executed.

Adequate and Dependable Quarries

In selecting granite for building purposes, the ability of the quarry to produce the quantity, sizes and quality of granite desired is the first essential. The quarry must be so equipped that its output may be handled and shipped at a rate to meet the cutting requirements, not only for the work under consideration, but all the work which may be simultaneously under contract.

The Association quarries, without exception, meet the above requirements. They are all quarries of established reputation and have been developed to meet the requirements of quantity production.

Modern Cutting and Finishing Plants

Granite is delivered to the finishing plant from the quarry in rough blocks—some already split to approximate dimension sizes, and others to be drilled and split to dimension, or sawed into slabs.

Modern building granite plants must be well equipped with up-to-date machinery and appliances for handling and manufacturing granite in considerable quantity, efficiently and with first class workmanship.

Included in the essential equipment of a modern granite finishing plant are saws, carborundum machines, polishing machines, pneumatic surfacing machines, turning lathes, sand blast, pneumatic hand and carving tools, and pneumatic drills. The handling equipment must be adequate and speedy, and arranged to serve the producing machinery and hand workers, and to handle the storing and loading, efficiently and safely.

The handling, machinery, sawing and polishing of granite requires power in large quantities. Adequate and dependable power is therefore a most important essential, and adequate blacksmith shops, carpenter shops and repair shops are also necessary accessories to a properly equipped plant.

Handwork is required in finishing the average type of architectural granite work, and a good journeyman granite cutter is one of the most skillful craftsmen in industry today. Modern tools and machinery have relieved this craftsman of a great deal of laborious and time consuming work, but his skill of hand and eye is as indispensable today as when the Egyptians cut their granite temples.

Association plants include the largest and best equipped plants of their kind in the country. They have been established for considerable periods and a "home guard" of skilled workmen has been built up to supply their steady demand for first class men. These are important factors in the superior ability of Association plants to fulfill both the quality and quantity demands for architectural granite work and entitle them to preferential consideration.

Each Member Has An Experienced Organization

Without a properly managed and experienced organization, even an adequate quarry and well equipped finishing plant will not ensure satisfactory execution of contracts.

Association members have built up organizations having the necessary experience and ability to put through whatever they may undertake. Their estimators have the benefit of actual cost figures covering a wide variety of executed work, thereby removing much of the guesswork and chance taking, because of which many a job is skimped and botched. Their draftsmen are the best trained men to be had and their knowledge of practical stereotomy, skill in layout and accuracy in figures may be counted upon to discover, in advance, errors in vital dimensions or impractical points in construction or jointing, thereby avoiding delay and expense to all concerned.

Experienced and practical salesmen constitute a service as well as a sales force, and the co-operation they are able to offer is frequently of no small importance in the securing of reliable preliminary estimates and in consultation as to practical economies possible.

Importance of Proper Planning and Supervision in the Mill

The planning and routing of work through the mill and its consistent and thorough inspection while in process and at completion, due to well trained and experienced plant management, is all reflected in expedited erection at the building and a minimum of interference with the progress of the work of other trades.

Inadequate or inexperienced plant management and supervision usually goes hand in hand with inordinately low bids, and poor workmanship, delayed and muddled deliveries, expensive tie-ups and delays to other trades on the building itself, usually follow as a natural consequence, and more than eat up any supposed savings.

The Association's Relation to Member Companies

The Association is maintained by its member companies as a vital and necessary extension of their individual organizations, to carry on collectively those important services which make for efficiency and economy and are alike beneficial to the users and producers of granite generally.

Continued on next page

CLASSIFICATION OF BUILDING GRANITES QUARRIED BY ASSOCIATION MEMBERS

White, Gray, Buff, Lavender, Pink, Red, Green

Name of Granite	Plate No.	Color	Grain	Technical Classification	Location of Quarry	Quarried by
Bethel White	1	White, faintly mottled with gray	Coarse inclined to medium	Quartz-monzonite.	Bethel, Vt.	Woodbury Granite Co., Inc., Burlington, Vt.
Mount Airy	2	Very light gray	Medium	Biotite	Mount Airy, N. C.	North Carolina Granite Corp., Mount Airy, N. C.
North Jay	3	Very light gray	Fine	Biotite-muscovite.	North Jay, Me.	Maine & New Hampshire Granite Corp., North Jay, Me.
Milford, N. H.	4	Light gray	Fine inclined to medium	Quartz-monzonite.	Milford, N. H.	Kittredge Quarries, Milford, N. H.
Carolina Gray	5	Light gray, flecked with pink	Medium	Biotite	Granite Quarry, N. C.	The Harris Granite Quarries Co., Salisbury, N. C.
Swenson Gray	6	Light to medium gray	Fine to medium	Muscovite-biotite.	Concord, N. H.	John Swenson Granite Co., Concord, N. H.
Mount Waldo	7	Light to medium gray	Medium	Biotite	Frankfort, Me.	Grenci & Ellis, Inc., Peekskill, N. Y.
Woodbury Gray	8	Medium gray	Medium	Biotite	Woodbury, Vt.	Woodbury Granite Co., Inc., Burlington, Vt.
Barre Building	9	Light to medium bluish gray	Fine to medium	Biotite	Barre, Vt.	Cut by Cook, Watkins & Patch, Inc., Barre, Vt.
Connecticut White	10	Medium buff gray, hammers light	Fine	Quartz-monzonite.	Waterford, Conn.	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York City
Light Mohegan	11	Light grayish buff	Medium	Muscovite-biotite.	Peekskill, N. Y.	Grenci & Ellis, Inc., Peekskill, N. Y.
Dark Mohegan	12	Deep yellowish buff	Medium	Muscovite-biotite.	Peekskill, N. Y.	Grenci & Ellis, Inc., Peekskill, N. Y.
Swenson Buff Antique	13	Light to medium grayish buff	Fine to medium	Muscovite-biotite.	Concord, N. H.	John Swenson Granite Co., Concord, N. H.
Goss Pink Deer Isle	14 15	Pinkish, lavender tinted, medium gray	Coarse	Biotite	Crotch Island, Stonington, Me.	John L. Goss Corp., Stonington, Me.
Old Pink Milford	16	Light to medium pink with black spottings	Medium to coarse	Biotite	Milford, Mass.	L. Luchini & Son, Milford, Mass.
Swenson Pink	17	Light pink with occasional black waves and pink stripes	Medium to coarse	Biotite	North Berwick, Me.	John Swenson Granite Co., Concord, N. H.
Conway Pink	18	Light pink mottled with large dark gray and small black spots	Coarse	Biotite	Redstone, N. H.	Maine & New Hampshire Granite Corp., North Jay, Me.
Somes Sound	19	Light pinkish buff mottled with gray.	Medium inclined to coarse	Biotite	Mt. Desert, Me.	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York City
Carolina Pink	20	Light mottled pink.	Medium inclined to coarse	Biotite	Near Granite Quarry, N. C.	Cut by The Harris Granite Quarries Co., Salisbury, N. C.
Balfour Pink	21	Light, uniform, slightly purplish pink	Medium	Biotite	Granite Quarry, N. C.	The Harris Granite Quarries Co., Salisbury, N. C.
Jonesboro Red	22	Medium reddish pink uniformly mottled with smoky quartz and flesh colored feldspar	Coarse inclined to medium	Biotite	Jonesboro, Me.	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York City
Conway Green	23	Dark olive green with black spottings	Coarse	Biotite-hornblende.	Redstone, N. H.	Maine & New Hampshire Granite Corp., North Jay, Me.

Continued on next page

BETHEL WHITE

Quarried and cut by:
Woodbury Granite Co., Inc.
Burlington, Vt.
Quarry at Bethel, Vt.

A strictly white, quartz-monsonite granite faintly mottled with gray, and with coarse inclining to medium grain. Its hammered face is considerably whiter than its rough or polished face and hammering also diminishes the prominence of the gray micaceous spots. Takes a high polish which emphasizes the gray mottling and mica spottings. Is beautifully white in hammered finish and is excellently adapted for fine carving.

Note: Actual granite much whiter than reproduction.



Plate No. 1. Bethel White Granite—Hammered

MOUNT AIRY

Quarried by:
North Carolina Granite Corp'n
Mount Airy, N. C.
Cut by:
J. D. Sargent Granite Co.
Mount Airy, N. C.
North State Granite Co.
Mount Airy, N. C.
Mount Airy Granite Cutting Co.
Mount Airy, N. C.

A very light gray, almost white biotite granite of medium grain. The nearly white background of feldspar is evenly mottled with slightly bluish-gray quartz and uniformly stippled with small biotite crystals, emphasizing the whiteness and giving strong character to the granite. Especially adapted for building work and mausoleums.

Note: Actual granite whiter than reproduction.

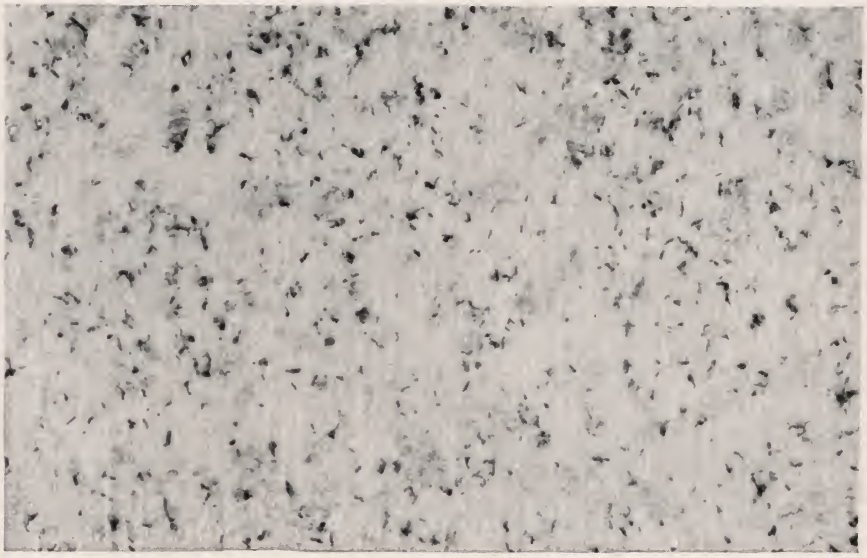


Plate No. 2. Mount Airy Granite—Hammered

NORTH JAY

Quarried and cut by:
Maine & New Hampshire Granite Corp'n
North Jay, Me.

A very light gray biotite-muscovite granite with fine even grain. Its general whiteness is due to the whiteness of its feldspars and clearness of its quartz. Fine, evenly distributed particles of biotite give life to the granite and emphasize its lightness of color. Its free working qualities, light color and fine grain adapt North Jay Granite equally well to fine details and carving or plain work of more rugged character.

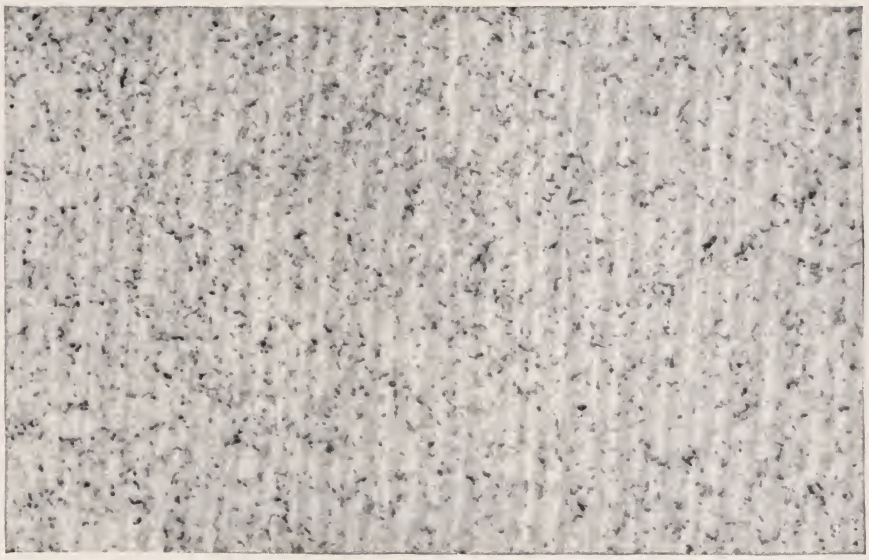


Plate No. 3. North Jay Granite—Hammered

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A SERVICE FULFILLING THE RECOMMENDATIONS OF THE AMERICAN INSTITUTE OF ARCHITECTS

Institute Advocates Knowledge of Materials

For a number of years the various chapters of the American Institute of Architects have advocated closer relations between the architect, designer and craftsman, and a more intimate knowledge of materials and methods of working them, so that better architecture may be produced.

Since earliest times granite has been used in the finest of buildings because it combines beauty and durability to an unusual degree. More recently, since cost became such an important factor, the use of granite has often been restricted because of excessive cost over softer, more easily working stones. A better understanding of its exceptional architectural qualifications, and how to adapt design and details to take fullest advantage of its aesthetic qualities and economical methods of cutting, would ordinarily so reduce the cost that the use of granite would be greatly increased.

The greatest asset of the true designer is complete sympathy for and knowledge of the material in which he designs. It is therefore important that both the designer and specification writer be as fully informed as possible concerning granite and its economical working possibilities. To that end this Association offers its services.

Information on Granite Made Available

Several years ago the National Building Granite Quarries Association decided that all possible information regarding granite and its economic use should be collected and made available to architects and users. This could be done more efficiently by the Association than by individual producers, as it involved considerable expense and, to be of maximum benefit, should be unbiased, continuous and representative of the best experience and practice. The Research and Information Bureau was therefore set up in the Association and a fund of reliable and useful information, heretofore not generally known outside the industry itself, was made available to architects, designers and specification writers.

GRANITE AND ITS ARCHITECTURAL QUALIFICATIONS

Natural Qualifications

Granite has exceptional strength and durability, is practically non-absorbent, and indefinitely withstands exposure to climate and weather. It is available in a wide range of colors and textures and has inherent beauty and character to be found in few other materials.

Granite may be cut into any form desired and dressed in a great variety of finishes. It takes a high and durable polish which will withstand long exposure to the weather. It may be carved with as much refinement of detail as desired. Granite is pre-eminently suited by nature for exterior architectural uses, and its natural qualifications are unsurpassed and rarely equalled by any other building stone.

Description of Granite

Granite is technically described as a holocrystalline, granular rock of igneous origin. The essential constituents are quartz and a potash feldspar. The principal accessory mineral is usually either mica or hornblende. Other minerals occur in small quantities, but are generally secondary to those mentioned.

The accessory mineral, mica, occurs in two forms—black mica or biotite, and white mica or muscovite. The hornblende in building granite is usually black or a very dark green.

Granites are technically classified by the predominating accessory mineral. The most common varieties of building granites are known as biotite, muscovite, biotite-muscovite, muscovite-biotite, hornblende, biotite-hornblende, and quartz-monzonite granites.

As a general rule the color of granite is determined by that of its feldspars, and the hardness by the quartz and feldspars, varying according to the proportion and hardness of the feldspars.

Colors and Textures—The granites produced by Association members include many shades of gray, lavender, pink, red, green, brown, buff, and white.

Natural texture varies according to the distribution and size of crystals of the constituent minerals. Granite is graded, as to grain, by the size of its feldspar crystals, from very fine to very coarse. The size of crystals or coarseness of grain has practically no bearing on the structural qualities, but gives to granite the variety of texture which adds greatly to its architectural possibilities.

Physical and Chemical Tests

The standard building granites produced by Association members so far exceed all ordinary architectural requirements as to physical and chemical properties, that specific data on physical tests and chemical analyses have little or no bearing upon the relative architectural merits of the different granites.

In confirmation of this, a detailed statement prepared by George F. Loughlin of the United States Geological Survey is on file in the Association office, a copy of which will be mailed on request.

Quality of Material and Workmanship

As noted under "Physical and Chemical Tests," the standard building granites so greatly exceed all possible requirements of architectural use, that standards as to quality of material are unnecessary, other than that they be sound, free from flaws or defects which would impair their strength and from stain or defects which would mar their appearance.

Quality of workmanship has been graded by usage into three classifications, which, while somewhat elastic and difficult to define exactly, are pretty well established and recognized in the trade, as follows:

Monumental Building Grade—For permanent buildings designed to perpetuate public pride or civic spirit, where utility and economy are subordinate to architectural merit, such as State house, courthouse, library or public memorial.

Good Commercial Grade—For high class buildings designed both for utility and to express something of the character, dignity and stability of the occupancy, such as banks or insurance buildings, high class office buildings, churches, schools, etc.

Ordinary Commercial Grade—For buildings where architectural appearance is subordinate to utility and governed by economic considerations. Workmanship will meet requirements of structural safety, but not carried beyond the point of a good appearance to the casual observer.

Color Plates

Plates Nos. 1 to 23 reproduce in color the principal building granites produced by Association members. They are full size as to grain but approximate only as to color. Both polished and hammered samples are included and it should be borne in mind that polishing brings out color and deepens tone while hammering lightens and softens the color of the granite. These plates will assist in making preliminary selections but final selections should always be made from actual samples.

Continued on next page

MILFORD NEW HAMPSHIRE

Quarried by:
Kittredge Quarries
Milford, N. H.

A quartz-monzonite granite of light gray shade with a very slight bluish tinge, spangled with black mica. The Kittredge quarry produces a fine, inclining to medium grained granite for building work and a very fine grained granite for monumental uses. The chief characteristics of the finer grained granite are its uniformity and delicacy of tint and its adaptability for fine details and carving. Its free working qualities well adapt it for general building purposes and also for curbing and paving.

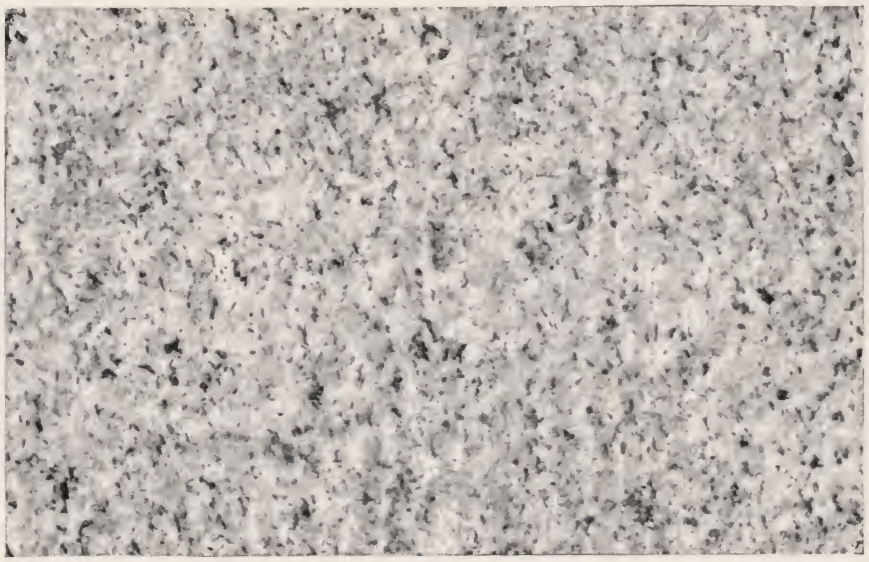


Plate No. 4. Milford New Hampshire Granite—Pointed

CAROLINA GRAY

Quarried and cut by:
The Harris Granite Quarries Co.
Salisbury, N. C.

A light gray biotite granite of medium grain. Sparsely scattered flecks of pink give the surface a unique character especially when polished. These small pink spottings are not close enough together to modify the light gray color, but give life and warmth to the stone and emphasize its whiteness. It takes a good polish, dresses well under the hammer and is well suited to building uses.



Plate No. 5. Carolina Gray Granite—Polished

SWENSON GRAY

Quarried and cut by:
The John Swenson Granite Co.
Concord, N. H.

A muscovite-biotite granite of light to medium bluish gray color and fine to medium, somewhat porphyritic texture. Polishing deepens the tone and brings out the bluish cast, while hammering lightens the color appreciably, there being considerable contrast between the rough and hammered faces and strong contrast between hammered and polished. The fast working qualities of this Concord granite contribute materially to economical cutting, and it is used extensively for both building and monumental work.



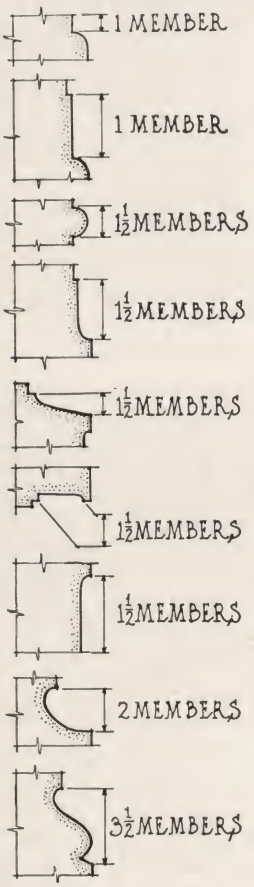
Plate No. 6. Swenson Gray Granite—Polished

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DETAILING FOR GRANITE—THE USE OF THE "MEMBER SYSTEM" IN ESTIMATING COSTS

The use of granite is often restricted because of its cost as compared with freer working stones. The cost of granite need not be so frequently prohibitive if certain facts are considered by the specification writer and the designer.

The cutting of mouldings on granite work involves a greater amount of expensive hand labor than on other classes of work. Mouldings lend themselves to reasonable modification and the cost savings possible are well worth careful consideration when detailing for granite. Some knowledge of the method generally used in estimating cost of cutting granite mouldings will give the designer a good idea as to the relative cost importance of moulded details.



The "Member System" for Estimating Granite Mouldings

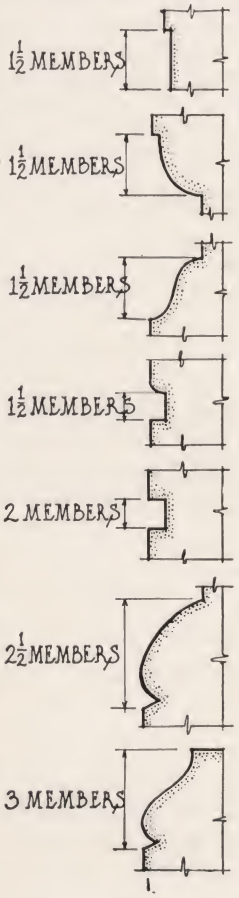
The so-called "Member System" is generally used in estimating cost of cutting granite mouldings.

The profile of a moulded section is first divided into units called "members," a "member" being a more or less arbitrary unit in which the edges, contour, changes in direction and width between edges are taken into consideration.

In counting the number of "members" in any given profile, no hard and fast rules can be laid down, but 4 in. of any contour is the maximum to be counted as a single member. Several basic member counts are illustrated here, and from these practically any ordinary moulded profile may be built up and counted.

To estimate the approximate cost per lineal foot of a moulded profile, multiply number of "members" by the unit of "member" cost per lineal foot and add the cost of plain face displaced by the membered surface at its unit cost per square foot.

The unit cost per lineal foot of "member" varies with grade of granite and finish, as do the unit costs per square foot of plain surface. For approximations, one lineal foot of "member" may be considered equal to a square foot of plain surface for any given granite or finish.

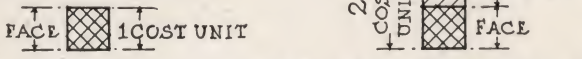


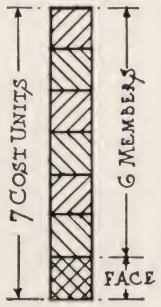
Relative Cost of Plain and Moulded Faces

The cost per lineal foot of a moulded surface, as explained above, is approximately:

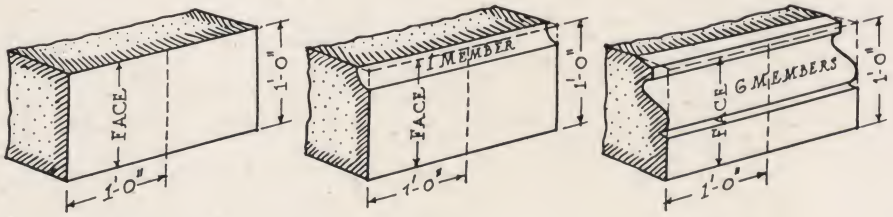
Area of face @ face unit + number of members @ member unit

The example below visualizes the application of this rule in making relative cost comparisons. Three granite sections are shown of equal face area. "A" has no members; "B" has one member; "C" has six members. The relative cost per lineal foot is illustrated by the squares above each section.





COST PER LINEAL FOOT



(A.) (B.) (C.)

PLAIN AND MOULDED SECTIONS OF EQUAL FACE AREA

Assume cutting cost unit for plain face and for members is $1.50. Applying this unit to these examples, the surface cost per lineal foot of "A" = $1.50; "B" = $3.00; "C" = $10.50. From this example the relative cost effect of superfluous "members" is quite apparent.

The designer, when detailing for granite, can quickly apply this principle to any moulded section under consideration.

PLATE A

Continued on next page

MOUNT WALDO

Quarried and cut by:
Grenci & Ellis, Inc.
Peekskill, N. Y.
Quarry at Frankfort, Me.

A biotite granite of light to medium gray shade and with medium inclining to fine, even grained texture. The whiteness of the feldspars is lightly shaded by the gray smoky quartz. Small but well defined biotite crystals distributed quite uniformly but coarsely over the surface give life and character to the granite and emphasize the whiteness of the feldspars. It works freely under the hammer and is well adapted to general building uses.



Plate No. 7. Mount Waldo Granite—Hammered

WOODBURY GRAY

Quarried and cut by:
Woodbury Granite Co., Inc.
Burlington, Vt.
Quarry at Woodbury, Vt.

A medium gray biotite granite with somewhat bluish cast and medium texture. Its mineral contrasts are quite marked, especially on the polished face. It is adapted for both building and monumental uses, the monumental grade having a fine inclining to medium texture and somewhat less marked mineral contrasts. Woodbury Gray works well under the hammer and is well adapted for both plain and carved work.

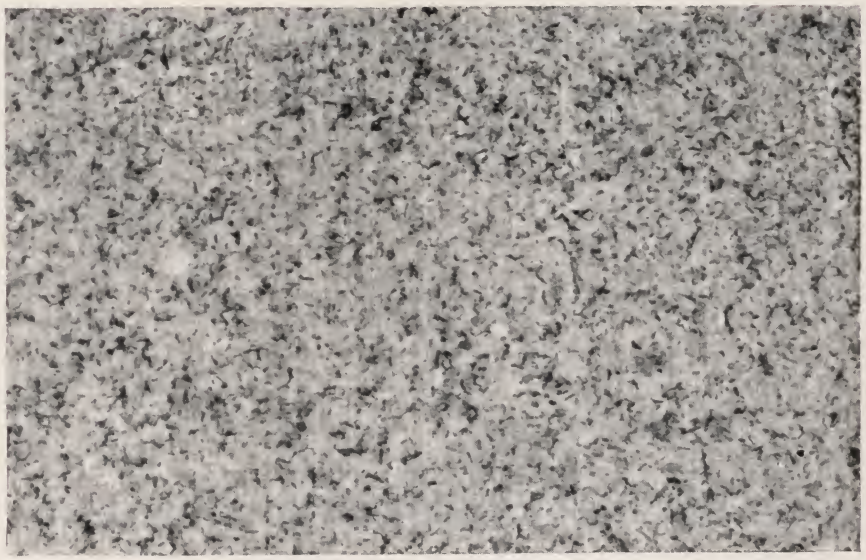


Plate No. 8. Woodbury Gray Granite—Hammered

BARRE BUILDING

Cut by:
Cook, Watkins & Patch, Inc.
Barre, Vt.
Quarried at Barre, Vt.

A biotite granite of light medium, slightly bluish gray color and fine to medium grain. It is somewhat coarser and less even grained than the "Light Barre" granite produced by the same quarry for monumental purposes, but is otherwise identical and of equal physical quality with the monumental grade. Its good weathering and easy working qualities well adapt this granite for all building purposes.



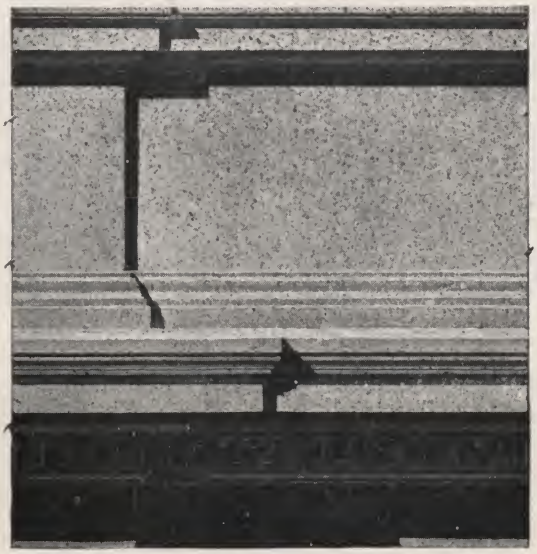
Plate No. 9. Barre Building Granite—Polished

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EXAMPLE OF DETAILING FOR GRANITE

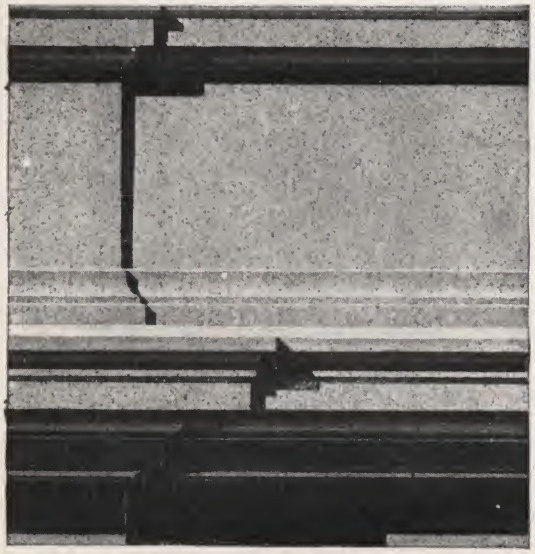
Simplification of Moulding—Applied to Specific Detail

The details below are taken from Plate XXVIII —Studies in Granite, illustrated on second page following. Profile "A" is as originally detailed, while "B" shows suggested modification for economy. The approximate saving is worked out below, showing that intelligent study of granite detail may produce material economies without seriously affecting aesthetic values.

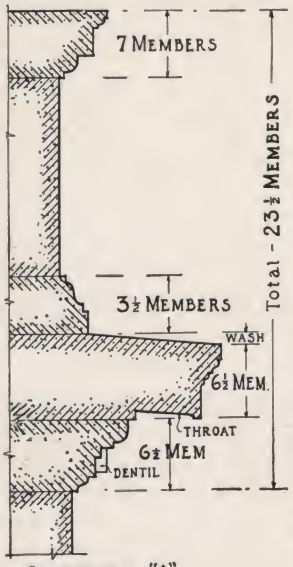


ORIGINAL PROFILE "A"





PROFILE AS MODIFIED "B"



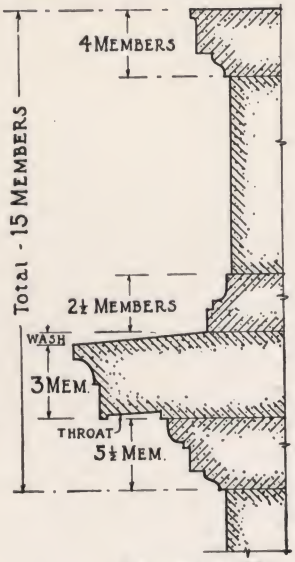
SECTION "A"

Comparison Between the Details Illustrated Showing Difference in Cost Based on the "Member System"

Profile "A" equals 23½ members + dentils
Profile "B" equals 15 members
Saving: "A" — "B" equals 9 members + dentils

Assume that one member costs $1.50 per lineal foot, and dentils at $3.00 each. The approximate saving then is $12.75 for members and $9.00 for dentils, or a total saving of $21.75 per lineal foot.

Apply this to the perimeter of the building and the total speaks for itself.



SECTION "B"

Other Studies and the Co-operation of Members of the Association

The Association has prepared comparative studies in modification of detail for economy, which are published as part of our series of "Studies in Granite" in the form of plates, similar to Plate XXVIII, as follows:

Plate XXVI—Main Entrance to Farnese Palace, Rome.

Plate XXVIII—Entrance to Palazzo Sciara di Carbognano, Rome.

Plate XXX—Entrance to Palazzo Negroni, Rome.

Plate XXXII—Entrance to Casino of Papa Giulio's Vineyard, Rome.

Plate XXXIII—Entrance to Habitation Building, Casino of Papa Giulio.

Plate XXXIV—Window, Casino of Villa di Papa Giulio.

The representatives of the Association, or the local representatives of its various member companies, are always glad to give practical advice, from the granite man's viewpoint, as to best and least expensive types of granite construction and detail. For the architect to avail himself of this service may save him considerable time and expense in revising shop drawings after bids are taken and costs found to be excessive.

PLATE B

Continued on next page

CONNECTICUT WHITE

Quarried and cut by:
Booth Bros. & Hurricane Isle Granite Co.
208 Broadway, New York City
Quarry at Waterford, Conn.

A quartz-monzonite granite of medium buff-gray color and even, fine grained texture. It hammers very light and its even tone and very fine grain adapt it to fine architectural and sculptural work. It is also a very fine-graded monumental and inscriptional granite. It takes a high polish which gives a buff-tinted medium to dark gray shade without mineral contrasts.



Plate No. 10. Connecticut White Granite—Hammered

LIGHT MOHEGAN

Quarried and cut by:
Grenci & Ellis, Inc.
Peekskill, N. Y.

A muscovite-biotite granite of light grayish-buff color and medium grain. The mica in Mohegan granite is not abundant and has very little influence upon the shade or texture of the stone. The general whiteness of the feldspars is softened by a delicate tint of buff giving it the mellowed look of old ivory. It works well under the hammer and is well adapted to carving.

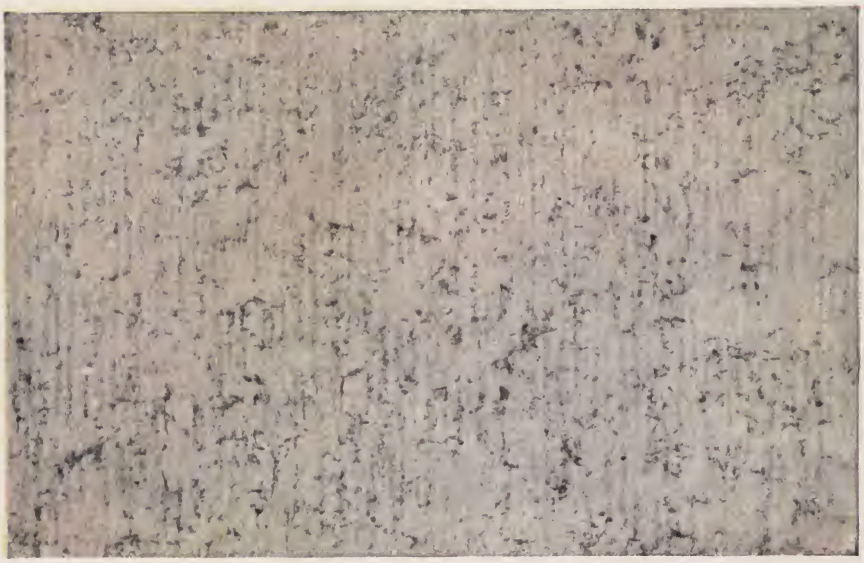


Plate No. 11. Light Mohegan Granite—Hammered

DARK MOHEGAN

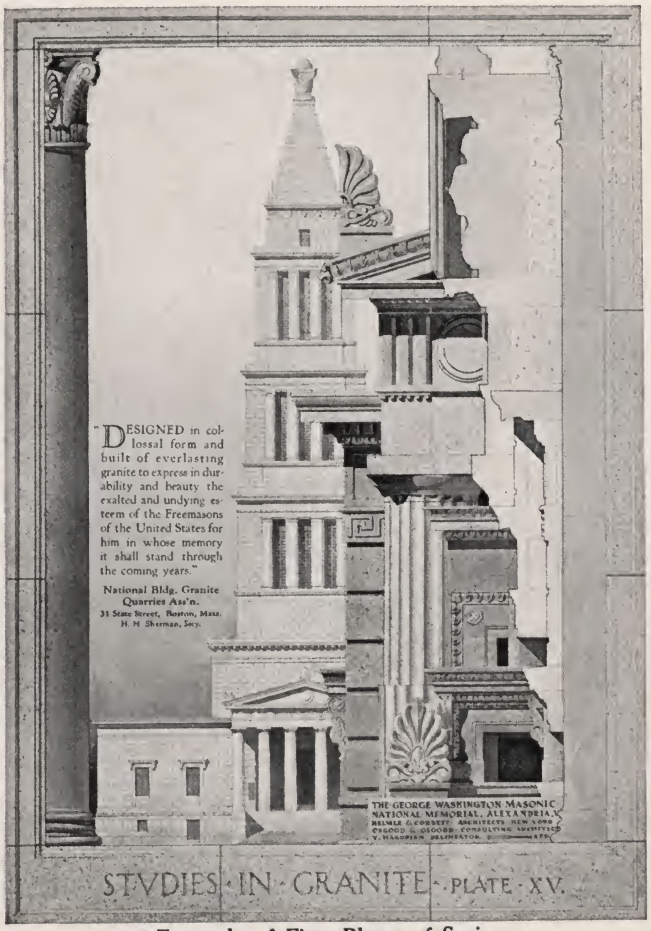
Quarried and cut by:
Grenci & Ellis, Inc.
Peekskill, N. Y.

Dark Mohegan is identical with Light Mohegan except that its general color is a deep, yellowish-buff, which appears to be a primary color and permeates the entire stone. The deeply tinted yellow crystals give a decidedly golden cast to the polished face, and in hammered finish the surface has the soft deep buff color which is the chief characteristic of Mohegan granite.

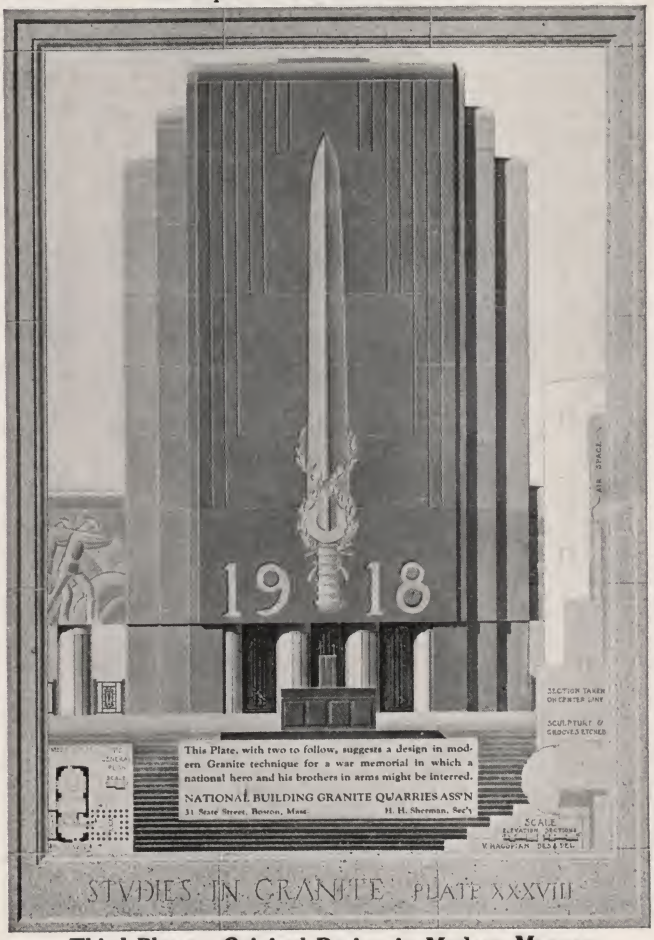


Plate No. 12. Dark Mohegan Granite—Hammered

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Example of First Phase of Series

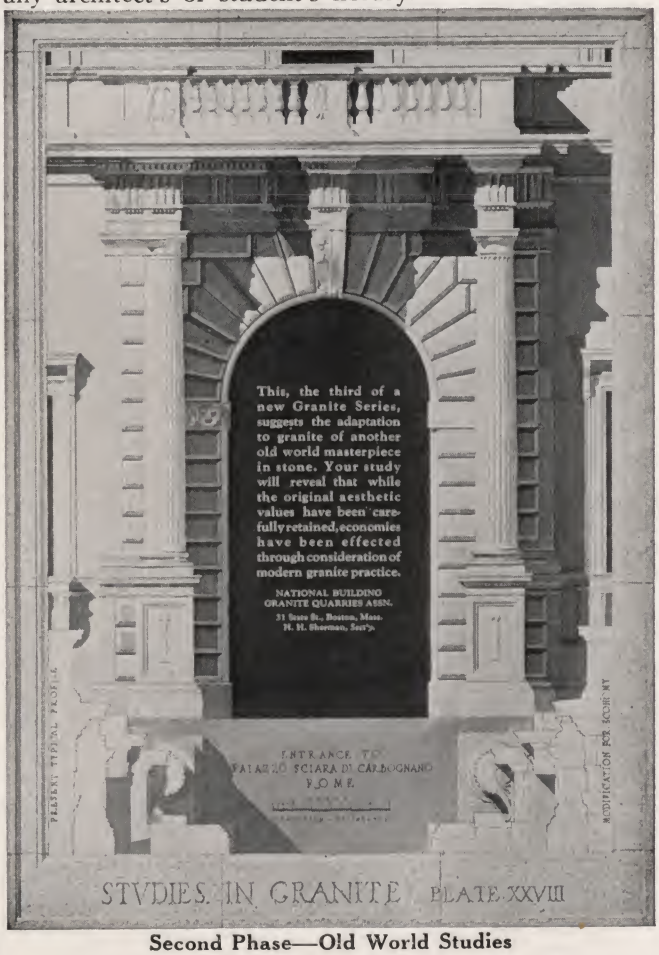


Third Phase—Original Design in Modern Manner

STUDIES IN GRANITE

The Association has been developing an interesting series of carefully rendered plates entitled "Studies in Granite." These plates illustrate the architectural use of granite and have been prepared for the information and use of designers, draftsmen and architectural students. This series has grown to a present total of forty plates, divided into three phases or groups. They have attracted world wide attention and splendid comment from the profession for their excellence in composition, rendering and practical value.

This entire series has been rendered by Vahan Hagopian, and each plate has been the subject of careful study, both from the aesthetic and practical viewpoint. They are of sufficient excellence and practical value, we believe, to make them a valuable addition to any architect's or student's library.



Second Phase—Old World Studies

The first group of twenty-five plates illustrates granite projects designed by contemporary American architects. Plate XV, illustrated at reduced size on this page, is typical of this group.

The second group, Plates XXVI to XXXIV inclusive, is based on studies of old world masterpieces in stone. Original details are compared with suggestive modifications to illustrate the possibilities of simplification without serious detriment to aesthetic values.

The phase, of which Plate XXXVIII is typical, consists of original designs illustrating the exceptional adaptability of granite to the modern trend in design and construction. This group starts with Plate XXXV and is still being added to.

The complete set of plates in any or all the groups will be sent upon request to any architect, designer, draftsman or architectural student.

Continued on next page

SWENSON BUFF ANTIQUE

Quarried and cut by:
The John Swenson Granite Co.
Concord, N. H.

A muscovite-biotite granite of light to medium grayish buff color and fine to medium grain. It is available in variegated buff tints produced by the delicate blending of brown and gray in the mica and feldspar. It has a softness of tone and pleasing antique character which give unique charm to the work in which it has been used. Buff Antique is effective in hammered or polished finish and is especially attractive as split face ashlar with hammered trim.



Plate No. 13. Swenson Buff Antique Granite—Hammered

GOSS PINK DEER ISLE

Quarried by:
John L. Goss Corporation
77 Summer St., Boston, Mass.
Quarry at: Crotch Island, Stonington, Me.

A biotite granite of pinkish lavender-tinted medium gray color and coarse, even-grained texture. The mineral contrasts, softly blended on the hammered face, produce a very attractive pattern when polished, the predominating lavender colored feldspar rimmed and intergrown with milk-white feldspar, in a background of smoky quartz accented with small, sparsely scattered crystals of biotite. It works well under the hammer and takes an excellent polish.

Plate 14 shows this granite in hammered finish and Plate 15 in polished finish.

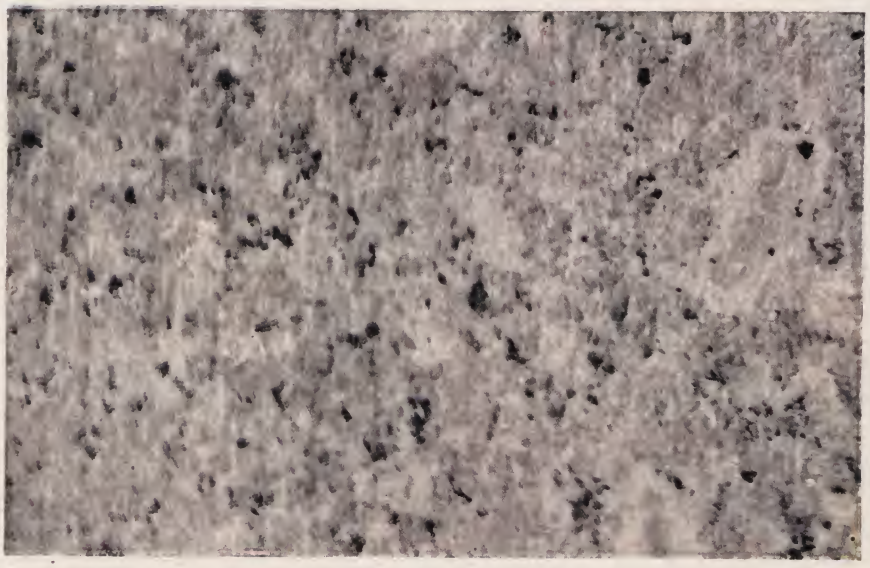


Plate No. 14. Goss Pink Deer Isle Granite—Hammered

Goss Pink Deer Isle Granite
Is cut by the following Association members:

Booth Bros. & Hurricane Isle Granite Co.
208 Broadway, New York City

Cook, Watkins & Patch, Inc.
Barre, Vt.

Grenci & Ellis, Inc.
Peekskill, N. Y.

Providence Granite Co.
Providence, R. I.

The John Swenson Granite Co.
Concord, N. H.

Alexander Thomson, Inc.
Providence, R. I.

Woodbury Granite Co., Inc.
Burlington, Vt.

A. Le Poidevin & Co., Inc.
286 Fifth Ave., New York, N. Y.



Plate No. 15. Goss Pink Deer Isle Granite—Polished

Continued on next page

PRACTICAL NOTES ON GRANITE SPECIFICATION AND DESIGN

Granite Versus Less Durable Material

Architects frequently claim that cost considerations compel the use of softer stones or material admittedly less durable and appropriate than granite.

Before ruling out a superior material like granite because of supposedly prohibitive cost, the greatest latitude should be permitted in stock, finish, jointing and details. Unsightly discoloration, weathering away or disintegration will soon neutralize or eventually efface any extra aesthetic effects which the substitution of a cheaper, less durable material may temporarily provide. The crudest of granite work retains its superior qualities indefinitely, and good granite work remains a joy forever.

The cost of granite need not ordinarily be prohibitive if certain fundamental facts are taken into consideration by the specification writer and designer.

In Regard to Specifying Color and Finish

Cost will be reduced if reasonable variations in color and texture, characteristic of most quarries, are permitted, eliminating only too obvious defects such as unsightly knots or clearly defined stripes.

Kind and quality of finish should be gauged by its effect in the building rather than at close range. The finer cuts are often specified where coarser finish would be more suitable and less expensive. Rock face and pointed work may often be used in place of hammered work, at less cost and with good effect. For plain surfaces, especially for work not near the eye, sawed finish or sawed and sand blasted is often more suitable and always economical.

Beds and Joints Deserve Attention

A surprising percentage of the cost of granite work is in the cutting of beds and joints. Elimination of unnecessary requirements here will produce material savings. Bush-hammered edges and unnecessary fullness of beds and joints add needless expense.

To require the same quality of arris and bed on coarse finishes as on fine hammered work is an expensive fallacy. It is sound trade custom to make beds conform to surface finish. Fullness of bed is a structural matter and it is sufficient in granite to provide reasonably full bearings near each vertical joint.

We recommend ¼ inch as the minimum allowance for beds and joints on monumental building work. On coarser textured work ⅜-inch or ½-inch joints are adequate and effective. For rock-face and more massive masonry even larger joint allowances are recommended.

Mouldings and Ornament

Hand cutting is required on practically all moulded work and ornament. The cost of hand labor is the most expensive item in granite cutting. Elimination of unnecessary members and simplification of details will reduce cost materially. Study of Plates "A" and "B," pages 8 and 10, will be of real help to the designer in working out his moulded details for economical production.

Special attention is also called to description of the sand blast process on page 16, and to carborundum sawing on page 24.

The use of the sand blast process and carbo-saw cuts for ornament opens up new and interesting possibilities for designers in granite.

Granite Carving and Models

Granite can be carved with the same delicacy of treatment and detail as much softer and less durable stones. The pneumatic carving tool, in the hands of a skilled granite carver, has made it possible and practical to carve granite to almost any extent desired, the only limiting factor being that of cost.

In the preparation of details and models for granite carving, three points should be considered: the color and texture of the granite; location in the building as to distance from the eye; and location as to sunlight.

Delicate detail would generally be wasted on a coarse grained granite having strongly contrasting mineral constituents. In a fine grained, light colored granite, or a granite of light uniform tone regardless of grain, delicate details would appear more nearly in their true values.

The character of detail and treatment, both from the aesthetic and economic viewpoints, should be regulated by the location of the carving in the building both as to distance from the eye and as to light and shade effects in different exposures.

A Few Cost Saving Pointers

The cost of granite work may be materially reduced by a study of the countless minor details from the viewpoint of economical production. A few pointers are given below as typical examples, and a study of the various granite plates illustrated in this catalogue will suggest others.

Color and Texture—Permit reasonable variations in color and grain, characteristic of the quarry from which the granite is taken.

Finish—Judge the quality of finish by its appearance in the building and specify the coarsest finish which will give the desired effect. For plain work utilize where possible the surface as it comes from the saw, lightly steeled or sand blasted to avoid possibility of rust stain.

Beds and Joints—Arrises and bed edges should conform to quality of face finish. Do not require ten-cut edges on four-cut work. Reasonably full bearings near each vertical joint are sufficient for stability. Full beds entire length of stone involve needless expense.

Jointing to Save Stock and Hand Cutting—Internal angles, cut in the solid should be avoided by jointing up. Joint heads to avoid expensive back checking for steel or backing. Cornices and similar courses can often be jointed to permit sawing or machining of flat surfaces, and to save stock.

Projections—Avoid projections on courses which might otherwise be sawed or machine surfaced.

Steps and Platforms—For safety and economy four-cut or machine point treads. Sawed treads and split risers are effective and practical for inexpensive steps. Avoid unnecessary bedding to exact height by allowing at least 2 inches between top of concrete and bottom of stone on plans.

Simplification of Mouldings—Simplify as much as possible by eliminating unnecessary members and unimportant details. (See Plates "A" and "B," pages 8 and 10.)

Avoid Raised Seats and Lugs—Raised seats and lugs on balustrade base, platforms, sills and thresholds are expensive. Keep to flat surfaces where possible, using depressed lugs if necessary.

Area Coping—Four-cut or machine pointed top and split face is economical and usually adequate. Omit rabbets for grilles, substituting iron brackets. Eliminate lock joints and substitute dowels.

Balusters—Substitute round for square plinths on turned balusters. Bed to slope of base to avoid raised seats.

Rustications, Rabbets, Checks and Drips—Detail to be carbo-sawed rather than for hand cutting.

Eliminate Guesswork in Estimating—Make plans, details and specifications as complete and clear as possible and ensure closer and more intelligent estimates.

Detail for Granite—Detailing for stone, regardless of whether it is to be of granite, marble or limestone, is responsible for much of the extra cost of granite. Best results will be secured if details are made specifically for granite. The Association can render real service here if consulted while details and specifications are under way.

Continued on next page

OLD PINK MILFORD

Quarried by:
L. Luchini & Son
Milford, Mass.

A biotite granite of light to medium pinkish-gray color accentuated with sparsely scattered black spots. Its texture is medium to coarse, somewhat gneissoid but more even grained than the old adjoining Norcross quarry. A finer grained variety is also quarried in which the black spots are smaller and more closely distributed, giving a finer texture with about the same pinkish color and shade as the coarser grained stone.



Plate No. 16. Old Pink Milford Granite—Polished

SWENSON PINK

Quarried and cut by:
The John Swenson Granite Co.
Concord, N. H.

Quarry at North Berwick, Me.

A light pink biotite granite with medium to coarse texture. Occasional waves of closely segregated black and stripes of pink give a unique and attractive variation in texture. The more uniform areas have a background of creamy and pinkish feldspars, flecked with reddish pink plagioclase, mottled with smoky quartz and accented with occasional crystals of sparkling biotite. It hammers well and takes a high polish.

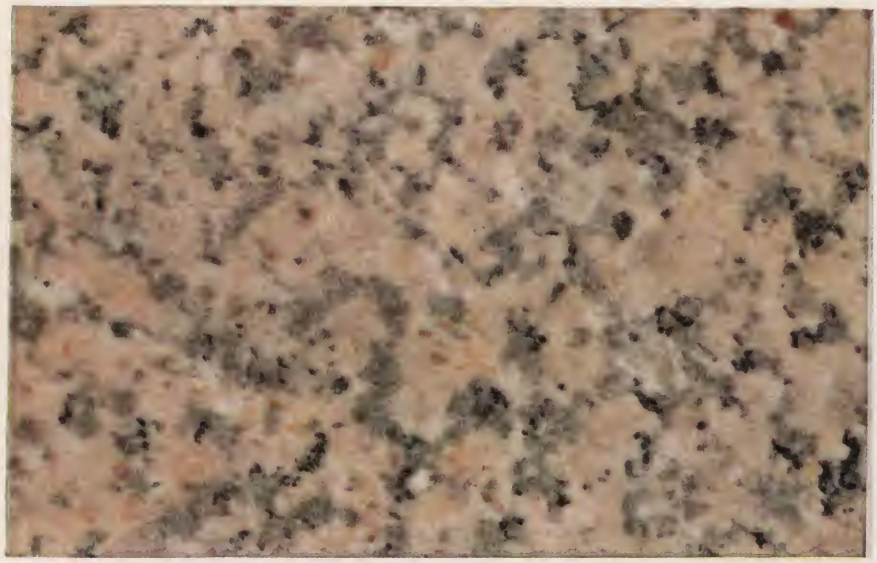


Plate No. 17. Swenson Pink Granite—Polished

CONWAY PINK

Quarried and cut by:
Maine & New Hampshire Granite Corp'n
North Jay, Me.

Quarry at Redstone, N. H.

A biotite granite of light pinkish-gray color uniformly mottled with large dark-gray and small black spots, and having a coarse, even-grained texture. The mineral contrast is mostly between the pink feldspar and the smoky amethystine quartz, which, especially in polished finish, is quite marked and very pleasing. Minor spots of black mica give added character and interest. This granite works freely under the hammer and takes a brilliant polish.



Plate No. 18. Conway Pink Granite—Polished

Continued on next page

THE ECONOMICAL SAND BLAST PROCESS AND ITS POSSIBILITIES FOR APPLICATION TO GRANITE CARVING AND SURFACE TREATMENT

The Sand Blast Process Described

This process has well been termed a "harnessing of the sand storm," for the sand blast is controlled at will to the etching of unique and beautiful ornaments. The cutting medium is white silica sand, or similar abrasive, driven through a controlled nozzle at very high velocity by compressed air, under absolute control of the operator.

The face of the stone to be "blown" is covered by a rubberlike composition about 1/8 in. thick, termed "dope" or "glue" in the trade. This "dope" is then cut away from the parts to be etched, forming, in effect, a stencil of the outline or ornament.

The sand blast etches away the granite thus exposed to the depth required in a remarkably short time. After the stenciled design is "blown," the blanket of "dope" is removed from the stone, revealing a remarkably clean cut intaglio possessing a unique texture and beauty impossible to duplicate by any other means.

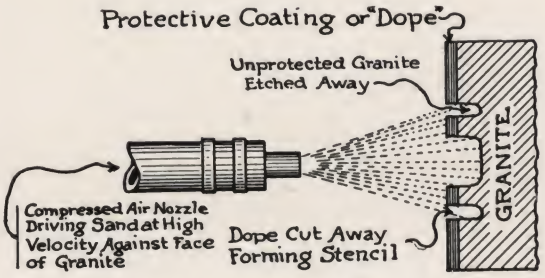


Diagram Showing Principle of Sand Blasting Process

Surfaces may also be etched in a similar manner to a moderate depth to produce sinkages and unique texture effects having almost limitless possibilities.

This, in brief, is the process. There are many variations in technique, and combinations of blowing, re-doping and re-blowing, by means of which a skillful operator may produce effects in shading, variable depths and texture which have unrealized possibilities of application and development.

Simple Forms of Application

The sketches below illustrate a few typical forms of application, from which the basic principles of sand blast ornament, as developed in the memorial granite industry, may be visualized. Applications of these simple principles to architectural ornament may be developed to any extent desired.

While the sinkage produced by the etching is relatively slight as compared to regulation carving, the sharpness of its cuts and the unique tone and texture of its surfaces in contrast with hammered or polished surfaces, produce effects which cannot be duplicated by any other method.

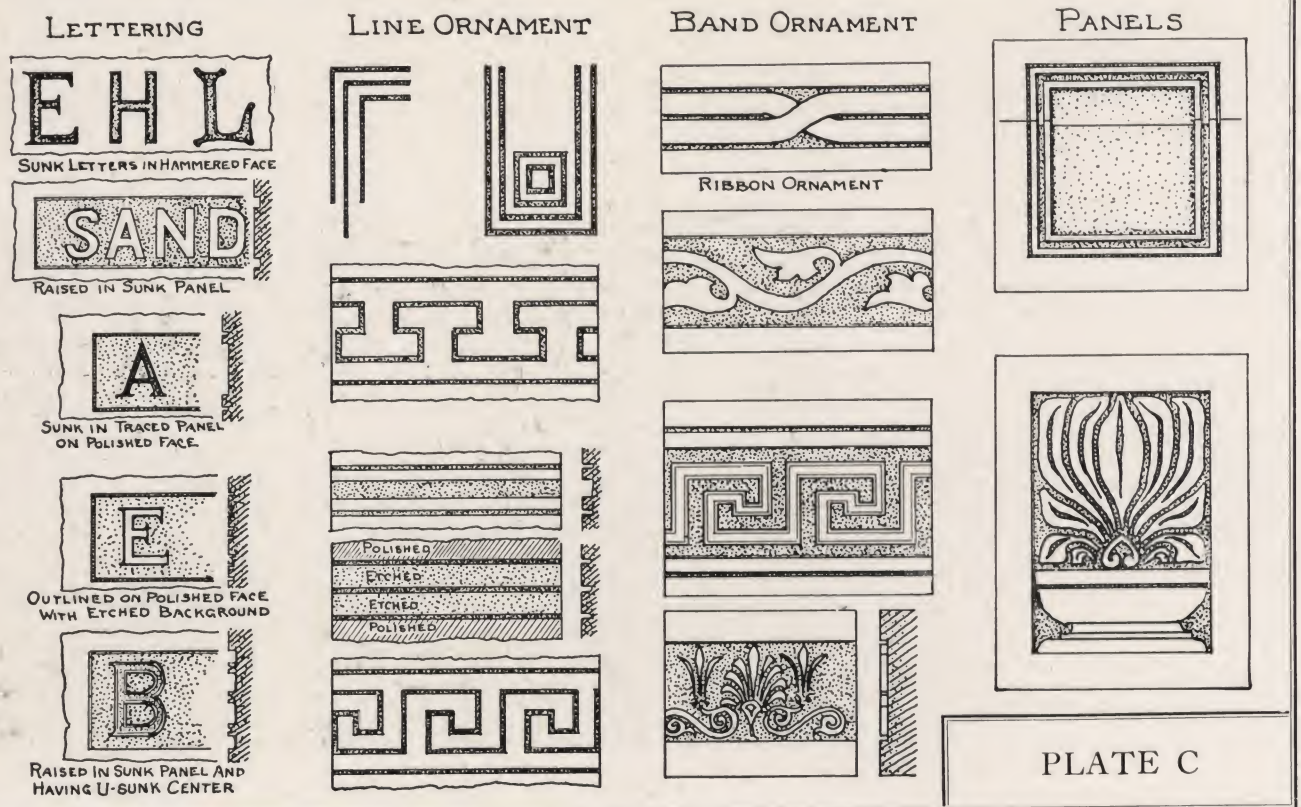


PLATE C

Continued on next page

SOMES SOUND

Quarried and cut by:

Booth Bros. & Hurricane Isle Granite Co.
208 Broadway, New York, N. Y.

Quarry at Mt. Desert, Me.

A biotite granite of light pinkish-buff color with a medium, inclining to coarse, even-grained texture. The mineral contrasts are soft and pleasing, with a background of pinkish-buff feldspar, rimmed and intergrown with milk-white feldspar and delicately mottled with medium tinted smoky quartz, lightly accented with small crystals of black mica. It takes a fine polish and works well under the hammer.

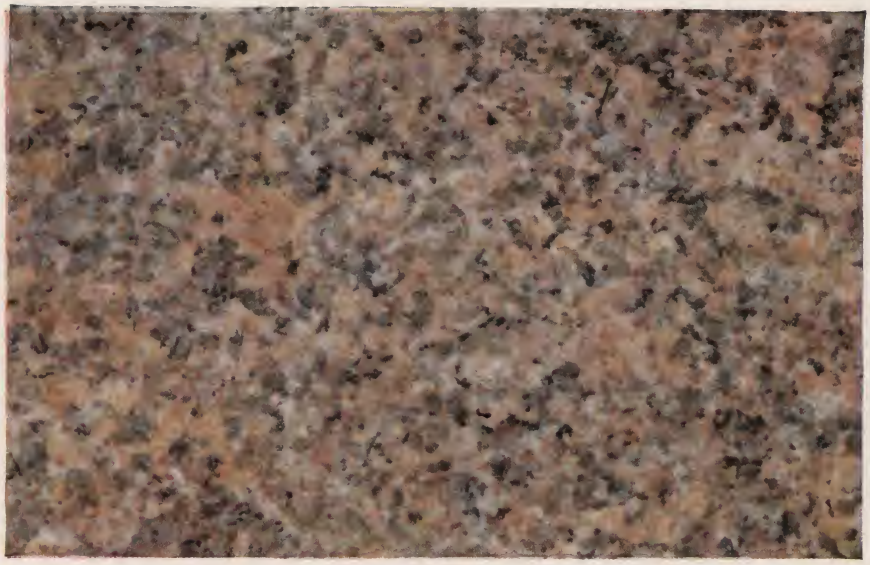


Plate No. 19. Somes Sound Granite—Polished

CAROLINA PINK

Cut by:

The Harris Granite Quarries Co.
Salisbury, N. C.

Quarried near Granite Quarry, N. C.

A biotite granite of light mottled pink color and medium, inclined to coarse, even-grained texture. Its mineral contrasts are more pronounced than in the Balfour Pink and the predominating pink feldspar has a slightly buff cast as compared with the purplish tint in the Balfour. It takes a good polish, hammers well and works more freely than the Balfour both under the hammer and the machine.



Plate No. 20. Carolina Pink Granite—Polished

BALFOUR PINK

Quarried and cut by:

The Harris Granite Quarries Co.
Salisbury, N. C.

Quarry at Granite Quarry, N. C.

A biotite granite of uniform, slightly purplish-pink color and medium grain. The mineral contrasts are scarcely apparent and the grain only vaguely defined, due to the uniform color and even distribution of the pink feldspars and the small amount of biotite. It is extremely hard but takes a beautiful finish either under the hammer or polishing machine. Its uniformity of color and texture and susceptibility to high polish adapt Balfour Pink to both building and monumental uses.



Plate No. 21. Balfour Pink Granite—Polished

Continued on next page

INFORMATION AS TO VARIOUS GRANITE FINISHES

Description of Regular Surface Finishes, Arranged in Order of Relative Cost

The surface finishes best adapted and most frequently used for granite on building work are:

Rock Face, Sawed, Pean-hammered, Pointed, Sawed and Sand-blasted, Four-cut, Six-cut, Eight-cut, Rubbed, Honed and Polished.

These terms are frequently misunderstood and sometimes misapplied, so the following brief descriptions are given as a matter of information.

Rock Face—Generally the least expensive finish, but with decorative as well as utilitarian value.

The relative cost varies with the grade of work required.

The grades vary from ordinary split or quarry face ashlar with split or roughly squared beds and joints, to carefully quarried faces having practically uniform projection, and with joints and arrises as carefully and accurately cut as for hammered work, and sometimes with rusticated or tooled margins.

Sawed Finish—A comparatively inexpensive plain-surface finish, utilizing the surface just as it comes from the saw, without further dressing or bushing. The marks or grooves left by the gang-saw, while not regular or uniform are generally parallel and give a texture effect approximately equivalent to four or six-cut work at a reasonable distance from the eye. This finish is not recommended unless special precautions are taken both during and after sawing to avoid rust stains developing after setting and exposure to the weather.

Pean-hammered—Adapted to rougher work, such as steps, curbings, house or mill sills and thresholds, or to portions of high class work not exposed to the eye. Pean-hammering is coarser and less regular than four-cut and the point marks are not entirely eradicated by the axing.

Pointed Work—Coarse, medium, fine and machine pointed are the four general distinctions for pointed work, with many special types for certain texture effects.

Hand pointing and machine pointing differ slightly in general appearance, machine pointing being generally more uniform. Special pointing is generally more expensive than the standard grades. In general, the point depressions in fine pointing will be approximately 3/8 in. apart, medium and machine pointing 5/8 to 3/4 in., and coarse pointing 1 to 1 1/4 in.

Where special pointing is required, a sample should first be prepared under the architect's supervision. Beds, joints, and arrises will conform to the character of use and grade of pointing.

Sawed and Sand-blasted—This finish utilizes the surface just as it comes from the saw which is then lightly sand-blasted, sufficiently to remove particles of steel ground into the surface during sawing and if desired to partially remove the more obvious saw marks and give a more uniform texture effect to the surface.

Four-cut, Six-cut, and Eight-cut—These finishes are produced by bushing with the patent "bush-hammer." This is a hand-hammer with patent head having two opposite jawlike openings about 7/8 in. wide, into which are firmly bolted sets of four, six or eight cutting blades as the case may be.

Four-cut work is frequently and erroneously specified as four cuts to the inch. Actually the four-cut hammer leaves nearer five cut marks to the inch, as four cutting blades are clamped into a 7/8-in. jaw; six-cut and eight-cut are likewise incorrectly specified as six cuts to the inch or eight cuts to the inch.

In bush-hammered finish the resultant surface has the appearance of being uniformly corrugated to the fineness determined by the number of cuts used, but while the bushing is kept parallel and in the required direction the bush marks are not necessarily continuous or mechanically precise.

Six-cut and eight-cut finishes are simply continuations of the four-cut process, each finer hammer being used consecutively until the required finish is reached.

Pneumatic surfacing machines are also used for bushing, especially on all larger surfaces, following practically the same routine as required for hand bushing. Sawed surfaces are also bushed under the surfacing machines, in which case much of the preliminary preparation is avoided.

Ten-cut and Twelve-cut—These finishes are also produced, but less frequently used on regular building work, being more applicable to small memorials or special work. Texture and character are emphasized by the coarser finishes.

Rubbed and Honed—Produced by grinding a pointed or sawed surface under the polishing wheel. The grade of rubbing is determined by the extent to which this grinding is carried and the abrasive used; from coarse-rubbed, with small surface scratches, adapted to work requiring fine smooth finish but not close to the eye, to honed finish, which is the last stage just before glossing, with velvet smooth surface, practically free from scratches.

Polished Finish—Produced by glossing, under a heavy, felt coated wheel, a surface previously rubbed and honed. A durable and mirrorlike polish requires that the grinding and glossing processes be carried to their extreme stages, leaving a surface free from scratches, dull spots, or "stun marks" from the tooling.

Under modern methods practically every standard granite may be polished to a satisfactory gloss, suitable and durable for most ordinary requirements.

Generally the harder granites and those containing the least mica content take the best and most durable polish.

Hand Polishing—Small surfaces and mouldings generally have to be rubbed, honed or polished by hand at considerable extra expense over machine work or cut work of similar character.

On work where cost is the dominant factor portions necessitating hand rubbing or polishing should be avoided wherever possible.

Selecting the Finish

The following general suggestions will indicate methods of selection, which depend on the type and design of building, and color and texture of the granite:

Large scale work: rock-face, pointed and the coarser cuts. Small scale work: the finer cuts.

Rock-face, sawed, pean-hammered, pointed and four-cut for economy, and rock-face and pointed for decorative effect in conjunction with hammered work and other materials.

Six-cut or sawed and sand-blasted for average work, combining economy with good architectural effect.

Polished for base courses, portions subject to traffic strain, lower stories where exposed to smoky atmosphere, and for decorative effect.

Rubbed or honed where fine finish is required and for softened tone and texture effects.

Polished finish is practically impervious to stain or weather. Fine finishes will keep clean longer than coarser finishes, particularly where subject to atmospheric dirt and dust.

The possibilities of combining different grades of finish are almost unlimited, and combinations of different granites are used extensively with splendid architectural results.

Continued on next page

JONESBORO RED

Quarried and cut by:
Booth Bros. & Hurricane Isle Granite Co.
208 Broadway, New York, N. Y.

Quarry at Jonesboro, Me.

A biotite granite of medium reddish-pinkish-gray color and of coarse, inclining to medium, even-grained texture. The mineral contrasts are strong and effective. The reddish-pink of the predominating feldspar is emphasized by the less abundant cream-colored feldspar and the even mottling of smoky quartz. It takes a fine polish, the durability of which is favored by the smallness of the sparsely scattered biotite scales.



Plate No. 22. Jonesboro Red Granite—Polished

CONWAY GREEN

Quarried and cut by:
Maine & New Hampshire Granite Corp'n
North Jay, Me.

Quarry at Redstone, N. H.

A biotite-hornblende granite of dark olive-green color with black spottings and with coarse, even-grained texture. The predominating feldspar is medium gray with more or less yellow-green on its cleavage faces. The feldspar is surrounded with smoky quartz of dark yellowish or olive-green color accented by sparsely distributed black spots of biotite and hornblende. It takes a high polish and its color is striking both in the rough and polished.



Plate No. 23. Conway Green Granite—Polished

Regarding Color Plates and Descriptions

It is impossible to duplicate with printer's ink and paper the real beauty and character of these granites. Made up of mineral constituents, nearly all of which are of gem-like quality, some opaque, some translucent and others of glass-like transparency, the true liveliness and penetration of color tones inherent in the actual granites are entirely lacking or but vaguely suggested in the color reproductions. For that reason, and in justice to the granites and their producers, the necessity for examining actual samples before making final selections is urgently suggested.

Practically all the granites reproduced in this catalogue and the quarries which produce them have been studied by eminent disinterested geologists both from the scientific and economic viewpoints, and their findings and conclusions published in official bulletins. In describing the colors, textures and other outstanding characteristics of the various granites, these unbiased reports and descriptions have been studied and utilized as far as possible and summarized in similar and somewhat comparable form to accompany the color plates.

Standard Grades of Surface Finishes

The half-tone reproductions on pages 20 and 21 illustrate the standard grades of surface finishes most commonly used on exterior building granite work. The reproductions are full size from actual photographs of the various finishes on a standard light gray granite. The reproductions are darker than the actual granite to bring out more distinctly the texture of the different finishes.

The relative costs of the different finishes runs in approximately the same order as the reproductions are numbered, with rock-face as the least and polished as the most expensive. No reproductions are shown of the sawed or sawed and sand-blasted finishes described on page 18, but their position as to relative cost would be approximately that of No. 2 and No. 6 respectively.

Complete sets of samples adopted as standard by the Association, and illustrating the finishes reproduced here are displayed in the permanent exhibits maintained by the Association at its headquarters in Boston, the Architects Samples Corporation in New York and the Master Stone Cutters Association in Philadelphia.

Continued on next page

STANDARD GRADES OF FINISHES FOR EXTERIOR BUILDING GRANITE WORK

Full-sized Reproductions Prepared from a Standard Light to Medium Granite of Fine to Medium Grain

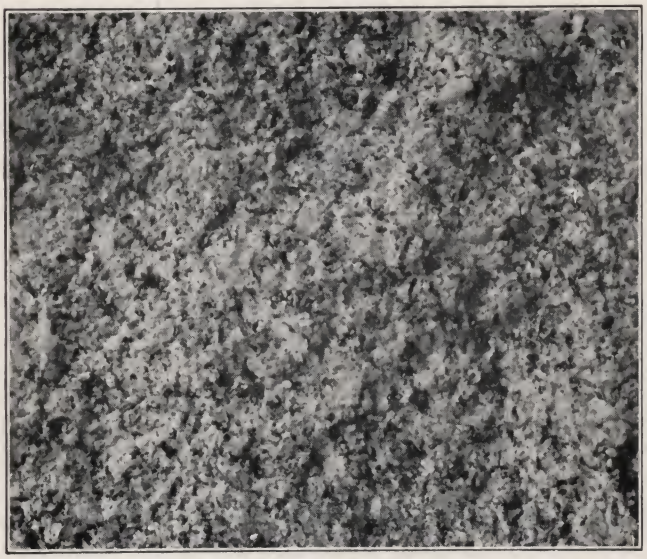


Plate No. 1. Rock Face



Plate No. 4. Medium Pointed



Plate No. 2. Pean-hammered

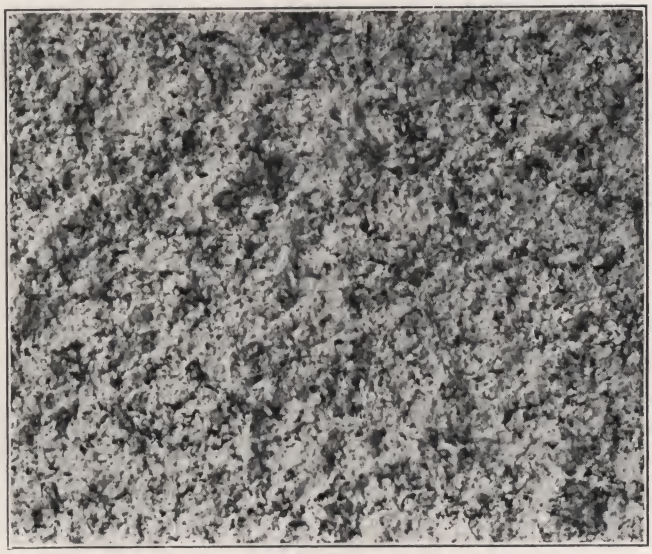


Plate No. 5. Fine Pointed



Plate No. 3. Coarse Pointed



Plate No. 6. Four-cut

Continued on next page

STANDARD GRADES OF FINISHES FOR EXTERIOR BUILDING GRANITE WORK

Full-sized Reproductions Prepared from a Standard Light to Medium Granite of Fine to Medium Grain

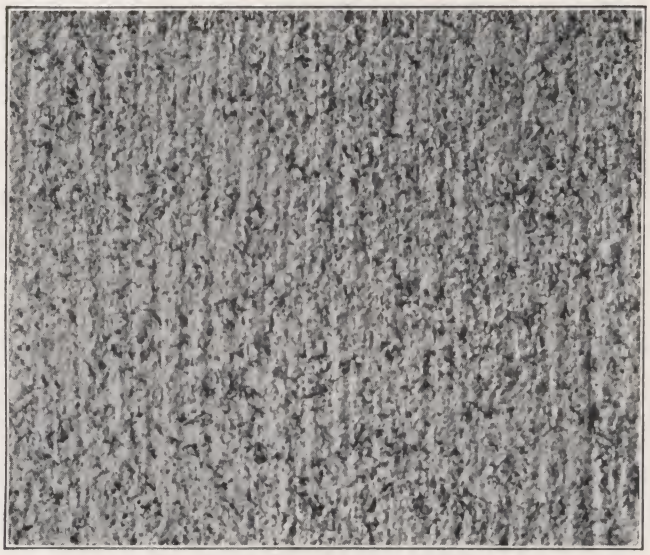


Plate No. 7. Six-cut



Plate No. 10. Rubbed.

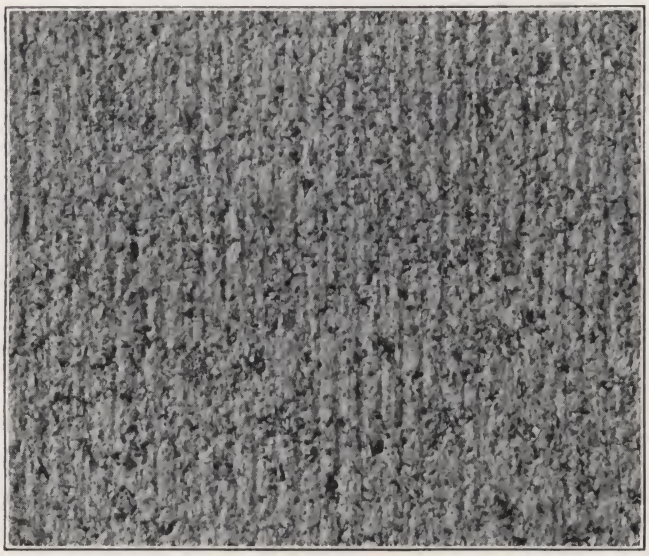


Plate No. 8. Eight-cut

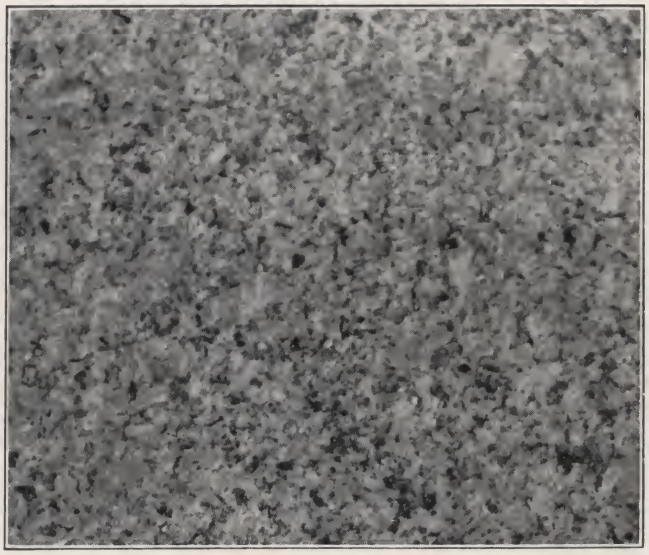


Plate No. 11. Honed

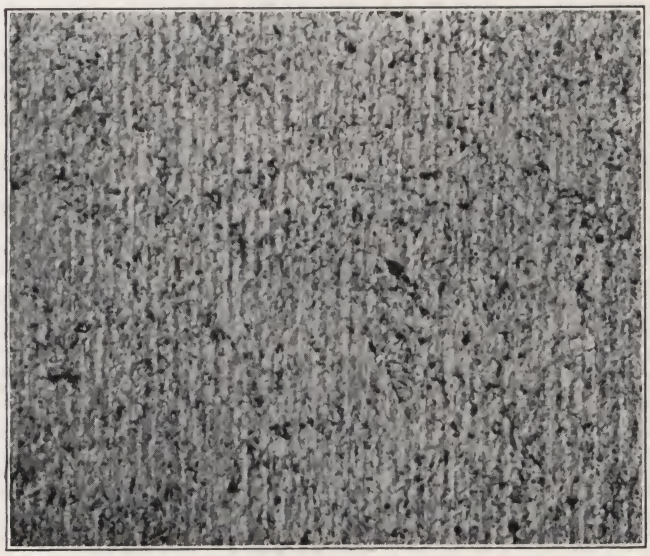


Plate No. 9. Ten-cut

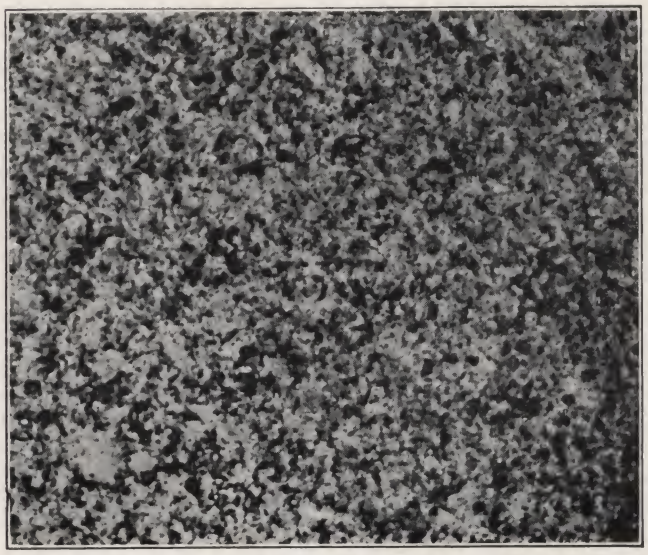


Plate No. 12. Polished

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GRANITE SPECIFICATIONS

SHORT FORM FOR REGULATION CUT GRANITE WORK

The Association has prepared a complete form of granite specifications for use on projects of major importance and of monumental building grade which is available on request. The following short form has been prepared as more convenient for ordinary use while still conforming to requirements of high grade work of the type classified herein as good commercial grade.

(1) **Work Included**—The work to be done shall include the furnishing, delivery, and setting of all granite work required by the drawings and specified herein. (State portions of work to be of granite and note any exceptions about which there might be any questions.)

(2) **Material**—The granite shall be sound and of good quality, free from defects which would impair the strength, durability, or appearance of the work, and equal to the approved sample. In estimating, the contractor shall state the name of granite and quarry, upon which his proposal is based. The following granites will be considered: (mention color, tone and grain) granite from (mention locality).

(3) **Samples**—Submit in duplicate, for the architect's approval, samples of the granite showing the extreme variation in quality, color and texture to be used under the contract, and showing the specified finishes. (State size of samples required.)

(4) **Shop Drawings**—The granite contractor shall prepare all necessary shop drawings, showing in detail the jointing, bonding, and construction of the granite work, and special anchoring. These shall be submitted to and approved by the architect before any cutting is done.

(5) **Finishes**—The exposed surfaces of the granite shall be finished as indicated on the drawings or specified herein.

Note: State finishes desired.

(6) **Cutting**—All exposed surfaces shall be out-of-wind, free from waves, projections, or depressions and flush at the joints. Arrises shall be cut sharp and true to square or pattern, and continuous with adjoining arrises.

(7) **Bed and Joints**—Beds shall be cut full and square for at least 2 in. from face, and may fall off not to exceed 1 in. in 12 in., reasonably free from large depressions. Joints to be full and square at least 1½ in. from face, falling off not to exceed 1½ in. in 12.

(8) Backs of granite shall be scabbled or split to approximately vertical surfaces.

(9) Jointing shall be as shown on approved drawings and ¼ in. in thickness.

(10) **Bonding**—Shall be as shown on approved drawings, with no bed less than 4 in. Projecting course shall have beds at least equal to projection, unless otherwise shown.

(11) **Mouldings**—Shall be cut with uniform profile throughout their lengths, in conformity with full size details, with lines true and straight, and flush at joints.

(12) **Washes and Drips**—Washes shall be cut on stones whose top surfaces are exposed, unless otherwise shown. Projecting stone shall have groove drip cut on underside.

(13) Raised seats or lugs shall be cut where stone work rests on projections or washes, and raised thresholds shall be cut on exterior door sills.

(14) Reglets shall be cut for flashing where shown or required.

(15) **Models**—Full size plaster models of all ornamental and carved work shall be furnished to the granite contractor, who shall preserve these models for reshipment to the building, if required.

(16) **Roughing for Carving**—This shall be done from approved models only, leaving the stone in suitable form and condition for the carving.

(17) **Carving**—All carved ornament shall be executed by skilled carvers, in a spirited and artistic manner, and in strict conformity with the approved models.

(18) **Crating and Shipping**—The finished granite shall be properly crated for shipment, to protect the surfaces and edges of all exposed work.

(19) **Precaution Against Stain**—Precaution shall be taken at all times to protect the granite from stain.

(20) Under no circumstances shall salt be used for thawing out lewis-holes, or otherwise in connection with the granite work.

(21) (If dampproof painting is required, specify requirements here.) After setting, the backs of all mortar joints shall be suitably dampproofed to prevent moisture from the backing seeping through the joints.

(22) **Setting**—The setting of the granite work shall be done by competent, experienced stone setters, and in strict accordance with the approved drawings and specifications.

(23) Each granite stone shall be brushed clean and thoroughly drenched immediately before setting and carefully bedded in a full bed of non-staining mortar. The granite facing shall not be built up more than two courses ahead of the backing, and the faces shall be kept free of mortar at all times.

(24) All surplus mortar shall be immediately raked out to a depth of at least 1 in. Sills, etc., subject to pressure shall be bedded only at the ends.

(25) Where a joint is exposed to the weather, it shall be made waterproof by mixing a satisfactory waterproofing compound with the mortar.

(26) The sand used in all setting mortar shall be such as will cause no stain, or chemical action with the cement.

(27) **Anchoring**—The granite shall be anchored to the backing with galvanized iron anchors, ¼x1¼ in., turned down into the granite 1¼ in., extending 8 in. into the backing if possible, and turned up into the backing 1½ in. There shall be two anchors to each stone whose length exceeds its height and, in general, not less than two anchors to every superficial yard of ashlar. All anchors, bolts, ties, etc., shall be furnished to the granite contractor.

Note: Special anchoring for heavy cornices and overhanging courses, cramps, dowels, etc., for parapets, balustrades, pilasters, columns, etc., should be suitably described or shown according to the requirements of the work.

(28) **Boxing and Protection**—All the granite work shall be protected by the general contractor during the progress of the work and until the completion of the building. No lumber or material shall be used which will in any way stain or deface the granite work.

(29) **Centers and Scaffolding**—All necessary forms, centers, scaffolding, etc., required by the setter or carver, will be furnished by the general contractor.

(30) **Pointing and Cleaning**—After all liability from stain or damage from other operations on the building is passed, the granite work shall be carefully cleaned, removing all dirt, mortar stains and other defacements. The use of wire brushes, acids, and solutions which might cause discoloration, will not be permitted.

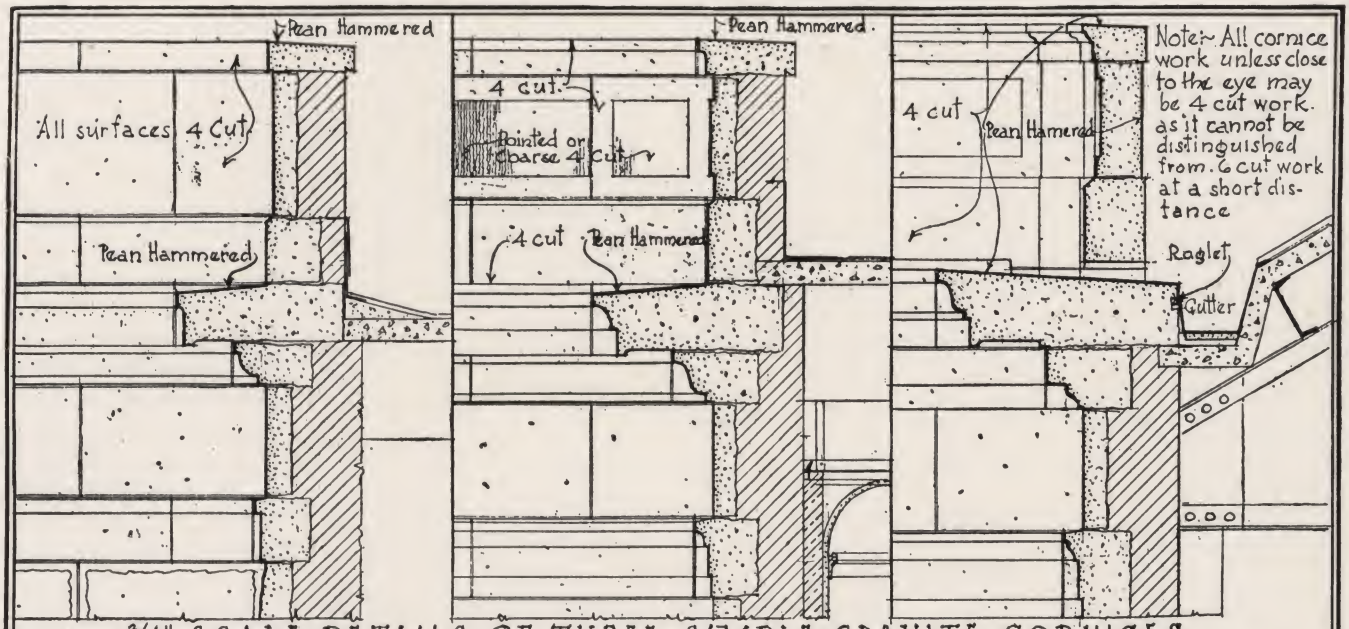
(31) All face joints shall be brushed out, thoroughly wet with clean water, and carefully pointed as directed by the architect.

Note: See long form for special treatment of vertical joints in uncovered cornices, and joints in upper surfaces of projecting stones.

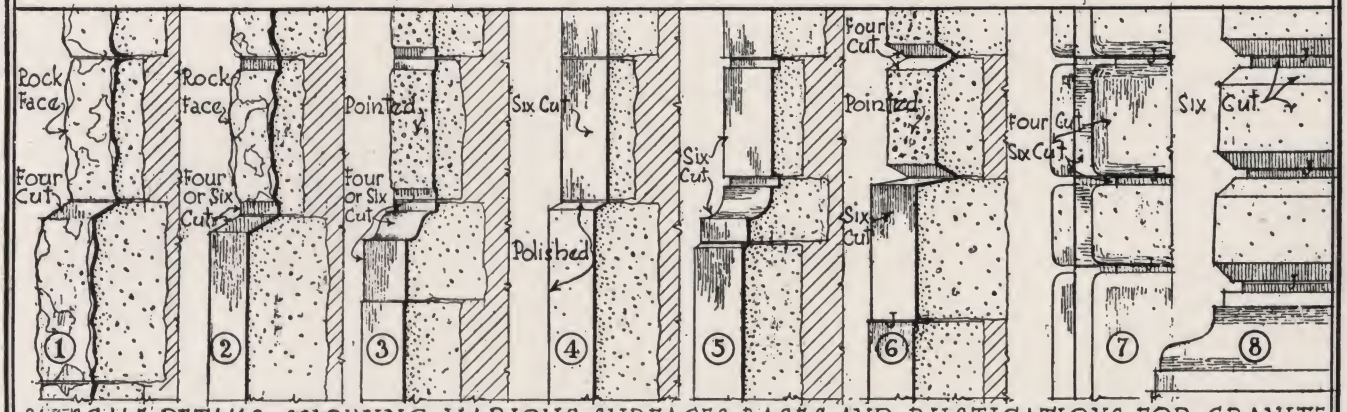
(32) **Defective Work**—No patching or hiding of defects will be permitted.

Defective stones shall be replaced with perfect ones, unless otherwise directed by the architect.

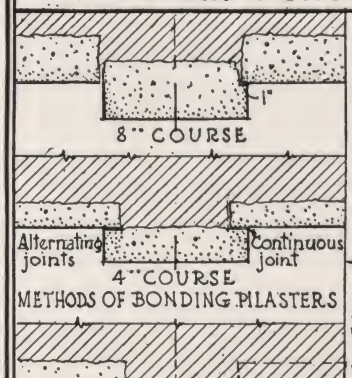
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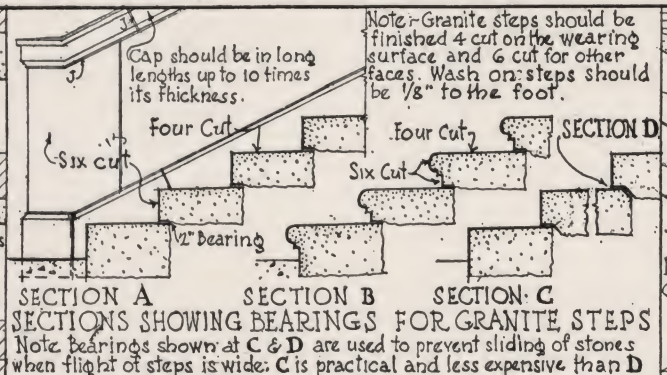
3/4" SCALE DETAILS OF THREE SIMPLE GRANITE CORNICES



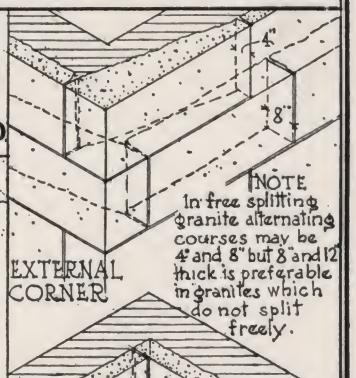
3/4" SCALE DETAILS SHOWING VARIOUS SURFACES, BASES AND RUSTICATIONS FOR GRANITE



3/8" SCALE PLANS OF BONDS OF PILASTERS & COLUMNS



3/8" SCALE DETAILS OF TYPICAL STAIR CONSTRUCTION



1/4" SCALE DETAILS SHOWING BONDING OF CORNERS

DRAWN BY SWEETS CATALOGUE SERVICE, INC.	TYPICAL GRANITE DETAILS SHOWING PRACTICAL METHODS OF CONSTRUCTION	SCALE- 3/8 & 3/4 EQUAL 1-0 DATE- JUNE-20	DRWG 3

Continued on next page

MODERN GRANITE VENEER

In buildings of the more modern type, where the exterior facing serves as a decorative and protective veneer rather than as a structural element, the use of granite is developing to such an extent and production methods are being so revolutionized that special consideration must be given to detailing and specifications for this type of work.

Its inherent beauty and variety of color and texture, its ability to take a high and durable polish, and its imperviousness to moisture and resistance to weathering even in the thinnest of slabs, give granite exceptional qualifications for use as exterior veneer. The extensive development and use of saws and carborundum machines in the granite industry have made the furnishing of granite veneer both feasible and economical.

The term "granite veneer" is applied to finished facing less than 4 in. in thickness. Granite veneer can be produced down to 1 in. in thickness, but for practical purposes 2 in. is recommended as the minimum thickness for exterior work.

Specifications describing hand finished work are not applicable in many respects to this type of work, and a few useful pointers are given below as a guide to the specification writer and designer.

Specification Pointers

Surface Finish—The finishes best adapted for granite veneer include polished, honed, rubbed (fine to coarse), and sawed and sand-blasted. Bush-hammered or pointed finishes are not recommended for work under 4 in. in thickness.

Projecting Edges—On polished, honed and rubbed veneer, projecting edges not exceeding ¾ in. wide may be left without further finish if carbo-sawed.

Beds and Joints—Beds and joints shall be full and square at least two-thirds back from face, reasonably free from depressions and may fall off not to exceed ½ in. at back.

Width of Joints—Joints shall be uniformly ¼ in. in width. (When desired to make jointing less conspicuous in polished or honed veneer, 3/16-in. or ⅛-in. joints may be specified.)

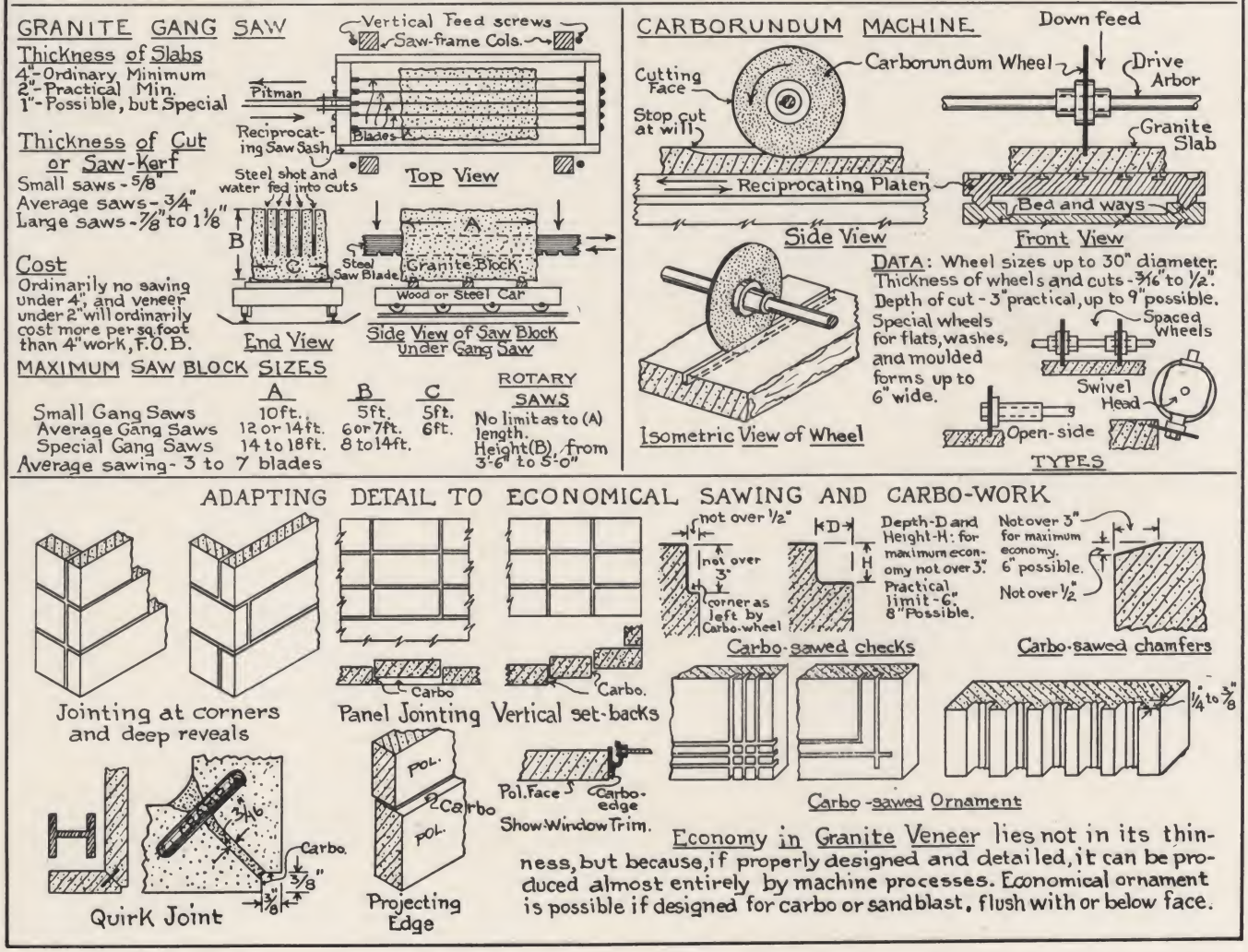
Quirk Joints—To avoid expensive back-checking for wide heads or reveals, quirk joints are recommended. The exposed edge of joint may be carbo-sawed. Joint surface should be full for at least 1½ in. and may fall off not to exceed ½ in. at the back.

Bonding—Where the veneer is not counted in computing wall thickness under building code requirements, no bonding is necessary either in the wall or by breaking joints.

Setting—Granite veneer should be set in non-staining mortar and backs of all mortar joints should be suitably dampproofed or parged to prevent moisture from seeping through the joint from the backing.

Anchoring—Anchor to backing or steel with ⅜-in. round iron, galvanized after bending, turned down ¾ in. into the stone (where veneer is 2 in. or less in thickness), using two anchors in top bed of each stone. (For 3-in. veneer turn down 1 in. and 1¼ in. for 4-in. veneer.)

ILLUSTRATING THE BASIC PRINCIPLES AND ECONOMICAL USE OF GRANITE SAWING AND CARBORUNDUM MACHINE WORK



Continued on next page

RUBBLE ASHLAR

The Use of Granite as Rubble Ashlar

The demand for granite as rubble ashlar has grown to such an extent that many granite quarries are now giving special attention to the production of this class of masonry material. One and two man rubble, specially split to appropriate sizes and shapes, eliminates much of the expensive shaping and trimming on the job formerly required when waste stone was used for this purpose, and enables competent masons to lay it up in the wall with minimum cost and excellent architectural effects.

There are many forms of rubble ashlar walls. The pattern and style of jointing and the color and texture effects obtainable in granite are practically unlimited. Broken range rectangular ashlar in rock-face, split-face, quarry-face or combinations of these faces, constitute the major demand and is rapidly becoming a regular product of our building granite quarries. Its extensive use for churches, schools, residences, apartment houses, retaining walls and bridges, indicates the increasing interest of architects and owners and the need for practical information as to its production, specification and economical use.

A digest of practical points with sketches illustrating the more typical methods of using this material economically is given here for the information of specification writers and designers.

Specification Pointers

Material—Specify granite by name or by color and grain. Specify sound quarry stock free from seams or defects which would impair strength. Permit reasonable variations in color and texture. If special variegated effect is desired, describe same.

Type of Ashlar—Many types of ashlar walls are used. Three types of rectangular broken range ashlar are illustrated below. Specify type desired and whether it is to be rock-face, split-face, quarry-face or a combination of these.

Dressing—Roughly squared as to length and rise. Beds and joints split or pitched approximately square to face. Faces pitched out-of-wind. No drill holes to show on face.

Thickness—Range of 4 to 8 in., average about 6 in.

Bonding—At least one bond stone, about twice average thickness of ashlar, for every square yard of wall surface. Where type of wall will not permit bond stones, anchor granite to backing with rust-proof, corrugated metal wall ties.

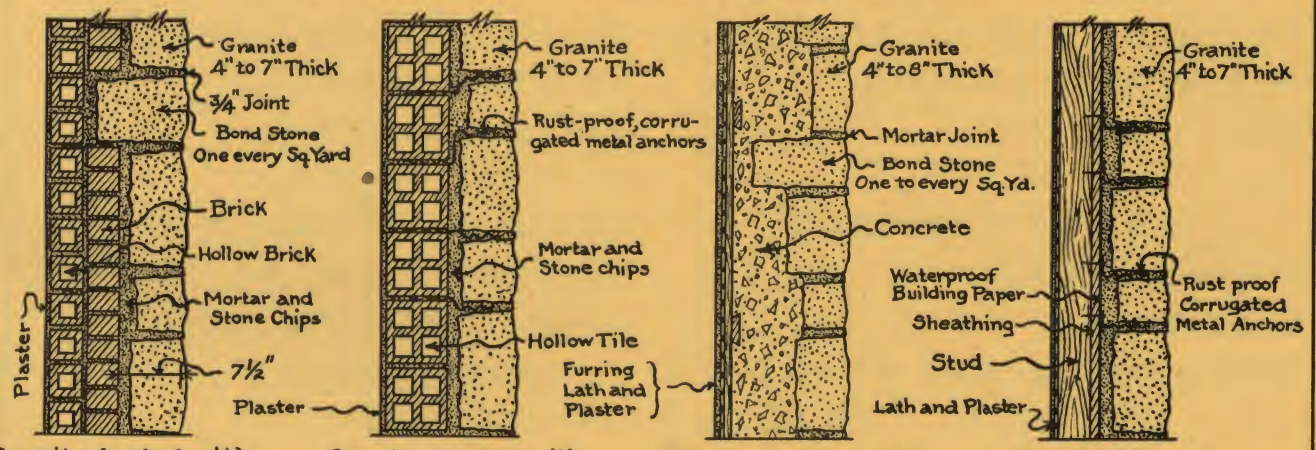
Jointing—Allow ¾ or 1 in. for beds and joints. Permit reasonable variations over and under specified joint thickness, provided variation does not mar general appearance of wall after pointing-up.

Setting—Set in full bed of mortar, tap firmly to solid bearing and thoroughly fill end joints with mortar.

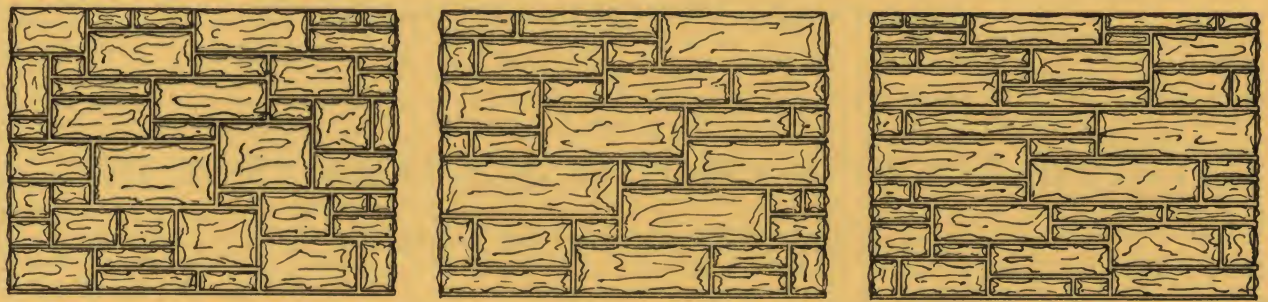
Setting Mortar—One part cement, two parts sand, thoroughly mixed and brought to putty-like consistency with clean water. If desired one part slaked lime putty or hydrated lime putty may be included. Rake out joints to depth of ¾ in. for pointing. Keep face free from mortar.

Cleaning and Pointing—Clean down thoroughly after setting and point-up with any approved type of pointing desired. For average work a ¾-in. flat bead pointing is recommended. Forbid use of wire brushes, acids or solutions which might discolor the granite.

ROCK FACE BROKEN RANGE ASHLAR WALLS
USING ONE & TWO-MAN GRANITE RUBBLE



TYPICAL WALL SECTIONS



Typical Wall Pattern
Rise 6" to 18"
Length 1½ to 2 times rise

Moderate Elongated Pattern
Rise 6" to 16" · High pieces averaging 12".
Length about three times rise

Extreme Elongated Pattern
Rise 4" to 12". Length five to six times rise. Wall leveled every 22".

ELEVATIONS - SHOWING STYLES OF FACE JOINTING

ARCHITECTURAL GRANITE

This catalogue, "Architectural Granite," has been prepared and placed in SWEET's by the National Building Granite Quarries Association to the end that reliable and unbiased information concerning granite and its architectural uses may be readily available to architects and others interested.

The information herein is based upon the combined experience and practical knowledge of the member companies whose joint support and co-operation make this and other services of the Association possible and valuable alike to the granite industry and to users of its products.

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NORTH STATE GRANITE CO.
PROVIDENCE GRANITE CO.
J. D. SARGENT GRANITE CO.
THE JOHN SWENSON GRANITE CO.
ALEXANDER THOMSON, INC.
WOODBURY GRANITE CO., INC.

ASSOCIATE MEMBER

A. LE POIDEVIN & CO., INC.

"Architectural Granite" has been reprinted in booklet form and copies will be gladly sent on request.

NATIONAL BUILDING GRANITE QUARRIES ASS'N, INC.

31 STATE STREET, BOSTON, MASS.

AMERICAN BLACK GRANITE COMPANY

GENERAL OFFICES AND PLANT

ASHLAND, WISCONSIN

Sales Offices in Principal Cities

Description of Product

Rosetta Black Granite (formerly Mellen Black Granite) is an extremely hard brilliant granite composed of black and deep gray crystals closely packed together and characterized by an occasional fleck of mother of pearl. There is just enough irregularity in the crystals to create an interesting and pleasing texture. Rosetta Black Granite is never monotonous.

Examined at very close range, the color is seen to be a deep gray, just off black. When seen at a distance, the color is a rich lustrous black. It is important to note that this granite owes its color partially to polishing and the refraction of light through its crystals. This, as well as its density protects the color against fading and discoloration.

Rosetta Black Granite weighs 210 pounds per cubic foot. Due to its great density, it will take a very high polish which it will hold indefinitely. The most modern machinery and high production standards at the plant insure a surface free from checks, cracks or any imperfection.

Adaptability

Rosetta Black Granite is peculiarly adapted to modern building requirements. As a base course, it is superior to lighter stones which fade with time and become discolored by the infiltration of rust, grease and city dirt. Time leaves Rosetta Black Granite as brilliant and flawless as the day it left the polishing table.

Architecturally, the adaptability of this stone is remarkable. Its distinctive color and brilliant finish harmonize with present tendencies in design. It is truly the most modern of all building granites. Where contrast is essential to the design, Rosetta Black Granite is striking and interesting. On the other hand, it will blend well with other stones of practically any color. Monel Metal, bronze and other metals have been most successfully used in conjunction with black granite.

Quarry

The quarry, at Mellen, Wisconsin, has been operated for ten years and includes 200 acres of exposed granite. When the American Black Granite Company acquired the property, it was completely equipped with the most modern machinery obtainable with a view to securing prompt delivery to the finishing plant of rough blocks in any desired quantity and size.

Blocks weighing up to 200,000 pounds are carried on the company's own freight cars over the Soo Line Railway to the finishing plant at Ashland, Wisconsin.

The finishing plant belonged formerly to the Charcoal Iron Company of America and is served by four railroads as well as docks on Lake Superior. Shipping facilities are unexcelled.

Only the latest devices for the manufacture of granite have been installed in the finishing plant. Gang saws, polishing machine, lathes, carborundum machines, compressors for pneumatic surfacing and cutting are all equipped with individual electric motors.

The daily capacity is 800 square feet of 4-inch polished material. The plant is in operation 24 hours a day.

Delivery

Over 25,000 square feet of polished material is kept on hand at all times so that deliveries can be made at short notice on all except unusually large contracts. In the case of the latter, the tremendous production capacity of the plant is further assurance of unexcelled despatch in the filling of all orders. The American Black Granite Company prides itself in the matter of delivery and has been able many times to shorten delivery dates by weeks when necessary.

Service Organization

Under the direction of an experienced architect, the Company maintains an excellent drafting department. Preliminary costs, information as to economical design, specification data and samples are promptly accessible to the Architect. The Company welcomes the opportunity to render whatever assistance it can in these respects.

The Company—Its Responsibility

Ample capital and experienced executives insure the Company's stability and the proper execution of any contract irrespective of size. References will be furnished on request.

Federal Reserve Bank, Detroit, Michigan.
Marshall Field-Pittsfield Bldg., Chicago, Illinois.
Marshall Field Bldg., Evanston, Illinois.
Marshall Field Bldg., Oak Park, Illinois.
Kenwood Apartments, Chicago, Illinois.
Atheneum Bldg., Chicago, Illinois.
Union Carbide Bldg., Chicago, Illinois.
National Parking Co. Bldg., Chicago, Illinois.
Walter W. Ahlschlager, Architect.
Trustees System Service Bldg., Chicago, Illinois.
Thilvar & Fugard, Architect.
Sacred Heart Convent, Madison, Wisconsin.
Kidder-Peabody Bldg., Newsbury St. Branch, Boston, Mass.
Strickland, Blodget & Law, Architects.
No. 6 Arlington St. Bldg. (Junior League Bldg.), Boston, Mass.
Hamilton First National Bank, Hamilton, Ohio.
Boody Building, Toledo, Ohio.
Carew Tower, Cincinnati, Ohio.
Walter W. Ahlschlager, Architect; Delano & Aldrich, Associate Architects.
Muskegon Building & Loan Building, Muskegon, Mich.
Edwin E. Valentine, Architect.
Robertson Store Building, Citizens Bank, South Bend, Ind.
H. G. Christman Company, Engineers.
Taylor Building, Louisville, Kentucky.
Pennsylvania Railroad Office Building, Philadelphia, Pa.
Northwestern National Bank, Minneapolis, Minn.

Continued on next page

Rosetta Black Granite—First Grade

Mellen Black Granite—Second Grade



COLD SPRING GRANITE COMPANY, INC.

Quarriers and Producers of Granite

GENERAL OFFICES AND PLANT
COLD SPRING, MINN.

SALES OFFICES

CHICAGO, ILL., 228 No. LaSalle Street
DETROIT, MICH., 2109 David Stott Building
ST. LOUIS, MO., 2041 Railway Exchange Building
NEW ORLEANS, LA., 1009 Maison Blanche Building
ATLANTA, GA., Bona Allen Building

Products

COLD SPRING RAINBOW GRANITE.
COLD SPRING PEARL PINK GRANITE.
COLD SPRING PEARL WHITE GRANITE.

Chemical Analysis

Silica	62.15%	Lime	2.27%
Alumina	19.41%	Phosphorus	.13%
Iron oxide	2.99%	Magnesia	trace

Absorption Test

4-23-24 to 4-30-24

Weight air dry, grains	Weight after immersion of one hour, grains	Weight after immersion of one day, grains	Weight after immersion of one week, grains	Total gain in weight, grains	Per cent gain
1944	1945.5	1945.5	1945.5	1.5	.07

The weight is the same after a week as it is after an hour. Gain in weight appears to be due to surface moisture only; no moisture being absorbed.

Uses

Building construction of every kind. Ashlar, facings, doorways, trim, sills, steps, stairways, floor tile, columns, mantels, fountains, and all other architectural, structural and memorial purposes.

Quarries

Location—Located within convenient proximity to the cutting plant in Cold Spring, Minnesota.

Equipment—Are fully developed and completely equipped with the best and most modern quarry machinery available. The drilling and broaching system of quarrying is used exclusively, instead of blasting, which eliminates all possibility of shattering. Our derricks have lifting capacity of more than 100 tons.

Size of Stock—The size of blocks obtainable is limited only by the restrictions of railroad transportation.

Operated Year Round—The granite is not affected by weather conditions and quarries and finishing plant operate throughout the year.

Finishing Plant

Capacity—Our cutting plant is one of the largest and best mechanically equipped in America. Capable of handling promptly and efficiently contracts of any size. Have capacity for handling single pieces of more than 75 tons.

Equipment—Modern gang saws, circular carborundum saws, planers, and various kinds of special, modern machines are employed in the production of cut granite. Many of the finishes are produced entirely by machinery.

Transportation

Railroad connections are convenient for shipping to any point in the United States with the least possible delay.

Stock

A large stock of blocks, also sawed and polished slabs, from two inches in thickness up, is maintained at all times, assuring prompt delivery of finished work.

Economies

The modern methods of quarrying employed in reducing waste and producing quarry stock of approximately true rectangularity together with the modern cutting and finishing process, most of which are accomplished by machine, reduces the hitherto high cost of the old hand methods in producing both cut and polished granite to a reasonable basis.

No excess stock is shipped due to the sawing of the stock to uniform thickness, which depending on its use and location may be as thin as two inches.

Cold Spring Pearl White Granite—Description

Of medium texture and extreme hardness. Like all Cold Spring Granites takes a high and absolutely permanent polish, impervious to stains or discolorations.

Polished finish produces a light gray color of unusual character and beauty.

The sawed, axed or rubbed surfaces produce an almost pure white finish suitable alike for the finest architectural and memorial work.

Cold Spring Rainbow Granite—Description

Is variegated in color, of a warm general tone ranging from deep black to dark red, but containing, as its name implies, all the colors of the rainbow in beautiful and varying combinations. It is of fine texture and one of the hardest granites produced, and is well adapted to fine carving and ornamentation. It is truly distinctive and outstanding among all granites and is especially desirable for columns and interior as well as exterior work. When polished, which is its most popular finish, it is particularly attractive.

Cold Spring Pearl Pink Granite—Description

Of medium texture, rich and pleasing color tones consisting of a combination of pink, buff, pearl, white and black appropriate for any architectural treatment. It is exceedingly hard. Cut finishes (other than polished) produce a warm gray tone. It lends itself readily to fine carving and other forms of ornamentation.

Finishes

Sawed—The face finish of stock as it comes from the saws approximates closely the old hand method 4 cut.

Machine Smooth—A very attractive and economical pebbled surface produced by shotting or rubbing the stock after it comes from the saw.

Rubbed—A uniformly smooth surface produced by rubbing with carborundum.

Honed—Fine rubbed with satin finish developed just prior to polishing.

Polished—Permanent high polish.

Samples

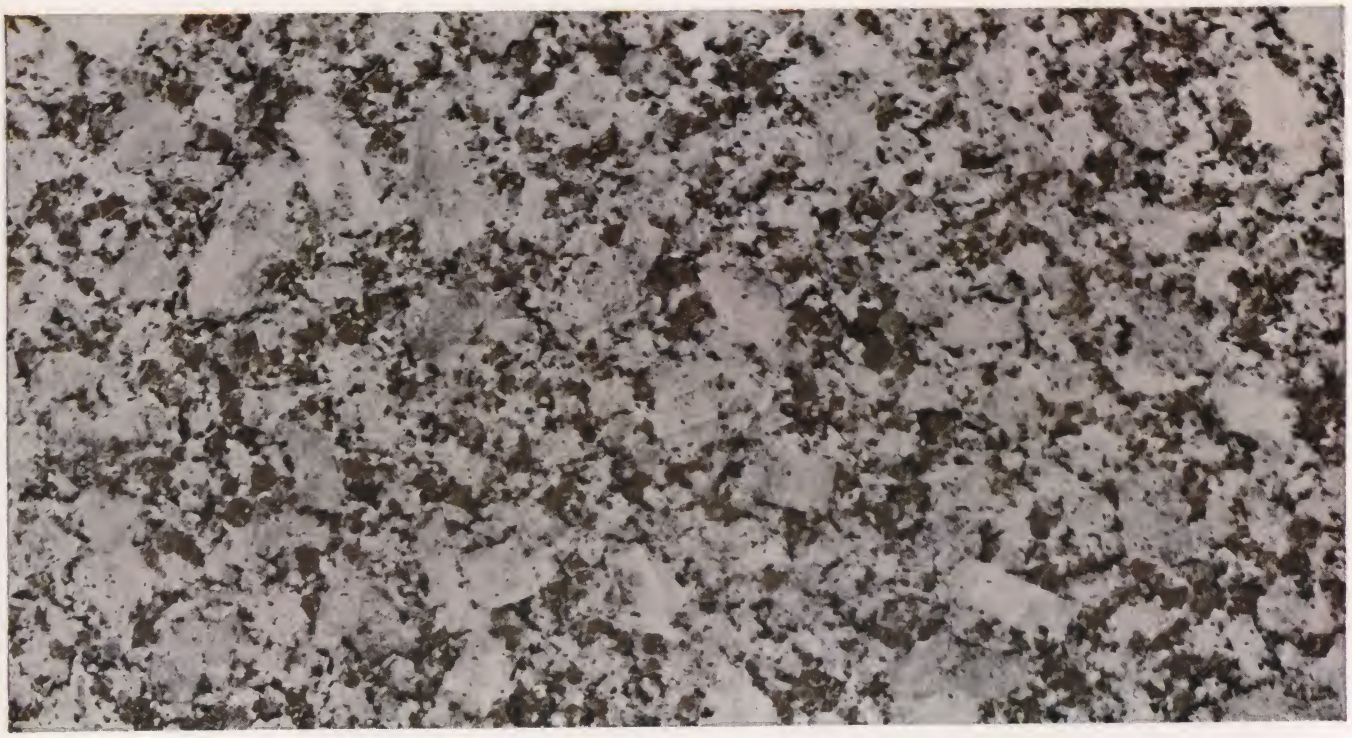
Samples of stock and finish will be furnished on request.

Service

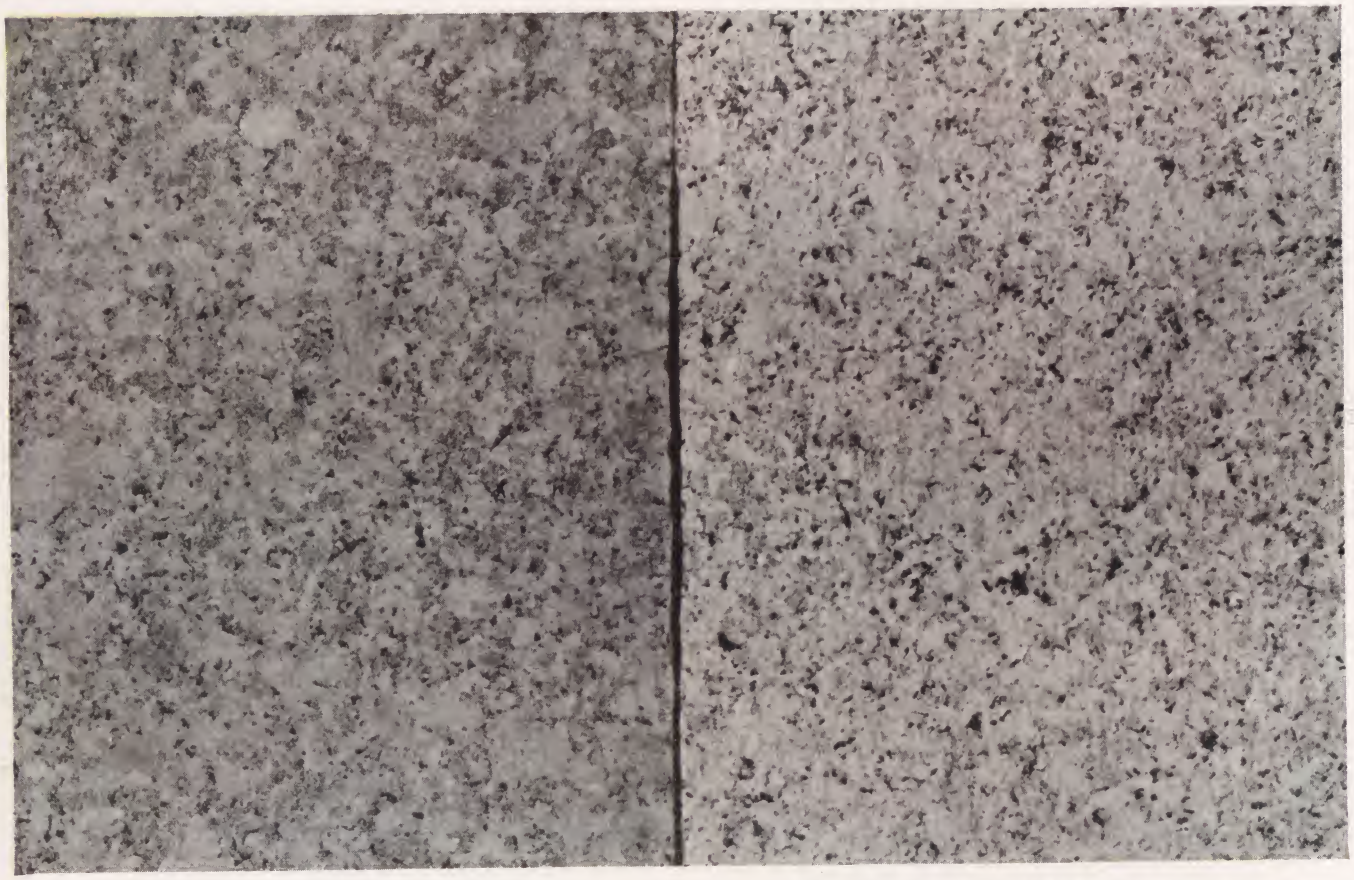
The COLD SPRING GRANITE COMPANY, INC., having in its production, estimating, sales, drafting, traffic and other departments, men experienced and trained in their respective lines and with a sincere desire to co-operate in the fullest measure with architects and contractors offers a complete and efficient service in the use of Granite.

Preliminary estimates and information will be gladly furnished without obligation.

Continued on next page



Cold Spring Pearl White Granite Polished Finish



Cold Spring Pearl White Granite
Rubbed Finish

Cold Spring Pearl White Granite
Eight Cut Axed Finish

Produced only by Cold Spring Granite Co., Inc.
Cold Spring, Minn.

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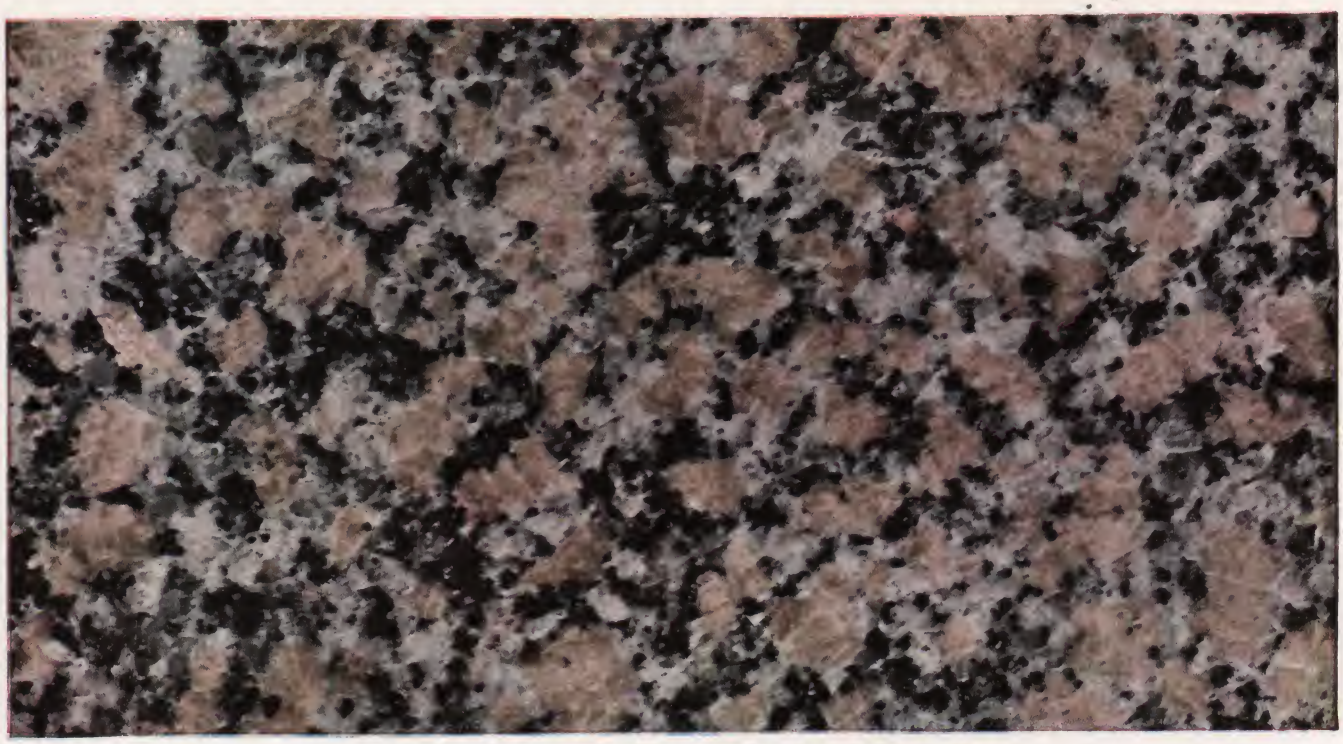
Cold Spring Rainbow Granite Polished Finish



Cold Spring Rainbow Granite Honed Finish

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Cold Spring, Minn.

Continued on next page



Cold Spring Pearl Pink Granite Polished Finish



Cold Spring Pearl Pink Granite
Sawed and Sanded Finish



Cold Spring Pearl Pink Granite
Rubbed Finish

Produced only by Cold Spring Granite Co., Inc.
Cold Spring, Minn.

Continued on next page

REFERENCES

A few of the many buildings throughout the country for which we have furnished our Cold Spring Granites and which illustrate the wide national distribution.

Cold Spring Pearl White Granite Used in the Following Buildings

Building	Location	Architect
Office Building, Floral Shop and Gateway, Lakewood Cemetery	Minneapolis, Minn.	Ernest Kennedy
Waite Phillips Building	Tulsa, Okla.	Smith & Senter
Bell Telephone Building	Evansville, Ind.	Vonnegut, Bohn & Mueller
James Riley School Building	South Bend, Ind.	Austin & Shambleau
Consumers Power Building	Battle Creek, Mich.	Stevens & Wood
Masonic Temple Building	Shawnee, Okla.	Edward J. Peters
Recitation Building	Iowa City, Iowa	Proudfoot, Rawson & Souers
Plaza Investment Building	Jackson, Miss.	N. W. Overstreet
Price Building	Kansas City, Mo.	William R. Bovard
Sherman Office Building	Corpus Christi, Tex.	Hardy & Curran
Root Store	Terre Haute, Ind.	Johnson, Miller & Yaeger
Hinds County Courthouse	Jackson, Miss.	Claude H. Lindsley
Aviation Building	Fort Worth, Tex.	Wyatt C. Hedrick
Interurban Station	Peoria, Ill.	Hewitt, Emerson & Gregg
Consumers Power Building	Pontiac, Mich.	Stevens & Wood, Inc.
South Side Bank	Scranton, Pa.	P. J. Morris
Oriental Institute	Chicago, Ill.	Mayers, Murray & Phillip
Capitol Club Office Building	Raleigh, N. C.	Frank B. Simpson
University Building	Kansas City, Mo.	W. R. Bovard

Cold Spring Rainbow Granite Used in the Following Buildings

Adler Planetarium	Chicago, Ill.	Ernest A. Grunsfeld, Jr.
McGraw-Hill Building	Chicago, Ill.	Thielbar & Fugard
Gas & Light Building	Milwaukee, Wis.	Eschweiler & Eschweiler
Hemenway Building	Boston, Mass.	Shepard & Stearns
Hartford Gas Company	Hartford, Conn.	Buck & Sheldon
J. E. Simpson Building	Washington, D. C.	W. S. Plager
Southland Hotel	Norfolk, Va.	Peebles & Ferguson
Watts Building	Birmingham, Ala.	Warren Knight & Davis
Walthall Hotel	Jackson, Miss.	N. W. Overstreet
Bankers Guarantee Title & Trust Co.	Akron, Ohio	Good & Wagner
St. Mary's Church	Shelby, Ohio	Howard W. Germann
Holy Name Church	Columbus, Ohio	Edward A. Ramsey
St. Louis University Medical Building	St. Louis, Mo.	Widmer Engineering Co.
Dallas National Bank Building	Dallas, Tex.	Coburn, Smith & Evans
Stuart Building	Lincoln, Neb.	Davis & Wilson
Pickwick Theatre	Park Ridge, Ill.	Zook & McCaughey
St. Basil's Church	Chicago, Ill.	J. W. McCarthy
David Stott Building	Detroit, Mich.	Donaldson & Meier
American State Bank	Saginaw, Mich.	Robert B. Frantz
Sacred Heart Cathedral	Superior, Wis.	Louis Preus
Baker Building	Minneapolis, Minn.	Larsen & McLaren
Fidelity Building	Duluth, Minn.	Thomas J. Shefchik
Skirvin Hotel	Oklahoma City, Okla.	Layton, Hicks & Forsyth
Oklahoma Natural Gas Building	Tulsa, Okla.	A. M. Atkinson

Cold Spring Pearl Pink Granite Used in the Following Buildings

Merchandise Mart	Chicago, Ill.	Graham, Anderson, Probst & White
Board of Trade Building	Chicago, Ill.	Holabird & Root
Jefferson County Courthouse	Birmingham, Ala.	Holabird & Root
Criminal Courts Building	New Orleans, La.	Diboll & Owen
Municipal Auditorium	New Orleans, La.	Favrot & Livaudias
Merchants Bank & Trust Building	Jackson, Miss.	Wyatt C. Hedrick
Ford Museum Buildings	Dearborn, Mich.	Robert O. Derrick
Cadillac Building	Boston, Mass.	Albert Kahn
New York Central R. R. Passenger Station	Buffalo, N. Y.	Fellheimer & Wagner
Gallinger Hospital	Washington, D. C.	Municipal Architect
Koppers Building	Pittsburgh, Pa.	Graham, Anderson, Probst & White
Maccabees Building	Detroit, Mich.	Albert Kahn
City Hall	Columbus, Ohio	Allied Architects Association
Union Central Life Insurance Building Annex	Cincinnati, Ohio	Garber & Woodward
Louisville National Bank & Trust Company	Louisville, Ky.	St. Louis Bank Building & Equipment Co.
Marx & Bensdorf Building	Memphis, Tenn.	Hanker & Cairns
Chamber of Commerce	Jacksonville, Fla.	Roy A. Benjamin
Calcasieu National Bank	Lake Charles, La.	Favrot & Livaudias
Southwestern Bell Telephone Building	Dallas, Tex.	Lang & Witchell
First National Bank Building	Del Rio, Tex.	Willis & Jackson
First National Bank Building	San Jose, Calif.	Willis & Jackson
Home Telephone & Telegraph Building	Pasadena, Calif.	John & Donald Parkinson
Youngs Market Building	Los Angeles, Calif.	C. F. Plummer
U. S. Post Office	Missoula, Mont.	James A. Wetmore
Oklahoma Gas & Electric Building	Oklahoma City, Okla.	Layton, Hicks & Forsyth
Alexander Building (2)	Tulsa, Okla.	Leland I. Shumway
Federal Reserve Bank	St. Louis, Mo.	Mauran, Russell & Crowell
Missouri Pacific Office Building	St. Louis, Mo.	E. M. Tucker
New Bismarck Hotel	Chicago, Ill.	Rapp & Rapp
U. S. Post Office and Courthouse	Des Moines, Iowa	Jas. A. Wetmore
Schroeder Hotel	Milwaukee, Wis.	Holabird & Roche
City Hall	Duluth, Minn.	Thos. J. Shefchik

BATES BROS. SEAM-FACE GRANITE CO., INC.

Quarriers of Granite Ashlar

QUINCY, MASS.

QUARRIES: WEYMOUTH, MASS.

Products

SEAM-FACE GRANITE ASHLAR.

SPLIT-FACE GRANITE ASHLAR.

SEAM-FACE GRANITE FLAGGING and STEPPING STONES.

DIMENSION STONE for Steps, Lintels, Sills, Arches and Coping.

Ample Facilities Mean Quantity Production

We are able to produce, quickly, in large quantities, as we have three quarries equipped with the latest labor and time-saving machinery.

Quality and Reasonable Cost

The rift, grain and texture of Weymouth Granite are extremely favorable to economic working. The ease with which this granite is worked, together with our volume production, enables us to market our products at extremely reasonable cost. Nature to a large extent has dressed this granite and then left it in a condition very favorable for inexpensive quarrying. The granite has a low absorption ratio, indicating very small porosity. Flame tests demonstrate it is among the best of the granites in proof against scaling and cracking.

Seam-face Granite

Seam-face granite appeals to architects because of its fine colored surface, ranging from deep browns and reds to the light greens and grays, with intermediate tones of yellow, buff and orange. The granite lies in the quarry in sheets of a laminated nature, vertical and parallel, varying in thickness from 4 in. to 2 ft. The faces of these sheets later become the faces of the building.

Split-face Granite

Split-face granite comes from the interior of the block sheets and varies in color from gray to light warm brown. It is a split rock face with nearly true faces and very slight projections.

Specification for Ashlar Work

All seam-face and split-face granite ashlar shall be of sound stock; beds and builds formed with pitching tool, ready to lay in wall. Rises shall be from 4 to 13 in., lengths shall be at least one and one-half times the rise and to average twice the rise. Thickness of granite to vary from 4 to 8 in., averaging 6 in.

No stone shall be less than 4 in. thick. No feather-edges on beds will be accepted and all ashlar shall be straight without wind. Fitting about trim stone, closures, etc., done at job.



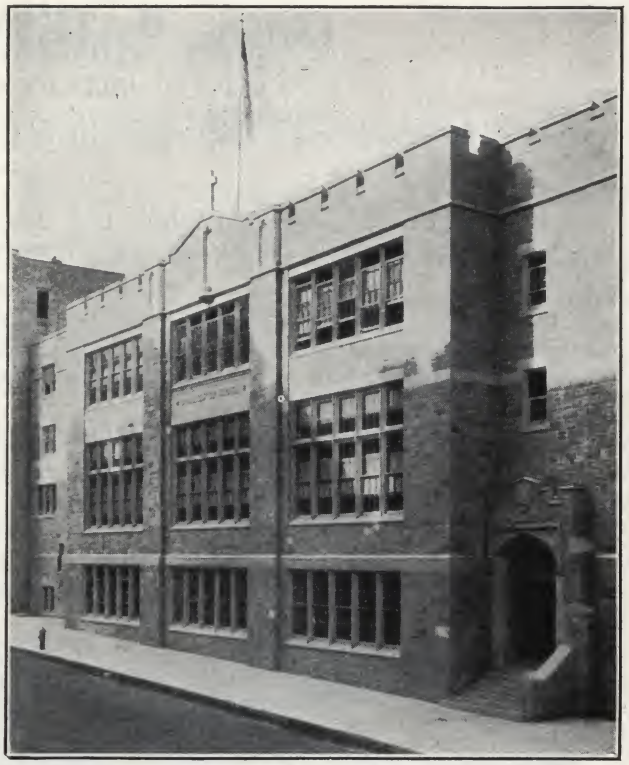
Sterling Memorial Library, Yale University, New Haven, Conn.

JAMES GAMBLE ROGERS, Architect — MARC EIDLITZ & SON, Builders

Continued on next page

References

Building	Architect
First Methodist Church, Bridgeport, Conn.	Allen & Collens
Dominican Convent, New York, N. Y.	P. Gregory Stadler
Elm Dormitories, Yale University, New Haven, Conn.	James Gamble Rogers
Church of Resurrection, Rye, N. Y.	Murphy & Lehmann
Saint Catherine's Church, Hillside, N. J.	Neil B. Conveary
Massachusetts State Armory, Norwood, Mass.	McLaughlin & Burr
Luther Memorial Church, Erie, Pa.	Alden & Harlow
Union Methodist Church, Fall River, Mass.	Woodbury & Stuart
St. Leo's School and Convent, Irvington, N. J.	Robert J. Reilley
One University Place (Apartment House), New York, N. Y.	Emery Roth
Nardin Park M. E. Church Rectory, Detroit, Mich.	Stahl & Morrison
Cutter Mausoleum, Charlotte, N. C.	Presbrey & Leland
Auburn Prison Cell Block, Auburn, N. Y.	State of New York
Pierpont Stackpole Residence, Manchester, Mass.	J. D. Leland



Our Lady of the Angels School, New York, N. Y.
Thomas F. Dunn, Architect Frank A. O'Hare Co., Builders



Wesley Methodist Church, Worcester, Mass.
Coolidge & Carlson, Architects E. F. Miner Building Co., Builder



Municipal Building, Norwood, Mass.
W. G. Upham, Architect E. F. Miner Building Co., Builder



Seamen's Bank for Savings, New York, N. Y.
B. W. Morris, Architect Wm. L. Crow Co., Builders

ESTABLISHED 1890

COOK, WATKINS & PATCH, INC.

221 Columbus Avenue, BOSTON, MASS.

IMPORTING OFFICES: CARRARA, ITALY AND ABERDEEN, SCOTLAND

PLANTS AT BARRE, VT.

Products

GRANITE: Barre, Coopersburg Black, Deer Island, Keystone Green, Imported Blacks and Reds, Westerly.

Barre Granite

The granite that retains its natural color after many years' exposure to the weather. Works well in either polished, hammered, vellum or rock-faced finish.

Long recognized as "The King Among Granites."

Vellum Finish

A new finish developed by our company which preserves the natural color of the granite. Gives a smooth finish equal to polish but without the gloss. Weathers equal to polish. Especially adapted to sand blast.

Service and Facilities

Designing and Architectural Departments—Our wide experience covering a period of forty years is at the disposal of interested architects through our drafting department in connection with the use of granite in buildings.

Plant Facilities—50,000 sq. ft. of shed space. Capacity: 1000 ft. of sawing, 800 ft. of polishing per day. Full line of machinery—gang saws, circular saws, carborundum and sand-blast machines.

Estimates and Samples

Estimates and samples are supplied promptly.



E. F. Albee Mausoleum, Kensico Cemetery, New York

Designed and executed by COOK, WATKINS & PATCH, INC.

References

West Philadelphia Title & Trust Building, West Philadelphia, Pa., Metzger, Fisher & White, Architects.

Syracuse City Bank & Trust Building, Syracuse, N. Y., N. P. Cross, Architect.

Marshall Field Addition, Chicago, Ill., P. E. Kemp, Contractor.

Vermont State Building at Eastern States Exposition Grounds, West Springfield, Mass., W. H. McLean, Architect.

Porteous, Mitchell & Braun Department Store, Portland, Me.

New York Times Building, Brooklyn, N. Y., Albert Kahn, Architect.



Rear View of E. F. Albee Mausoleum

Medical Arts Building, Rochester, N. Y.

E. F. Albee Mausoleum, Kensico Cemetery, New York, N. Y., designed and executed by us.

Charles Comiskey Mausoleum, Chicago, Ill.

Keim Mausoleum, Philadelphia, Pa.

Bishop Miner Mausoleum, Flint, Mich.

Winslow Mausoleum, New York, N. Y.

Corseglia Mausoleum, New York, N. Y.

Reed Mausoleum, Brockton, Mass.

Stocke Mausoleum, St. Louis, Mo.

ESTABLISHED 1889 INCORPORATED 1924

DEACON BROTHERS, INC.

JOHN R. DEACON, MANAGER

Manufacturers, Cutters and Finishers of Building and Monumental Granite

307-323 Centre Street, QUINCY, MASS.

Materials

We use in manufacturing, the various Quincy Granites from the quarries situated in our home city and granites from other New England quarries.

We make a specialty of carrying a supply of slabs of Goss Pink Deer Isle Granite sawed, polished, and ready to be cut into store fronts and base courses.

Facilities

Our plant is the largest in the city, occupying a whole city block and consists of a modern cutting plant, polishing mill, saw and carborundum equipment.

We are situated so that we can easily ship by rail or water (from Boston) to any point in the United States, and locally by our own motor transportation within 150 miles.

Organization

We are known as the "Quality Manufacturers" on account of the quality of work we produce.

The polish on granite produced at our plant is of the highest gloss obtainable. This quality is *maintained at all times.*

The firm was founded in 1889 by the late William H. Deacon and has been operated continuously by the same family to this day.

Estimates

Estimates on granite work and samples on request.



The Palmer House, Chicago, Ill.
Granite used in the lower courses of this hotel was furnished by DEACON BROTHERS, INC.

A Few Representative Installations

BUILDING	ARCHITECT
Hotel Statler, Boston, Mass.	George B. Post & Sons, Boston, Mass.
Palmer House, Chicago, Ill.	Holabird & Roche, Chicago, Ill.
First National Bank, Northampton, Mass. Granite Trust Co. Bank, Quincy, Mass.	J. Williams Beal Sons, Boston, Mass.
Southwestern Bell Telephone Co. Building, St. Louis, Mo.	Mauran, Russell & Crowell and I. R. Timlin Associated
Hibernia Bank Building, New Orleans, La.	Favrot & Livaudais, Ltd.
Union League Club Building, Chicago, Ill.	Mundie & Jensen, Chicago, Ill.
Houston Post-Dispatch Building, Houston, Tex.	Sanguinet, Staats, Hedrick & Gottlieb, Houston, Tex.
City Savings Bank & Office Building, Alliance, Ohio	Simons, Britain & English, Inc., Alliance, Ohio
National Mount Wollaston Bank, Quincy, Mass.	Thomas M. James Co., Boston, Mass.
Pontiac Michigan Central Office, Detroit, Mich. Mack Avenue Telephone Exchange Building, Detroit, Mich.	Smith, Hinchman & Grylls, Detroit, Mich.
J. A. Mercier Office Building, Detroit, Mich.	Donaldson & Meir, Detroit, Mich.
The Corning Building, Hartford, Conn.	Whiton & McMahon, Hartford, Conn.
H. P. Hood & Sons Co. Building, Charlestown, Mass.	Monks & Johnson and Kilham, Hopkins & Greeley, Boston, Mass.
National Bank of Commerce Building, Detroit, Mich.	C. Howard Crane, Inc.
Atlantic National Bank Addition, Boston, Mass.	Thomas M. James
West End Telephone Building, Boston, Mass.	Densmore, LeClear & Robbins

J. J. Newberry, Schulte-United and Grant Store Fronts

THE DOLBEN QUARRIES

Weymouth Seam Face Granite

DOLBEN & COMPANY

TELEPHONE
HUBBARD 8354, 8355, 8356

7 Water Street
BOSTON, MASS.

QUARRIES
WEYMOUTH, MASS.

(Address All Correspondence to Boston Office)

Products

SEAM FACE GRANITE ASHLAR.
SPLIT FACE GRANITE ASHLAR.

Seam Face Flagging and Stepping Stones; Special Arches, Lintels and Sills, cut according to drawings; Jambs, Quoins, Steps, Copings, etc., of special sizes for trimming walls faced with ashlar.

Nature of Stone

A true granite of great strength, found in nearly upright sheets of various thicknesses. Seams between these sheets provide faces for the blocks into which the stone is cut. Permanent in texture and color. Split face granite is produced by splitting blocks after quarrying. Surface is generally a little rougher than seam face. Splits evenly and requires no dressing or pointing.

Colors of Stone

The range of colors is wide, and includes grays, buffs, tans, browns, greens, and purple.

Color of seam face ranges from light gray to dark browns and purples. Color of split face granite is warm gray. Color group is optional.

Sizes

Standard heights are 5½ to 11½ in.; where necessary, 4 to 14½ in. Thickness is from 4 to 8 in. Lengths are random.

Methods of Laying

Lay this ashlar in mortar composed of 1 part of cement to 3 parts of sand and ¼ part lime putty. Joint should be ½ or ¾ in. thick, tooled according to choice but usually weathered, struck or raised joint. Raked joints are very effective and add to the texture of the wall.

Stone is laid either broken ashlar or coursed ashlar. There is no difference in cost of stone but broken ashlar costs more to lay.

Broken ashlar, either three-head or four-head, or a combination of both, can be built with our wide range of sizes.

Coursed ashlar can be laid in interrupted courses giving some of the texture of broken ashlar but emphasizing horizontal lines.

Estimates and Samples

Estimates and samples are supplied promptly to architects, owners and contractors.

Flagging

For paving of courts, terraces and garden walks or other landscape features there is no stone that surpasses seam face granite. It is generally used in irregular shapes but can be cut to rectangular. Thickness is under 4 in. and surfaces have the full range of seam face colors.

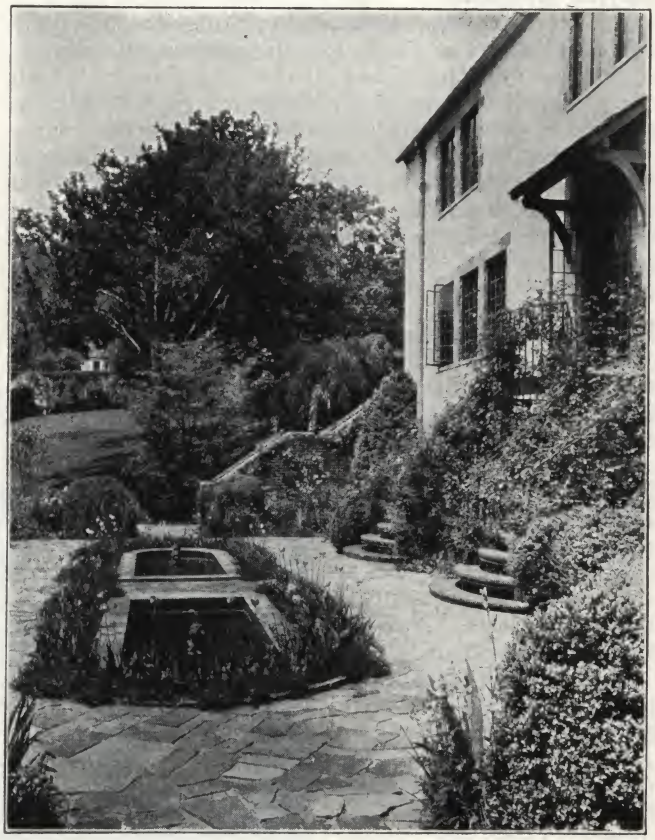


Star of the Sea Church, Marblehead, Mass.
MAURICE P. MEADE, Architect

Continued on next page



Left:
Church, Holyoke, Mass.
D. R. Baribault, Architect



Right:
Gardens of Private Estate, Port Washington, N. Y.
Delano & Aldrich, Architects
Seam face lintels, jambs, sills, flagging, borders and coping

Reference Buildings and Their Architects

First Swedish Lutheran Church, Brockton, Mass., Charles C. Coveney, 184 Boylston Street, Boston, Mass.
Vincent Astor Residence, Port Washington, N. Y., Delano & Aldrich, 126 E. 38th Street, New York, N. Y.
First Unitarian Church, Reading, Mass., Adden & Parker, 177 State Street, Boston, Mass.
St. Joseph's Church, Bridgeport, Conn., Joseph Jackson, 30 Whitney Avenue, New Haven, Conn.
Blessed Sacrament Church, Worcester, Mass., John W. Donahue, Springfield, Mass.
St. Anthony's Church, Revere, Mass., Edward T. P. Graham
St. Mary's Church, Uxbridge, Mass., John W. Donahue
Holy Cross Cathedral, Holyoke, Mass., John W. Donahue
Immaculate Conception Church, Holyoke, Mass., D. R. Baribault
Rectory, Our Lady of Victory, Jersey City, N. J., McKenna & Irving, 15 Park Row, New York, N. Y.
Temple Ohabei Shalom, Brookline, Mass., Blackall, Clapp & Whittemore, 31 West Street, Boston, Mass.
First Methodist Church, Rutland, Vt., Woodbury & Stuart
Church of Our Lady of Angels, Worcester, Mass., George Haynes
Wise Centre Building, Cincinnati, Ohio, Fechheimer & Ihorst
Severance Hall, Wellesley College, Wellesley, Mass., Day & Klauder, and Coolidge & Carlson, Associates
St. John's Church, Brunswick, Me., Chas. R. Greco
Stone Hall and Administration Building, Wellesley College, Wellesley, Mass., Chas. M. Klauder, Philadelphia, Pa.
Residence, Weston, Mass., Eric Kebbon, New York, N. Y.
St. Paul's Church, Edgewood, R. I., Ambrose Murphy
St. Coleman's Church, Brockton, Mass., E. T. P. Graham
Mt. Carmel Church, Worcester, Mass., Raymond Gorami
Notre Dame Church, Worcester, Mass., D. R. Baribault
Regis College, Weston, Mass., T. Edw. Sheehan, Boston, Mass.
Unitarian Parish House, Winchester, Mass., Smith C. Walker
Fire Station, Weymouth, Mass., McLaughlin & Burr
Memorial Park, North Easton, Mass., Stone & Webster
Hopkins School, New Haven, Conn., J. M. Kelly

JOHN L. GOSS CORPORATION

Producers of "Goss Pink Deer Isle Granite"

QUARRIES AND HOME OFFICE

STONINGTON, MAINE

SALES OFFICE, 77 Summer Street, BOSTON, MASS.

SALES AGENTS

NEW YORK, N. Y., A. Le Poidevin & Co., Inc., 286 Fifth Avenue
PHILADELPHIA, PA., Frank Williamson, 2302 Spruce Street
LOS ANGELES, CAL., Bly Stone Co., 1985 E. 16th Street
SEATTLE, WASH., Clark H. Grunewald, 314 Eitel Building
MIDDLE WESTERN TERRITORY, Wm. H. Mitchell, 30 Church Street, NEW YORK, N. Y.

Product

Goss Pink Deer Isle Granite, for buildings, memorials and general construction, polished, hammered, pointed or rock-faced.

Service Available

Any responsible manufacturer or dealer can supply this material. The rough granite and sawed slabs are shipped to finishing plants all over the country, which are equipped to furnish all classes of work. A large number of plants carry stocks on hand, and the quarry always stands ready to supplement these with prompt shipments of any sizes, shapes or quantities. We will be pleased to assist you in getting in touch with subcontractors in position to handle your particular project to best advantage, or to give preliminary estimates.

Facilities for Production

The natural advantages of the quarry site—a free working formation, so located that the product travels the short distance to our tidewater dock by gravity—are supplemented by the best modern equipment; derricks, compressors, air tools, granite saws, etc., which are constantly being improved, replaced and kept up-to-date.

This makes it possible to give prompt deliveries on large or small orders, and to furnish monoliths of any size that may be desired. We ship by water directly from our quarry dock to seaport cities, or deliver to the railroads at Rockland, Me.; Portland, Me.; Boston, Mass.; Philadelphia, Pa., and Wilmington, Del.



Merchants National Bank, New Bedford, Mass.
Adden & Parker, Architects

Color and Texture

The catalogue of the National Building Granite Quarries Association in this book has natural scale color plates of Goss Pink Deer Isle Granite, both polished and hammered. Rock-faced work has a tone between the two but with a very rugged character. For base courses, especially where subjected to accumulation of dirt or stain, we recommend a polished surface. A rubbed or honed finish gives some of the same advantages but is without the high gloss. For most general purposes, and especially in connection with moulded members or carved details, a hammered finish is advised. A pointed surface is an interesting but inexpensive finish with strong texture.

Compressive Strength

Tests in the laboratory of Massachusetts Institute of Technology give an average compressive strength of 32,250 pounds per square inch. This is well above all structural or code requirements.

Specifications

We suggest that you use the form recommended by the National Building Granite Quarries Association on another page of this book, inserting the finish desired, and in place of Section 2—"All granite shall be Goss Pink Deer Isle Granite from the quarry of John L. Goss Corporation at Stonington, Maine."

References

Building	Architect
Stevens Hotel, Chicago, Ill.	Holabird & Roche
Federal Reserve Bank, Boston, Mass.	R. Clipston Sturgis
Lafayette Building, Philadelphia, Pa.	John T. Windrim
Evans Memorial Galleries, Boston, Mass.	Guy Lowell
Insurance Co., of North America Building, Philadelphia, Pa.	Stewardson & Page
Neils Esperson Building, Houston, Texas	Eberson & Eberson
Southern California Edison Building, Los Angeles, Cal.	Allison & Allison
Security Trust & Savings Bank, Los Angeles, Cal.	John Parkinson
Public Ledger Building, Philadelphia, Pa.	Horace Trumbauer
East Boston (Mass.) Savings Bank	Thomas James
Pilgrim Memorial Tower, Provincetown, Mass.	Willard T. Sears
South Office Building, State Capitol, Harrisburg, Pa.	Arnold W. Brunner
Industrial Trust Building, Providence, R. I.	Walker & Gillette
Security Building, Miami, Fla.	Robert Greenfield
New York State Office Building, Albany, N. Y.	Sullivan W. Jones
Salem Fields Entrance, Brooklyn, N. Y.	Percy W. Darbyshire
Fountain of Oceanus, Estate of John D. Rockefeller, Pocantico Hills, N. Y.	Welles Bosworth
Drexel Bank Building, Philadelphia, Pa.	Day & Klauder
Mutual Trust Co., Philadelphia, Pa.	Heacock & Hokanson and The Ballinger Co.
New York State Office Building, New York, N. Y.	Sullivan W. Jones, William E. Haugaard
Fountain Memorial to Pilgrim Women, Plymouth, Mass.	McKim, Mead & White
Internal Revenue Building, Washington, D. C.	J. A. Wetmore

H. E. FLETCHER COMPANY

Producers of Granite

WEST CHELMSFORD, MASS.

Products

CHELMSFORD WHITE GRANITE.
CHELMSFORD GRAY GRANITE.
CHELMSFORD "BULFINCH" GRANITE.
MILFORD (N. H.) GRAY GRANITE.

DIMENSION, CUT, RUBBLE and CRUSHED GRANITE for buildings, bridges, roadways, sea-walls, docks and dams.

DIMENSION GRANITE, in carloads for mausoleum and monumental work.

PAVING BLOCKS, CURBING, SEWER INLETS and CRUSHED GRANITE for municipal work.

Chelmsford White Granite

A grayish-white granite which weathers well and is widely used for building and bridge work.

Chelmsford Gray Granite

A well-known standard light gray granite for building and memorial work.

Weathers equally as well and is finer grained than Chelmsford White.

Both granites, when bush-hammered, are almost unequalled in retaining their light, almost white color.

Chelmsford "Bulfinch" Granite

A varied light grayish-buff colored granite used for many years in Colonial structures. A notable example is University Hall, of the Harvard University group at Cambridge, Mass., designed by Bulfinch and built in 1813. This famous building stands today, an example of the splendid weathering qualities of Chelmsford Granite. Chelmsford "Bulfinch" Granite has been used in recent additions to this group.

Paving Blocks and Curbing

We are one of the principal producers of paving blocks and curbing.

Facilities

Fifty years of quarry development has produced quarry faces containing millions of feet of granite available for quarrying under numerous derricks. With unexcelled railway facilities, and adequate cutting plant, this means that large contracts can be promptly executed. We do no polishing work at this plant, but are in a position to furnish sawed slabs or saw blocks to polishing plants.

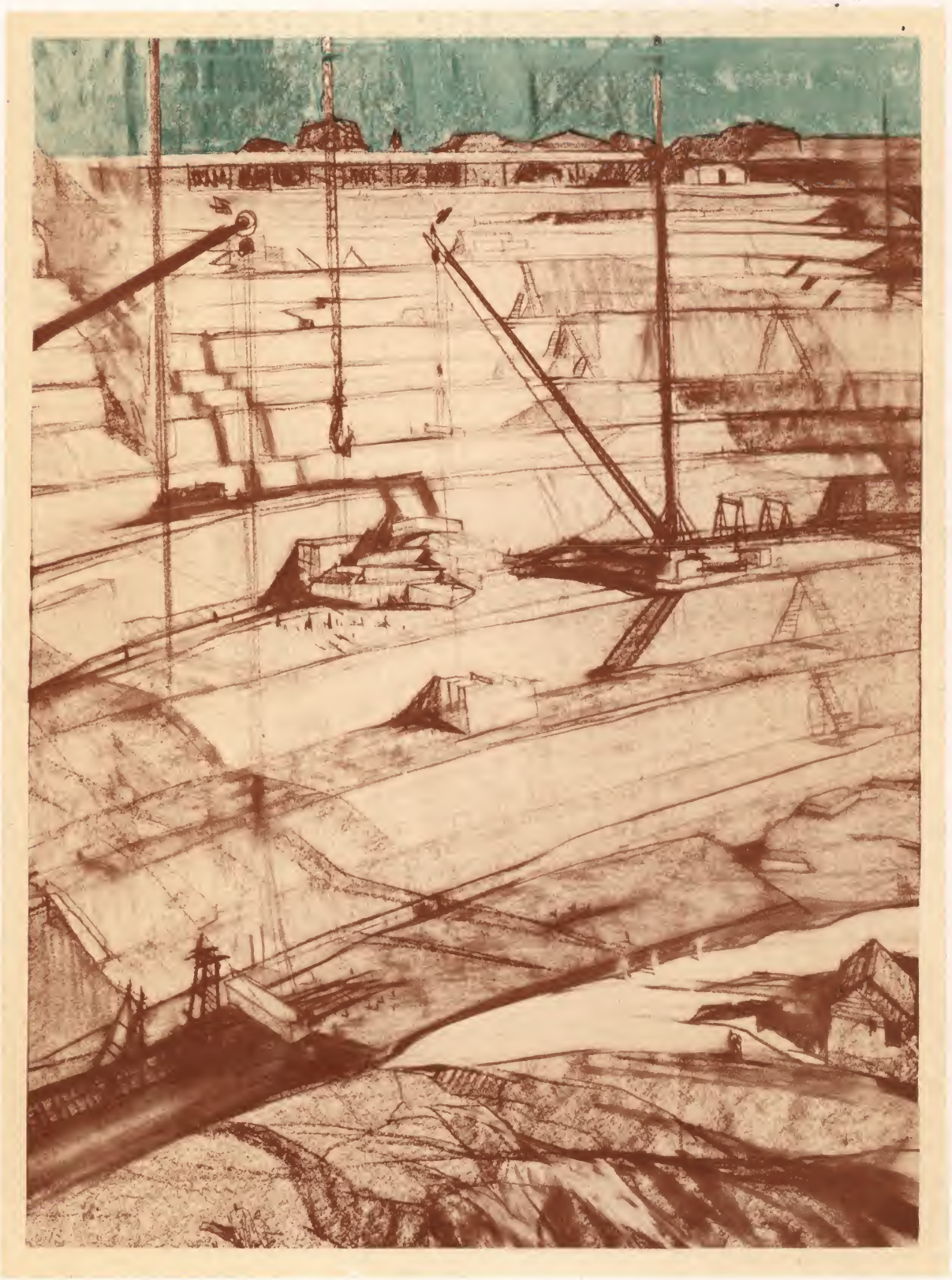
Organization and Service

Our organization has been built up of men having long experience in granite production and includes business, traffic and technical experts.

REFERENCES

BUILDING	LOCATION	ARCHITECT OR ENGINEER
New Jersey State Office Buildings	Trenton, N. J.	J. Osborne Hunt and Hugh A. Kelly
Pennsylvania State Capitol, West Approach	Harrisburg, Pa.	Gehron & Ross
Pennsylvania State Capitol, North Office Bldg.	Harrisburg, Pa.	Gehron & Ross
Pennsylvania State Capitol, South Office Bldg. No. 2	Harrisburg, Pa.	Gehron & Ross
The Sailors and Soldiers Memorial Bridge	Harrisburg, Pa.	Gehron & Ross and J. E. Grenier Co., Engineers
New York State Office Bldg., Park Work	Albany, N. Y.	State Architect Wm. E. Hougaard
Philadelphia-Camden Bridge	Philadelphia, Pa.	Paul P. Cret, and R. Modjeski, Eng.
Louisville-Jefferson Bridge	Louisville, Ky.	Paul P. Cret, Architect and Modjeski, Masters & Chase, Engineers
Federal Reserve Bank	Baltimore, Md.	Parker Thomas & Rice
Federal Reserve Bank	Boston, Mass.	R. Clipston Sturgis
Ridge Road Bridge	Rochester, N. Y.	Gehron & Ross and Frank McKibben, Engineer
Hartford County Court House	Hartford, Conn.	Paul P. Cret and Smith & Bassette, Assoc.
New Orleans Post Office	New Orleans, La.	Supervising Architect of the Treas.
Thirty Columns in Facade, Treasury Bldg.	Washington, D. C.	Supervising Architect of the Treas.
Lowell Post Office	Lowell, Mass.	Supervising Architect of the Treas.
Kansas City Post Office	Kansas City, Mo.	Supervising Architect of the Treas.
Fidelity Mutual Life Ins. Co., Bldg.	Philadelphia, Pa.	Zantzinger Borie & Medary
Wilkesbarre Kingston Bridge	Wilkesbarre, Pa.	Carrere & Hastings
Massachusetts State House Wings	Boston, Mass.	R. Clipston Sturgis
Lehman Hall, Harvard University	Cambridge, Mass.	Coolidge Shepley Bulfinch & Abbott
St. Louis Masonic Temple	St. Louis, Mo.	Eames & Young, Albert B. Groves, Assoc.
Metropolitan District Commission Bldg.	Boston, Mass.	Densmore LeClear & Robbins
Camden County Court House and Camden City Hall	Camden, N. J.	Edwards & Green
Olin Memorial Library	Middletown, Conn.	McKim, Meade & White
John W. Weeks Memorial Bridge	Cambridge, Mass.	McKim, Meade & White
Cottage Farm Bridge	Boston, Mass.	Desmond & Lord
Old First National Bank	Boston, Mass.	R. Clipston Sturgis
Shawmut National Bank Addition	Boston, Mass.	Parker Thomas & Rice
Detroit Windsor Bridge	Detroit and Windsor	McClintic-Marshall Co., Engrs.
St. Peters Parochial School and Orphanage	Lowell, Mass.	Henry L. Rourke
Outerbridge, Crossing	New York, N. Y.	York & Sawyer, N. Y. Port Authority
Goethals Memorial Bridge	New York, N. Y.	York & Sawyer, N. Y. Port Authority
Kill Van Kull Bridge	New York, N. Y.	Cass Gilbert, Inc., N. Y. Port Authority
Holland Tunnel Ventilator Shafts	New York, N. Y.	New York & New Jersey Tunnel Comm.

Continued on next page



A QUARRY VIEW

This is number one of a series of twelve Drawings made at the Fletcher Quarries by Ernest Born.

GRANITE
H · E · FLETCHER CO.
WEST CHELMSFORD MASS.

ESTABLISHED 1826

GRANITE RAILWAY COMPANY

Quarriers of Granite Railway Syenite

1245 Hancock Street, QUINCY, MASS.

The Company

In 1826 the GRANITE RAILWAY COMPANY was organized and chartered by the Commonwealth of Massachusetts, for the dual purpose of quarrying stone and transporting it by railway to the Neponset River, whence it was taken by vessels to all parts of the Atlantic coast from Maine to Louisiana. The railway which was built in 1826 was *"The First Railway in America."* For a half century the Company operated both its quarries and railway, then it gave up its railway and devoted its entire energies to the quarrying side of the business.

Syenite

Railway granite is really a syenite composed of quartz, feldspar and hornblende and takes it name from Syene in upper Egypt where the similar stone so extensively used by the ancient Egyptians was quarried. The hornblende makes it very hard and durable. Even after a hundred years of such a variable climate as is found in New England, Railway Syenite fails to show the slightest trace of disintegration. Two good examples of this are Bunker Hill Monument and Minot's Ledge Light.

The syenite from the quarries of the GRANITE RAILWAY COMPANY is taken from strata far below the surface of the ground. Every block is closely examined, and any that is not perfect in color and texture is discarded. Two standard shades of color, dark and extra dark, give the architect a choice permitting considerable flexibility in chromatic design.

The Quincy syenite first used in buildings was selected for its hardness and its permanence. While stone polishing is one of the oldest arts, the methods were at first rough and crude, making the cost of polishing too great to permit of the use of large polished surfaces in building construction. It was early recognized, however, that Quincy syenite when polished presents a uniquely beautiful surface, unusually dark in color, yet with far more lively a sparkle than is ordinarily associated with so dark a material. The beauty of this polished surface, together with the contrasting gray of the hammer-finished stone, led gradually to a larger and larger part of the output of the Quincy syenite being used by monument manufacturers.

In recent years changing conditions once more offer an opportunity to the architect to obtain new distinction of design by the use of this same Granite Railway stone which was so widely used for structural purposes two, three or four generations ago. Not only does the modern steel-framed building permit the use of much thinner veneers than was feasible in the days when masonry walls were all bearing walls, but also the methods and machinery for polishing stone have so improved that it is now possible to polish large surfaces of granite at greatly reduced cost.

At the same time, saws have been devised which enable the granite manufacturers to cut the solid block into veneers of almost any thickness desired. Owing to its hardness and strength, and the ease with which it can be cleaned by simple washing, polished Granite Railway syenite is especially adapted for use as a facing on the lower stories of buildings that are subject to the dirt of the streets and likely to be chipped by the wear and tear of passing traffic.

The beautiful dark color of its polished surface contrasts well with lighter stone in upper stories. As the setting for windows and doorways, for bronze and iron grill work, for marble carving or panels, polished Granite Railway syenite provides a background which brings out the contrasting detail subordinating its own intrinsic beauty.



The Parker House, Boston, Mass.

Service to Architects

THE GRANITE RAILWAY COMPANY desires to place its skill and knowledge of the possibilities of syenite granite at the service of the architect and contractor. It welcomes, therefore, inquiries about the use of granite in any way. The knowledge of the various applications of syenite possessed by this company enables it to suggest economical and efficient new ways of using its granite both in the ashlar and in the massive block. In fact, new uses for the employment of syenite granite are constantly being developed.

Recent Buildings

Some of the most recent examples of the use of Granite Railway syenite in modern building construction may be seen in the Parker House, Boston, Mass.; Palmer House, Chicago, Ill.; National Mt. Wollaston Bank, Quincy, Mass.; and the McCrory Five and Ten Cent Stores, Dayton and Youngstown, Ohio.



Bunker Hill Monument, Boston, Mass.
Erected by Granite Railway Co. Height 221 ft. Construction started 1826



Showing Gateway to the Quarry, and on the Left, Part of the Original First Railway in America



Photo by W. A. Bradford
Minot's Ledge Light, Boston Harbor
Built 1855-60 with Railway Granite

GRANITE MANUFACTURERS ASSOCIATION OF MOUNT AIRY

MOUNT AIRY, N. C

MEMBERS

J. D. SARGENT GRANITE COMPANY
Mount Airy, N. C.
Branch Offices:
40 Journal Square, Jersey City, N. J.
127 No. Dearborn Street, Chicago, Ill.
615 Witherspoon Building, Philadelphia, Pa.
207 Fulton Building, Pittsburgh, Pa.

NORTH STATE GRANITE COMPANY
Mount Airy, N. C.
Branch Office, 30 East 42nd Street, New York, N. Y.

THE NORTH CAROLINA GRANITE CORPORATION
Mount Airy, N. C.
Branch Offices:
40 Journal Square, Jersey City, N. J.
127 No. Dearborn Street, Chicago, Ill.
615 Witherspoon Building, Philadelphia, Pa.
207 Fulton Building, Pittsburgh, Pa.

MOUNT AIRY GRANITE CUTTING COMPANY
Mount Airy, N. C.

Products

DIMENSION GRANITE for Buildings, Mausoleums, Monuments, Bridges, Dry Docks, etc.

POLISHED and TURNED GRANITE.

GRANITE PAVING BLOCKS, STREET CURBING, CROSSWALK, RUBBLE ASHLAR, BUILDING BLOCKS, CRUSHED GRANITE and RIP RAP.

The Association and Its Object

The aim of this Association is to promote the use of Mount Airy Granite for all purposes. Its members are prepared to co-operate with architects, engineers and builders in matters relating to the use of granite, samples, specifications, estimates, etc.

Quarry Production

The quarries were first opened in 1889. The output has steadily increased until a maximum of 3500 carloads in one year has been reached.

Owing to natural advantages peculiar to Mount Airy quarries, Dimension Stone of unusual size is easily obtained, only limit being that of railway transportation.

Facilities

Cutting plants and offices are strategically located at the base of the Mount Airy Quarries. Equipment is modern and complete. Electric traveling cranes, polishing machinery and turning lathes, sandblast and carborundum machines, gang saws, compressed air driven tools of all kinds; this equipment, together with the unlimited supply of rough granite available, enables large contracts to be executed in quick time.

Geographical Location

The Mount Airy quarries are well situated in reference to shipping, being about an equal distance from New York, New Orleans and Chicago; which fact guarantees a reasonable transportation cost to points throughout the East, South and Middle West. Nearby connections with the Southern and Norfolk & Western Railways serve the quarries.

Colors and Texture of Mount Airy Granite

Mount Airy granite, *"The Granite of Individuality,"* is a very light gray, almost white, biotite granite of medium texture. Feldspar, quartz and mica characterize the granite megascopically.

The feldspar is nearly white, while the quartz is a blue gray and the mica black and very evenly distributed, giving an appearance of decided strong character.

The following Chemical Analysis and tests are significant:

SiO_2	70.70
Al_2O_3	16.50
Fe_2O_3	2.34
MgO	0.29
CaO	2.96
Na_2O	4.56
K_2O	2.45
FeS_2	0.09
Total	99.89
Weight per cu. ft	165 lbs.
Water absorbed per cu. ft	0.33 lb.
Crushing strength	23,068 lbs. per sq. in.

From Bulletin No. 2, page 155, North Carolina Geological Survey, "The building and ornamental stones of North Carolina." JOSEPH HYDE PRATT, State Geologist.

Estimates and Samples

A complete organization is maintained by each member of this Association for furnishing estimates, setting plans, details, etc., promptly and efficiently.

Preliminary estimates cheerfully furnished without obligations on request of architects or contractors.

Samples of Mount Airy Granite will be furnished on request, and advice as to grade or style of finish desired.



A Panoramic View of the Famous Mount Airy Granite Quarry of The North Carolina Granite Corp'n
There are over 75 acres of exposed granite in the working area

Continued on next page

Granite for Every Purpose

Cut, carved, and polished granite for all purposes is the principal product of this Association.

In addition, several hundred thousand feet of street curbing, a million or more paving blocks, thousands of tons of crushed granite and rip rap are produced every year.

A specially prepared rubble for broken range ashlar has won great favor with architects, contractors, and owners.

New types of building blocks are being developed with very pleasing results.

Whatever type of granite product is required this Association, through one or more of its members, can assure complete satisfaction.



Buildings

Good practice requires the use of some granite in every fine building. Whether the granite be limited to base course or includes the entire superstructure, this organization will give the same attention to details and first class workmanship.

The prompt delivery of accurately cut granite saves time and money on any building job.

REFERENCES

Union Trust Building, Washington, D. C.
Guilford County Courthouse, Greensboro, N. C.
Citizens National Bank, Long Branch, N. J.

Mausoleums

The dignity and beauty of the modern private mausoleum are best secured through simplicity of design enriched by a granite of strong character in appearance. Monolithic wall and roof stones are preferred from a structural standpoint.



The fact that Mount Airy Granite has been used in the construction of more private mausoleums than any other American granite is striking recognition of its superior qualities.

REFERENCES

Private Mausoleums

The Sauer Mausoleum, Richmond, Va.
O'Brien Mausoleum, Cincinnati, Ohio
Dodge Mausoleum, Detroit, Mich.

Public Mausoleums

Rose Hill Mausoleum, Chicago, Ill.
Valhalla Mausoleum, St. Louis, Mo.

Monuments



Mount Airy Granite is particularly well suited to heavier type monuments. Stock of uniform texture free from defects is always available in sizes up to the limits of transportation. It is especially adapted to fine moulding, carving, and sculpture work. Superior equipment and craftsmanship have also been important factors in winning for Mount Airy a position of leadership in the heavier type monument field.

REFERENCES

Higgins Monument, Chicago, Ill.
Patterson Monument, Dayton, Ohio
Acacia Park Monument, Buffalo, N. Y.
Pennsylvania Monument, Gettysburg, Pa.



Bridges

Bridge construction requires a granite with structural strength. Mount Airy has that strength and, in addition, is lastingly beautiful. It lends itself equally well to massive piers and graceful arches. Plant and quarry capacity have been important factors in enabling unusually large bridge contracts to be completed in record time.

REFERENCES

Arlington Memorial Bridge, Washington, D. C.
Fall Creek Bridge, Indianapolis, Ind.
Delaware River Bridge, Philadelphia, Pa.

Rock Face Broken Range Ashlar



Mount Airy 1 & 2 Man Rubble is granite broken out in neat rectangular shapes and is intended to be used in broken range ashlar masonry work. Prominent architects have specified it in building after building; mason contractors prefer it because it can be put in the wall with remarkable economy; owners are enthusiastic about its appearance.

Write for a copy of the folio describing this interesting material and containing model specifications and other valuable information about broken range ashlar.

REFERENCES

St. Charles Borromeo Seminary, Overbrook, Pa.
Bethesda M. E. Church, Salisbury, Md.
First United Evangelical Church, Williamsport, Pa.
Rectory of Holy Child, R. C. Church, Philadelphia, Pa.
Residence Dr. C. W. Banner, Greensboro, N. C.



A Continuation of the Panoramic View

The cutting plant appearing in the foreground has a floor space of 33,000 sq. ft. The combined floor space of Association plants is in excess of 75,000 sq. ft.

ESTABLISHED 1845

HARRISON GRANITE COMPANY, INC.

TELEPHONE
MURRAY HILL 2477

MAIN OFFICE AND STUDIOS
4 East 43rd Street, NEW YORK, N. Y.

BRANCH OFFICES
CHICAGO, ILL., 809 Fine Arts Building
DETROIT, MICH., 1214 Maccabee Building
MINNEAPOLIS, MINN., 3529 Hennepin Avenue
PITTSBURGH, PA., 6663 Aylesboro Avenue

WORKS, BARRE, VT.

Products

MEMORIALS of all kinds in GRANITE, MARBLE and BRONZE, ranging from monumental pieces of public interest to the simplest of private tributes.

Mortuary Art

Individual tastes are as diversified as the art itself but, whether the desired effect is dignified elegance or impressive simplicity, we are truly prepared to serve the best interests of our clients in an efficient and able manner.

Construction and Erection Facilities

Eighty-five years of "knowing how," careful personal supervision, and our complete and extensive cutting facilities enable us to set and maintain a high standard of workmanship and design.

The Harrison plant is electrically equipped and contains all the modern tools and appliances necessary to the production of well-finished, artistic monuments.

Our erection facilities are of the best and this work is entrusted only to those who have demonstrated their ability to grasp and execute the lofty concept of the architect who designed the memorial they are to build.

Design and Architectural Departments

Wide experience in our field has fitted us to offer design suggestions, sketch studies, etc., and we are glad to co-operate with the architect by placing the facilities of these departments at his disposal.

Partial List of References

Trowbridge & Livingston, New York, N. Y.
Carrere & Hastings, New York, N. Y.
Alfred C. Bossom, New York, N. Y.
C. P. H. Gilbert, New York, N. Y.
John V. Van Pelt, New York, N. Y.
Hobart Upjohn, New York, N. Y.
Albert Kahn, Detroit, Mich.
Talmadge & Watson, Chicago, Ill.
H. Hornbostel, Pittsburgh, Pa.
McKim, Mead & White, New York, N. Y.
Frank A. Moore, New York, N. Y.
J. Robertson Ward, New York, N. Y.
H. Van Buren Magonigle, New York, N. Y.
Wm. Lawrence Bottomley, New York, N. Y.
T. E. Blake, New York, N. Y.
Eugene Schoen, New York, N. Y.



Mausoleum for Richard T. Crane, Graceland Cemetery, Chicago, Ill.
JOHN RUSSELL POPE, Architect

S. HASKEL & SONS, INC.

Producers of "Shastone" Special Granites

97-115 Harrison Place and 96-114 Ingraham Street
BROOKLYN, N. Y.

Products and Services

"SHASTONE" GRANITES for building exterior work, memorials, mausoleums and monuments; FOREIGN GRANITES from Norway, Sweden, Finland, etc.; GRANITE CUTTING and SHAPING; POLISHING, a specialty.

"Shastone"

The world's selected granites, foreign or domestic, noted for their beautiful colors, flawlessness, durability and all other fine qualities which make their use adaptable for highest grades of monumental and architectural purposes.

"Shastone" polished granites have demonstrated their ability to resist the action of the elements in any climatical condition, are non-absorptive and non-staining.

They are therefore specially commendable for all exterior decorative work and memorials, which are subject to dust and dirt.

The trade-mark shown above is a guarantee for quality and genuineness. Every stone that leaves the firm's yards bears the "Shastone" trade-mark.

Polishing

"Polish Expresses the Beauty of Granite."

It is the genuine polished surface of granite that is the effective means of preservation and preventive of surface deterioration against the action of the elements and staining from dust and dirt.

"Shastone" Polishing Plant—Our polishing plant is one of the largest in the world. It is equipped with every imaginable device for the production of a high class polish.

Colored Granites

We carry in stock both foreign and domestic granites of a large variety of colors (white, black, gray, red, green, etc.). Samples, details and prices on request.

Recent Installations

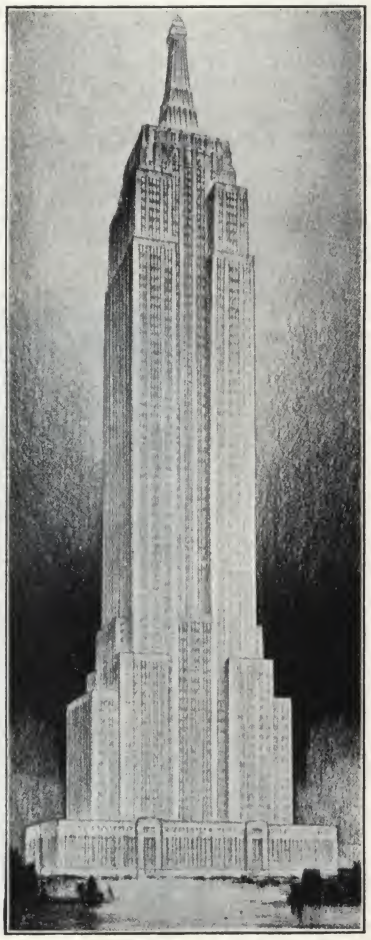
Integrity Trust Building, Philadelphia, Pa.
Grant Building, Pittsburgh, Pa.
Worth Stores, New York, N. Y., Emery Roth, Architect
Bricken Casino, New York, N. Y., Ely Jaques Kahn, Architect
38th St. and Broadway Building, New York, N. Y., Ely Jaques Kahn, Architect
Faidley Building, Omaha, Neb., John McDonald, Architect
Banks Huntley Building, Los Angeles, Cal., John & Donald Parkinson, Architects
29 Broadway Building, New York, N. Y., Sloan & Robertson, Architects
Judah Building, Chicago, Ill., Holabird & Root, Architects
Fuller Tower, New York, N. Y., Walker & Gilbert, Architects
Stewart & Co., New York, N. Y., Warren & Wetmore, Architects
United States Savings Bank, Newark, N. J., Guilbert & Betelle, Architects
Title Guarantee & Trust Co., New York, N. Y., John Mead Howells, Architect
Goldman Sachs Building, New York, N. Y., A. F. Gilbert, Architect
Wellington Hotel, New York, N. Y., Robert T. Lyons, Inc., Architects
Seaboard National Bank, New York, N. Y.
Women's Athletic Club, Chicago, Ill.



Chrysler Building, New York, N. Y.
WILLIAM VAN ALEN, Architect
Granite used is "Shastone" Emerald Pearl



American Radiator Building
RAYMOND M. HOOD, Architect
The exterior work at the base and first three stories of this modern cathedral of commerce is "Shastone" Black Swedish Granite as specified by the architect. It harmonizes and is an integral part of this example of modern structural design



Empire State Building, New York, N. Y.
(In process of construction)
SHREVE, LAMB and HARMON, Architects
Granite used is "Shastone" Black Swede

NEW ENGLAND GRANITE WORKS, INC.

WESTERLY, R. I.

BRANCH OFFICE: Room 501, 12 East 41st Street, NEW YORK, N. Y.

REPRESENTATIVES

PITTSBURGH, PA., Jay R. Wells, 501 Keystone Building

DETROIT, MICH., W. A. Munger, 1416 St. Clair Avenue

PHILADELPHIA, PA., Edward A. Jefery, 34 So. 16th Street

Product

Westerly Granite in several distinct colors for the highest grade of permanent construction including:

Building Work of distinctive or Monumental Character.

Mausoleums of any size.

Public and Private Memorials in which quality of material and workmanship are paramount.

Westerly Granite

Westerly Granite is available in several colors: White, Red, Blue, and Pink.

White Westerly Granite—A creamy white in the hammered finishes and a buff gray when polished. It is a fine grained granite adapted to the finest finishes and carved work and yet readily available in quantity and sizes so that it can be used on the larger class of work. It is very uniform in color and character. As monoliths can be produced to the limits of transportation it is especially recommended for mausoleum work where large roof stones and other members are required. The polished finish brings out a delicate buff gray color which harmonizes very satisfactorily with limestone superstructures. It has been notably so used on the Greater Penobscot Building and the St. Aloysius Church, both in Detroit.

Red Westerly Granite—Of a medium grain and of a deep pink shade. It is adapted for building work, mausoleums and memorials where a colored granite is desired. If used in the variegated shades it is especially economical.



Hardy Mausoleum, Flushing, L. I., N. Y.

Blue Westerly Granite—A blue-white color and fine grain. It is of the very best quality, noted for its permanence of color and its adaptability to the finest workmanship. It is therefore used almost exclusively for the best type of memorial work.

Pink Westerly Granite—In both the light and dark shades, it is acknowledged one of the finest granites in the world. It is of a delicate pink shade and extremely fine grain and very hard. It can be finished with the delicacy of marble and yet has the permanence of the best of all granites. It is used for the most refined memorial work.



Greater Penobscot Building, Detroit, Mich.
Smith, Hinchman & Grylls, Architects

Facilities

All shades of Westerly Granite are produced from our own quarries at Westerly, R. I., which have been developed and expanded so as to make them all readily obtainable for their respective classes of work.

Our finishing plant is equipped with all types of modern machinery and skilled workmen are available for all classes of work. Direct rail connection with the New Haven Railroad allows prompt handling of all shipments.

We are prepared to erect mausoleum and memorial work with our own men and equipment and thus furnish complete supervision and assume complete responsibility.

Organization

Our representatives are willing to assist architects at any time in the preparation of specifications or in the discussion of the details of construction for building work.

We have specialized in the design of mausoleums and memorials and are prepared to submit sketches, discuss construction or otherwise assist architects, sculptors or contractors with this type of work.

References

Travelers Insurance Building, Hartford, Conn., Donn Barber, Architect. Red Westerly Granite for entire exterior.

Colonial Trust Company, Pittsburgh, Pa., F. J. Osterling, Architect. Red Westerly Granite for two street fronts.

Greater Penobscot Building, Detroit, Mich., Smith, Hinchman & Grylls, Architects. Polished White Westerly Granite for first story.

St. Aloysius Church, Detroit, Mich., Donaldson & Meier, Architects. Polished White Westerly Granite for base and entrance pilasters.

Charter Oak Memorial Tablet, Travelers Building, Hartford, Conn., R. H. Dana, Architect. Honed Light Pink Westerly Granite.

McLachlan Mausoleum, Cleveland, Ohio, Abram Garfield, Architect. Light Pink Westerly Granite.

Hardy Mausoleum, Flushing, L. I., N. Y., W. G. Mercer, Architect. Blue Westerly Granite.

Marrott Mausoleum, Indianapolis, Ind., A. H. Fehmer, Architect. Blue Westerly Granite.

Independence Memorial, Boston Common, Boston, Mass., John F. Paramino, Sculptor. Honed Light Pink Westerly Granite.

Hartford National Bank & Trust Company, Hartford, Conn., Dennison & Hirons, Architects. Blue Westerly Granite for rebuilding two stories of six-story building of the same granite built fifty years previously.

NORTH STAR GRANITE CORPORATION

Producers of Architectural Granite

MAIN OFFICE, DRAFTING ROOMS, PLANTS AND QUARRIES

ST. CLOUD, MINN.

CHICAGO OFFICE: 105 South Dearborn Street

DETROIT OFFICE: 2539 Woodward Avenue

Products

"ORIGINAL MINNESOTA PINK" GRANITE—a coarse grain granite of unusual architectural possibilities. Has crushing strength well over 20,000 lbs. Very reasonable in price since quarry is free of defects that cause big losses.

"PIONEER DARK GRAY"—a dark granite, finer in grain than "Original Minnesota Pink."

"INDIAN RED," and "NORTH STAR RED"—medium grained granites ideally suited for decorative pieces, as they carve well and are highly colorful.



Carved Figure Used in the Fisher Building, Detroit
For which we furnished four stories of polished Original Minnesota Pink

Facilities

We own the quarries used in producing the granites described above. Steel derricks and modern equipment enable us to obtain blocks in any size that can be transported. Our cutting plants contain an array of cost-saving machines which reduce hand operations to a minimum.

A Service Department for Architects and Builders

The staff of this department is headed by an experienced and competent architect. These men are always at the disposal of our clients.



A Completely Equipped Loading Yard and Rail Facilities Greatly Contribute to Handling of Time Contracts

Partial List of Buildings on Which "Original Minnesota Pink" Granite Has Been Specified and Used

Liberal Arts Building, University of North Dakota, Grand Forks, N. D., Jos. Bell DeRemer, Architect

Talcott Building, Rockford, Ill., Howard Shaw, Chicago, Ill., Architect

Bank and Office Building, Pittsburgh, Pa., H. Hornbostel, Erie, Fisher, Wood Co., Architects

Muskegon Chronicle Building, Muskegon, Mich., Albert Kahn, Detroit, Mich., Architect

Store and Apartment Building, St. Louis, Mo., Otto J. Kreig, Architect

Theatre and Office Building, Detroit, Mich., C. Howard Crane, Architect

Office and Garage Building, Forth Worth, Tex., W. G. Clarkson & Co., Architects

Fountain Theatre, Cincinnati, Ohio, Thos. W. Lamb, New York, N. Y., Architect

Ohio Bell Telephone Building, Cleveland, Ohio, Mills, Rhines, Bellman & Nordhoff, Toledo, Ohio, Architects

Ladies of the Sacred Heart School, Chicago, Ill., Hellmuth & Hellmuth, St. Louis, Mo., Architects

Eaton Tower, Detroit, Mich., Louis Kamper, Architect

Huron County Bank Building, Norwalk, Ohio, Bond-Hubbard, Chicago, Ill., Architects

Mincks Hotel Building, Tulsa, Okla., A. C. Fabry, Architect

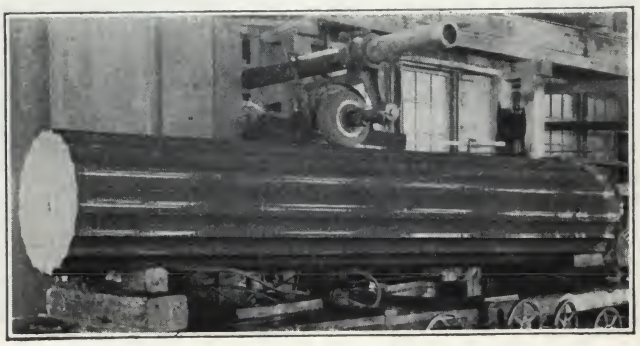
Detroit Times Building, Detroit, Mich.

Kresge Administration Building, Detroit, Mich., Albert Kahn, Inc., Architect

Dollar Savings Bank, Pittsburgh, Pa., Press C. Dowler, Architect



For the Dollar Savings Bank, Pittsburgh, Pa.
This modernistic decorative piece was carved from a polished slab of granite by means of the sandblast—an economical medium for decorative carving



Fluting a Large Column
The machine and the operation are typical at North Star where expensive hand operations are being continually done away with

PLYMOUTH QUARRIES INCORPORATED

Specialists in Ashlar

Savings Bank Building
EAST WEYMOUTH, MASS.

SHIPPING POINT: EAST WEYMOUTH, MASS.

Products

ASHLAR, in Seam Face and Split Face Granite.

FLAGGING and STEPPING STONES, in Seam Face Granite.

Seam Face Ashlar

The geological formation of our material is unique in that the rock mass has been sheared and tipped, so that it now stands in vertical sheets. The seepage of vegetable and mineral solutions through the seams between sheets has produced a wide range of coloring on the faces of the seams ranging from the natural gray through buffs, tans, yellows, greens and browns to a very dark brown and dusty purple.

By using the face of the seams as the exposed face of the stone in the building, a very interesting texture and coloring is obtained, and since these are the result of natural causes, a permanent and natural effect of age is immediately obtained on new construction together with the feeling of strength characteristic of granite.

The seams in the quarry have in no way affected the strength of the granite, which together with the fact that our granite is practically non-absorptive, make it an ideal building material.

Split Face Ashlar

Our Split Face Ashlar is obtained by splitting the blocks and using the split face as the exposed surface.



St. Paul's Church, Winston-Salem, N. C.
CRAM & FERGUSON, Architects
JACOBS & YOUNGS, Builders
Setting of Ashlar and Stone Trim, PLYMOUTH QUARRIES INCORPORATED

The texture is somewhat rougher than Seam Face, but is not a rock face in any sense.

Although the variation in color is not as wide as in Seam Face, the Split Face colorings, ranging from the grays through the light tans and buffs to the light browns, give life and warmth to this material.



Forman Residence, Buffalo, N. Y.
EDWARD B. GREEN & SON, ALBERT HART HOPKINS, Architects
JAMES N. BYERS & SON, Builders

Where Seam Face and Split Face Granite Can Be Used

Plymouth Quarries products, both Seam Face and Split Face, can be used for all purposes for which ashlar is suitable: walls, both exterior and interior; jambs; lintels (if not too large); slip sills; steps, etc.

Flagging and Stepping Stones

Flagging and stepping stones can be obtained only in Seam Face. The surface is sufficiently smooth to be very suitable for both interior flooring and for garden walks, etc., and has all the variety of color of the ashlar.

Allow at least 5 in. for bed and flagging.

Thickness and Height of Ashlar

The thickness of the ashlar varies from 4 to 8 in. thick.

In height it is generally used from 5½ in. to 1 ft. 1 in. rises, though higher rises can be obtained, if desired, in limited quantities.

Cost of Ashlar

The natural seams in this formation together with our organization and equipment enable us to produce a granite ashlar at a minimum cost, so that we can compete with local stone over a very extended area.

Continued on next page

No. 15 Seam Face and Split Face

Three and four-head work with splay joints using about half small stones; half split face and half seam face, with a wide variety of color if desired





No. 6 Seam Face Ashlar of a Rough Face with 15% Split Face

Replica of Harkness Memorial, Yale University. Interrupted course ashlar. James Gamble Rogers, Architect.

Colors: gray, tan, buff, dull purple, brown, yellow

No. 2 Seam Face Ashlar of a Very Smooth Surface

Three-head work with splay joints.

Colors: gray, tan, buff, dull purple, brown, yellow. Can be restricted if desired





No. 3 Coursed Ashlar with a Few Interruptions

A very wide range of color which may be restricted if desired

Continued on next page



No. 5 Sappy Split Face Laid in Interrupted Course Ashlar

Of a true surface, no projections over 1 in.

Replica of St. Vincent Ferrer Church, New York, N. Y., Bertram G. Goodhue, Architect.

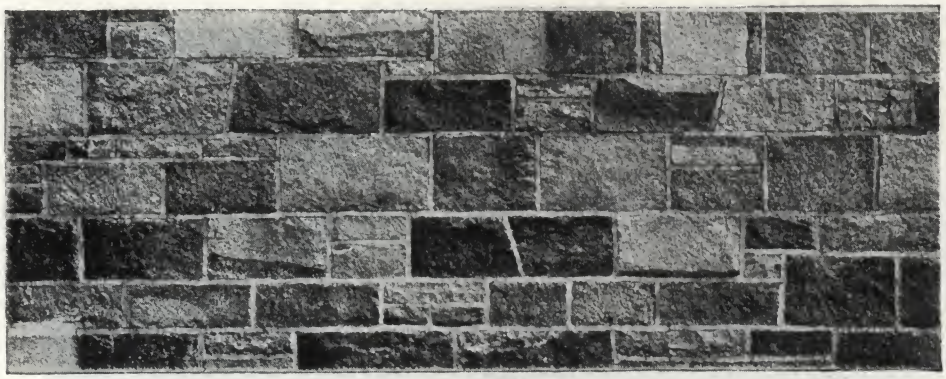
Colors: Several shades of brown

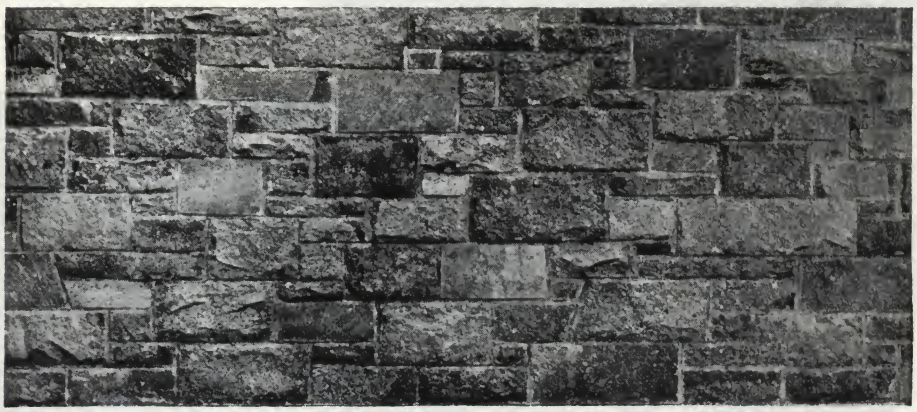
No. 7 Split Face Sappy, Gray and Sappy and Gray Mixed

Coursed with occasional interruptions. True split face, projections not over 1 in.

Replica of Church of the Sacred Heart, Jersey City, N. J., Cram & Ferguson, Architects.

Colors: gray and several shades of brown





No. 17 Seam Face and Split Face in Equal Proportions

Replica of First Presbyterian Church, Glen Falls, N. Y., Cram & Ferguson, Architects.

Average texture bright colors eliminated

References

The following are a few of the buildings where our material has been used:

Harkness Quadrangle, Yale University, New Haven, Conn., James Gamble Rogers, Architect

Lawyers' Club and Dormitory, Ann Arbor, Mich., York & Sawyer, Architects

St. Paul's Church, Winston-Salem, N. C., Cram & Ferguson, Architects

Swedenborgian Church, Bryn Athyn, Pa., Bryn Athyn Studio, Architects

Temple Beth-El of Borough Park, Brooklyn, N. Y., Shampan & Shampan, Architects

St. Mary's Church, Stamford, Conn., O'Connell & Shaw, Architects

Queen of the Holy Rosary Cathedral, Toledo, Ohio, Comes, Perry & McMullen, Architects

Epworth-Euclid Methodist Episcopal Church, Cleveland, Ohio, Bertram Grosvenor Goodhue Associates, Architects



Split and Rock Face. Colors: Gray to Sappy. Three and Four-head Work with Splay Joints

Continued on next page

Specifications

The following specifications are our standard and are intended to so describe the material that it will meet the requirements of ashlar work in general, either artistically, structurally or economically.

Changes in our standard sizes, limitations in color and changes in the manner of cutting can of course be made within reasonable limitations.

Ashlar—Squared up as to rise and length ready to set with beds, builds and joints formed with pitching tool.

Rises—5½ to 11½ in. with smaller stones for jinks if required.

Lengths—One and one-half times the rise or more.

Thickness—Random from 4 to 8 in., averaging 6 in.

Heads or Corners—Split or rough pointed with returns of 4½ to 8½ in. or more.

Reveals of Jambs, Lintels and Arches—Split or rough pointed and cut ½ in. less than actual reveal leaving joint for plumbing frame, etc.

Sills—Slip sills without lugs, seam face wash, split face rise.

Color and Texture—Seam face: color, quarry run or restricted; texture smooth, average or rough.

Split face: color gray, sappy and mixed; texture, projections up to 1 in.

Cutting

We seldom cut to a setting plan, as we have found from experience that, although pleasing effects as to distribution of sizes may be obtained, it is difficult to interpret color, and a more pleasing result as to both sizes and color is obtained by having the setters at the job interpret the architect's ideas.

Setting

We have a construction department with a thoroughly competent organization for setting our material and the cut stone trim, and we will either quote on setting or give any help we can to contractors bidding on the setting.

Handling Material

Ours is a very tough close grained granite and is not easily chipped or broken. We have found that the stone may be dumped from a dump truck with little if any breakage and at a considerable saving in hauling cost. Special stones such as sills, lintels, arches, etc., or any stone cut to plan should not be dumped. Nearly all of the stones are one-man stones and the largest can easily be lifted by two men.

Mortar

We have found the following to be a good setting mortar with our stone. One part cement to 3½ or 4 parts sand with lime equal to 15% to 20% of the volume of cement added. This mortar should be well mixed and wet enough to be plastic but not as wet as soft stone mortar, as the granite is practically non-absorptive. Joints should be well raked out and pointed with mortar of 1 cement to 2½ to 3 of sand and 5% to 10% lime. Non-staining cement is not necessary with our stone.

Joints

Our material is not a cut stone and is usually used as ashlar where a comparatively informal effect is desired. The joints should not be less than ½ in. and in general should be about ¾ in. with slight variations allowed.

Anchors

The variation in thickness of our material gives a good masonry bond if the setters are at all careful. In nearly every city our ashlar is considered as part of the bearing wall, in general anchors are not necessary.

Tests

Compression tests on our material made at the U. S. Arsenal, Watertown, Mass., Sept. 5, 1910 show 35,000 to 40,000 lb. per cu. in. for our gray granite and 26,000 to 27,000 lb. per cu. in. for colored granite.

The following extracts are from a report on the Plymouth Quarries made by Prof. W. O. Crosby and Dr. G. F. Loughlin, of the Department of Geology of the Massachusetts Institute of Technology.

Quality—The feldspar is nearly as hard as steel, and is free from soft kaolin spots, such as would cause pitting on exposure to the weather. It is a very important fact that the jointing of the granite does not tend in any slightest degree to make it shaly or impair its strength.

Fire Resistance—Flame tests demonstrate that this granite, and especially the seam face variety, is, to a good degree, proof against the scaling and cracking to which granites in general are so subject on exposure to fire.

Absorption—While the absorption is remarkably low for the seam face granite, the fresh, or white granite is virtually non-absorptive. The low absorption ratio makes freezing tests wholly unnecessary; and this conclusion is fully confirmed by an examination of the natural ledges, which are singularly free from disintegration or scaling due to frost action.



Buffalo Country Club, Buffalo, N. Y.
Bley & Lyman, Architects

ESTABLISHED 1874

PERRY BROS. GRANITE CO.

Designers, Quarry Operators and Cutters of Concord Granite

CONCORD, N. H.

BOSTON, MASS. CINCINNATI, OHIO CLEVELAND, OHIO PHILADELPHIA, PA. WASHINGTON, D. C.

Concord Granite—For Permanent Structures of Artistic Merit and Imposing Design

Concord Granite is a holocrystalline, granular rock composed of quartz, a potash feldspar and muscovite-biotite potassium and magnesium iron mica). Very small feldspar crystals produce a granite of very fine grain. Color is blue gray, the shade determined by feldspars in quarry. Because of its very fine grain and especially high quality, Concord Granite is primarily used for such buildings as memorials, public buildings, mausoleums and other structures of a permanent character.

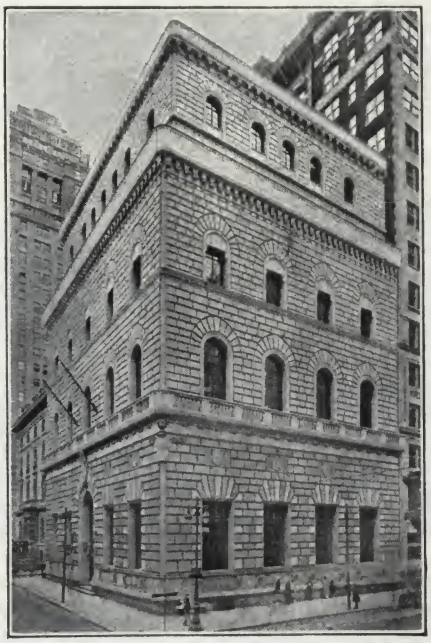
The Perry cutting plant, one of the largest and best equipped in the United States, located near our quarries at Concord, N. H., enables us to turn out large quantities of polished, dressed and rough granite in a comparatively short time.

Location on Boston & Maine R.R. with connections with Boston & Albany R.R., Central Vermont R.R. and New York, New Haven & Hartford R.R. makes possible the shipping of our granite to any part of the United States.

Advice on Proposed Work

Unnecessary expense may be avoided by considering finish of stone for different parts of building and adaptability of design to cutting methods generally employed, depending on location and exposure of granite to smoke and dirt, and its position as regards visibility to the public eye. The advice of our designers, also estimates and samples, gladly furnished.





Installation of Goss Pink Deer Isle Granite, at Philadelphia, Pa., Manufactured by Perry Bros.



Above:

Installation of Gray Concord Granite, at Wilkes-Barre, Pa., Quarried and Manufactured by Perry Bros.



Above:

Installation of Goss Pink Deer Isle Granite, at Dover, N. H., Manufactured by Perry Bros.

Installation of Gray Concord Granite, at White Plains, N. Y., Quarried and Manufactured by Perry Bros.

Partial List of References

Philadelphia, Pa.

Abbott's Alderney Dairies, Inc.
Oak Lane Trust Company
Lancaster Avenue Title & Trust Company
Fleischmann Building
Belmont Trust Company Bank Building
Atwater Kent Manufacturing Company Building No. 1
Rittenhouse Plaza Apartments
Shriners Hospital for Crippled Children
Broad Street National Bank
Bell Telephone Building, 19th and Arch Streets
Boy's Catholic High School
Curb for Scottish Rite Temple
Apartment Hotel, 17th and Locust Streets
Restaurant and Office Building, 16th and Chestnut Streets
Drexel & Co. Bank Building, 15th and Walnut Streets
Beth El Sisterhood Building
Lawyers Building
Sacred Heart Parish School
Funfield Recreation Center Building

Philadelphia, Pa. (Continued)

William Penn Title & Trust Company
Forrest Theater

Boston, Mass.

Theodore Roosevelt School
Prince District School
Washington-Allston School
Curb for Boston Chamber of Commerce Building
Police Station, Division No. 2
Health Unit Building
Pilgrim Court Apartments
Police and Fire Station
School Street Trust Company
Boston Museum of Fine Arts, Western Art Wing
B. P. O. Elks' Building
George Robert White Health Unit Building No. 7
Consolidated Gas Company
Goodyear Tire & Rubber Company
Nurses Home, Boston City Hospital
Roxbury High School for Boys, Roxbury, Mass.

New York, N. Y.

Public Schools Nos. 117, 60, 100, 36, 47, 52, 107, 99, 108, 205, 116, 125, 215, 212, 180, 97, 216, 217
James Monroe High School
James Madison High School
High School of Commerce
Mother A. M. E. Zion Church
Hamilton Avenue Sewer
Bank Building, 21st Avenue and 86th Street
Flatlands Avenue Sewer
95th Street Apartment House
Fort Hamilton Parkway and 60th Street Sewer
Bay Ridge Savings Bank Building

Detroit, Mich.

Calvert Lithographing Company
Ralsar Apartments
National Bank of Commerce
Detroit Life Insurance Building
R. L. Polk Building
Smith-Bridgeman Store Building
St. Catherine's High School and Auditorium
First State Bank

STONE MOUNTAIN GRANITE CORPORATION

Producers of Granite and Manufacturers of Granite Products

STONE MOUNTAIN, GA.

The Quarries

This corporation operates the granite quarries in the Stone Mountain area, sixteen miles east of Atlanta, in the eastern section of DeKalb County, Georgia, the site of the famous mountain of solid granite on the face of which the Confederate Memorial, of heroic proportions, is being carved. Incidentally, Stone Mountain Granite Corporation is doing this carving under contract. However, many years before the Stone Mountain memorial project was conceived, the stone from these quarries had already received the highest endorsements as a structural and monumental granite.



Bas-relief of Stone Mountain Confederate Memorial

Three figures, 130 ft. high by 200 ft. long, being carved by STONE MOUNTAIN GRANITE CORPORATION
AUGUSTUS LUKEMAN, Sculptor

Character of Stone

Stone Mountain granite is remarkably uniform in color, texture and composition. It is free from sulphides, oxides of iron and impurities that are unstable under weather conditions. The exposed surfaces of the stone in the quarry are very smooth. The weathered portions vary from only a fraction to several inches in thickness, and consist of hard, fine rock of a pinkish hue.

Analysis

Numerous analyses of Stone Mountain granite have been made from time to time, the following by S. W. McCallie, State Geologist, being typical:

Silica	72.56%	Magnesia	.20%
Alumina	14.81%	Soda	4.94%
Iron Oxide	.94%	Potash	5.30%
Lime	1.19%	Loss on Ignition	.70%

Physical Tests

In the course of its long history Stone Mountain granite has been subjected to physical and mechanical tests for specific projects on many occasions. The findings of three such tests are cited below.

Test for Absorption—On January 6, 1887, F. W. Clarke, chief chemist, reported to J. W. Powell, Director of U. S. Geological Survey on the results of an absorption or porosity test of Stone Mountain granite. The combined weight of two samples after having been dried in an oven was 666.2 grams. After immersion for 48 hours and removal of surface dampness they weighed 666.5 grams. Mr. Clarke concluded that inasmuch as the stone absorbed no appreciable amount of water it would well withstand the disintegrating action of frost.

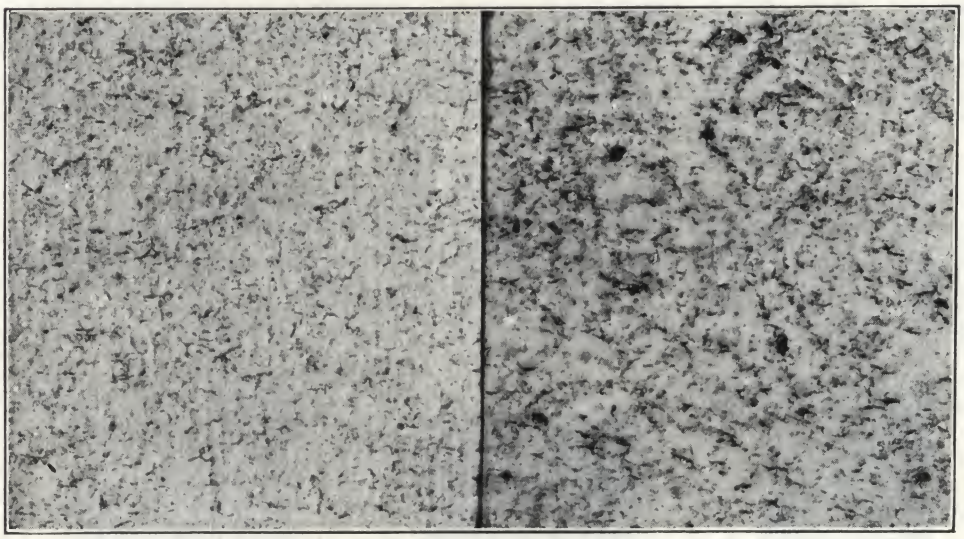
Crushing Test—On March 4, 1924, the Ordnance Department of the U. S. Army reported on a test made to determine whether Stone Mountain granite could be used on the government dry dock project at Balboa, Panama. The first cracks developed at from 12,972 to 23,950 lb. per sq. in. and the ultimate strength shown was from 20,461 to 24,650 lb. per sq. in.

Test for Resistance to Sea Water—On August 29, 1924, S. W. Stratton, Director, Bureau of Standards, Department of Commerce, Washington, D. C. reported to the Purchasing Department of the Panama Canal that two identical samples of Stone Mountain granite, boiled for 24 hours in distilled and in a 5% salt solution, respectively, showed a difference in loss of weight of only .04 of 1%, and concluded that the action of sea water on this stone would be practically negligible.

Service and Equipment

Quarries and plant are located on the Georgia Railroad, insuring prompt handling of shipments in all directions. Quarries contain ledges from which monoliths of practically unlimited size can be taken. A competent technical staff, a large plant thoroughly and modernly equipped, and a steady force of expert workmen, provide for the execution of the largest contracts with speed and exactitude.

To memorial contractors who might otherwise hesitate to undertake a mausoleum or other large project we lend every necessary assistance in planning and erection.



Hammered Surface — Polished Surface

Exact Photographic Reproductions, Showing Grain, Shading and Texture of Stone Mountain Granite

References

For more than a generation Stone Mountain granite has been used in practically every section of North America for every conceivable construction and monumental purpose. Many leading architects and contractors habitually specify this granite by name because they know that by so doing they are insuring the best in material and workmanship. Architects, engineers, memorial contractors, and others interested in granite—either in a general way or for some definite project—are invited to communicate with us direct for any information or assistance they may desire.

SULLIVAN GRANITE COMPANY

Producers of Extra Fine Grained Blue-White Westerly Granite

WESTERLY, R. I.

Products

EXTRA FINE GRAINED BLUE-WHITE WESTERLY GRANITE in the ROUGH for Mausoleums, Memorials and Statues.

Also Crushed Granite—screened to any size desired—for use in cement for floors and construction work, also for roads, walks and drives.

Character of Granite

All the Westerly Granite known as Extra Fine Grained Blue-White Westerly Granite is quarried by the SULLIVAN GRANITE COMPANY. This granite is uniform in color, nice and white when hammered and a bright blue when polished, and is very fine grained and exceedingly hard. The longer it is exposed to the weather the better it looks in comparison with all other light colored granites. Fine hammered or carved it is distinctive in appearance. It takes a brilliant and permanent polish. Because of its especially fine grain this granite is particularly well suited for memorial purposes and carving in granite. Its hardness and clear light color give effective definition to the most delicate details of ornament.



World War Memorial, Pawcatuck, Conn.
LOUIS A. WHITEHOUSE, Sculptor, Boston, Mass.

Quarries

The quarries of the SULLIVAN GRANITE COMPANY have been in continuous operation since 1834, and are operated the year around. Dimension granite in the rough in unlimited quantities is always available. Some of the largest granite blocks ever produced have been shipped from these quarries. The granite is unvaryingly uniform in color and texture; and every piece is subject to rigid inspection before shipping, to insure against the slightest flaw.

The granite, cut to size, is delivered to any of the several first class finishing plants at Westerly or shipped to any part of the country for finishing.

Facilities

Every modern device for quarrying and handling granite in all sizes is in use by the SULLIVAN GRANITE COMPANY, which makes it possible to fulfil large contracts promptly and satisfactorily.

The quarries are advantageously connected by spur track with the main line of the New York, New Haven & Hartford Railroad.

Service

Architects and other users of granite are invited to visit the quarries at any time.

Prompt attention is given to requests by mail for information or estimates. Samples are willingly furnished upon request.

All responsible finishing plants can give quotations on work to be executed in Extra Fine Grained Blue-White Westerly Granite. The company will furnish a list of those firms equipped to handle any project in the best manner.



Charles I. Corby Mausoleum, Washington, D. C.
CHARLES BARTON KEEN, Architect

References

Mausoleums

Charles I. Corby Mausoleum, Washington, D. C., Charles Barton Keen, Philadelphia, Architect
Borland Mausoleum, Poughkeepsie, N. Y., Ross & McNeil, New York, N. Y., Architects
Flower Mausoleum, Pittsburgh, Pa., Albert G. Lowe Pittsburgh, Pa., Architect
John E. Andrus Mausoleum, New York, N. Y.
Richard Kyle Fox Mausoleum, New York, N. Y.
Besse Mausoleum, Springfield, Mass.
Fabian Mausoleum, Saddle River, N. J. Fred Wesley Wentworth, Paterson, N. J., Architect
Moore Mausoleum, Westerly, R. I.
Langmade Mausoleum, North Baltimore, Ohio

Memorials

World War Memorial, Pawcatuck, Conn., Louis A. Whitehouse, Boston, Mass., Sculptor
Uppercu Memorial, New York, N. Y.
Eben D. Jordan Memorial, Boston, Mass.
Armour Memorial, Chicago, Ill.
Theodore Roosevelt Memorial, Oyster Bay, N. Y.
Paulsen Memorial, Spokane, Wash.
Chapin Memorial, Springfield, Mass.
Fitzsimons Memorial, Cleveland, Ohio
Ensley Memorial, Bradford, England
Joseph Belfield Memorial, Providence, R. I.

WOODBURY GRANITE CO., INC.

Quarriers and Finishers

BURLINGTON, VT.

QUARRIES AND PLANTS: HARDWICK AND BETHEL, VT.

Woodbury Gray and Bethel White Granites—Standard Materials for Buildings, Mausoleums and Memorials

Woodbury Gray

This granite has become one of the three or four standard gray building granites. It is of medium grain and gray in color.

Finishes

The plants of the company can supply any of the standard finishes. These comprise generally, sawed, 4, 6, 8 and 10 cut, honed and polished.



Wisconsin State Capitol, Madison, Wis.
GEO. B. POST & SONS, Architects
Erected of Bethel White Granite

Bethel White

Bethel White is one of the hardest granites quarried and has the added distinction of being one of the whitest. Its grain is but slightly coarser than medium and the color is a beautiful white faintly mottled with gray.

Quarries

The quarries both at Woodbury and Bethel are large in area and can produce in quantity. Both of these quarries have been operated continuously for many years.

It is, however, almost impossible to estimate the amount of material still available.

Plants

The plants of the company are large modern plants and are equipped with the usual, and with special machinery. Recent additions are devised especially for polished and honed finishes.

Reputation

Woodbury granites, workmanship and service are so well known to the profession that detailed description is unnecessary. The company has quarried and manufactured some of the finest U. S. Government, State, Municipal and private buildings in the United States. We invite opportunities to co-operate with architects to secure the full use of machine operation









APPALACHIAN MARBLE CO., INC.

Quarriers and Manufacturers of Appalachian Tennessee Marble
Manufacturers of Foreign and Domestic Marble

KNOXVILLE, TENN.

APPALACHIAN TENNESSEE MARBLE especially for interior use, including Appalachian Tavernelle, Appalachian Roseal, Appalachian Golden Vein, Appalachian Gray, Appalachian Champion Pink, Appalachian Dark Chocolate, Appalachian Mahogany, Bond Pink, American Pink, and other Appalachian Colors.

FOREIGN and DOMESTIC MARBLES, FLOOR TILE, ASHLAR, MARBLE FLAGSTONES, TENNESSEE GRANITO.

Quality

Appalachian Marbles are non-absorbing, long wearing, strong and easily workable.

	Average
Co-efficient of absorption	.047
Tensile strength (transverse to bed)	1,554 lbs. per sq. in.
Tensile strength (with bed)	1,551 lbs. per sq. in.
Transverse strength (modulus of rupture)	2,686 lbs. per sq. in.
Compressive strength	18,274 lbs. per sq. in.

These tests made by U. S. Bureau of Standards and reported by T. Nelson Dale, Retired Geologist, U. S. Geological Survey.

Standard Thickness

Appalachian Marble is cut in standard thicknesses. They are (after honing and polishing): 7/8, 1¼, 1½ and 2 inches. Other thicknesses on order.

Floor Tile

Appalachian Tennessee Floor Tile comes in 8x16, 10x20 inches and 12 inches square, standard sizes. It can also be obtained in any special sizes the architect may desire for exactly carrying out his own ideas. It can be had in a wide variety of beautiful colorings.

Appalachian floors are low in initial cost, low in maintenance cost and last the life of the building. They are easy and economical to keep clean, materially reduce the dust nuisance and make for better health. They subdue traffic noise and afford a safe, comfortable walking surface.

8x16 and 10x20-inch tile are always on hand, and shipment can be made on receipt of order.

Ashlar

Appalachian Marble tile for ashlar, either hone or polish finish, can be furnished in our standard tile sizes at prices which make marble ashlar available for the comparatively moderately priced home as well as for more pretentious structures. This is because it is one of our by-products.

Tennessee Granito

Sizes No. 1, 2 and 3 for terrazzo floors. In three colors, select light colored, pink and dark cedar.

Tennessee Marble Flagstones

For sun room, terraces, garden walks and stepping stones. Can be laid in distinctive and exclusive design, in shapes just as taken from our yard.

To meet the increasing demand for such uses of Tennessee flagstones, we have provided large storage facilities and can give immediate delivery.

Price

Because of quantity production Appalachian Marbles, although as beautiful as most fine foreign marble and superior in quality to the best of them, are a great deal cheaper in price than imported marbles, as well as like quality domestic marbles.

Installation

Appalachian Marble has been manufactured exclusively by us for sixteen years. More than $1,000,000.00 of it is sold annually in England, Canada, Latin America and every state of the Union.

Many of the most noted public and office buildings, churches, schools, theaters, hospitals, stores, banks, etc., have interiors, including floors and ashlar work, of Appalachian Marble.

Foreign Marble

Our established connections with the leading foreign quarries enable us to manufacture practically any desired foreign marble at a substantial cost saving.

Prompt Shipments, Low Rates

Huge production facilities and entire absence of labor troubles insure quick deliveries. Freight rates on marble from the Appalachian mill are estimated at commodity rates to all points in the United States and Canada.

Samples

Polished samples, showing the beauty of the Appalachian Marbles, will be sent to any interested architect or contractor, upon request.

Cost Estimates and Co-operative Service

The Service Department of the APPALACHIAN MARBLE CO., INC., welcomes the opportunity to co-operate with the architect. This co-operation reaches its highest state of efficiency when architects furnish the Appalachian Service Department with blue prints of the projects upon which they are working. The Service Department is then in a position to carefully estimate on work and offer all possible co-operation.

All Marble from One Source

Though a project may contemplate the use of foreign marble in addition to Appalachian Tennessee and other domestic marble, the complete cost estimate may be obtained from the Appalachian Service Department. Obtaining all marble from one source is not only a convenience but has definite shipping and price advantages.

Marble Working Drawings

Complete marble working drawings are made up by our drafting department to be used in submitting to the architects for approval as to jointing and for the securing of accurate Building Measurements.

Catalogue

A copy of the elaborate Appalachian loose leaf catalogue, illustrated in full colors, will be gladly furnished to architects and others interested in interior marble.

CARTHAGE MARBLE CORPORATION

Quarriers and Fabricators of Ozark Gray Interior and Carthage Exterior Marbles

Finishers of All Foreign and Domestic Marbles

CARTHAGE, MO.

NEW YORK, N. Y., 8 West 40th Street
WASHINGTON, D. C., 410 Bond Building
CHICAGO, ILL., 228 No. La Salle Street
PITTSBURGH, PA., 207 Fulton Building

"A Superior Service"

Product

"Ozark Gray" Veined, Veinless and Claire.

Carthage Exterior Marble.

Monumental and Sawed Stone — Quarry Blocks.

Finished Foreign and Domestic Marbles.

Analysis—Carthage Marbles

Calcium Carbonate	98.57%
Oxides of Iron and Alumina	.21%
Absorption ratio	.0045
Compressive strength	20,000 lbs.

Qualities

Their permanence, non-porous and non-staining qualities, freedom from structural defects, and reasonable price make Ozark Gray marbles particularly desirable in combining beauty and color harmony with ease and economy of cleaning and sanitation.

Ozark Veined is a warm, neutral gray, made interesting by dark veins.

Ozark Veinless is a fine grained monotone soft gray, slightly buff-toned.

Ozark Claire is a new monotone marble from a deeper strata. Very uniform. Polishes to a soft light buff tone.

Veined, Veinless and Claire blend unusually well in color harmonies.

Carthage Exterior is a buff-toned light gray adaptable to any color scheme. Used extensively where dignity and permanence are to be considered; is non-staining; mellows with age; and is effective when used for trim stone. Outstanding when used in mass. Operating economies enable this superior marble to compete favorably with limestones.

Facilities

Eight quarries and plants insure capacity for jobs of any size.

Our complete facilities offer service, convenience and price advantages.

Foreign Marble

We finish and install foreign and domestic marbles in any quantities—anywhere.

Co-operation

Consultation, samples and quotations gladly furnished upon request.

References

Southwestern Bell Telephone Building, Dallas, Tex.
Bank of Manhattan, New York, N. Y.
No. 1 Wall Street, New York, N. Y.
R. H. Macy Company, New York, N. Y.
Bank of Commerce & Trust Co., Memphis, Tenn.
Civil Courts Building, St. Louis, Mo.
Mt. Hope Memorial Mausoleum, St. Louis, Mo.
Missouri State Capitol, Jefferson City, Mo.
Mackay Science Hall, University of Nevada, Reno, Nev.
Mountain States Telephone Building, Denver, Colo.
St. Benedict's Abbey, Atchison, Kan.



Left:

Fisher Building, Detroit, Mich.

Albert Kahn, Architect
H. G. Christman-Burke Co., Inc., Builders
132,000 cu. ft. of Carthage Exterior Marble was fabricated and shipped for this building over a period of six months.

Right:

Chicago Board of Trade Building, Chicago, Ill.

Holabird & Root, Architects
Hegeman-Harris Co., Inc., Builders
One of our recent interior installations.



JOHN J. DEERY COMPANY, INC.

Importers and Wholesalers of Foreign and Domestic Marble and Stone Blocks and Rough Sawed Slabs Only

HOME OFFICE

Erie Avenue "F" to "G" Streets
PHILADELPHIA, PA.

BRANCH OFFICES

BOSTON, BUFFALO, CHICAGO, CINCINNATI, DETROIT, CLEVELAND, KNOXVILLE, NEW YORK, PHILADELPHIA, PITTSBURGH, ST. LOUIS, WASHINGTON

Other Branches Scheduled for Announcement During Current Year

SAMPLE ROOM: Architects' Building, 101 Park Avenue, NEW YORK, N. Y.

MILLS AND YARDS: LONG ISLAND CITY, N. Y., PHILADELPHIA, PA., MONTREAL, CAN.

FACILITIES

Stocked in our yards we have Domestic and Imported colored marbles—the pick of European and American Quarries—in quantities adequate for any size project. Only the finest quality marbles carry the "Sterling" trade mark.

Our stock is personally selected by our own representatives in Europe. Prior to shipment to us each block is personally inspected by our men specially trained in the selection of material of a standard to meet the most exacting American requirements.

STERLING MARBLES

We do no marble finishing. Our stock is carried in quarry blocks and rough sawed slabs only, and is available for prompt shipment to your marble finisher.

PRODUCTS

Our stocks include every well known variety.

As agents, in the United States and Canada, for Europe's leading quarries, we feature the following under the "Sterling" trademark:

BLACKS
- Belgian Black (genuine)
- Belgian Black (B)
- Bleu Belge
- Noir coquillé
- French Grand Antique
- Spanish Grand Antique
- Black and White
- Brêche Portor Imperiale
- Brêche Portor Arlechino
- Black and Gold
- Black and Platinum

YELLOWS
- Jaune Ambré
- Jaune de Brignoles
- Comblanchien
- Rocheron
- Hauteville
- Brêche Orientale (genuine)
- Botticino (light and dark)
- Jaune No. 39
- Algerian Onyx Doré
- Yellow Verona (Giallo Mori)

GRAYS
- Lumachelle
- Bois Jourdan
- Logan Gray (Domestic)
- Belgian Ste. Anne
- French Gray

BROWNS
- French Napoleon (genuine)
- Lunel Notre Dame A & B
- Lunel Foncé
- Lunel Uni Clair
- Lunel Uni Foncé
- Lunel Rosé
- Lunel Joinvillé
- Brêche de Salernes

REDS
- Red Levanto
- Belgian Reds (Royal, Griotte, Byzantin, etc.)
- Rouge Campan
- Rouge de Vitrolles
- Rouge de Brignoles
- Breche Rose
- Rose Perlé
- Red Alicante
- Rose de Provence
- Red Verona

PURPLES
- Brêche Violette
- Fleur de Pêcher
- Violet de Brignoles

WHITES
- White Italian (every variety)
- Arabescato
- Vigaria
- Rose Aurore
- Calacata
- Giardino

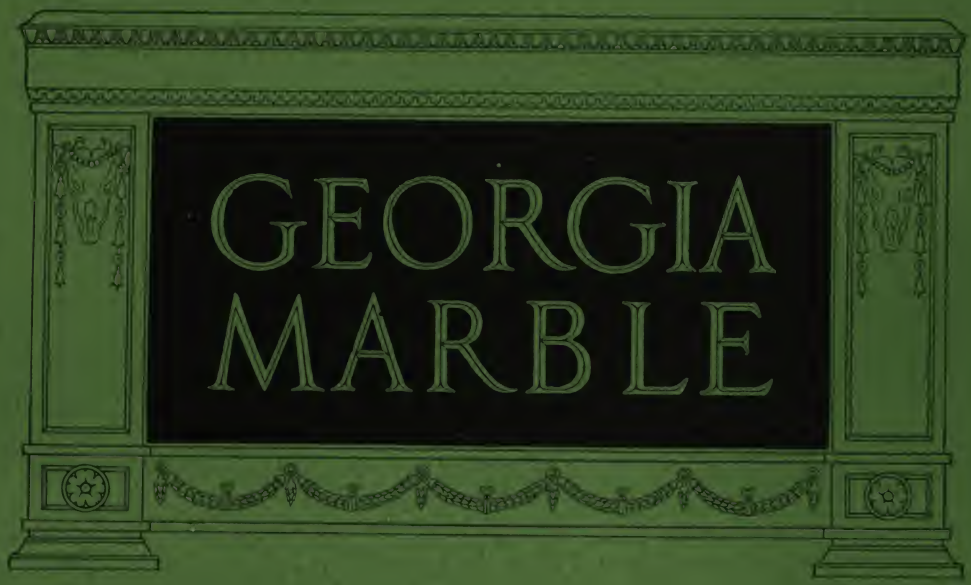
VARIEGATED
- Campan Mélangé
- Brêche Romaine (genuine)
- Sarrancolin
- Etc.

GREENS
- Cipollino Versilia
- Alps Green
- Verde Antico
- Vert Campan
- Brazilian Green Onyx
- Alpicella
- Vert St. Denis
- Forest Green

BLUES
- Bardiglio Fiorito
- Bardiglio Tigrato
- Bleu de Lagoa
- Brêche Ropocevo

SWEDISH GRANITES
- Labrador Foncé
- Labrador Clair

STONES
- Lesina White and Gray
- Travertine
- Lerouville
- Euville
- Larrys
- Mezangeres
- Caen
- Tercé Normandoux
- Turgot
- Descartes
- Val d'Arion
- Chauvigny



THE GEORGIA MARBLE COMPANY

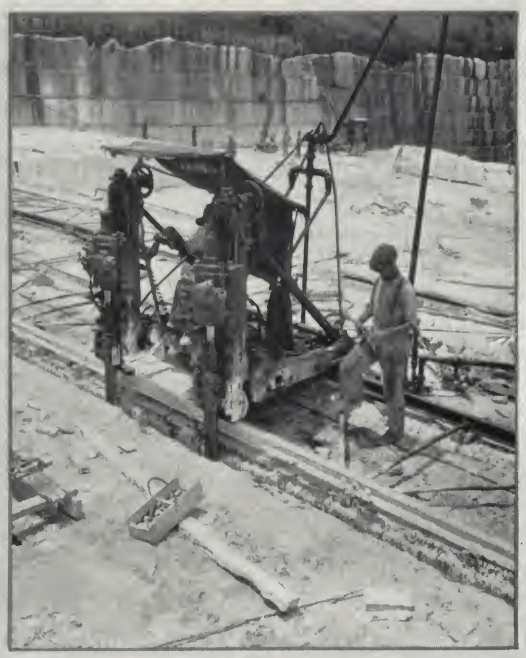
Main Office and Quarries

TATE, GEORGIA

ATLANTA CHICAGO CLEVELAND

DALLAS NEW YORK











QUARRY VIEWS OF THE GEORGIA MARBLE COMPANY

GEORGIA MARBLE
AND
THE GEORGIA MARBLE COMPANY
AND
THEIR RELATION TO THE ARCHITECT

THE GEORGIA MARBLE COMPANY, operating one of the finest known deposits of marble on this continent, has met the varying needs of architects for over 45 years. Colossal monuments, exteriors as durable as the Taj Mahal, and interiors where beauty and enduring quality are paramount, are built from this marble.

The architect is interested not only in the marble and whether it meets the requirements of the proposed structure—but in the company back of the product. Can the particular marble be furnished in sufficient quantities and will it be delivered on time? If the building should require an extension, can the marble be matched accurately 30 or even 50 years from now?

These questions are readily answered when it is known that THE GEORGIA MARBLE COMPANY can produce upwards of 1,000,000 cu. ft. of marble annually, that large reserve stocks are constantly on hand and that the supply of unquarried marble will require many centuries to exhaust. In specifying Georgia Marble, the architect can feel confident that when it becomes necessary, even if after 50 years or more, to add to the building there will be no difficulty in obtaining Georgia Marble which will match the marble selected. As an example of this, the Corcoran Art Gallery, illustrated on page 6, erected 37 years ago, recently had an extensive addition built, using the same Georgia Marble, matching perfectly. There are many other similar instances where Georgia Marble was supplied for extensions to prominent buildings satisfactorily matching the marble in the original building.



Window of Bok Carillon
MILTON B. MEDARY, Architect

At each of the Service Offices listed below are men who will gladly co-operate in supplying facts and constructive information without any obligation to the architect. The information gleaned in 45 years of experience in solving marble problems is gladly and willingly offered to any architect with the hope that this co-operation will be of real help.

Main Office and Quarries
TATE, GEORGIA

PLANTS

TATE, GA. NELSON, GA. MARIETTA, GA. MARBLE HILL, GA.

SERVICE OFFICES

1328 Broadway
NEW YORK, N. Y.

814 Bona Allen Building
ATLANTA, GA.

The Builders Building
CHICAGO, ILL.

622 Construction Industries Building
DALLAS, TEXAS

1200 Keith Building
CLEVELAND, OHIO

Continued on next page

GEORGIA MARBLE

An Invitation to Architects

An actual visit to the quarries and plants of THE GEORGIA MARBLE COMPANY is the best way to obtain the full facts concerning the extensive operations and facilities of this company. A standing invitation is extended to all architects and others interested in marble. Such a visit would amplify the information contained on the following pages, and the more thoroughly the architect investigates the product and the methods of manufacture, the more certain it is that he will enthusiastically endorse Georgia Marble and the company who produces it.

General Information

Marble is supplied either in the rough or in finished form to be set by the contractor or builder, or, for the larger structures, contracts are taken for the complete erection by THE GEORGIA MARBLE COMPANY according to the architect's specifications.

Complete installations of interiors requiring any kind of domestic or foreign marbles are contracted for by this company as well as for their own product.

The organization through its many years of experience in handling the larger building projects is thoroughly equipped from Drafting Department through to the Erection Department to handle the entire work efficiently and extend the fullest co-operation to the architect and builder.

Preliminary Consultations—Very often before the architect is ready to issue final specifications, questions will arise concerning details and price of marble work. At any of the sales offices listed on the preceding page are men who will gladly co-operate during this earlier stage of the work, giving all necessary information, including approximate estimates of cost.

We also invite preliminary consultation with the architect in the matter of jointing and detailing as it has sometimes been found that simple changes will save thousands of dollars.

Extent of Marble Deposit—Georgia marble is quarried from a deposit of crystalline marble about 3 miles long, ⅜ mile wide and with a depth not yet reached. Some of the quarries are over 200 ft. deep. This immense supply of crystalline marble can be quarried for many generations with no signs of exhaustion.

The deposit of marble lies in a solid mass, not laminated and therefore easily cut in any direction. This freedom from stratification also eliminates the necessity of setting on natural bed to insure against weathering—a precaution required with many stones.

Quarries—Eight to ten quarries, capable of producing upward of 1,000,000 cu. ft. of marble per year, are operated by THE GEORGIA MARBLE COMPANY. Due to the equable climate quarrying activities are carried on throughout the entire twelve months.

Stocks on Hand

A large quantity of marble is always carried in the yards of the company. Usually not less than 2,000 to 3,000 blocks or about 200,000 to 300,000 cubic feet. THE GEORGIA MARBLE COMPANY operate their own railway to provide quick transportation of the rough marble blocks between quarry and mills, and locomotive cranes stock the blocks along the railroad. These blocks can be loaded for shipment without delay.

In addition to the quarry blocks, a considerable quantity of sawed stock is also carried to facilitate quick shipments of orders. As these stocks become depleted they are promptly replaced.

Sizes of Sawed Stock—For exterior use slabs of standard thicknesses are always on hand. The standard thicknesses are: 4, 6, 8, 10 and 12 in.

For interior work slabs of standard thickness, ⅞, 1¼, 1½ and 2 in., are constantly carried in stock.

The average sizes of blocks quarried are from 6 to 8 ft. in length, 4 ft. 6 in. to 5 ft. in width and 4 ft. to 4 ft. 6 in. in depth. Of course larger blocks are quarried where necessary but for ordinary work it is advisable to have jointing arranged so single pieces will come within the dimensions of the ordinary quarry block.

Special Sizes—For special work where very large sizes are necessary, the Georgia Quarries, due to the soundness of the deposit, have long been noted for their ability to produce sound blocks of unusual size. Blocks have frequently been produced up to the capacity of transportation facilities, such as columns and large blocks for heroic statuary, fountains, etc.

Three Main Divisions of Marble Work

The work of THE GEORGIA MARBLE COMPANY is divided into three main branches: Exterior Building Work, Interior Building Work, and Monumental Work (monumental work not only includes large public memorials but mausoleums and cemetery memorials).

Each of the three main plants of THE GEORGIA MARBLE COMPANY specialize in one of these main divisions.

The plant at Tate, Georgia, specializes in monumental work. But the unusually large sawing capacity at Tate is more than enough for the monumental business and is used to supply additional sawed stock to the other plants.

The plant at Nelson, Georgia, about 3 miles from Tate, is devoted principally to handling the exterior building work. But this plant is also equipped to do quite a volume of interior work when necessary and also executes many of the larger monuments and memorials which come into the field of building construction.

The plant at Marietta, Georgia, about 20 miles north of Atlanta and 40 miles south of Tate, is devoted principally to interior building work. But it is also equipped for handling exterior work and has fabricated marble for some very large jobs.

The fourth plant, in addition to the three main plants, is located at Marble Hill, Georgia, alongside two of the white quarries. At present it is equipped with only gang saws for furnishing rough sawed marble. But the buildings are ready for finishing machinery whenever the capacity of the other plants is filled.

It will be noted in this description that the three main plants are equipped to do either Exterior, Interior or Monumental work. This has proved to be a great balance wheel—an assurance that delivery dates agreed upon will be kept, as any plant can be called upon to help another in any branch of the work.

Continued on next page

GEORGIA MARBLE

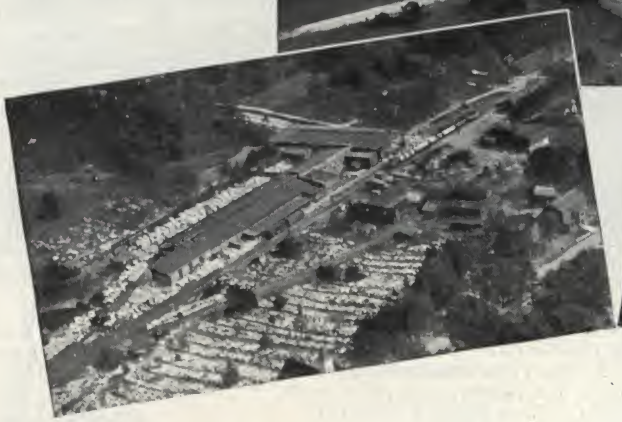
Plants—and Typical Views of Plant Operation

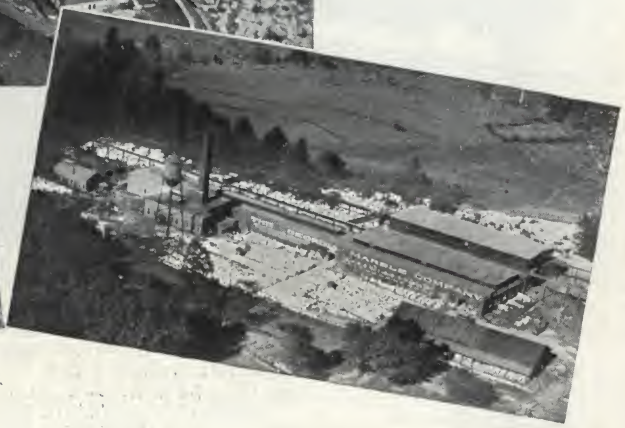
At Right:
GEORGIA MARBLE COMPANY'S PLANT AT TATE, GA.

Below:
NELSON PLANT OF THE GEORGIA MARBLE COMPANY



Below:
THE MARIETTA, GA., PLANT OF THE GEORGIA MARBLE COMPANY



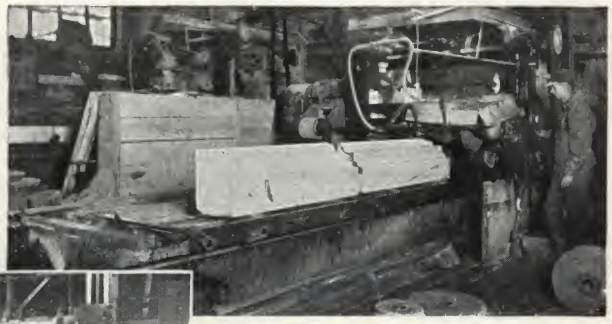




Above:
A BATTERY OF MARBLE SAWS

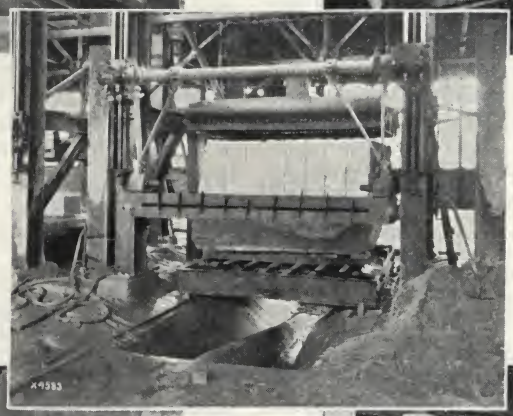
At Right:
A CLOSE-UP OF ONE OF THESE SAWS. HAVING NO TEETH, SAND AND WATER ENABLE THEM TO CUT THROUGH THE CRYSTALLINE MARBLE

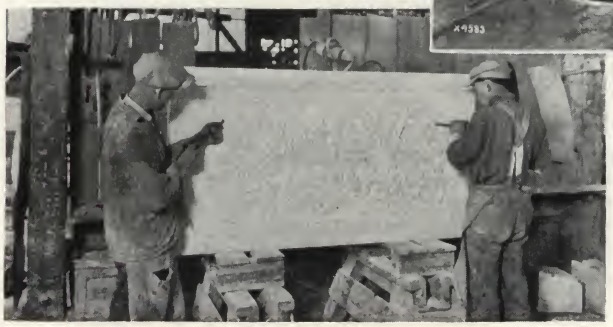
Below:
MEN HIGHLY SKILLED IN THEIR CRAFT AND WITH A GREAT DEAL OF THE ARTIST IN THEIR MAKE-UP DO THE CARVING ON GEORGIA MARBLE

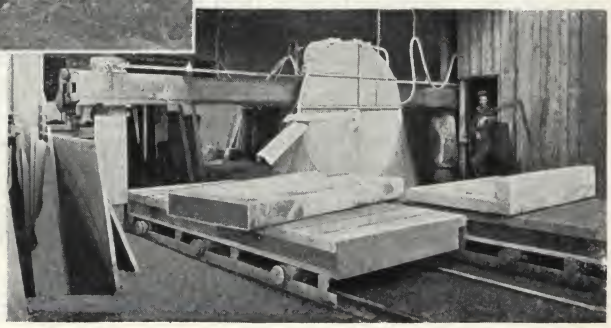


Above:
A CARBORUNDUM MACHINE WHICH CUTS MOULDINGS ACCORDING TO THE ARCHITECT'S SPECIFICATIONS

Below:
THE DIAMOND SAW IS USED IN CUTTING SMALL SLABS QUICKLY. REVOLVING AT A SPEED OF 850 REVOLUTIONS A MINUTE THIS SAW ACCOMPLISHES IN A SHORT TIME WHAT THE LARGER SAWS REQUIRE HOURS TO DO







Continued on next page

GEORGIA MARBLE



THE TAJ MAHAL—BUILT OF CRYSTALLINE MARBLE WHICH PERFECTLY DUPLICATES THE CRYSTALLINE FORMATION OF GEORGIA MARBLE. SEVENTEEN YEARS WERE SPENT IN ITS CONSTRUCTION. THE MAUSOLEUM IS NOW ALMOST 300 YEARS OLD AND IS IN PERFECT CONDITION DESPITE THE EVER CHANGING CLIMATIC CONDITIONS OF INDIA

The Test of Time

It is interesting to note that the ancients chose for their masterpieces types of marble greatly resembling Georgia Marble in formation. Before the fifth century Parian Marble, imported by the Greeks from the Island of Paros, was largely used. This marble was of crystalline formation and examination of ancient works shows that it has a most remarkable resemblance to Georgia Marble. Pentelican Marble, used by the Greeks at a later date, is another marble of the same type. Together these are the world's most durable marbles. Georgia Marble is the only one of this type in general use today.

Had the frieze of the Parthenon been constructed of some material other than marble it is probable that the Elgin Marbles would not be on exhibit today in the British Museum. The greatest of the ancient sculptors, Phidias and Praxiteles, executed their masterpieces in marble. It has brought down to us the deathless beauties from the later chisel of Michelangelo. The exquisite Venus de Medici was cut in marble.

Today, the findings of chemists, physicists and laboratory experts prove the unparalleled excellence of crystalline marble. When the tests of time are weighed in conjunction with the results of laboratory tests it is shown that Georgia Marble is undoubtedly one of the longest wearing building stones obtainable.

Laboratory Tests

An analysis of Georgia Marble shows innumerable crystals that overlap and interlock in much the same fashion as dovetailed joints. The union between them is practically perfect and without rupture. As the results of the following tests will show, there are no crevices through which water, moisture, acids or gas may enter or destroy. At the Washington University Testing Laboratory specimens 1/1000th of an inch in diameter were prepared, mounted on plates and examined through a powerful microscope. With the surface magnified 150 diameters, the structure of the marble was found to be uniform, of a mosaic character, closely amalgamated and entirely of an interlocking crystalline formation. Despite the great magnification no visible openings or crevices could be noted.

The crystalline formation of Georgia Marble not only gives to the material great strength, great moisture and water resistance, but also contributes a high degree of beauty, for the clear crystals have the diamond-like quality of refracting light.

As a result, with Georgia Marble construction, in large masses where there is the play of light and shade a degree of beauty is added that is not found in other building materials.

What Factors Prove Building Stone Quality?

In addition to beauty, the primary reason for using stone for building is permanence. All building stones should meet the following conditions:

(1) Strength—a requirement met by practically all stones.

(2) Water resistance—to avoid weathering and deterioration through freezing.

Continued on next page

GEORGIA MARBLE

Laboratory Tests (Continued)

(3) Acid resistance—to remain unaffected by the one, big deteriorant of city air, the carbonic acid gas in smoke filled atmosphere.

(4) Maintenance of color—to retain the beauty of the freshly cut stone.

The purpose of any test would be to prove the characteristics of the stone in regard to these conditions. The following excerpts from tests made by familiar and prominent authorities answer conclusively the questions which any architect might ask concerning the physical properties of Georgia Marble.

Chemical Analysis

An analysis of Georgia Marble, made at the Worcester Polytechnic Institute, follows:

Carbonate of Calcium	98.96%
Carbonate of Magnesium	0.13
Alumina	0.22
Silica	0.61
Loss	0.08
	100.00%

Strength

The following are excerpts from tests made by the Robert W. Hunt Company, Engineers, File No. 8295-2, Order No. B-21983.

To prove the ultimate strength, 5 cubes of each type of Georgia Marble, each approximately 4 in. in size, were put to a crushing test. The average loads which these cubes withstood are as follows:

Name of Marble	Average Crushing Load Per Sq. In., Lbs.
White Georgia	12,486
Etowah	13,590
Light Cherokee	10,356
Creole	11,274
Silver Gray	9,106
Mezzotint	10,338

Among others, the test made recently by the Watertown Arsenal, August 1929, with 6-in. cubes instead of 4-in., follow closely the same average crushing loads per square inch as made by the Robert W. Hunt Company.

Georgia Marble together with many other marbles and granites possess structural strength far in excess of that required for building purposes. Theoretically, a stone with a compressive strength of 6,000 lbs. per square inch, weighing 170 lbs. per cubic foot, could be built into a tower over 5,000 feet high before the lower course would fail through crushing.

The value, however, of the crushing strength test is in proving the inherent relationship between similar materials, invariably showing Georgia Marble to be a superior stone.

Water Resistance

Since absorption of moisture is the chief destroying agent of building materials, the selection of stone with the lowest possible porosity insures the greatest permanence. To prove the unusual low absorption of Georgia Marble, the Washington University Testing Laboratory made the following report: "To show the non-absorbent properties of Georgia Marble, cubes were dried at a temperature of 220° F. until their weights were constant. The cubes were then placed in water at 60° F. and left for twenty-four hours. They were re-weighed and each was found to have absorbed less than 6/100 of 1% of moisture." This is the reason why each rain washes the surface of Georgia Marble clean and does not permanently stain or mar its beauty.

Another test of Georgia Marble was made by the Washington University Testing Laboratory for comparative porosity against four well-known granites. The results were as follows:

Amount of water absorbed per 100 lbs.:

Granite No. 1	0.470
Granite No. 2	0.420
Granite No. 3	0.340
Granite No. 4	0.294
Georgia Marble	0.028

In this test Georgia Marble proved itself to be 90% less absorptive than the best granite sample examined. A comparison of this second with the first test shows a variation of from 3/100 of 1% to 6/100 of 1% and it is probably fair to assume in the light of other tests that this is average. Such low absorption entirely fulfils any claims of permanence and non-porosity. It can be said, over any period of time, that it is almost impossible to disintegrate or decompose Georgia Marble in any climate.

Acid Resistance

It has been learned that the smoke-laden air of a city contains small quantities of acid. Rain falling through this acid-bearing atmosphere takes a portion of this acid into solution, which is injurious over a period of years to those stones which do not have a very low absorption. The following reports by George P. Merrill, on the effect of carbonic acid on marbles, are taken from the Proceedings of the United States National Museum, volume 49, pages 347 to 349.

Two samples of each stone selected were cut into cubes approximately an inch in diameter. They were thoroughly washed and dried at 100° C., and then suspended by threads in a large jar of water kept acid by a stream of carbonic acid gas from a charged cylinder. The water was changed once each week. Twice during the trial the cubes were withdrawn and while still suspended, dried out by artificial heat and again immersed. At the end of three months they were withdrawn, dried at a temperature of 100° C. and brushed off with a soft fitch brush to remove any loosened granules or dust.

Two samples of the white crystalline marble submitted to the test lost .011% and .009% by weight, respectively, at the end of seventy days—an average of .010%. Slight roughening but no granulation was noted.

At the end of three months four samples of Georgia Marble treated likewise lost .0165, .017, .015 and .016% by weight, respectively—an average of slightly more than .0161%. At this time the surfaces were slightly roughened but no granulation was noted.

The reaction of Georgia Marble to the continuous stream of carbonic acid gas proves that the crystalline nature of the material is protection against acid-laden rain water.

Maintenance of Color

The most noteworthy test, more significant than that of any laboratory, is that of nature over an estimated period of many thousands of years, as evidenced by the natural outcroppings of the unquarried marble in Georgia. Here the rough marble can occasionally be seen at the surface in solid mass, with no nearby boulders, chips or small stones. A hammer can be used to strike off small spalls and in no instance does the stain, created over great periods of time and usually a faint brown tone on Georgia White, penetrate more than paper thickness to the uniform character and color of the marble immediately beneath.

Rain has a noted tendency to wash Georgia Marble clean instead of dirtying it and this is particularly true of the rough, axed and hammered finishes.

Considerable evidence, in the form of testimonials about buildings erected many years ago, can be had on this point if desired.

Other Tests

Other tests supporting and amplifying the information given above may be yours upon request. Among the laboratories and institutions which have tested Georgia Marble are the following:

United States Bureau of Standards
United States National Museum, George P. Merrill
Ordnance Department, United States Government
Washington University Testing Laboratory
University of Wisconsin, Prof. E. B. Hall, Department of Geology
Robert W. Hunt Company, Engineers
Watertown Arsenal, Major Ord

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GEORGIA MARBLE
Some of Its Uses for Exteriors

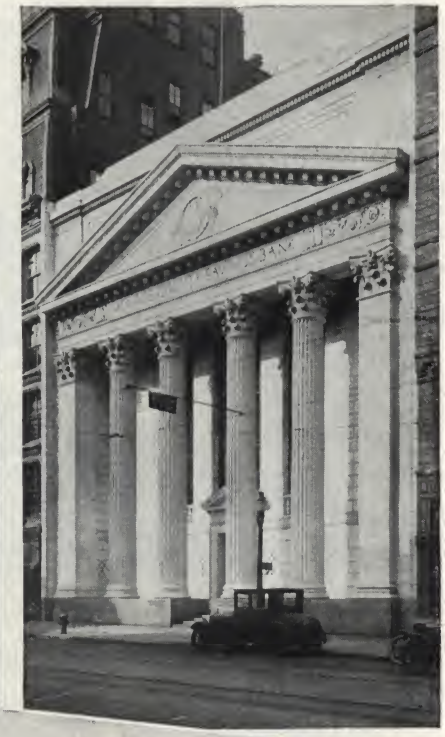
Below:
NEW YORK TRUST COMPANY,
NEW YORK, N. Y.
Cross & Cross, Architects
Georgia White Marble



Below:
TROWBRIDGE RESIDENCE AT NOROTON, CONN.
Electus D. Litchfield & Rogers, New York, N. Y., Architects
Georgia Pink Marble



Below:
MONROE COUNTY SAVINGS BANK
ROCHESTER, N. Y.
Uffinger, Foster and Bookwalter, New York, N. Y., Architects
Georgia White Marble





CORCORAN ART GALLERY,
WASHINGTON, D. C.
Earnest Flagg, New York, N. Y., Architect
Erected 37 years ago with recent addition of same Georgia Marble, matching perfectly



ADMINISTRATION BUILDING OF THE DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C.
Acting Supervising Architect of U. S. Treasury Department and Rankin & Kellogg, Architects



LARGEST MARBLE BUILDING IN THE UNITED STATES—FIELD MUSEUM, CHICAGO, ILL.
Graham, Anderson, Probst & White, Architects
Exterior of this building is constructed entirely of Georgia Marble

Continued on next page

GEORGIA MARBLE
Some of Its Uses for Interiors



CHRYSLER BUILDING, NEW YORK, N. Y.
WILLIAM VAN ALLEN, Architect
Typical men's toilet partitions of Georgia Creole Marble



GUARDIAN SAVINGS & TRUST COMPANY, CLEVELAND, OHIO
WALKER & WEEKS, Architects
Georgia Pink Marble, fine axed finish



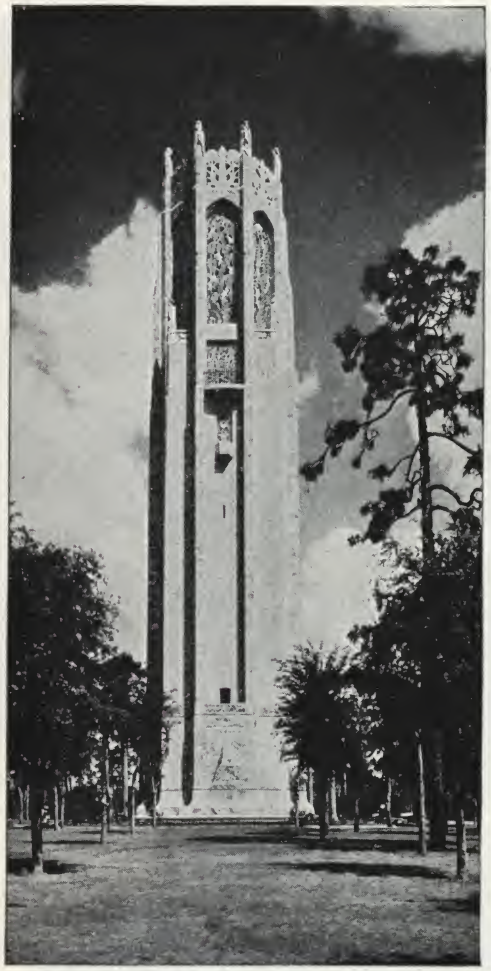
ACACIA MAUSOLEUM, CHICAGO, ILL.
R. G. SCHMIDT & Co., Architects
Georgia White Marble



ATLANTA CITY HALL, ATLANTA, GA.
G. LLOYD PREACHER, Architect
Stair, railing and trim of Georgia Rosepia. Base throughout of Georgia Verde Antique

Continued on next page

GEORGIA MARBLE
Some of Its Uses for Monumental Work



At Left:

BOK CARILLON, MOUNTAIN LAKE, FLA.
MILTON B. MEDARY, Architect
Built of Creole and Etowah Georgia Marble and Coquina stone

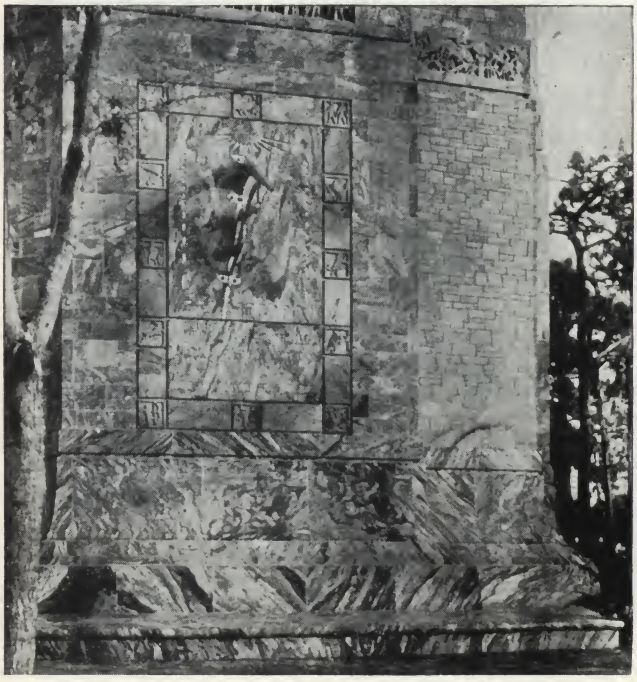


Above:

DUPONT MEMORIAL FOUNTAIN, WASHINGTON, D. C.
DANIEL CHESTER FRENCH, Sculptor, and HENRY BACON, Architect
The pedestal was cut from a single block 10 ft. high, and the bowl from a block 13 ft. in diameter

Lower Left:

BASE OF BOK CARILLON
Pink and Creole Georgia Marble





LINCOLN FIGURE, LINCOLN MEMORIAL, WASHINGTON, D. C.
HENRY BACON, Architect; DANIEL CHESTER FRENCH, Sculptor; carving and erection by PICCIRILLI BROS., New York, N. Y.
Considered the most heroic monumental work in marble ever attempted in America. An idea as to the size may be had by realizing that the shoe is over 60 in. long.

Continued on next page

GEORGIA MARBLE

Description and Uses for Georgia Marbles

Name	Color	General Description, Uses and Finishes
Georgia White	Almost pure white with a slight amount of veining and clouding.	Georgia Crystalline White has the smallest percentage of color particles of any of the Georgia Marbles. It presents a glistening appearance owing to its crystalline structure. The color is well distributed and adds to its lively appearance. By careful selection of this material, a very white effect may be obtained. Used in some of the nation's finest and largest buildings and memorials. For exteriors the finish is usually axed or bush hammered, illustrated on Page 11.
Georgia Pink "Etowah"	From old rose to deep pink with greenish black and gray veinings.	Georgia Crystalline Pink, with its variety of colors, its unusual patterns and its crystalline property of reflecting light is ideally adapted to both exterior and interior work. It is often used as a trim with Georgia Crystalline White, where it is advisable to have a variety of tone. This marble is beautiful in any of the standard finishes.
Georgia Cherokee	In three varieties, from white with small amount of gray wavy veining, to light Cherokee with darker gray veinings and silver gray—a uniform pearl gray with very little marking.	In Georgia Crystalline Cherokee one readily notes the transparency of the crystals. Those clouds of color which lie on the surface are sharply defined. Yet, below the surface we can see, through the clear crystals, hidden pools of color that are hazy in their boundaries because of their distance from the surface. Georgia Cherokee is recommended for all uses, both exterior and interior. It may be had in all of the standard finishes—polished, honed, axed, bush hammered, etc.
Georgia Creole	About half white background and half a profusion of bold, blue black veining and clouding.	In Georgia Creole, the pattern is considerably bolder and richer than in Georgia Crystalline Cherokee. The color is almost totally absent from the white background and predominates in the various dark markings. Therefore the contrast is sharp and the veining is boldly beautiful. It is particularly appropriate for matched panels. Because of its color it is an ideal marble for use in interior treatments. Where dark tone effects are desired in interiors its use is well advised. Georgia Crystalline Creole is available in all standard finishes. When axed or bush hammered it presents, of course, a much lighter appearance than when polished or honed.
Georgia Mezzotint	Gray background with dark gray wavy veining.	Georgia Crystalline Mezzotint is a combination of dark designs on a gray background. Over the predominating gray tones spread an endless number of little rivers of darker color that here and there are sharply defined. It is much used in interior work, finished axed or bush hammered where a monotone is desired. These finishes practically obliterate the stronger color vein, which produces a soft and even tone of gray. It is available in all standard finishes.
Georgia Rosepia	A warm pink with brownish clouding.	Unlike most other varieties of Georgia Marble, the Rosepia crystalline formation is very fine. Its very warm tones make it an uncommonly beautiful marble. It is primarily an interior marble and is recommended for the standard polished or honed finishes. Rosepia is difficult to obtain in very large sizes.
Georgia Verde Antique	In two varieties—a rich, dark green and a light green, both beautifully patterned.	Georgia Verde Antique is not of crystalline formation. The marble is richly colored and patterned. It is one of the handsomest marbles of the green variety quarried. Due to its characteristics, Georgia Verde Antique is used with a polished or honed finish. The rich dark green varied with faint tracings of gray and lines of intensely dark green makes Georgia Verde Antique unusually valuable as a trim, harmonizing with any other marble. The Verde Antique is produced in both light and dark shades.

It is difficult to describe any marble accurately. Samples will be furnished upon request.

Continued on next page

GEORGIA MARBLE

Description of Finishes and Recommendations as to Use

All varieties of Georgia Marble are susceptible to smooth sand rubbed, honed or polished finishes, as any other marble. In addition, we have found by long years of experience that the extreme hardness and the crystalline character of the Georgia Marble lends itself admirably to texture finishes. It has also been found that the weathering of the texture finishes is more even and freer from streaks than the smoother finishes. This is probably due to the hardness and extremely low absorption of this material.

Contrary to general opinion, textured finishes, particularly on Georgia Marble, remain cleaner and are more easily washed by the rain, while smooth marble, much the same as glass, collects a far greater amount of the gummy, greasy film which settles on smooth objects in city atmosphere.

The texture finishes illustrated on the opposite page are some which have been used on important Georgia Marble buildings with satisfactory results and are highly recommended. It is, of course, understood that this treatment tends to lighten the color of the marble and soften the veining, often giving a more pleasing effect than the smoother finishes where the veining is more pronounced.

Medium Axed Finish

The medium axed finish is obtained by using a plain chisel in a pneumatic hammer over surfaces previously trued up by machinery. It is a fine finish suitable for use either on plain surfaces or mouldings.

It is customary to have all lines running vertically except mouldings where the lines should run parallel.

Fine Axed Finish—Where desired, for small, delicate work, a finish finer than medium axed finish is recommended and can be furnished.

Medium Bush Hammered

This finish is obtained by the use of a bushing tool in a pneumatic hammer over surfaces previously trued up by machinery. It is well suited to rusticated ashlar and plain surfaces, but is not recommended for mouldings.

A combination of the Medium Bush Hammered for ashlar fields and Medium Axed Finish for mouldings produces good results and is recommended.

Fine Bush Hammered—Similar to Medium Bush Hammered only finer and used for more delicate work.

Coarse Axed and Coarse Bush Hammered

These finishes are similar to the Medium Axed and Medium Bush Hammered Finishes just described and are produced in about the same manner. The application of these coarser finishes should be for larger and heavier work.

Tooth Chiselled Finish

The Tooth Chiselled Finish is used on plain surfaces and heavy mouldings where a lined effect is desired. Because of its coarseness it is not recommended for light mouldings.

Tooled Finish—Five Lines per Inch

Suitable for both plain and moulded work where a job is fairly heavy in character.

Marble for Sculptural Purposes

Georgia Marble has long been recognized by prominent sculptors as the ideal material for sculptural work exposed to the weather such as memorials, fountains, statuary groups, pediments, etc. It is favored because its translucency enables the sculptor to get lights and shadows that are impossible to secure in other materials, and its known durable qualities are assurance of great permanence.

Sculptors Who Have Used Georgia Marble

A partial list of sculptors who have used Georgia Marble follows:

Amateis, Edmund R.
Bartlett, Paul W.
Beach, Chester
Borglum, Gutzon
French, Daniel C.
Gregory, John
Herring, Henry
Lawrie, Lee
MacMonnies, F. W.
McNeil, Herman A.
Mulligan, Charles J.
Nebel, Berthold
Rhind, J. Massey
Taft, Lorado
Ward, J. Q. A.

Lorado Taft has said, "I should think that my constant use of it (Georgia Marble) would convey the idea that it is my preference among American marbles. I have used it many times with the greatest satisfaction and expect to continue its use."

Piccirilli Bros., who have erected many of the most famous monuments and memorials in this country, heartily endorse Georgia Marble:

"In response to your request that we write you a letter about our experience with Georgia Marble, will say that we have no hesitancy in stating that in thirty-four years of marble practice we have never found a sounder or better working material, its durability is unquestionable as very many examples will prove.

"Of the works of sculpture for which this marble was used by us with great satisfaction may be mentioned the following:

"The Lincoln Statue, Lincoln Memorial, Washington, D. C.

"DuPont Memorial Fountain, DuPont Circle, Washington, D. C.

"McKinley Statue, McKinley Birthplace Memorial, Niles, Ohio.

"Columbus Memorial Fountain, Washington, D. C.

"Sculptures in Pediment East Wing, National Capitol, Washington, D. C.

"Civic Virtue, City Hall Park, New York.

"Statues on State Capitol, Hartford, Conn.

"We regard Georgia Marble as probably the best and most durable of the American marbles for fine memorial work."

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GEORGIA MARBLE

Texture Finishes – Actual Size



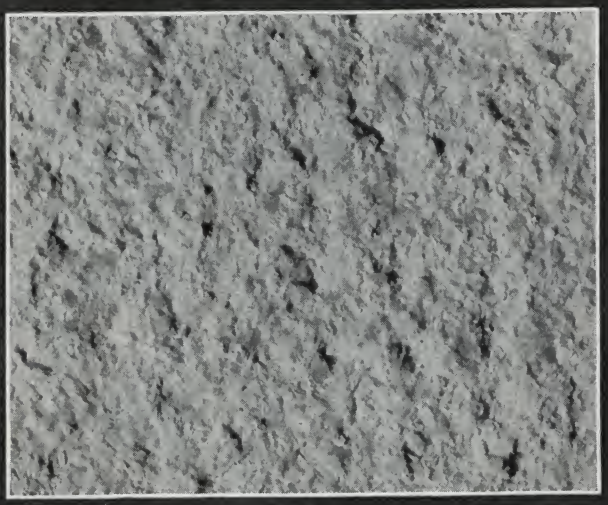
MEDIUM AXED FINISH



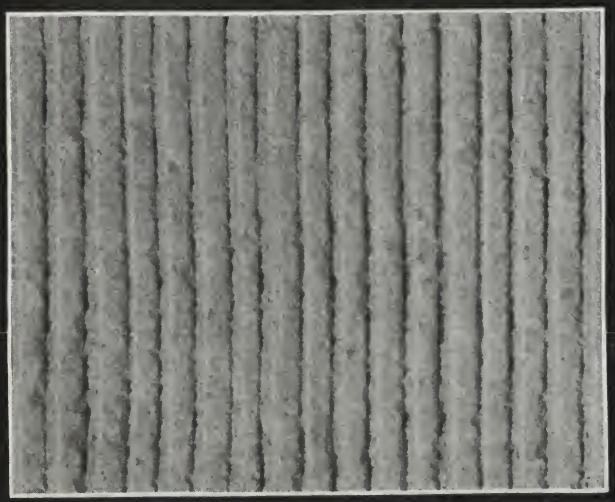
MEDIUM BUSH HAMMERED FINISH



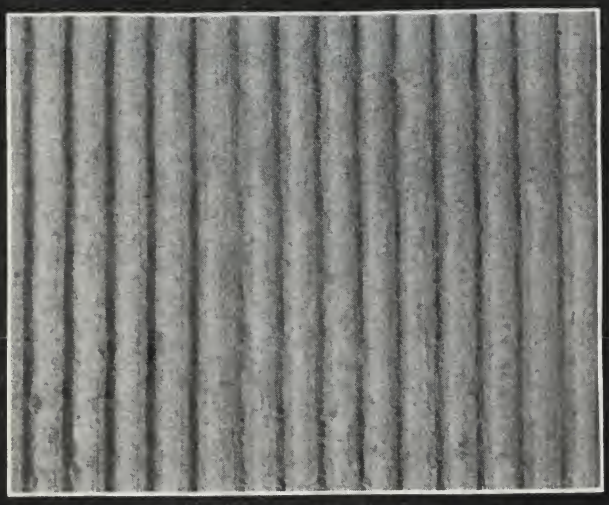
COARSE AXED FINISH



COARSE BUSH HAMMERED FINISH



TOOTH CHISELLED FINISH



TOOLED FINISH – FIVE LINES PER INCH

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GEORGIA MARBLE



It is a remarkable fact that the great Wall Street Explosion, which damaged buildings and broke every pane of window glass within two blocks of the New York Stock Exchange, failed to injure the marble sculpture, with its outstretched arms and other projecting points. Soon after the explosion Piccirilli Brothers, who carved the work, were asked to make a careful inspection, and they found the sculpture intact. This speaks well for the soundness and durability of the Georgia Marble to withstand such a shock, even after almost 20 years' exposure to the action of the weather.



Above:

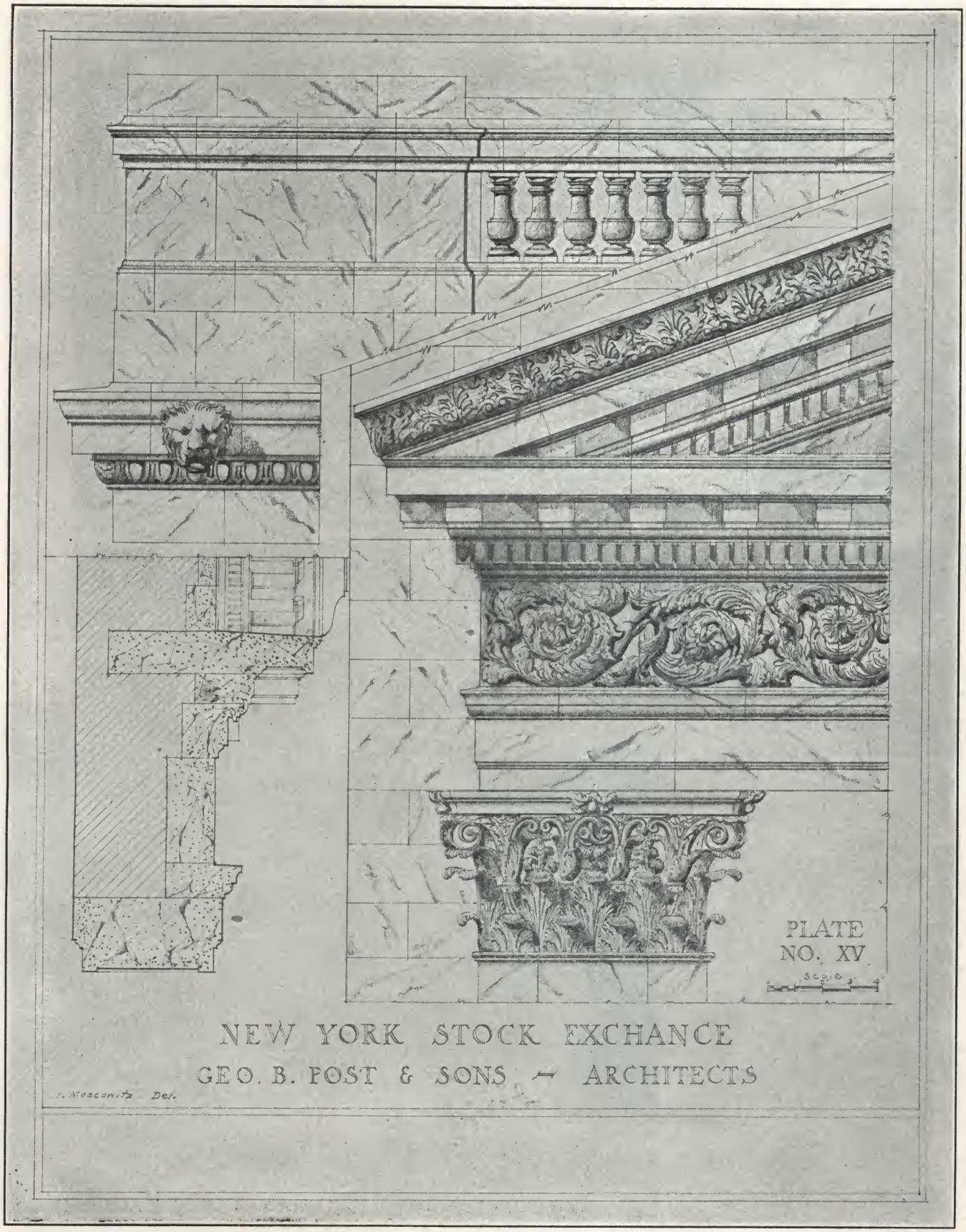
THE NEW YORK STOCK EXCHANGE
J. Q. A. WARD, Sculptor
Built in 1903
GEORGE B. POST & SONS, Architects

At Right:

THE NEW YORK STOCK EXCHANGE AND THE NEW YORK STOCK EXCHANGE ANNEX
TROWBRIDGE & LIVINGSTON, Architects
The latter was built in 1922, from the same Georgia Marble, matching perfectly

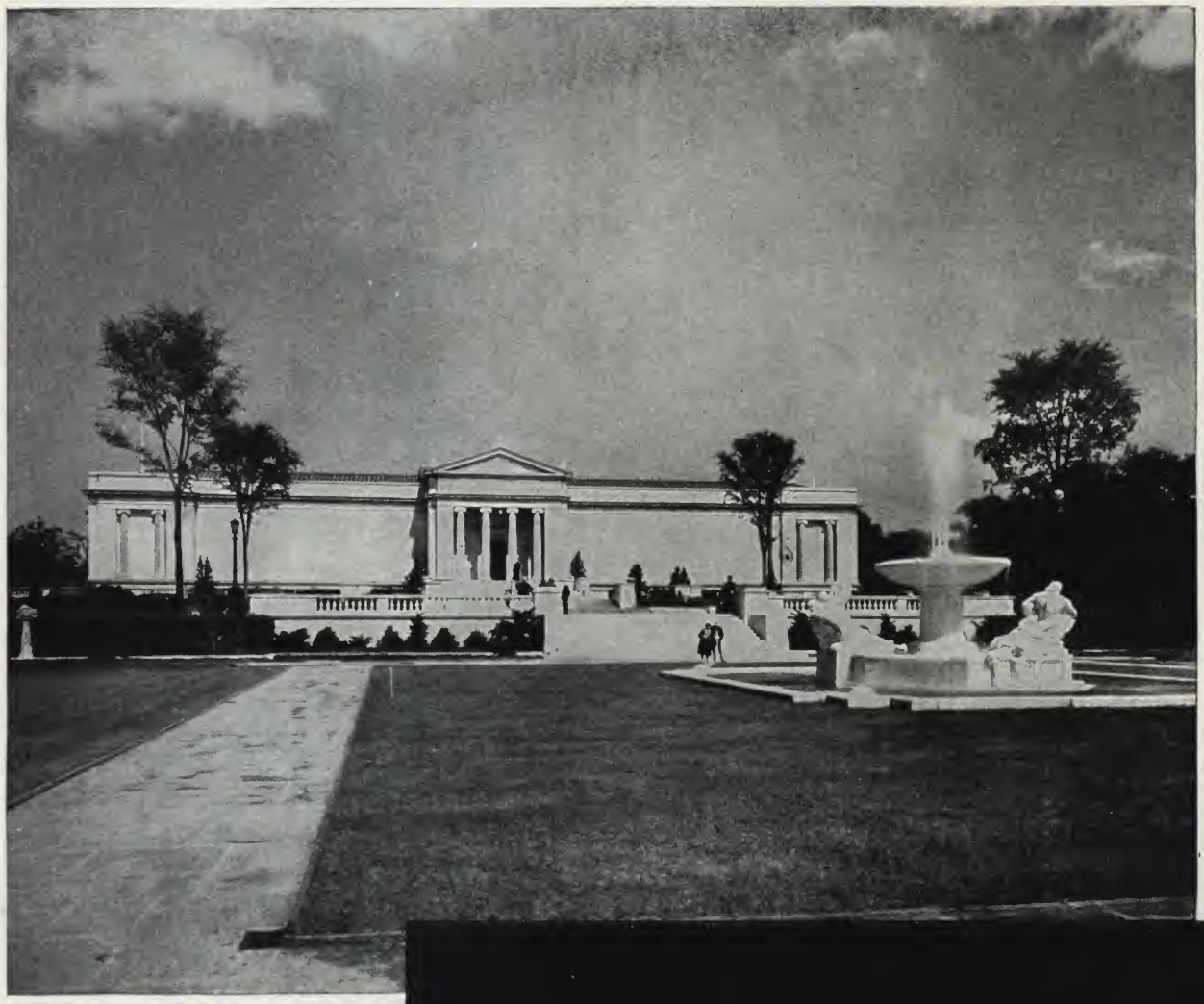
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GEORGIA MARBLE



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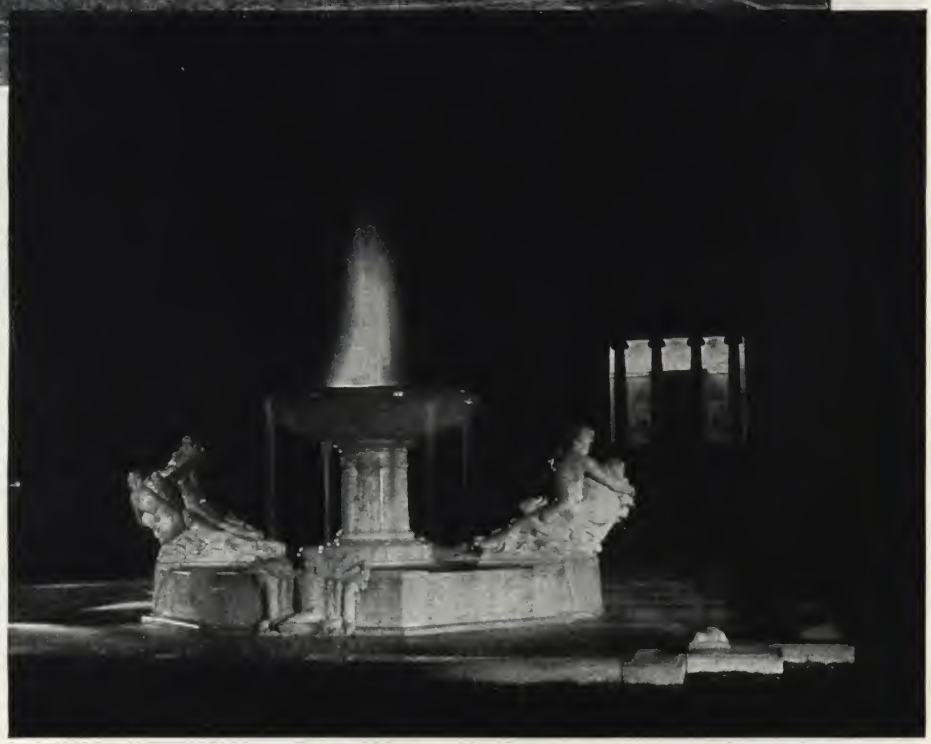
GEORGIA MARBLE



THE CLEVELAND MUSEUM OF ART, CLEVELAND, OHIO

HUBBELL & BENES, Architects

An illustration of the use of Georgia Marble in a building of pure classic style

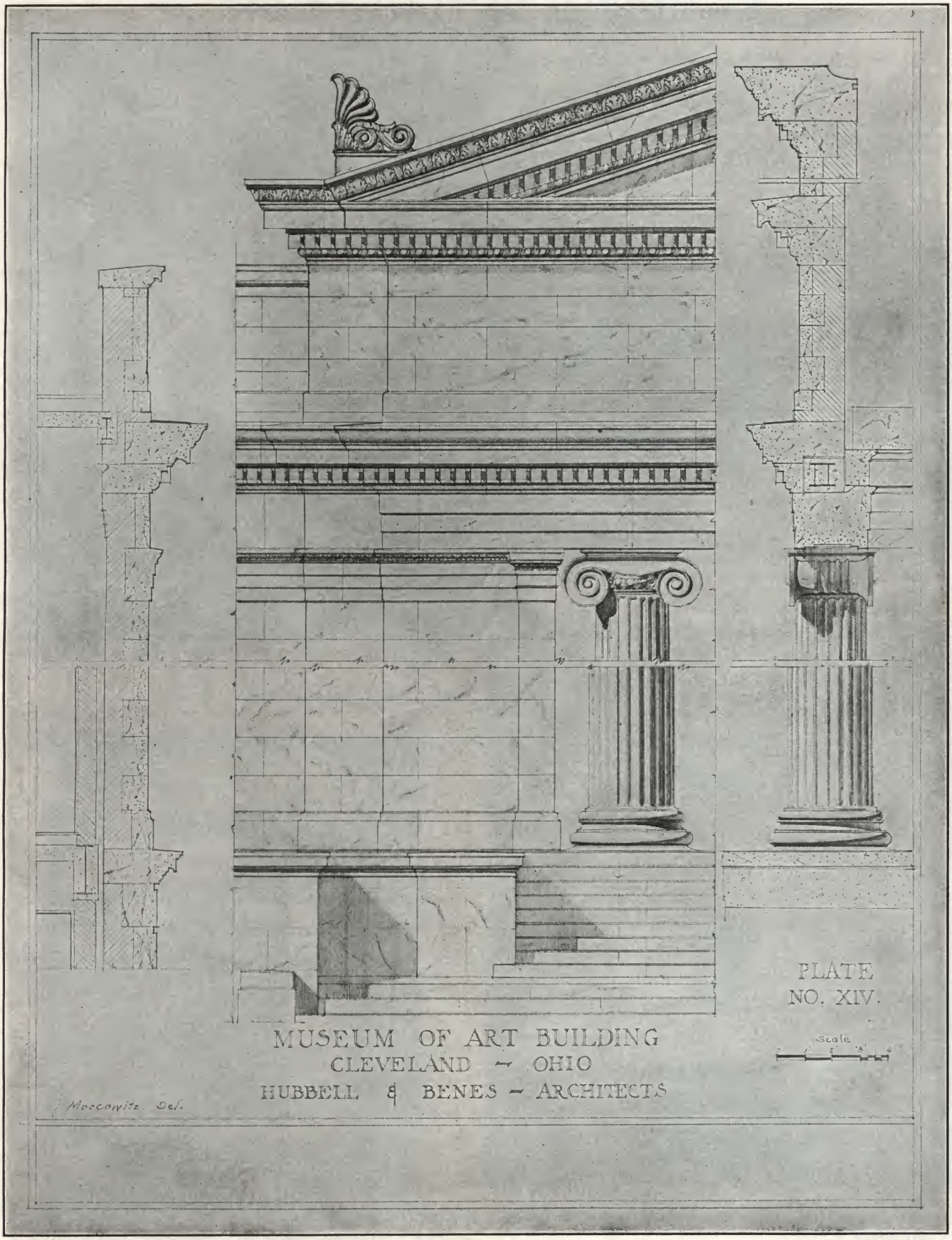


FOUNTAIN OF WATERS IN WADE PARK AT FRONT OF THE CLEVELAND MUSEUM OF ART

CHESTER BEACH, Sculptor

Continued on next page

GEORGIA MARBLE



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GEORGIA MARBLE

Specifications for Exterior Marble

(1) Work Included—Here describe parts of the work to be marble.

(2) Kind and Quality—All stonework specified to be marble shall be (insert color and grade) Georgia Marble obtained from quarries having capacity and facilities for producing the stone and cutting same so as not to delay the work. All marble shall be of compact structure, hard and practically non-absorbent showing by analysis, to contain not less than 98% calcium carbonate. It shall be free from seams or defects which will impair its strength or durability—and all exposed surfaces shall be free from stains, discolorations or other defects marring its appearance.

(3) Samples—Large samples of size to be fixed by the architects shall be submitted for approval before commencing the work. These samples shall show the extreme variation in color, veining and clouding and shall show all the different finishes required in the work.

(4) Shop Drawings—Drawings in triplicate showing in detail the position of all joints, depth of bond, projections, etc., shall be submitted to the architects for approval before cutting begins. These drawings, after final approval by the architects shall be numbered to identify each stone and fix its position, and used for setting plans.

(5) Cutting and Finishing—All exposed surfaces must be cut true and out of wind, free from waves, projections or depressions, and in accord with the approved shop drawings. The depth of stones shall be as shown by the approved shop drawings. The thickness of beds and joints shall be uniform ⅜ in. The finish to be used on the different portions of the work shall be as follows:

All plain surfaces shall be given a bush-hammered finish similar to but finer than crandled work and obtained by the use of a bushing tool in a pneumatic hammer over the surfaces previously trued up by machinery. The architect to select from samples showing variation in the fineness of this finish, one to be used.

All mouldings, belts, cornices, architraves and trim to have a fine axed finish obtained by the use of a plain drove tool in a pneumatic hammer over surfaces previously cut to form by planing, turning or by hand cutting.

Fine axed work to show tool marks about 10 to 12 lines per in. These lines to run vertically except on mouldings, the lines shall be parallel with run of the mouldings.

(Describe here other desired finishes.)

All carving shall be executed in a spirited and artistic manner from plaster models furnished therefor Carving shall have a chisel finish of a character approved by the architect. All projecting stones, such as sills, belt courses, etc., shall have a grooved drip on underside according to full size details. Steps and platforms, unless otherwise indicated, shall have wash of ⅛ in. per ft.

All stones shall be carefully crated to protect them against any damage in shipping and handling before setting.

(6) Setting—The stone shall not be set at any time more than two courses in advance of the backing and no stone having a greater width of bed than the one below it shall be set until the lower course is backed up. All stone shall be brushed clean immediately before setting. Each stone shall be set in a full bed of plastic mortar and tapped home with a wooden mallet. All joints shall be thoroughly filled and all joints raked out ¾ in. deep from face for pointing.

Care must be taken in setting all stone to prevent the bearing of the stone on edges so as to cause undue stress. Sills, etc., subject to unequal pressure shall be bedded only at the ends.

All stone shall be securely bonded or anchored in place, except where special anchoring is required, all stones with less than 9 in. beds and all stones more than 18 in. high shall be tied back with at least one 1¼ by ¼ in. wrought iron anchor for each stone for every 2 ft. or portion thereof in length. Cornices and stones having great projections to be secured in place by special anchors as detailed.

All stone anchors and cramps not specified to be galvanized or brass shall be heavily coated with asphalt.

(7) Setting Mortar—The mortar used for setting stones shall be composed of approved white non-staining portland cement, sharp washed sand and lime putty. No more lime shall be used than required to retard the setting of the mortar sufficiently for the proper bedding of the stones, and the mortar must have the strength and set up with the hardness of one to three (1-3) portland cement mortar.

(8) Cleaning and Pointing—On completion the stone work shall be washed down with stiff bristle brushes, clean water and an approved soap powder. The use of acid will not be permitted. After cleaning down, the joints to be neatly pointed up with mortar composed of 1 volume of non-staining cement and 2 volumes of clean white sand. Joints to be thoroughly wet before pointing and mortar packed in solidly filling the joints.

For Interior Specifications

Georgia Marble is subject to standard finishes and standard specifications. A reliable specification for Interior Marble Work is issued by the National Association of Marble Dealers, Cleveland, Ohio.

Examples of Work in Georgia Marble

The following is a partial list of prominent jobs in which Georgia Marble has been used in addition to those illustrated in this catalogue.

Exterior of Buildings

Ford Museum Buildings, Dearborn, Mich., Robt. O. Derrick, Inc., Architects
Folger Shakespeare Library, Washington, D. C., Paul P. Cret, Architect
Girard College House Group, Philadelphia, Pa., John T. Windrim, Architect
Shedd Aquarium, Chicago, Ill., Graham, Anderson, Probst & White, Architects
Joslyn Art Museum, Omaha, Nebr., John McDonald & Alan McDonald, Architects
Temple of Memories, White Chapel Memorial Park, Detroit, Mich., Alvin E. Harley & C. Kenneth Bell, Architects
Girard Trust Co., Philadelphia, Pa., McKim, Mead & White, and Furness, Evans & Co., Architects
U. S. Post Office, Birmingham, Ala., Supervising Architect, Treasury Department
Pan-American Building, Washington, D. C., Albert Kelsey and Paul P. Cret, Architects
Federal Reserve Bank, Cleveland, Ohio, Walker & Weeks, Architects
Capitol Building, San Juan, Porto Rico, R Carmoega, Architect

Interior of Buildings

Hurt Building Addition, Hugh Tallant, Architect
Fairmont Mausoleum, Newark, N. J., Wm. H. Deacy, Architect
First National Bank Building, Atlanta, Ga., Pringle & Smith, Architects
Miami City Hall and Court House, A. Ten Eyck Brown, Architect
State Capitol, Salt Lake City, Utah, R. Kletting, Architect

Monumental and Sculpture

Harding Memorial, Marion, Ohio, Henry Hornbostle and Eric Fisher Wood, Architects
Livingstone Memorial Light House, Belle Isle, Detroit, Mich., Albert Kahn, Architect
Pasteur Monument, Chicago, Ill., Bennett, Parsons & Frost, Architects
"Civic Virtue" Municipal Fountain, City Hall Park, New York, N. Y., Frederick W. MacMonnies, Architect
Pediment, National Capitol, Washington, D. C., Paul Bartlett, Sculptor
Columbus Memorial Fountain, Washington, D. C., Lorado Taft, Sculptor
McKinley Birthplace Memorial, Niles, Ohio, McKim, Mead & White, Architects, J. Massey Rhind, Sculptor

Continued on next page

GEORGIA MARBLE

As Used in Distinctive Mausoleums

The beauty and durability of Georgia Marble account for its selection for many fine mausoleums throughout the country. Whether for the small family mausoleum or for those which are more pretentious and elaborate Georgia Marble is a wise selection. The company specializes in this work and through its many years of experience is able to offer the architect complete and dependable service in mausoleum construction.



MAUSOLEUM FOR W. A. CLARK, JR., IN HOLLYWOOD CEMETERY, CALIF.
ROBERT D. FARQUHAR, Architect; SHERRY FRY, Sculptor
The entire exterior, including roof, is of Georgia White Marble. All columns are monolithic



WILLIAM R. COE MAUSOLEUM, COLD SPRINGS, L. I.
WALKER & GILLETTE, Architects
Erected by PRESBREY-LELAND STUDIOS



DEVAUX MAUSOLEUM, SAN FRANCISCO, CALIF.
I. MOSCOWITZ, Architect



RINGLING MAUSOLEUM, SARASOTA, FLA.
CLAS, SHEPHERD & CLAS, Milwaukee, Architects

GEORGIA MARBLE

SOUTHWEST ONYX & MARBLE COMPANY

Producers, Manufacturers and Designers of Pedrara Onyx

SAN DIEGO, CALIF.

"America's Oldest and Largest Exclusive Onyx Plant"

PLANT AT SAN DIEGO, CALIF. QUARRIES AT BAJA CALIFORNIA, MEXICO

Distributed Exclusively by

TOMPKINS-KIEL MARBLE COMPANY

505 FIFTH AVENUE, NEW YORK

Branches: San Francisco, Los Angeles, Chicago, St. Louis, Knoxville, Tenn., Carthage, Mo.

Pedrara Onyx

Pedrara Onyx is an unusually attractive stone, imported from Old Mexico. It is specially selected stock from the world's largest deposits of high grade commercial onyx. These quarries are located in Baja (Lower) California, about three hundred miles south of San Diego and fifty miles inland from the Pacific Ocean.

PEDRARA ONYX

"Nature's Most Beautiful Stone"

Texture and Composition

Pedrara Onyx is translucent, noted for its fine texture, unusual durability, beautiful coloring and uniform quality. It is a calcareous or limestone composition. Next in importance to the lime is iron, which mineral in different states of combination with manganese, has caused its beautiful color variations.



Uses

Onyx may be worked, set and used just like marble—and, for all purposes where marble is used Pedrara Onyx is adaptable. It is particularly appropriate for:

Ceilings,
Lobbies,
Indirect Lighting Fixtures,
Panels,
Stairways,
Columns and Railings,
Mantel Facings,
Fountains, etc.

Or any interior where a decorative trim is wanted. Its charming translucency makes it especially attractive in panels, ceilings, theatre lobbies and other places where soft, diffused lights or indirect lighting can be brought into play.

Analysis

Pedrara Onyx shows the following analysis:

Hardness 3.5
Specific Gravity 2.79
Weight per cu. ft.
174 lbs.

Advantages

Pedrara Onyx is 1½ times harder than the average marble. It is close grained and impervious to stains of any kind. It takes and retains a smooth finish and an extremely high polish. Unlike the ordinary marble it is non-absorbent and will not discolor with long usage.



Continued on next page.

Coloring

Pedrara Onyx lends individuality to every job—for no two pieces of Pedrara Onyx are alike. Its coloring ranges from pearl-like white to fleecy cream—with delicate tints of green, rose, yellow, gold, brown and sometimes blue, appearing in fine lines, or veins, in broad bands, in random flecks or in cloudlike masses of color. There are colors to suit every taste and harmonize with every color scheme. Plain slabs without coloring may also be had if desired.

Shapes and Sizes

Pedrara Onyx can be sawed, planed, turned, cut and polished to architects' specifications for any interior work. Usual sizes of blocks run two to eight feet long, six inches to two feet thick, one to three feet wide. Larger sizes may be procured on reasonable notice to quarriers.

Samples

Polished samples showing typical coloring and veining will be sent to architects and contractors upon request.

Deliveries

Large stocks of raw material on hand at all times assure quick, dependable deliveries.

Prices

As owners and operators of our own quarries we are in position to offer the best of service and the most attractive prices.

Official Report

Dept. of Geology, U. S. National Museum (reporting on Pedrara Onyx), says:

> "The colors are peculiarly delicate, and there is a wonderful uniformity in quality. Pearl white (the virgin onyx), delicate rose tints, and light greens are the more common, all variegated by a network of fine sharp veins of rose-red color. The rose color is quite unique and wonderfully beautiful.
>
> "The analyses show this to be the most dense of any of the onyx marbles thus far examined."



Quarries in Old Mexico

Pedrara Onyx is the choicest stone from the world's largest known deposits of high grade commercial onyx. From these immense deposits only the most exquisite stone is selected. This is called "Pedrara" Onyx—and its quality and beauty have inspired critics to proclaim it *"Nature's Most Beautiful Stone."*



Shipped In Our Own Boats

Raw Pedrara Onyx is hauled over winding mountain roads, transferred to our own ships on the western seacoast of Old Mexico, then brought to America's Oldest and Largest Exclusive Onyx Plant, at San Diego, California. . . To be manufactured into choice slabs for architectural purposes, or made into bank and fountain fixtures, lamp parts, desk sets, table and smoker tops, automobile gearshift balls, and many other interesting articles to order—for the delight of beauty lovers the world over.



Hauled Over Winding Desert and Mountain Roads

ESTABLISHED 1865

THE STANDARD MARBLE WORKS COMPANY

JOHN STACEY MUELLER, PRESIDENT

Importers, Finishers and Contractors

TELEPHONE
WEST 2705

701 to 705 West Front Street, P. O. Station N
CINCINNATI, OHIO

Products

Imported and domestic QUARRY BLOCKS, SLABS and FINISHED MARBLE for building interiors, decorative exterior panels, altars, mantels, mantel facings, furniture tops, lavatory tops, etc.

Facilities

One of the largest complete sawing and finishing mills in the Middle West. We have modern equipment and do but one grade of finishing—the best that can be done. See our mill if possible.

Stock

We buy the best marble blocks obtainable, and have on hand ample stock of block and sawn marble, including "Premier," "Sterling" and many other grades. We have it or will secure it.



Storage Building Showing Stock of Slabs and Blocks of Foreign and Domestic Marbles

Service

Orders for blocks, full size slabs and custom sawing solicited.

We also sell finished marble f.o.b. cars Cincinnati, Ohio, or installed anywhere.

We will furnish any order no matter how small.

Estimates

Estimates will be submitted upon definite plans and specifications or complete lists.

Marble Classifications

All Marbles and Stones Are Sold in Accordance with the Following Definitions—Trade practice in the Marble Industry recognizes all marbles and stones commonly used for interior building purposes, as falling within one of four groups or classifications, according to their respective characteristics and working qualities. Therefore, for purposes of standardization and clearer definition, the National Association of Marble Dealers has officially adopted these four classifications, and defines them as follows:

Group A—Sound marbles and stones, which require no "sticking," "waxing," or "filling"; characteristically uniform and favorable working qualities.

Group B—Marbles and stones similar in character to the preceding group, but somewhat less favorable working qualities; occasional natural faults; limited amount of waxing and sticking necessary.

Group C—Marbles of uncertain variation in working qualities; geological flaws, voids, veins and lines of separation common; standard shop practice to repair Nature's shortcomings by sticking, waxing and filling; "liners" and other forms of reinforcement freely employed when necessary.

Group D—Marbles and stones similar to the preceding group and subject to the same methods of finishing and manufacture, but embracing those materials which contain a larger proportion of natural faults, and a maximum variation in working qualities, etc.; this group comprises many of the highly colored marbles prized for their decorative qualities.

Have No Reference to Merit or Value—It is to be carefully noted that the four groups above defined have no reference whatsoever to comparative merit or value. With proper methods of manufacture, all materials, regardless as to classification, are reguarded as of substantially equal permanence, durability, or utility, with respect to the particular purpose for which employed. The classifications merely define what shall be proper and acceptable in each instance, as based on trade usage.

Kinds of Marble

On account of the almost limitless colorings of marble we are unable to give a list.

We are prepared to quote and furnish any commercial marble.

Samples

Samples will be submitted if trade name is given or if use and color tone are mentioned. We maintain a sample room at our mill.

Exact duplication of color and figure of samples submitted are not guaranteed, as a variation in natural products is unavoidable.

VERMONT MARBLE COMPANY

Producers and Manufacturers of Exterior and Interior Marbles

PROCTOR, VT.

BRANCHES AND SALES OFFICES

BOSTON, MASS., 44 School Street
ALBANY, N. Y., 1318 Standard Building
CHICAGO, ILL., 5535 No. Lincoln Street
CLEVELAND, OHIO, Hickox Building
DETROIT, MICH., 1560 First National Bank Building
TORONTO, ONT., Ontario Marble Co., Ltd., 308-9 Manning Chambers Building
NEW YORK, N. Y., 101 Park Avenue
PHILADELPHIA, PA., 22nd and Westmoreland Streets
WASHINGTON, D. C., Commercial National Bank Building, 14th and G Streets, N. W.
SAN FRANCISCO, CAL., 244 Brannan Street
TACOMA, WASH., East End 11th Street Bridge
LOS ANGELES, CAL., 857 Roosevelt Building
DALLAS, TEX., Vermont Marble Company of Texas, 1513 Wall Street
HOUSTON, TEX., Vermont Marble Company of Texas, 946 Electric Building
SAN ANTONIO, TEX., Vermont Marble Company of Texas, 507 Milam Building

Facilities

The company has large sawing mills and finishing plants in Vermont; also finishing plants in Philadelphia, Cleveland, Chicago, Dallas, Houston, San Francisco and Tacoma. At Tacoma is the storage yard for the Alaska marble for shipment in rough or finished state. It can also be supplied from any of the other plants.

Varieties

Exterior—Mountain White Danby, Imperial Danby, Highland Danby, Corona, Eureka and Pearl Gray Vermont.

Interior—***Vermont Marble***—Over 40 varieties, including white, lightly clouded and veined; gray, light green and dark green; red and black.

Alaska Marble—Several kinds, pearl white veined with gray or black predominating.

Colorado Marble—The Vermont Marble Company is now the sole sales agent for the marble known as Yule Colorado.

Physical Properties of Marble

It means little to say that a stone will stand so many pounds to the square inch. It is much simpler to say that the marbles we recommend for exterior work could be used in the base of a tower three miles high before failure from compression would result.

Tests made by the U. S. Bureau of Standards show that Danby Vermont marble absorbs about one-tenth of one per cent by weight when immersed in water—a very low rate of absorption.

Suggested Specifications for Exterior Marble

Material—All cut stone work shall be (insert name of variety of marble wanted).

Quality—All marble entering into the construction of the work shall be selected for uniform color. It must be free from cracks, chips, stains, or other defects upon exposed surfaces.

Samples—Before proceeding with the work the contractor shall submit a sample 4x8x2 in. of the marble he proposes to use. One face of this sample shall have (specify what finish is desired).

Joints—All marble shall be cut for $\frac{3}{16}$-in. joints.

Finish—All exposed surfaces of marble work shall have (specify desired finish).

Drawings—Detailed drawings will be furnished by the architect for all work requiring them. The contractor shall make and submit for the architect's approval, shop drawings showing in plan and elevation the dimensions of all stones, position of joints, and the spacing of dentils or other repeated ornament.

Cutting—All cutting must be done in a workmanlike manner and in accordance with the shop drawings referred to. All faces shall be free from winds, so as to present a true and even surface. Joints shall be at right angles to the face. Intersecting profiles shall be accurately cut. Re-entering angles of mouldings shall be cut from the solid, unless otherwise shown by the drawings.

The contractor shall, where called for by the architect's drawings, cut the marble work to accommodate steel, flashings, leaders or other structural materials.

Delivery—All marble shall be crated or otherwise protected so as to be delivered at site in good condition.

Storage—All marble stored at the site shall be on cleats, off the ground, and protected where necessary from any stains from above.

Setting—Marble shall be set with a derrick and in full bed of mortar. The mortar-



Red Cross Memorial to Women of World War, Washington, D. C.—Vermont Imperial Danby Marble
Trowbridge & Livingston, Architects

Continued on next page

bed shall be kept back at least 1 in. from the face of the stones.

Mortar—Mortar for setting marble shall be composed of 1 part white non-staining portland cement, 3 parts clean, sharp sand and a quantity of hydrated lime equal to 10% of the volume of cement.

Protection—During construction, all sills, moulding, or other work liable to injury shall be suitably protected by boards which shall not be removed until the cleaning and pointing is done.

Anchors—Anchors to be of wrought iron, heavily galvanized or painted 2 coats with an approved brand of dampproofing paint and allowed to dry before using. For each stone 2 ft. long one anchor shall be used, and for each stone over 2 ft. long, at least two anchors. Provide suitable clamps at corners and such special anchors as the architect may direct. Balusters shall be doweled top and bottom with brass, copper, zinc or some other non-staining metal.

Pointing and Cleaning—All exposed surfaces of the building shall, on completion, and when directed by the architect, be cleaned with clean water only and fiber brushes.

All joints shall be raked out, 1 in. back from the face, and carefully pointed with a mixture of 1 part white non-staining portland cement and 2 parts clean white sand. Joints shall be ruled with a tool of approved shape.

Vermont Interior Marble Service

We contract either for interior marble work installed or to finish and furnish it to local interior marble dealers, following whichever method will give best service to architects, contractors and owners.

Suggested Specifications for Interior Marble

Material—All interior marble shall be as follows: All toilet marble, Vermont Venoso; all corridor marble, Vermont Brocadillo. (Always insert the name of the desired grade, avoiding the too general term "Vermont Marble.")

Quality—All interior marble shall be of good quality, free from stains. Patching will be permitted only where the natural imperfections of a particular stone are subject to correction by the established usage of the industry.

Samples—Before proceeding with the work the contractor shall submit to the architect samples of all the marble specified above, 1 ft. square and 7/8 in. thick.

Finish—All floors and stair treads shall have a fine sand finish. All standing marble shall be highly polished.

Drawings—Detailed drawings will be furnished by the architect for all work requiring them. The contractor shall make and submit for the architect's approval, shop drawings showing proposed jointing.

Measurements—Before proceeding to finish the interior work the contractor shall verify all measurements at the building.

Cutting—The marble contractor shall do such necessary cutting and fitting to accommodate his work to other trades as is sanctioned by common usage in the trade.

Setting—All floor marble shall be set in a cement mortar of 1 part cement and 3 parts sand, adding a quantity of hydrated lime, not exceeding 10% of the volume of cement. The concrete fill must be swept and thoroughly sprinkled before setting is started. All stair treads and all standing marble shall be set in plaster of paris.

All wall marble shall be securely anchored with brass, copper or aluminum wire.

When work is completed all marble shall be cleaned and left in good condition.

Classes of Work Supplied

Wainscot and interior decorative treatment generally: floor tile, stair treads, bank screens, counter tops, soda counters, electric switchboards, scale tops, lamp bases, and many other purposes.

Adaptability

Innumerable are the ways in which Vermont marble may be applied to building construction. Nor is it merely a beautiful product. It is thoroughly sanitary as well as fireproof, though it may be readily cleaned. It needs no refinishing.

Although initial cost of marble may be slightly in excess of certain other materials, in the end it is no more expensive.

Marble Exhibit in New York City

There is an exhibit of large-sized samples of our marbles at our New York office in the Architects' Building, 101 Park Avenue, to which architects, engineers, contractors and owners are cordially invited.

"The Book of Vermont Marble"

A book of standard filing size giving condensed information relative to the quarrying, finishing, setting and detailing of marble. Furnished without charge to any architect on request.



First Trust & Savings Bank, Chicago, Ill.—Vermont White and Verde Antique Marble
H. Hanselman, Architect

BUILDING STONE ASSOCIATION OF INDIANA, INC.

Box 54, BLOOMINGTON, INDIANA

MEMBERS

BEDFORD CUT STONE CO.
BLOOMINGTON LIMESTONE CO.
EDWARD EDINGER CO.
EMPIRE STONE CO.
CARL FURST CO.
B. G. HOADLEY QUARRIES, INC.
HARDING & COGSWELL, INC.
INDIAN HILL STONE CO.
INDEPENDENT LIMESTONE CO.
MATTHEWS BROTHERS CO.
MONON STONE CO.
MUTUAL OOLITIC CUT STONE CO.
SHAWNEE STONE CO.
SWENSON STONE CO.
VICTOR OOLITIC STONE CO.
H. A. WOOLERY & SON

INDIANA LIMESTONE

Product

Indiana Limestone is produced by the members of this Association in a considerable range of color-tone from a light buff, almost white, to a medium gray of slightly bluish cast. It is graded by the members of this Association according to color and texture under the classification officially adopted by the Indiana Limestone Institute, embracing the following regular grades:

Select Buff	Select Gray	Special Hard Buff
Standard Buff	Standard Gray	Special Hard Gray
Rustic Buff	Rustic Gray	Variegated
Buff Statuary Stock		Old Gothic

In addition to these regular grades, the members of this Association produce a number of trade-named varieties that are marketed as specialties by reason of some distinctive characteristic in texture or color-tone.

Indiana Limestone by years of usage in many of the finest buildings of America, including numerous United States Government Buildings, has, by reason of its beauty and fine weathering properties under all conditions of exposure, very generally become recognized as one of America's premier building stones—always moderate in cost, although thoroughly permanent and superior both in its structural qualities and esthetic characteristics.

Purpose of the Association

This Association has been organized by the operators listed above as an information and service Bureau for the industry here. Its activities will be conducted along lines similar to those of the former Indiana Limestone Quarrymen's Association.

It will be the earnest effort of this organization to serve the architectural profession and building public in every way possible to insure the most satisfactory and economical use of this stone in all types of construction. *No sales—service only.*

Mills and Quarries, Facilities and Equipment of Members

Our members own over 2,950 acres of proven stone land, of which only 130 acres are now under active quarry development.

As some of the older quarries of the district are gradually approaching depletion, the center of the Oolitic Limestone District is moving northward into Monroe County, where these quarries are located and where practically all of the more recent quarry developments of the district occur.

The estimated present output of the quarry producer members of our Association is about 8,300,000 cu. ft. The maximum output with present equipment is estimated at about 11,850,000 cu. ft.

The approximate annual sawing capacity is about 5,600,000 cu. ft. The enclosed mills of our membership have an aggregate area of approximately 630,000 sq. ft. plus open cutting yards having an area of approximately 90,000 sq. ft. The estimated present cut stone production is about 2,200,000 cu. ft., the maximum cut stone capacity with present equipment being about 2,500,000 cu. ft.

The Indiana Limestone Deposit

The oolitic limestone deposit of Indiana is confined within an area extending north and south for about sixty-five miles and east and west less than twenty miles, which for the most part lies in Monroe and Lawrence Counties.

For many years a peculiar fallacy prevailed among architects that the Limestone deposit of Lawrence County possessed physical properties superior to that in Monroe County. It was no uncommon experience for the cut stone contractor to find "Bedford Limestone" or "Limestone from the quarries of Lawrence County" specified for some particular project.

This apparent handicap, while acting temporarily as a barrier to unrestricted production in Monroe County, has proved an unqualified boon, for the choicest classes of Indiana Limestone have been conserved to Monroe County. The real center of production of Indiana Limestone is now found in Monroe County, with Bloomington as the main shipping point.

Estimates

Plans and specifications sent to the district for estimates, if sent either to the office of this Association or to the office of the Cut Stone Association of Indiana, will be made available to the firms listed above.

THE EDWARD EDINGER COMPANY

CEDAR RAPIDS, IOWA BEDFORD, IND.

CUT INDIANA LIMESTONE FOR ALL BUILDING WORK

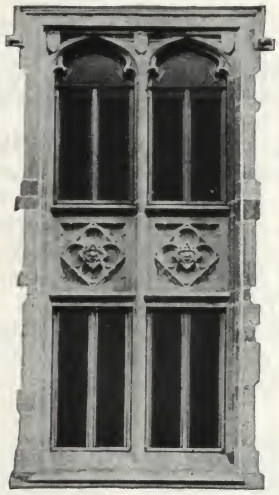
The Company

Three generations of Edingers have carried on the business of THE EDWARD EDINGER COMPANY.

Skill and experience in cutting Indiana Limestone have been conspicuously present throughout the many years of the company's existence and hundreds of notable projects have drawn upon "Edinger-Cut."

Plants

The company maintains fully equipped plants at both Cedar Rapids, Iowa, and Bedford, Indiana.



Precision and Promptness

Precision and promptness are characteristics of Edinger Service which elicit favorable comment from those whom we have served. Every modern mechanical facility for cutting and carving building stone is maintained. We would value the privilege of submitting cut stone estimates.

Other Stones

While we specialize in cut Indiana Limestone, other stones are cut and sold in substantial volume. This company has furnished and is now furnishing Kasota, Mankato and Phenix stones for either interior or exterior work.





Exterior Stone Details from the New University of Iowa $4,000,000 Hospital Group
PROUDFOOT, RAWSON, SOUERS & THOMAS, Des Moines, Iowa, Architects



Memorial Building, Cedar Rapids, Iowa
W. J. BROWN, Architect



Merchants National Bank Building, Cedar Rapids, Iowa
WEARY & ALFORD CO., Chicago, Ill., Architects

BLOOMINGTON LIMESTONE COMPANY

QUARRIES, MILLS AND GENERAL OFFICES

BLOOMINGTON, IND.

SALES OFFICES

NEW YORK, N. Y., 535 Fifth Avenue
CHICAGO, ILL., 228 No. La Salle Street
KANSAS CITY, MO., 6151 Oak Street
CINCINNATI, OHIO, 915 Chamber of Commerce Building
DETROIT, MICH., 1058 Maccabees Building
TORONTO, ONT., CAN., 1104 Bay Street

Products

INDIANA LIMESTONE in rough and scabbled blocks and in sawed, cut and carved stone of any dimensions called for. The following color tones are available: Buff, Gray, Variegated and Cirri, the latter being a Variegated stone found only in the quarries of this company.

Characteristics of the Stone

Indiana Limestone from the quarries of this company is of the highest grade obtainable. It is of a dense texture that offers much greater resistance to the penetration of moisture, dirt and soot than stone of a more porous nature, which fact makes it particularly suitable and desirable for structures in large cities.

That the delicate color tones of this stone are permanent is proved by the fact that quarrying operations of many years have revealed them to be substantially the same throughout a given vein as on the stone ledges which have always been exposed to the natural elements.

Proof that this stone will stand up without perceptible change under the most drastic climatic variations is afforded by numerous examples in most of the large cities throughout the United States and Canada.

Quarries and Facilities

The quarries of BLOOMINGTON LIMESTONE COMPANY have enough stone blocked out to maintain maximum production for more than 75 years. The annual output of these quarries is approximately 3,000,000 cubic feet. Three sawing mills and three cut stone finishing plants finish approximately 60,000 cu. ft. of cut stone a month and 120,000 cu. ft. of sawed stone.

Quarries and shops are equipped with the most modern machinery and tools, manned by a large, permanent force of efficient, expert workers. Orders for stone of any size and in any quantities are filled promptly and correctly.

The central location of this company's quarries and plants makes it one of the most convenient shipping points to every section of the United States and Canada.

The direct service of this company is supplemented by that of cut stone contractors in practically all of the principal cities.

Workability

Indiana Limestone from the quarries of the BLOOMINGTON LIMESTONE COMPANY is often referred to as a "free stone"—meaning that it is easily workable in any direction either by machinery or hand. The stone lends itself readily to all the standard finishes such as hand and machine tooling, sawing, honing, smoothing, etc., as well as to any such special finishes as may be called for by architectural requirements.



Bank of Manhattan, 40 Wall Street, New York, N. Y.

H. CRAIG SEVERANCE, INC., Architects
YASUO MATSUI, Associate Architect
STARRETT BROTHERS, INC., Building Contractors

Classifications

The color-tones, textures and classifications of the products of the BLOOMINGTON LIMESTONE COMPANY are classified according to the uniform classification of Indiana Limestone as established by the Indiana Limestone Institute as follows: Statuary Buff, Select Buff, Standard Buff, Rustic Buff, Select Gray, Standard Gray, Rustic Gray, Variegated, Old Gothic, Special Hard Buff and Special Hard Gray, the latter two classifications being the same general texture as the Select classifications.

Stone of any of these classifications is available from the quarries of the BLOOMINGTON LIMESTONE COMPANY in practically unlimited commercial quantities.

Samples

Samples of stone showing color-tones, textures, finishes, etc., will gladly be sent upon request.

Service

The technical and architectural departments of the BLOOMINGTON LIMESTONE COMPANY are able to render valuable assistance to architects and building contractors in the planning of Indiana Limestone buildings and in the economical use of the material. Avail yourselves of this service without obligation.

Recent Representative Examples

New structures built of BLOOMINGTON LIMESTONE COMPANY'S Indiana Limestone are as follows:

Office Buildings

Bank of Manhattan Building, New York, N. Y.
Central Illinois Public Service Co. Building, Springfield, Ill.

Banks

National Bank of Commerce, Houston, Tex.
Austin National Bank, Austin, Tex.
Merchants National Bank, Mobile, Ala.

Commercial Buildings

New England Telephone & Telegraph Building, Boston, Mass.
Strawbridge & Clothier Department Store, Philadelphia, Pa.
John Marshall Hotel, Richmond, Va.

Public Buildings

Deaconess Hospital, St. Louis, Mo.
Reno County Courthouse, Hutchinson, Kan.
Hall of Civil Rights, Easton, Pa.
U. S. Post Office, Springfield, Ill.
U. S. Post Office, Asheville, N. C.
U. S. Post Office, Kenosha, Wis.

Churches

Park and Central Presbyterian Church, Erie, Pa.
Union Congregational Church, Green Bay, Wis.

Residences

J. F. Rothwell, Beaumont, Tex.
Mrs. Harry Bassett, Jackson, Mich.

Continued on next page

Ashtone

An exclusive product of BLOOMINGTON LIMESTONE COMPANY.

Ashtone is a *natural stone* wall facing which provides an unusual type of standardization. The kind which permits architects and builders to exercise the widest latitude of choice in exterior design and to put personality and distinction into their construction, with all of the advantages of economy and quality.

ASHTONE

Standardized Product of Bloomington Limestone Company, Bloomington, Indiana

Sawed Finish Ashtone—Smooth, sawed pieces of Indiana Limestone with ends left rough for breaking or jointing at the building, into proper lengths required to obtain a pre-determined random design or pattern as selected by architect or owner.

Available in the complete range of colorings and markings.

Split-faced Ashtone—Supplied either in standardized units, which are produced to multiples of brick sizes or, where larger height units are required for especially designed patterns, Split-faced Ashtone is supplied in unjointed strips in any designated number of course heights, ready for breaking or jointing at the job.

The exterior of the attractive but inexpensive residence shown below is entirely faced with Split-faced Ashtone, produced in standardized units, in multiples of brick sizes and laid up with ½ in. mortar joints, much the same as face brick. It is no longer necessary to revert to meaningless ornamentation to create interest and architectural attractiveness. Note the complete absence of cut stone trim.

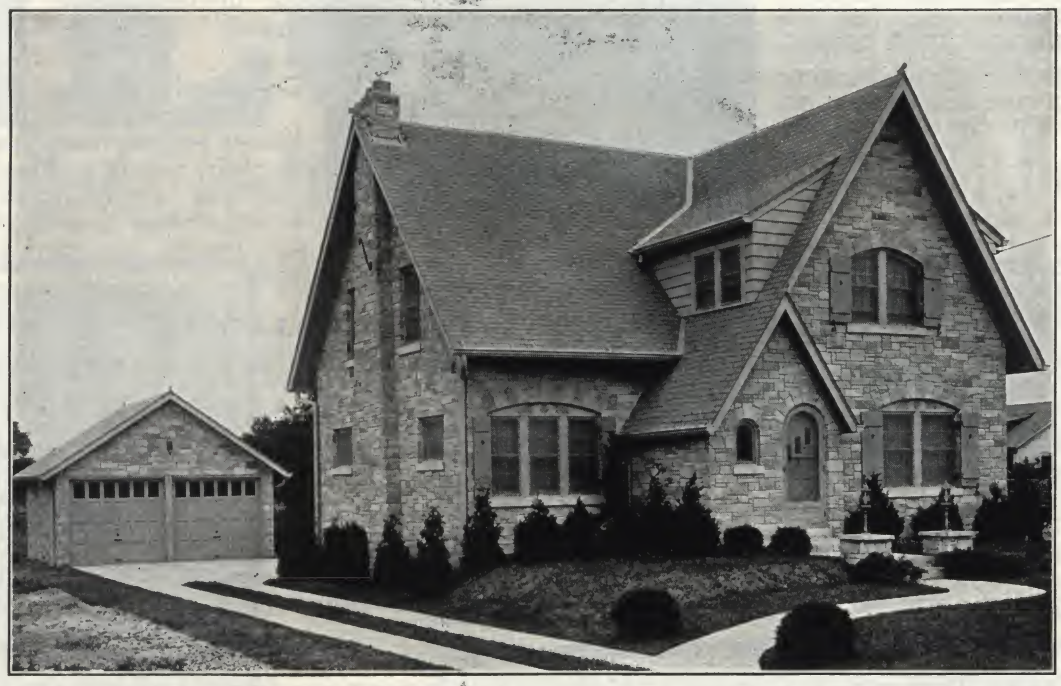
Details—We shall be glad to furnish all architects and builders details about the methods and practices of using Ashtone—without obligation.



Sawed Finish Ashtone



Split-faced Ashtone



Residence and Garage Faced with Split-faced Ashtone—an Exterior Finish of Beauty and Durability

SHAWNEE STONE COMPANY

SUCCESSORS TO CENTRAL OOLITIC STONE COMPANY

Indiana Limestone

GENERAL OFFICES, QUARRY AND MILLS

BLOOMINGTON, IND.

CHICAGO OFFICE: 2120 So. Kedzie Avenue
Telephone, Lawndale 8940

NEW YORK OFFICE: CHARLES C. JENKINS, 30 East 42nd Street
Telephone, Murray Hill 5944

Shawnee Carrara Two-Tone

A special Indiana Limestone of statuary texture combining blended tints of creamy buff and light blue, particularly adaptable for bank, office and monumental buildings.

Produced solely by this company.

Shawnee Oriental

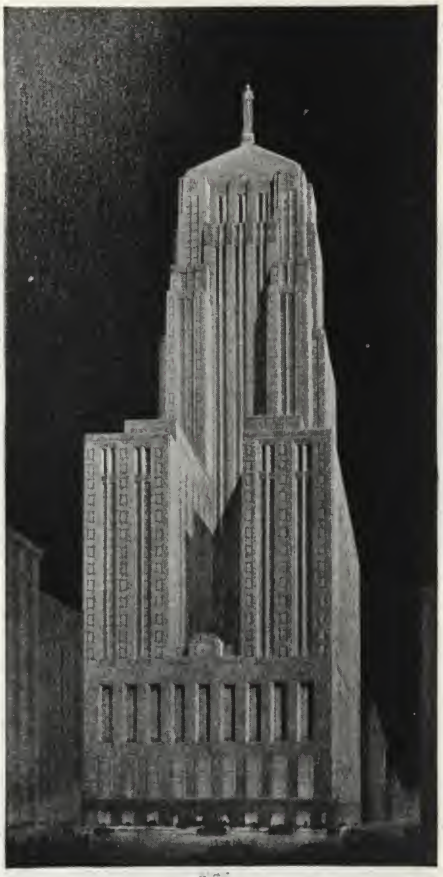
Of rustic texture, with gradations from a light to a dark buff with occasional veins of golden tan and light blue, Shawnee Oriental when used for ashlar walls affords a most pleasing color effect. Can be supplied sawn in strips to required heights which can be economically jointed on the job.

Quality

It is a policy of this company to see to it that no stone leaves its mill which is not executed in a workmanlike manner. With officials of the company at all times supervising operations and with all of our stone coming from but one quarry, builders can be assured not only of unquestionable workmanship but of stone both in color and texture in strict conformity with approved sample submitted.

Quarry

Located in the heart of the Indiana Limestone District with unparalleled railroad facilities, producing annually in excess of one million cubic feet of Indiana Limestone in all of its various grades as the same are classified by the Building Stone Association of Indiana.



Chicago Board of Trade
HOLABIRD & ROOT, Architects
HEGEMAN-HARRIS CO., Contractors

Facilities

With a mill entirely enclosed employing the latest improved electrically operated machinery, together with ample stacking facilities, this company is equipped to promptly and efficiently handle contracts of any size.

Samples

To interested parties and prospective buyers will be sent, express prepaid, on request, samples of ordinary size to any part of the United States and Canada.

Estimates

Requests for quotations on stone work are solicited and will be given prompt attention. Plans submitted for figures will be promptly returned.

Co-operative Service

This company has an organization of men thoroughly experienced in their respective lines, and will cheerfully supply information and render service to architects, owners and general contractors when called upon.

REFERENCES—SOME OUTSTANDING INSTALLATIONS

This company has supplied the cut stone for many of the most prominent buildings of the country and points with pride and satisfaction to its references, a number of which follow:

London Guarantee & Accident Insurance Building, Chicago, Ill., Alfred S. Alschuler, Architect
Union Trust Co. Building, Cleveland, Ohio, Graham, Anderson, Probst & White, Chicago, Ill., Architects
S. W. Straus Building, Chicago, Ill., Graham, Anderson, Probst & White, Architects
Illinois Life Insurance Building, Chicago, Ill., Holabird & Roche, Architects
First National Bank, Detroit, Mich., Albert Kahn, Architect
Washington Building, Washington, D. C., Coolidge, Shepley, Bullfinch & Abbott, Boston, Mass., Architects
City Hall, Columbus, Ohio, Allied Architects Association, Architects
Mutual Life Insurance Building, Baltimore, Md., Parker, Thomas & Rice, Boston, Mass., Architects
Memorial Union and Tripp Commons Building, Madison, Wis., Arthur Peabody, Architect
Houston National Bank, Houston, Tex., Hedrich & Gottlieb, Architects
Central Row Building, Hartford, Conn., Voorhees, Gmelin & Walker, New York, N. Y., Architects
New York State Office Building, Albany, N. Y., New York Commissioner of Architecture, Albany, N. Y., Architect
A. E. Staley Administration Building, Decatur, Ill., Aschauer & Waggoner, Architects
Scottish Rite Temple, Moline, Ill., Wm. H. Schulzke, Architect
Chicago Board of Trade, Chicago, Ill., Holabird & Root, Architects
Jewel Tea Company, Barrington, Ill., Holabird & Root, Chicago, Ill., Architects

At present completing contract for the restoration of the World's Columbian Exposition Fine Arts Building (Graham, Anderson, Probst & White, Chicago, Ill., Architects) one of America's outstanding monumental structures.



ILCO

SPECIFICATION MANUAL

INDIANA LIMESTONE CO.
BEDFORD, IND.

INDIANA LIMESTONE COMPANY

SALES AND SERVICE OFFICES

ATLANTA, GA.
BEDFORD, IND.
BOSTON, MASS.
CINCINNATI, OHIO
CLEVELAND, OHIO
DALLAS, TEX.
DETROIT, MICH.
KANSAS CITY, MO.
MINNEAPOLIS, MINN.
CHICAGO, ILL.
PHILADELPHIA, PA.
PITTSBURGH, PA.
ST. LOUIS, MO.
SYRACUSE, N. Y.
SAN FRANCISCO, CALIF.
WASHINGTON, D. C.

INDIANA LIMESTONE COMPANY OF NEW YORK, INC., NEW YORK, N. Y.

INDIANA LIMESTONE OF CANADA, LTD., TORONTO, CAN.

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INDIANA LIMESTONE COMPANY

Producers and Fabricators of Indiana Limestone
"The Nation's Building Stone"

GENERAL OFFICES AND ARCHITECTS' SERVICE BUREAU
BEDFORD, INDIANA

EXECUTIVE OFFICES: Tribune Tower, CHICAGO, ILL.

PRODUCT—GENERAL ADAPTABILITY

Indiana (Oolitic) Limestone

Indiana Oolitic Limestone (often called Bedford Stone) is found in commercial quantities only in *Lawrence, Monroe and adjacent Counties, Indiana.*

It is a non-crystalline limestone of fine even texture, characteristically a free-stone. The massive deposits forming the ledges in the hills of Southern Indiana constitute the most remarkable and probably the most useful building stone deposits in the world.

It is found in a variety of standard grades known as Gray, Buff, Variegated, Rustic and Old Gothic described in detail under a separate heading of "Grading." The Company's quarries also produce many special trade-named varieties of outstanding individual characteristics.

In color it varies in a wide range and mixture of color tones, from a light cream buff to a medium buff; from a light silver gray to a dark bluish gray and mixtures of both buff and gray.

Its permanence and durability have been firmly established by its use over a period of seventy-five (75) years and more in many of the country's most architecturally prominent buildings.

For complete data, see separate heading "Physical Characteristics."

Cost

Due to modern machine methods of quarrying and fabrication and quantity production, coupled with the wide range of grades readily obtainable, admirably suited to a great variety of appropriate machine finishes (see separate heading "Surface Finishes"), the cost is surprisingly moderate even when compared to less desirable and less permanent substitutes.

There is a grade and finish economically adapted to every class of work from the finest monumental structures and commercial building to the simplest store front, small commercial building, school, institution and industrial building.

ILCO-Riplstone, the sawed-four-side Indiana Limestone of short length stock, is well adapted to range work, random ashlar and other informal types of ashlar facing, for moderate cost buildings.

ILCO-Riplstone, the rough sawed strip stone, is particularly economical and suitable for use in decidedly moderate cost residences.

Selection of Most Suitable Material

Under the separate headings "Grading" and "Surface Finishes," are subheadings "Adaptability," applying to each grade and to each finish. Both grade and finish should be selected conjointly since only certain surface or texture finishes are appropriate for certain grades. Obviously, the rougher texture finishes are inappropriate and extravagant when applied to the finer, select grades of stone and vice versa.

Again, the selection of the kind and grade of stone for the particular building, depending on its type, class and architectural detail, is of paramount importance. In the exercise of good judgment in this respect lies great economy with no lessening of permanence, durability and usually increased artistic merit.

When the type or class of building would seem to demand only the best as good enough, there is a temptation to specify the fine-textured "Select," or what is really selected stone of the highest cost, for all parts of the work. This is rarely necessary or desirable.

All grades of Indiana Limestone are equal, in so far as soundness is concerned—see separate heading "Physical Characteristics" for confirmation. Furthermore, production processes in the cut stone mill are such as will automatically eliminate blocks or pieces that contain any possible planes of weakness, since in the average run of work, stresses set up in machining the stone and in handling it by travelers from one machine to another are greater far than would be permitted in building, and serve to effectively test all stone as it passes through the various milling operations to shape and prepare it for its position in the building.

For many types of structures, especially for sawed-finish wall facing or ashlar, the "Old Gothic" grade, which is decidedly low in cost, is the most appropriate. The moderate cost "Variegated" (mixed buff and gray) grade is most suitable for all purposes, both for ashlar and trim.

During the past few years many architects have shown a distinct preference and have increasingly specified the "Gray" stone on account of its fine, close, uniformly even color-tone, texture and density. It has fine weathering qualities together with dignity and pleasing color which progressively becomes lighter in shade with passing years.

Since the Company's quarries all lie within the boundaries of Lawrence and Monroe Counties of Indiana, the only locality where Indiana Oolitic Limestone is available in commercial quantities, the architect is warranted, both for his own and his client's protection, against substitutes in directly specifying the products of this company's quarries.

Continued on next page

THE COMPANY—ITS FACILITIES

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BEDFORD ——— INDIANA

The Company

The Indiana Limestone Company, a Corporation of the State of Indiana, was formed April 19, 1926, and consisted of a merger of twenty-four (24) of the long established, favorably known, proven quarries of Indiana Oolitic Limestone from which this dependable stone has been produced for generations. All of the quarries are located within Lawrence and Monroe Counties, Indiana.

The properties and plants acquired by the Indiana Limestone Company include nearly all of the larger Indiana Limestone producing companies located in the Bedford and Bloomington, Indiana, District as follows:

Bowman-King Stone Co.
Brooks Cut Stone Co.
Clear Creek Quarries Co.
The Consolidated Stone Co.
Crescent Stone Company
C. D. Donato Cut Stone Co.
Doyle Stone Company
The Furst-Kerber Cut Stone Co.
Hoadley Stone Co.
J. Hoadley & Sons Co., Inc.
Hoosier Cut Stone Co.
Hunter Valley Stone Co.
Imperial Stone Co.
Indiana Quarries Co.
Inter-State Cut Stone Co.
Mathers Stone Co.
W. McMillan & Son
The Monroe County Oolitic Stone Co.
National Stone Co.
John A. Rowe Cut Stone Co.
Shea & Donnelly Co.
Star Stone Co.
Struble Cut Stone Co.
United Indiana Stone Co.

The merging of these vast limestone interests into one well-financed, effectively managed organization is in line with the whole trend of modern, progressive business, the object of which is to secure all the benefits of organized quantity production together with the efficiency and economy inherent with it.

The principal viewpoint behind the consolidation, borne out by actual experience, is the more effective co-operation with the architectural and building professions, and the production of Indiana Limestone at a price that would make it even more attractive to the public, at the same time setting a higher standard of accuracy and a keener appreciation of the merits of stone in interpreting the spirit of modern art.

Responsibility

The Indiana Limestone Company is capitalized at over forty-six (46) million dollars. The company is rated in Dun's and Bradstreet's as First Grade of Credit—over $1,000,000.00 (the highest rating given).

Quarry Capacity

The Company owns approximately 6,000 acres of land of which over 1,600 acres are proven stone land either now under or available for immediate quarry development.

Engineers estimate that at the present rate of production and shipment, there is sufficient stone in these proven areas for seventy (70) years' operation.

The Indiana Limestone Company has a quarrying capacity of 16,000,000 cubic feet per year, more than the present production of the entire district.

Mill Capacity

The cut stone mills of the Company have an aggregate floor area of 1,312,700 sq. ft. (equivalent to 30 acres) of space under roof for the cutting and fabrication of stone, exclusive of the area of miscellaneous and accessory buildings.

The mill capacity is 6,000,000 cubic feet of sawed stone and close to 4,000,000 cubic feet of cut stone per year.



Unsurpassed Production Facilities

With millions of dollars invested in modern machinery, equipment, buildings and a network of railway tracks, the Company's entire production is handled with precision and efficiency, more comparable with large-scale manufacturing than quarrying and fabrication as ordinarily accomplished.

This enables the Company to assure rapid delivery and unexcelled service, regardless of the quantity of material required, or the size or number of contract operations in work.

Transportation Facilities

Due to the central location of quarries and unsurpassed railroad facilities, the Indiana Limestone produced by the Indiana Limestone Company can be transported to all points in the United States and Canada with dependable promptness and at minimum cost.

Local Stock

The stock from this Company's quarries is carried in adequate quantities by cut stone contractors in nearly all the principal cities of the United States and Canada. It is a standard product available in quantity for prompt deliveries at all times—virtually everywhere.

Sales and Service Facilities

Sales and service offices in charge of experienced representatives are established in the principal centers. They are at all times accessible for effective co-operation. Samples of both the standard and special grades of the Company's product together with standard and special finishes will be promptly furnished on request.

Architects' Service Bureau

Architects and builders are cordially invited to make free use of the Architects' Service Bureau, maintained by the Company as a source of reliable unprejudiced information regarding its product, its most effective and economical use and for assistance in the solution of problems relating to the structural design and use of Indiana Limestone in building construction.

For examples of Structural Details for Indiana Limestone exemplifying and illustrating the best in recommended practice see "ILCO Details" published and distributed by the Architects' Service Bureau, Bedford, Indiana. These detail sheets are sent periodically to all Architects and Architectural Draftsmen who request them.

The bureau has accumulated much accurate information on construction in stone and related subjects not only through preparation of shop drawings but from research and field inspection carried over a period of some fourteen years.

Many technical bulletins covering this field as well as photographs of a large number of finished buildings of Indiana Limestone are available and freely used in answering inquiries.

Continued on next page

PHYSICAL CHARACTERISTICS—INDIANA LIMESTONE



(1) Composition and Structure

Indiana Limestone is the type of rock termed by geologists as Oolitic Limestone, found almost wholly in Lawrence and Monroe Counties, Indiana. It is a calcite cemented calcareous sand rock formed of shells and shell fragments, practically non-crystalline in character. It is characteristically a *free-stone* without cleavage plane, possessing a remarkable uniformity of composition, texture and structure and equality of strength in all directions regardless of the plane of its natural bed.

It possesses a high internal elasticity, adapting itself without damage to extreme temperature changes and other prerequisites of permanence demanded in modern building structures.

The capillary attraction and absorption of the Standard grades is usually somewhat less than of the Select.

The average analysis as developed by carefully prepared composite samples is given below.

	Buff	*Gray*
Carbonate of Lime	97.39	97.07
Carbonate of Magnesia	1.20	1.20
Silica	.69	.80
Alumina	.44	.68
Iron Oxide	.18	.12
Water and Loss	.10	.13
	100.00	100.00

This composite analysis of these two varieties was made on samples from a number of the quarries, by the Chemical Division of the Bureau of Standards at Washington, indicating that there is no important difference between the Buff and Gray varieties, both averaging over 97% carbonate of lime, the difference in color-tone being due solely to oxidation of the stone occurring above the natural ground water level in the quarry ledges.

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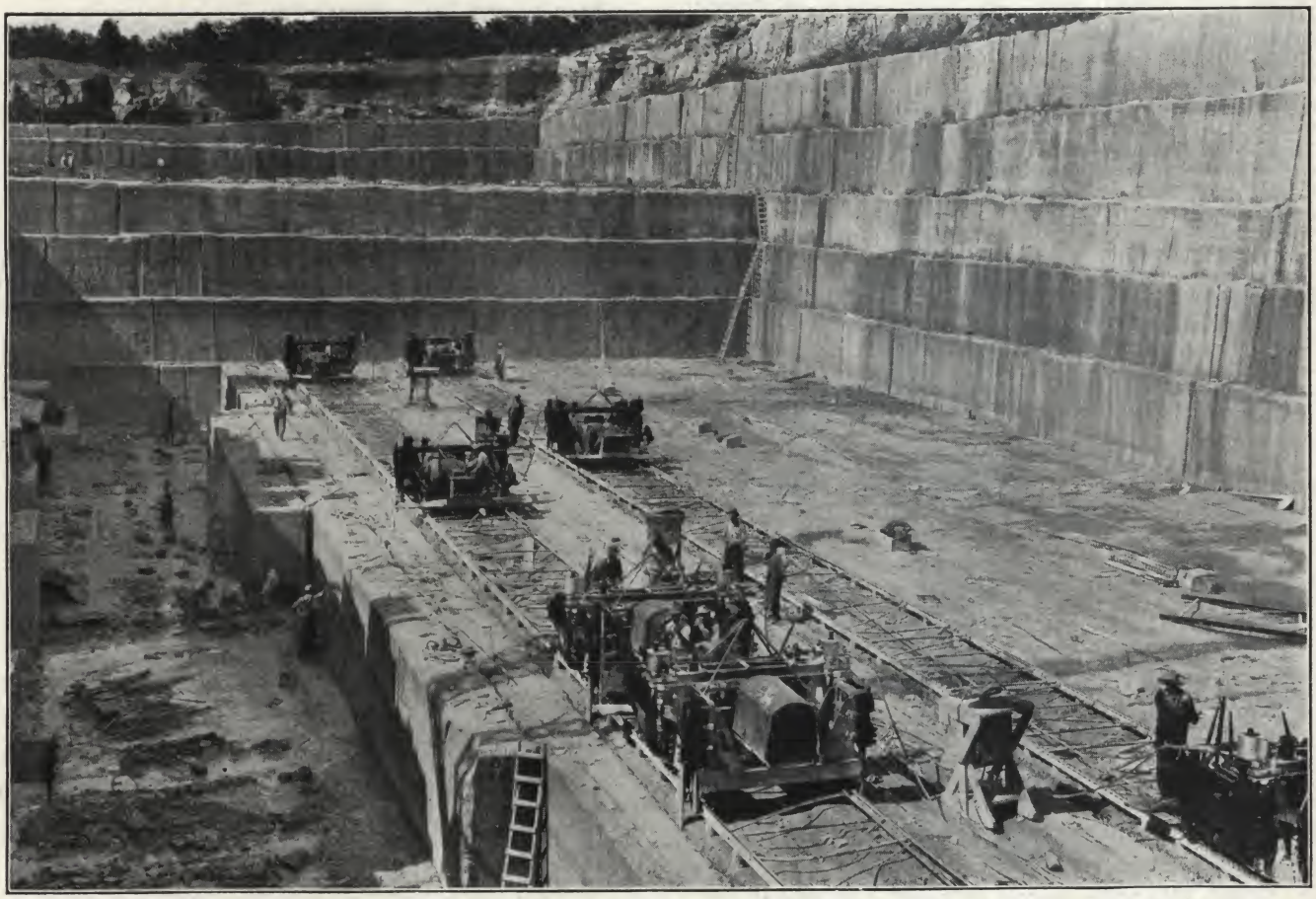
(2) Weight

The average weight of *dry* (seasoned) Indiana Limestone, as will be noted in the table on page 4, is 144 lbs. per cubic foot. The figures in this table applying to weight, specific gravity, etc. are all based upon authentic comprehensive tests and therefore supersede all previous, less comprehensive data establishing a greater weight, or values obtained from limestone in general, found in nearly all parts of the country and used principally as crushed stone for roads, concrete, etc.

(3) Strength—Recommended Values

The data in this paragraph is taken from the table on page 4 or from supplementary information developed by tests made at the Bureau of Standards at Washington.

Crushing Strength—From the table it will be noted that the crushing value for seasoned stone varies from about 5,000 to 13,000 lbs. per sq. in., averaging close to 7,000 lbs. per sq. in. Taking this value at 6,000 lbs. per sq. in. for any of the grades is conservative and sufficiently close for all practical purposes.



Ledge at the Indiana Limestone Company's Dark Hollow Quarry

The largest single ledge in operation in the Limestone district, measuring 1400 ft. long, 140 ft. wide, 60 ft. deep. This will cube 11,760,000 ft.; approximately 20,000 large car loads of Indiana Limestone

Continued on next page

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Tensile Strength — Tests were made with carefully cut briquettes on 35 specimens embracing 12 varieties of the product. The tensile strength for seasoned stone varies from 300 to 715 lbs. per sq. in., averaging 535 lbs. per sq. in. The test figures for the individual specimens in each set of 3 from the same variety of stone show good agreement. The range, amounting to nearly 40% above and below the average, is accounted for by the marked difference in tensile strength between the more dense and the softer open grained variety of the product—a much greater variation than the corresponding difference in crushing value.

Although stone is seldom, if ever, used in tension, using a factor of safety of ten (10) with the above average results gives a conservative, working value of 50 lbs. per sq. in.

Transverse Strength—From the table it will be noted that the modulus of rupture varies from about 900 to 1600 lbs. per sq. in., averaging approximately 1250 lbs. On this assumption, with a factor of safety of ten (10) a working stress of 125 lbs. per sq. in. is applicable to the design of lintels and similar "stone beams."

Shear—It was considered unnecessary to conduct shear tests on all the grades and samples of stone which were included in the series of physical tests below tabulated. The shear tests were therefore confined to representative samples of grades, based upon the crushing and other tests, that were sufficient to show a full range of the product. These shear tests were made on the stone in 3 directions and the average taken for the figures below.

The shear value developed ran from 900 to 2300 lbs. per sq. in. for all grades tested, averaging 1600 lbs. per sq. in.

Elasticity—The coefficient of elasticity has been established as 4,400,000 lbs. per sq. in.

Expansion—The coefficient of expansion has been established as .0000027 in. per degree Fahrenheit.

(4) Color

Indiana Limestone is marketed in two color-tones, each of varying shades called "Buff" and "Gray" and in an irregular mixture of these two called "Variegated." See also rust brown staining developed by shot-sawing described under "Surface Finishes," paragraph 3, page 8.

Gray—The Gray is a beautiful silvery gray stone with a slightly bluish cast, and is often called "blue" by the trade. It is available in light and medium dark shades.

Buff—The Buff varies from a very light creamy buff or buff-gray to a distinct brownish-buff.

Variegated—The Variegated occurs in the quarries at the irregular juncture of the Buff and Gray stone and in the finished work consists of both buff and gray stone with some stone containing both color-tones in the same piece.

(5) Texture

For complete classification of the stone by texture, see "Grading—Indiana Limestone," pages 5, 6, 7.

(6) Fire Resistance



Indiana Limestone is to all intents and purposes fireproof. It calcines above 1500° F. and will not spall, crumble, split nor check when drenched with cold water.

(7) Specification Summary

Irrelevant Terms — From the data given under this heading it will be noted that many terms customarily included in the description of stone in no way apply to Indiana Limestone and are therefore purposely eliminated from the Master Specifications—see paragraph 4a1, page 12. Among these are freedom from "reeds," "seams," "spawl holes," "sand holes," etc., which apply more particularly to other materials.

The term "reed" applies to the plane of weakness that often occurs parallel to the rift or grain along the bedding planes of laminated stones, particularly in certain sandstones. Indiana Limestone has practically no grain and no weakness along the bedding plane. It is, in fact, about equally strong and may be cut or split with equal facility at any angle to the bed. For all practical purposes in building construction it is treated as a free-stone.

Little attention is paid in the working of this stone to its natural quarry bed. The great majority of ashlar is sawed with the grain parallel with the face of the wall. Monolithic columns are produced with the grain running vertically. Therefore, it is unnecessary to specify "that the stone be set on its natural quarry bed" as evidenced by the elimination of this clause in the specifications applying to Indiana Limestone in use by the architects of the United States Government—extensive users of this stone in important Government buildings for more than fifty (50) years.

The term "seam" applies to a structural defect, seldom occurring in Indiana Limestone and which would invariably be cut out in the production of the quarry block or slab before the stone reaches the cutting mill.

Small pits, which are left by cutting through a shell, are, in Indiana Limestone, unavoidable, except in the finest grain stone, and do not weaken or otherwise detract from its value.

Staining and Stain Prevention—The fact that frequent references to the prevention of staining occur throughout the specifications and the appendices should not be taken either to indicate staining to be a frequent occurrence, or that Indiana Limestone is particularly susceptible to staining.

Any light colored building stone, including the lighter colored granites, will show the effect of stain from *Portland Cement Mortar*, where improper construction details or methods that do not prevent this are employed.

Staining is not a fault of Indiana Limestone and is always preventable. Where staining has occurred, it has, upon investigation, been invariably found to be the direct result of lack of knowledge or proper care.

These references, therefore, constitute only a sincere endeavor based on definite experience and research to correct improper practices and make clear preventable sources of discoloration and stain.

PHYSICAL PROPERTIES OF INDIANA LIMESTONE

As developed by tests made at the Bureau of Standards, Washington, D. C., on 72 specimens of stone, including the more common grades produced by the Indiana Limestone Quarry District in Lawrence and Monroe Counties, Indiana

Grade	Compressive Strength				Transverse strength		Weight per cu. ft. dry	Absorption percentage		Apparent specific gravity
	Dry—lbs. per sq.in.		Wet—lbs. per sq.in.		Lbs. per sq. in.					
	On Bed	On Edge	On Bed	On Edge	⊥ to B	∥ to B		By wt.	By vol.	
Statuary buff	6525	6320	6148	5931	1357	1021	140	5.52	12.32	2.24
Select buff	7426	6743	6837	6290	1292	1022	144	4.75	11.14	2.30
Standard buff	6251	5455	6260	5458	1044	946	142	4.97	11.27	2.28
Rustic buff	5954	5333	5607	5089	1090	934	142	5.36	12.13	2.27
Select gray	8519	7121	7655	6781	1387	1107	145	4.26	9.86	2.32
Standard gray	7093	6064	6889	5951	1344	1272	147	4.28	9.87	2.35
Variegated	7640	6515	7149	6208	1309	1206	145	4.34	10.05	2.32
Special hard grades	12769	13080	10417	10038	1614	1618	150	3.60	8.52	2.40
Average values	7757	7016	7123	6439	1395	1148	144	4.60	10.58	2.31

Note: The average values are the average of the various grade averages given above, not the average of all specimens tested; that is, they are not weighted averages.
⊥ to B—indicates that the load was applied perpendicular to the bedding.
∥ to B—indicates that the load was applied parallel to the bedding.

Continued on next page

GRADING—INDIANA LIMESTONE



(1) Introduction

The grades given under this heading define the range of variation in texture and the markings that are characteristic of and permissible under the system of grading adopted by the Indiana Limestone Institute.

It has been adopted as "Standard Practice," with the exceptions noted, to submit two (2) samples for grade approval, showing the maximum and minimum of fineness and coarseness of texture to establish the range of variation from uniformity, instead of one sample intended to indicate the average run of the particular grade.

In the case of "Statuary Buff," a single sample will suffice. In the case of "Variegated," three samples are submitted showing the range of color and texture. In the case of "Old Gothic" there is no fixed limit as to the number of samples which may be required to adequately fix the limit as to variation in texture, formation and markings characteristic of this grade.

The selection of grades of stone should be made conjointly with the selection of the Surface Finishes (see page 8) and the Colors (see "Physical Characteristics," par. (4), page 4) since the architectural effect of most of the various finishes is dependent upon the particular grade of stone to which they are appropriately applied.

That this selection may be accomplished with the greatest economy and intelligence, the facilities and experience of the Architects' Service Bureau of the Company are at all times accessible for co-operative counsel. Lists and photographs of existing buildings with complete data as to grades and finishes of stone used are obtainable on request.

(2) Classification

	Variegated Old Gothic	
Select Gray		Select Buff
Standard Gray		Standard Buff
Rustic Gray		Rustic Buff
*Special Hard Gray		*Special Hard Buff
	Statuary Buff	

*These grades are select in texture.

(3) Statuary Buff

Description—This grade covers only the very fine uniform grained Buff stock. In the texture the grain shall not exceed one millimeter (about 1/25 in.) in cross-section, visibly uniform and well cemented in structure and entirely free from seams, streaks and pit-holes, and without calcite crystals larger than four millimeters (about ⅛ in.) in diameter.

Adaptability—Principally used for sculpture, carved doorways, tracery, sculptured panels, memorials, mantels and elaborate interior work.

(4) Select—Gray and Buff

Description—"Select" stock (both "Gray" and "Buff") is sound and durable and shall embrace the average finer grained stone, in texture ranging from the finest, most uniform grained stock to stone having an average grain, as shown by the samples and photo reproductions thereof designating the range of this grade.

It shall include stone in which any openness of grain does not show pore spaces exceeding about one mm. (1/25 in.) in diameter and in which tight fine opaque white or glass-like calcite streaks or veins not exceeding one mm. (about 1/25 in.) in width, may occur and will include stone having occasional solid fossils and grains, crystals or spots of calcite. Pit-holes not exceeding six mm. (about ¼ in.) in diameter may occur, providing that there are not more than the equivalent of one of these to any ten square feet of area of slabs, nor more than 15% of the cube of blocks so affected, and in which any of these allowed minor variations in the formation and texture do not constitute a defect that impairs the strength and durability or appearance of the fabricated and finished stone-work produced therefrom, and when appreciably affecting the appearance are such that can be eliminated readily from appearing on the face of stonework in the finished building.

Adaptability—For Ashlar or Field, should be confined to the finest monumental types of buildings where cost is not a prime factor and where "Smooth Machine," "Rubbed," or "Machine-tooled" finishes are appropriate. Particularly adapted in the better work for moulded and plain trim and carved and sculptured detail where the ashlar or field is of coarser, less expensive, stock. Advocated particularly for lower story work, entrances and similar details. The "Buff" may be substituted on the simpler work for the "Statuary" grade adaptations.

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Choose "Select Gray" or "Select Buff" for characteristic color-tone desired. (See "Physical Characteristics," par. (4), page 4.)

(5) Standard—Gray and Buff

Description—"Standard" stock (both "Gray" and "Buff") is sound and durable and is the average of the moderately large grained product of the quarries that constitutes the bulk of the total output of stone and is therefore classed as "Standard." This grade has certain variations in density, color-tone and texture not allowed in "Select" and may contain streaks of calcite or moderately coarse grained or reedy formation and small pit-holes, providing such variations in texture and color-tone do not exceed the following limits, or impair the strength or durability of the stone. Texture or grain ranging from "Select" to a somewhat shelly appearing formation having an average grain, as shown by samples and photo reproductions thereof designating the range of this grade. White calcite or crystalline streaks, not over four mm. (about ⅛ in.) in width, nor more than one such marking in any 30 sq. ft. of stone so affected. Glass-like calcite streaks or veins not over two m.m. (about 1/12 in.) in width nor more than one such defect in any 30 sq. ft. of stone so affected; coarse or open texture bands averaging not over one inch in width, nor shall it aggregate over 6% of the measurement across grain; pit or shell holes aggregating not over one sq. in. in area to any 30 sq. ft. of stone; stock to be well cemented and with the exception of the pit-holes and coarse somewhat open-textured streaks allowed, shall not be visibly open or porous in general structure.

Adaptability—Adapted to the great average of work where a general uniformity of color and texture is desired and cost is a consideration. Particularly adapted to the ashlar or field in the better types of commercial and the less pretentious monumental buildings where "Select" stock is not appropriate or warranted and the slight variations in texture are an addition to rather than a detraction from the general character of the design. Entirely satisfactory in quality and appearance for the simpler trim, especially above the lower story. Adapted to the smoother finishes, such as "Sand-sawed," "Sand-sawed Slightly Rubbed," "Smooth Machine," "Rubbed" and "Machine-tooled."

Choose "Standard Gray" or "Standard Buff" for characteristic color-tone desired. (See "Physical Characteristics," par. (4), page 4.)

(6) Rustic—Gray and Buff

Applicable to Both Rustic Gray and Rustic Buff—"Rustic" stock is sound and durable and shall embrace the coarser, more or less open shelly grained stone, having a varying amount of crystalline calcite intermixed, including stone having a decidedly coarse with some honey-comb formation, as shown by the samples and photo reproductions thereof designating the range of this grade.

It may include some stone which is darker in color-tone, some stone with streaks of fine texture and some stone that is quite hard, due to the size and amount of crystalline calcite that it contains. This grade is therefore distinctly coarser and more varying in texture, showing a wider range of granular formation and more variation in color-tone than any other grade, except "Old Gothic."

Buff—Rustic Buff may contain an average amount of very open grain stone of more or less cellular formation like travertine and stone of *appreciably* darker color-tone.

Gray—Rustic Gray by the nature of the deposit will generally be somewhat denser in formation than Rustic Buff, and regardless of its coarse shelly texture, it will usually be practically free of any very open grain, travertine-like cellular formation characteristic of some Rustic Buff stock.

Continued on next page

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Adaptability—Adapted to the less formal types of architectural design, particularly ashlar or field where wide range of both color-tone (confined wholly to either Buff or Gray) and texture are appropriate. Especially adapted to the coarser finishes, such as "Sand-sawed," and "Shot-sawed." May be used for the coarser moulded work not close to the vision where variations of texture and color are desirable.

Choose "Rustic Gray" or "Rustic Buff" for characteristic color-tone desired. (See "Physical Characteristics," par. (4), page 4.)

(7) Special Hard—Gray and Buff

Description—"Special Hard" (both Gray and Buff) for the purpose of grading is classed as "Select." It is the fine grained, hard, dense stone similar to the regular "Select" grade in texture and may be included as such, but as a grade by itself, shall be specially selected for its hard, dense, usually somewhat crystalline texture.

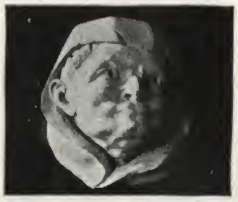
Adaptability—This grade is particularly suitable for grade or base courses, steps, platforms, floor tiling, paving and other walkway surfaces. It is also well adapted to use for members with wide shallow washes and for coping and exposed capping stones where the utmost in close grained, hard, weather-resisting and water-shedding characteristics are desirable. Like the "Select" grades it is particularly adapted to the smoother finishes.

Choose "Special Hard Gray" or "Special Hard Buff" for characteristic color-tone desired. (See "Physical Characteristics," par. (4), page 4.)

(8) Variegated

Description—"Variegated" stock is sound and durable and embraces the irregular mixture of the Buff and Gray color-tones which occur in the blocks that are quarried where the Buff and Gray color-tones adjoin in the quarry ledges and includes stone showing variation in texture as well as the variation in color-tone, as shown by the samples and photo reproductions thereof designating the range of this grade. "Variegated" stock includes stone that may vary in texture from the lower range of "Standard" up through "Select" as herein graded by texture and consequently from moderately large to quite fine grained stone and will include some stone containing streaks or veins or crystalline calcite and bands or areas of shelly formation that do not affect the structural soundness of the stone, or make the stone stock too coarse or variable to be used for the average run of "cut stone" work, trim, etc. It is understood that while the quarry blocks shall contain stone of both color-tones, Variegated stock when cut up for building purposes, will, in the finished work, produce pieces of solid Buff and solid Gray and only a certain percentage of stone with the two color-tones in one piece. The coarser variegated stone is sometimes listed as Old Gothic.

Adaptability—Adapted to the great average of work where a distinct variation and mixture of color-tones (both Buff and Gray) and general uniformity of texture are appropriate. May be used for both ashlar and trim with the smoother finishes and for ashlar or field in the rougher finishes, such as "Sand-sawed" and "Shot-sawed." Variegated is sometimes considered inappropriate for columns or other trim units of large size where separate color tones might look out of place. (See "Physical Characteristics," par. (4) page 4.)



(9) Old Gothic

Description — This grade of stock is sound and durable and embraces Gray, Variegated and Buff. It includes stone of pronounced texture, unselected as to color, ranging from a fine to a distinctly coarse grain, and may contain shelly, honey-comb formations with both white and dark crystalline streaks or streaks of glass-like calcite and tight crowfeet, none of which, however, affect the structural soundness and weathering properties of the stone. For this grade of stone there are no fixed limits as to variation in texture, general formation and surface markings, and when the material is fabricated some pieces will be produced in solid Buff and in solid Gray.

Adaptability—Particularly adapted to the less formal types of architecture where an extermely wide range and mixture of both color-tones (both Gray and Buff) and texture are appropriate. May be used for simple, coarse trim combined with the same stone for ashlar or field. Especially adapted to the coarser finishes such as "Sand-sawed" and "Shot-sawed."

(10) Special Varieties of Stone Produced by Indiana Limestone Company Quarries

In addition to the regular grades of stone which this company produces under the grading established by the uniform classification of the Indiana Limestone Institute, this company also produces in unlimited quantities, the series of trade named varieties of its product as hereafter listed, the trade names of which are copyrighted as applying only to the product of the particular quarry or ledge designated thereby which possesses some distinctive characteristics.

It should be understood that these trade named varieties do not constitute another series of grades nor are they in most cases "off-grade" varieties but simply stone that possesses some distinctive characteristics, either in structure or formation in texture or in color-tone.

Where a specific kind of stone of known satisfactory quality and unique artistic merit is desired, the architect is justified in specifying these well and favorably known trade named varieties.

The relation of these trade named varieties to the regular grading under the uniform classification may briefly be explained by the following:

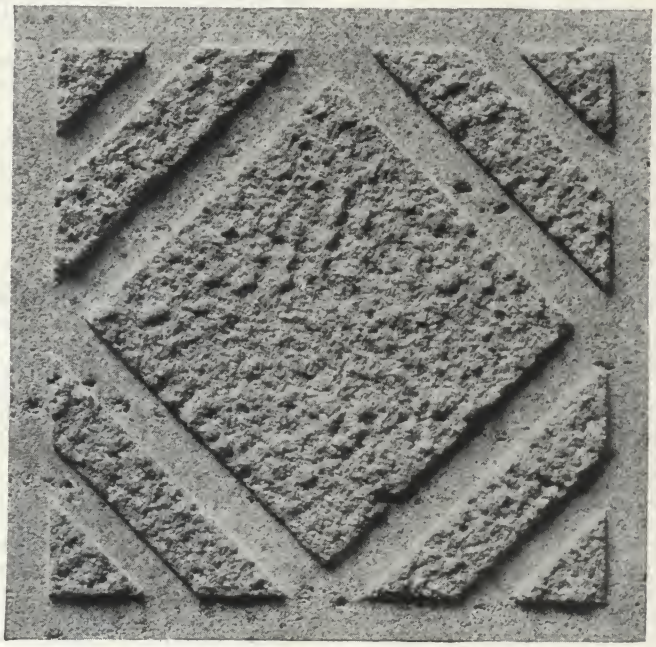
P. M. & B. Buff — The well known buff from this famous quarry is obtainable in both the "Select" and "Standard" grades and to an unlimited extent in "Rustic."

Dark Hollow Gray—The fine, dense uniform textured Gray stone from this celebrated quarry, obtainable chiefly in the "Select" grade though also in "Standard" and to a very limited extent in "Rustic."

Eureka Variegated — About the most distinctive Variegated stone produced by the Indiana Limestone district, having a more marked contrast between the Buff and Gray than most of the Variegated stone.

Hoosier Silver Gray—A fine textured very light Gray stone produced principally in the "Select" grade.

University Buff — A fine, even textured Buff stone of very light color-tone produced principally in the "Select" grade.



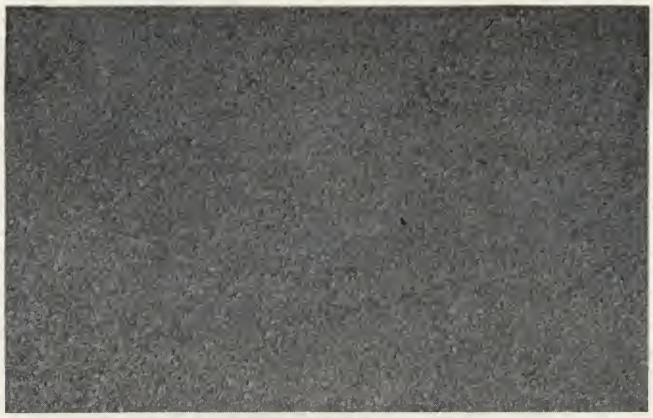
ILCO SPANDRELS

ILCO Spandrels have been especially designed to meet the requirements of the modern office building. They can be cut to harmonize with almost any design and when so desired the entire spandrel including window sills and lintels can be cut in one piece. The cost of setting is very low so that the cost in place is no greater than many inferior substitutes.

Detailed information will be furnished on request.

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TYPICAL SAMPLES (FULL SIZE) ILLUSTRATING GRADING



(A) Statuary Stock and Maximum Degree of Fineness of Select Stock



(D) Minimum Degree of Fineness of Rustic



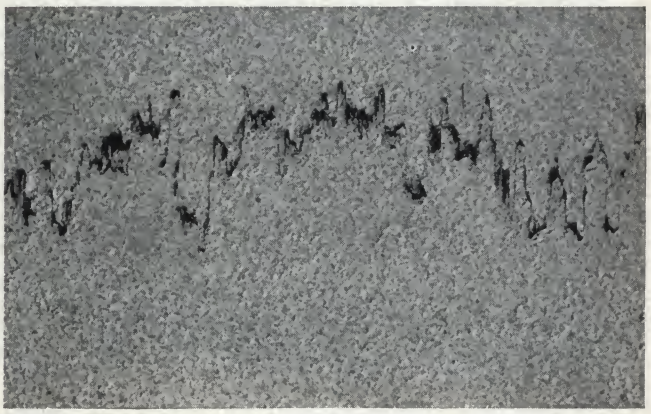
(B) Minimum Degree of Fineness of Select and Maximum Degree of Fineness of Standard



(E) Variegated



(C) Minimum Degree of Fineness of Standard and Maximum Degree of Fineness of Rustic



(F) Crowfoot

The conventional grades of Indiana Limestone, Select, Standard and Rustic are classified by their fineness of grain. This fineness does not change by jumps but gradually from the finest to the coarsest. Consequently two samples are furnished, one showing the maximum; the other, the minimum degree of fineness for the grade specified. The cuts on this page show the *limits* of fineness, separating Statuary, Select, Standard and Rustic.

Stone is graded for both fineness and color when quarried and each block is marked with grade, quarry ledge and individual number. With some few exceptions each quarry produces all the grades but in varying proportions.

Statuary includes only the finest grain stone (A); all stone between fineness A and B is graded as Select; between B and C as Standard and between C and D as Rustic.

Variegated (E) is a mixture of buff and gray unselected as to texture though the fine stone predominates.

Old Gothic is a mixture of Rustic and Variegated and also includes some few stones having "crowfeet" (F) as well as glass seams and other markings not affecting the strength of the stone. See paragraph 9, page 6, detailed specification. Variegated stone included under this classification is generally coarser in texture than that graded as Variegated.

Continued on next page

SURFACE FINISHES—INDIANA LIMESTONE

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(1) Introduction

Indiana Limestone in addition to the large range of grades of stone (see "Grading," page 5) and color-tones (see "Physical Characteristics," par. (4), page 4) is adapted to a wide variety of standard machine and hand-tooled finishes. Many new and special finishes are constantly being developed.

The selection of the surface finish should be made conjointly with the selection of the Grade and Color of the stone, not only from the viewpoint of adaptability to the architectural design, but because of its particular adaptation to the grade of stone to which it is applied, its position in regard to close inspection, its function or purpose, and its relative cost.

That this selection may be accomplished with the greatest economy and intelligence, the facilities and experience of the Architects' Service Bureau of the Company are at all times accessible for co-operative counsel. Lists and photographs of existing buildings with complete data as to grades and finishes of stone used are obtainable on request.

Data under this heading is intended to establish for specification use those finishes most commonly used and their adaptability.

(2) Sand-sawed Finish

Description—The surface left as the stone comes from the gang-saw. A moderately smooth, granular surface varying in texture with the grade of stone. Sometimes contains shallow, parallel scores or saw marks.

Adaptability—The least expensive finish. Particularly adapted to the various types of ashlar of the coarser grades of stone.

Ideal and economical for commercial structures, especially above the first story. In the best work of this type partial rubbing may be added (see par. (5)). Use for plain ashlar only—not obtainable on moulded or cut work.

(3) Rough Short-sawed or Ripple-face Finish

Description—A rough gang-saw finish produced by the addition of chilled steel shot to the sawing sand. Produces an interesting range of rough surface textures varying with the composition of the stone and the amount and type of shot used.

Range runs from a medium rough, rather uniform, pebbled surface to a surface heavily ripped up with irregular, roughly parallel grooves.

Adaptability—Little, if any, more expensive than sand-sawed finish; except where the return heads must be finished to correspond with the textured face. This finish should be confined to the four coarser textured grades: Variegated, Rustic Buff, Rustic Gray, Old Gothic. Adapted to the various types of ashlar or field work. Used almost exclusively for ILCO-Riplstone.

May be combined with varying proportions of sand-sawed stock for field or ashlar, trimmed with either Variegated or the finer grades of Indiana Limestone customarily used for cut stone work.

Added Color-tone Range—The shot-sawed finish has a further advantage by widening the range of color-tone. This is accomplished by allowing some of the saw-slush to remain on the surface of the stone, permitting a varying amount of rust stain to develop on the surface, adding the brown tones thus obtained to the natural color variations of the stone itself. This is nature's coloring matter and absolutely permanent.

(4) Smooth Machine Finish

Description—The generally recognized Standard Machine Smooth finish. Produced by the planers, without hand work other than the removal of objectionable tool marks where they occur.

While referred to as smooth, it is a machine finish and the surface always has a certain amount of texture.

Adaptability—This finish is always furnished for all parts of the work, both plain and moulded surfaces, when other finish is not specificially designated.

An economical finish for all grades of stone, particularly those of fine texture where a smooth finish is desirable and appropriate. Obviously, it will remain cleaner than the less smooth textures.

(5) Wet Rubbed Finish



Description—Where a really smooth finish is desired, sand and water rubbed or Carborundum and water rubbed finish should be specified. (Grinding smooth with dry carborundum or gritstone is not recommended.)

Adaptability—Specify for all parts (plain and moulded surfaces) wherever a smooth dirt and grime resisting finish is desired. Adapted to all grades, but particularly to the finer textured stones.

An excellent procedure is to require that the lower story be sand and water rubbed and leave the balance of the work as it comes from the planers or saws.

(6) Honed Finish

Description—A superfine smooth finish.

Adaptability—Usually confined to fine interior work.

(7) Machine-tooled Finishes

Description—The customarily used machine-tooled finishes are four (4), six (6) and eight (8) bats (parallel, concave grooves) to the inch—*specified as 4, 6, and 8 cut work.* Two (2) bats to the inch tooling is occasionally used on large scale work and ten (10) bats to the inch where especially fine tooling is desired. Convex tooling, less usual, can be furnished where required.

Two-bat tooling, on account of the necessity of matching the flutes, is very expensive. Ten-bat tooling is so fine as to be invisible at a comparatively short distance from the building.

Adaptability—Not employed as much as formerly, but when used, principally on ashlar surfaces with mould work finished smooth. Tooled mouldings can be cut by machine only in the direction of the mould. When cut across the mould work must be done by hand and is expensive. Tooling on ashlar and large fillets is generally vertical.

(8) Carborundum Finish

Description—A very smooth finish produced by use of a carborundum machine instead of a planer.

Adaptability—Lower in cost than Honed Finish and smoother than Wet Rubbed. May be specified for flat surfaces of any area and for mouldings whenever there is sufficient length (about 500 ft.) of one profile.

(9) Plucked Finish

Description—This is another machine finish obtained by rough planing the surface of the stone, breaking or plucking out small particles. This gives an interesting rough texture to the stone.

Adaptability—It is often used as a finish on cut stone trim of buildings faced with ILCO-Riplstone.

(10) Other Machine Finishes

Description—Machine finishes have been developed closely resembling many of the hand finishes. Others are adapted to particular parts of buildings, such as spandrels, special rusticated ashlar, etc.

Adaptability—The imitation hand finishes can be applied to areas larger than economically possible with hand finishes and can be distinguished from them only by very careful inspection.

The special features make possible obtaining outstanding effects in buildings at low cost or the production of particular effects desired by the architect.

(11) Hand-tooled Finishes

Description—Due to their greater cost over the more generally used modern machine finishes, particularly when applied to large areas, hand-tooled finishes should be confined to accent points where the cost is warranted.

Various types of hand-tooling are particularly adapted to Indiana Limestone, such as crandalling, drove and tooth chiseling.

Where rough effect is desired, the "rough picked" or "hand pointed" finishes are often used.

Special finishes to meet special requirements will be prepared by the Indiana Limestone Company and samples will be submitted to form the basis of specifications.

Continued on next page



Adaptability—The judicious use of a small amount of hand-tooled finishing to accent certain architectural details of an otherwise smooth machine-finished building will often add much to the character and distinction of the design.

A small amount of hand-tooling in contrast to plain surfaces or machine-tooled work, will generally give a richer effect than where there is an over-abundance. Hand-tooling, like sculptured detail, needs a contrasting background to attain its full value and effect. Thus quoin or arch stones, certain quoining of rusticated work, lintels and similar details can often be hand-tooled to advantage to contrast with plain rustication or plain walls.

(12) Rusticated Work

The rustication of ashlar may in a general way be considered as a finish, since it is an important factor in giving texture to the surface of the building. The width and depth of the rustication and the shape of the groove or channel will contribute materially to the effect as well as the finish of the stone itself. Too great a depth to the rustication often adds materially to the cost without improving the effect.

The faces of rusticated work may be plain or tooled in various ways with a plain or tooled margin draft around each facet. The tooling on rusticated work is quite generally done by hand.

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ILCO-RIPLSTONE

Below are two typical examples of ILCO-Riplstone, a Rough Shot-sawed or Ripple Face Finish (see Par. (3), page 8).

The grooving of the ripple finish may be made to run in the same direction on all strips, either vertical or horizontal, as preferred. Some of the pieces of stone will be more or less uniformly roughened like rough-textured tapestry brick; while the surface of other pieces will be irregularly corrugated or rippled to a degree that it is impossible to obtain in any other material.

The beauty of ILCO-Riplstone is enhanced by the fact that no two pieces of stone or the entire area of any single piece is the same either in texture or color-tone. A soft, mellow, shadowy effect is the result. It is not only admirably suited for range work and random ashlar masonry, but for coursed ashlar and plain areas of cut stone work as well.

The cost of ILCO-Riplstone is quite moderate and often enables natural stone to be used for plain wall surfaces in strict competition with less desirable materials.

While ILCO-Riplstone was originally developed more particularly for range work and random ashlar in ecclesiastical, collegiate and residential construction, it has grown so tremendously in popularity with architects that it has already been used also for the finish of plain surfaces of cut stone work in commercial buildings of nearly every type—hotels, apartment buildings, banks, office buildings, store fronts, etc.

"333" North Michigan Avenue Building in Chicago, designed by Holabird & Root, Architects, is a recent example of ripple finish on cut stone work in tall commercial buildings. This building was awarded a gold medal as the most distinctive structure erected in Chicago during 1928.

The colors, along with the natural variation of the stone itself, range from almost a rust-color brown through warm tawny browns and grays of various shades to a mellow, creamy buff.

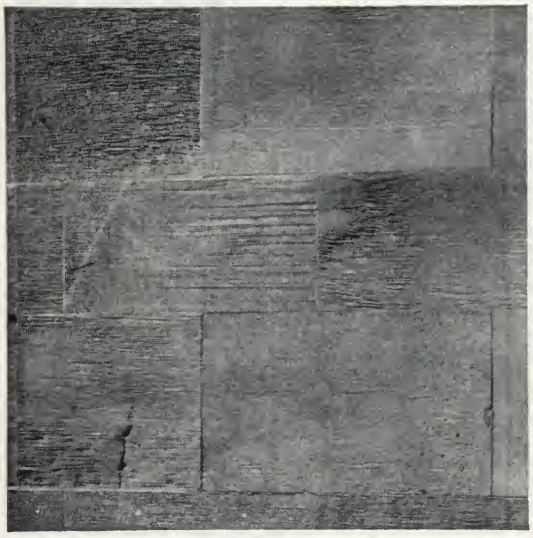
The ripple face stone is recommended for plain wall surfaces only. Moulded and ornamental work of all kinds, and all items of cut stone trim that occur in conjunction with it, will be either machine or hand finished as required, forming a pleasing, decided contrast with the ripple finish of plain wall areas.



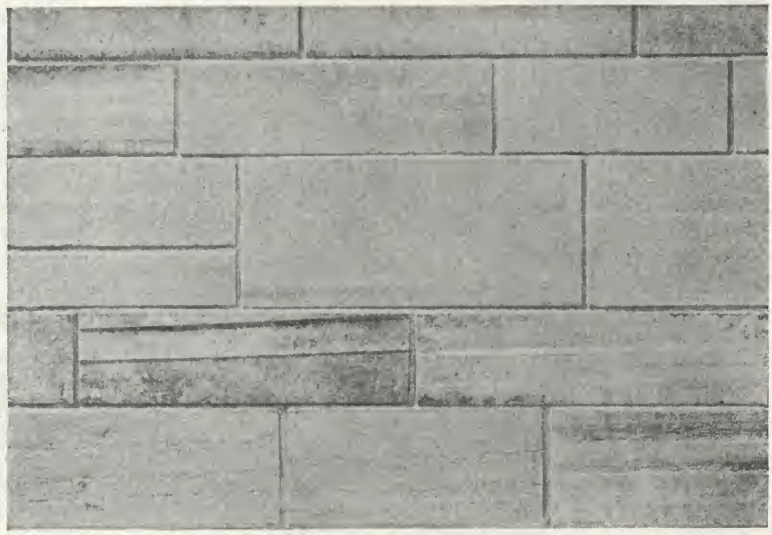


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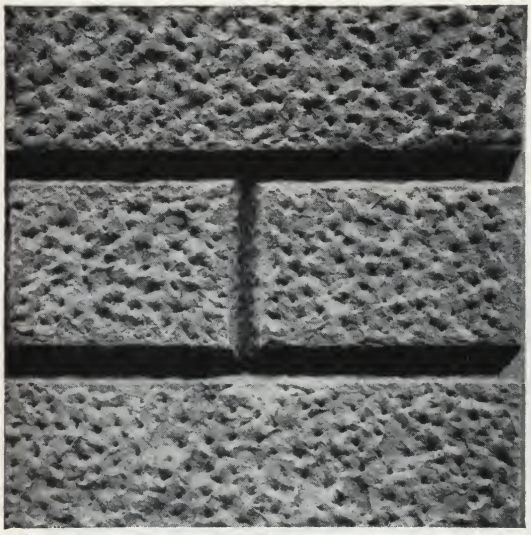
TYPICAL INDIANA LIMESTONE ASHLAR SURFACE FINISHES



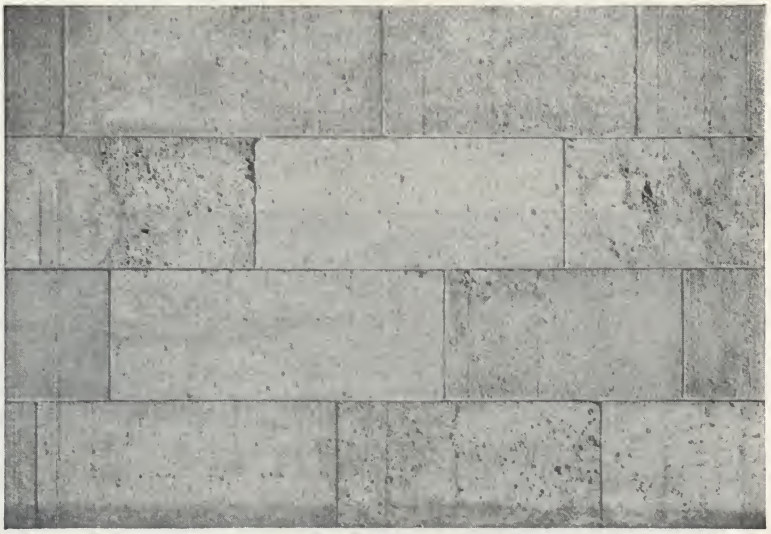
RANGE WORK
ILCO-Riplstone



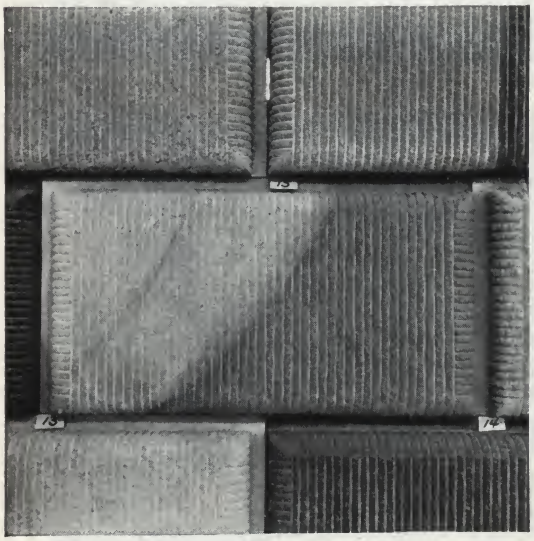
RANGE WORK
Sand-sawed Finish



RUSTICATED ASHLAR
Course Pick-pointed Finish



COURSE RANGE ASHLAR
Pluck-planer Finish



RUSTICATED ASHLAR
Face and Edges Broached Finish



RANDOM ASHLAR
Channel-face and Sand-sawed Finish

Continued on next page

CUT STONE—MASTER SPECIFICATION
INDIANA OOLITIC LIMESTONE

PREFACE



Scope

The term "Cut Stone" is, for the purpose of this specification, confined to that product which is *wholly* fabricated at the mill, ready to set in the building.

Indiana Limestone furnished rough-sawed in strips, or but partially fabricated is not considered cut stone. The furnishing and laying of this material should, therefore, be included under a separate division of the General Masonry Contract. See specifications for ILCO-Riplstone, page 19.

Drawings Required for Intelligent Estimates and Execution

Contract Drawings—The term contract drawings as used in this specification refers to the architect's drawings and details on which the cut stone contract is based.

In order to permit an intelligent and accurate estimate and proposal on the work the contract drawings should include not only complete small plans, elevations and sections showing scope and nature of the work but also sufficient large scale details to permit the estimator to determine accurately size of units, general character and amount of carving, profile or moulds, amount of bond stones, and all other required details such as jointing, special finishes, etc.

Shop Drawings—The term "Shop Drawings" refers to the shop or Cutting and Setting drawings prepared by the Cut Stone Contractor for the fabrication of the cut stone.

Full Size Details—The necessary complete Full Size Details of stone work should be furnished promptly by the architect to insure prompt preparation of "Shop drawings." Delay in this respect often disrupts the proper sequence of shipping and progress schedules.

Structural Details Required—In addition to the complete contract drawings and details, the stone fabricator should be furnished, prior to commencement of the Stone Shop Drawings, with complete structural plans, details and such *Structural Shop Drawings* of the work as may affect the cut stone work. Only so may proper clearances and fitting be provided at the mill to obviate expensive hand field dressing and fitting.

Cut Stone Specification Divisions

Since it is common practice, especially in the larger centers, to divide the Cut Stone work into two (2) distinct subcontracts—namely, the Furnishing of the Fabricated Stone f.o.b. mill, freight allowed to destination (or delivered alongside curb at the building site), and the Setting of the Fabricated Stone, including transportation from the cars (or unloading from trucks at building site), this Cut Stone specification is separated into these two distinct divisions. This procedure is advocated even where the Furnishing of the Cut Stone and the Setting are finally merged under one subcontract.

Note: *The clauses in parenthesis in this paragraph apply to cut stone furnished by local cut stone contractors.*

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Specification Form

The form of this specification is that of a "Master," including all clauses which in ordinary practice apply to average work. All clauses, obviously, do not apply to every building. In formulating the Cut Stone Specifications for a particular building only those clauses which apply should be selected. Special provisions or methods but seldom required are not included—such clauses should be added wherever necessary to clearly define the procedure, especially to obviate controversy involving responsibility and cost.

Appendices

Following the specifications are Appendices specifically and in detail dealing with subjects forming the basis of selection of materials and methods recommended in these specifications. They contain many specification provisions affecting other trades which should be included under other divisions of the work if the Cut Stone work is to be wholly satisfactory. The inclusion of these related provisions and safeguards is of vital importance—a careful study of these Appendices is therefore recommended.

Advisory Service

The Architects' Service Bureau, maintained by the INDIANA LIMESTONE COMPANY, is at all times accessible for advice and recommendations in the formulating of Cut Stone Specifications. Special data, the result of much extended research work, relating to the fabrication and setting of Indiana Oolitic Limestone will be furnished on request.

Notes

Notes in italics are explanatory or advisory only and should not be included in the specification.

Selective Words or Phrases

Wherever words or phrases occur in the body of the specification paragraph printed in italics and enclosed in parentheses, choose that word or phrase which applies to the particular work, omitting those that are irrelevant. Wherever the word "Specify" occurs in italics enclosed in parentheses, thus (*specify*), add the particular word or clause applicable, optional with the specification writer.

CUT STONE FABRICATION

Note: *For "Cut Stone Setting," see separate division, page 15.*

(1) Work Included

(1a) The work under this contract shall include all labor and material for the *furnishing* of the Indiana OOLITIC Limestone cut stone work in accordance with the drawings and as hereinafter specified.

(1b) Delivery shall be *(f.o.b. mill, freight allowed to destination) (specify).*

(1c) In general, this work shall include *(list and locate items in detail).*

Note: *When the work is not clearly indicated on the drawings, or if there is any particular reason for enumerating the items, this paragraph may be included—ordinarily it is not necessary. See recommended listing of Grades and Finishes under par. (4).*

(2) Work Not Included

(2a) The following work is not included under this contract: *(list and locate items).*

Note: *Where there is Cut Stone work other than Indiana Limestone or where there is Limestone not considered "Cut Stone" and specified elsewhere under the General Masonry Contract, include this clause.*

(3) Alternate Estimate

This contractor shall include in his proposal an alternate estimate for the furnishing of Indiana Limestone in lieu of *(specify)* as follows: *(List and locate).*

Note: *Include where items indicated of other material are to be figured as well in Limestone, the comparative costs being a determining factor.*

Continued on next page

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(4) Description of Stone, Grades and Finishes

(4a) General—All Cut Stone included under this contract shall be Indiana Oolitic Limestone building stock quarried in Lawrence, Monroe or adjacent Counties, Indiana *(by the Indiana Limestone Company).*

(4a1) Stock shall in all respects fulfill the grade requirements established and adopted by the Indiana Limestone Institute and shall be from a quarry the product of which has been tested at the U. S. Bureau of Standards for physical properties and weathering with satisfactory results.

(4a2) The quarry from which the Limestone is obtained shall be one having ample capacity and facilities to assure prompt delivery in such quantities as will permit the rapid and uninterrupted execution of the work.

(4a3) This Contractor's facilities for cutting and handling the work as well as the character of Limestone Quarry will be considered in the award of contract.

Note: *For large and important work it is customary and desirable to include either or both clauses (4a2) and (4a3).*

(4a4) The architect reserves the right to approve the cut stone sub-contractor before the award of this work.

Note: *Recommended whenever the furnishing of the Cut Stone is included under the "General Contract."*

(4b) Grades and Finishes—

(4b1) All Limestone shall be *(specify grade) ((specify special Trade Named variety) from the quarries of the Indiana Limestone Company or equivalent),* with *(Smooth Machine) (specify)* surface finish.

Note: *Clause (4b1) should be included only where the entire cut stone work is to be of one grade and one finish. Where there are two (2) or more grades or varieties of cut stone or two (2) or more finishes, each grade and finish should be listed and definitely located separately as below.*

(4b2) Variegated *(Specify)* ***Finish***—The following *(items) (portions of the work)* shall be executed in Variegated Stock *(Specify special Trade Named variety) from the quarries of the Indiana Limestone Company or equivalent),* with all surfaces *(except as otherwise indicated or specified)* finished in *(Smooth Machine) (specify)* finish.

Note: *Here list and locate the items or portions of the work. Particular attention is called to the "Adaptability" suggestions for both "Grades" and "Finishes" given under these separate headings on pages 5 and 8 respectively. Note particularly the advocated use of the "Special Hard"" varieties, par. (7) and "Wet Rubbed Finish," par. (5). See par. (10), page 6 for "Special Varieties of Stone Produced by Indiana Limestone Company."*

Note: *Continue other clauses similar to (4b2) specifying other grades and finishes.*

(4b3) Special Tooling and Finishes—In addition to the general surface finish*(es)* above specified, the following items shall have *(special tooling) (finishes)* as described below:

Note: *Here list, locate and describe. See particularly paragraphs (8), (10) and (11), page 8.*

(4b4) Alternate Estimate—

Note: *Describe the grade of stone, finish, etc. required for alternate estimate (see par. (3)) following substantially the same outline as suggested in (4b2).*

(5) Samples

(5a) *(Prior to) (Immediately after)* the award of contract, the contractor shall submit to the architect for approval two *(2) (except as noted below)* samples of *(the grade) (each grade)* of stone specified, illustrating the extremes which are to be furnished under this contract.

(5b) In the case of "Statuary Buff" one sample will suffice.

(5c) In the case of "Variegated" three samples are required.

(5d) In the case of "Old Gothic," *(specify number)* samples are required.

Note: *See par. (1), "Grading," page 5 in reference to (5a), (5b), (5c) and (5d).*

(5e) Samples shall be approximately 3½ in. wide x 7 in. long x ¾ in. thick, produced with the large faces cut across the grain of the stone and one large face finished to correspond with *(that) (those)* specified. At least two *(2)* edges shall be rock face.

(5f) All samples shall be marked "Sample of Indiana Limestone for *(specify)* Building" including Grade, Finish and Contractor.

(5g) Stone shall be of the same grade, color and finish as the *(specify)* building at *(specify) (except [specify exceptions]).*

Note: *Often more satisfactory than basing contract on samples.*



(6) Shop Drawings

(6a) Prior to fabrication, This Contractor shall prepare and submit in *(triplicate) (specify)* for the approval of the architect, complete "Shop" drawings for all Cut Stone work under this contract as indicated on the contract drawings and specifications and no stone shall be cut until these drawings are approved.

(6b) A sufficient number of copies of approved shop drawings shall be furnished for *(the Cut Stone Setting Contractor) (and)* other trades for the co-ordination of their work with the cut stone work.

(6c) Shop drawings shall show accurately in detail the dimensions and sections of stone, the jointing, bonding, special anchoring and the support of stone by shelf angles and loose steel and other necessary structural details and shall conform to the contract drawings and specifications and to the general provisions governing the fabrication as set forth in par. (7).

(6d) All stone work shown on the Cut Stone shop drawings shall be detailed to leave at least a **full** *(1 in.) (specify)* clearance between the back of the stone and the ultimate face of *(reinforced concrete work) (concrete floor construction) (fireproof covering over structural steel).*

Note: *Due to unavoidable inaccuracies, slight bulging of forms, etc., which often advance the theoretical face of these rough members, a clearance of 1½ in. is often allowed to assure the prescribed, necessary 1-in. clearance. Clearance of more than 1½ in. is not recommended.*

(6e) In no case shall the contractor deviate from the jointing shown on the architect's drawings and details without written approval.

Note: *Include only where the jointing has been accurately and carefully worked out on the contract drawings, not only on small scale drawings, but as well on complete typical large scale details.*

(6f) No departure from the architect's drawings shall be indicated on the shop drawings submitted for approval, unless the change is specifically called to the architect's attention by a note on the shop drawings or an accompanying letter of explanation.

Note: *Recommend in lieu of clause (6c) in the great majority of cases where the experience of the Cut Stone contractor may be relied upon to suggest only changes or departures from the architect's drawings which are beneficial or fall within more practical limits of the material.*

(6g) Each stone on shop drawings shall be numbered and the fabricated stone shall bear the corresponding identification numbers marked on the back or bed with non-staining paint.

(7) Fabrication—Cutting

(7a) General—All stone work shall be accurately cut to shape and dimensions shown on the approved shop drawings. All exposed plane faces shall be true. Beds and all joints shall be dressed straight and, unless otherwise shown, at right angles to the face. All arrises shall be sharp and true, with the fragile edges slightly rounded to prevent "snipping." Patching of stones will not be permitted except with consent of the architect.

(7b) Ashlar—Ashlar in general shall be *(4 in.) (specify)* thick with *(8 in.) (specify)* bond courses and *(8 in.) (specify)* heads on external angles, a net variation of ¼ in. in thickness of ashlar being allowed.

Note: *The difference in thickness between ashlar and bond stones or bond courses should normally be 4 in., one brick width.*

(7b1) Every *(other) (third)* course shall be a bond course.

Note: *In average work every third course is sufficient Check with local Building Code.*

(7b2) Every other stone in alternate courses shall be a bond stone.

Note: *Amply sufficient for stability. Check with local Building Code.*

(7b3) *(Fifteen) (specify)* per cent of the superficial area of the wall shall be bond stones and these shall be uniformly distributed over the surface.

Note: *Recommended by the Building Officials Conference, 1925, as sufficient.*

Continued on next page



(7b4) There shall be *(one) (two) (three)* bond courses to each story height.

Note: *Sufficient for enclosure walls on structural frame buildings. Check with local Building Code.*

(7b5) Provide "through" or bond stones wherever indicated on the Architect's contract drawings.

(7b6) Reprises at internal angles shall have *(4-in.) (6-in.) (specify)* returns.

Note: *Use only on special work where the considerable added expense involved is warranted.*

(7c) Projecting Stones—All projecting stones, except where specially detailed on the shop drawings as anchored to the structure, shall have beds in the wall at least 1 in. greater in depth than their maximum projection.

(7c1) Moulded projecting courses, unless specially shown as secured by suitable anchorage or steel supports, shall have not less than four-sevenths (4/7) of their cubical contents inside the face of the wall.

(7d) Washes—All washes shall be cut in strict accordance with details, true to line and to match perfectly at joints.

(7d1) Unless otherwise specially shown, all washes shall be cut with lugs or seats to receive masonry work above.

Note: *See Recommendations as to the pitch of wide washes in the last clause of par. (1) page 22 of appendix E.*

(7e) Drips—On all projecting stones and courses, provide drips of sufficient width and depth to shed water as shown on the contract drawings.

(7e1) Unless otherwise specifically indicated, all *(copings) (caps) (sills) (specify)* etc. shall overhang the work below not less than *(1½ in.) (specify)* and shall be provided with drips.

Note: *The modern trend of design in the eliminating of these projecting members with drips results in much unsightly streaking especially beneath sills. Drips therefore are strongly advocated. Where drips cannot be provided, washes should be as steep as possible.*

(7f) Joints—Joints shall have a uniform thickness of *(¼ in.) (specify).*

Note: *¼ in. is standard and recommended.*

(7f1) In some instances, the drawings show stones cut in large pieces with false joints. False joints shall be cut *(¼ in.) (specify)* wide and *(⅝ in.) (specify)* deep.

(7g) Moulded Work—All moulded work shall conform accurately to profiles given on full sized details and shall match perfectly at joints. All intersecting profiles shall be cut with returns with their lines carefully connected *(except where miters are specifically called for on the approved shop drawings).*

(7h) Curved Work—All curved work shall be cut to correct radii with joints on true radial lines.

(7i) Reveals—Reveals shall *(unless specially otherwise shown)* show full heads. The returns against *(frames) (masonry) (specify)* shall be dressed approximately smooth and true.

(7j) Lintels, etc.—All stone *(lintels) (voussoirs of arches) (keys)* etc. shall be the full depth of reveals. The returns against *(frames) (relieving arches) (steel) (specify)* shall be dressed approximately smooth and true.

(7j1) Lintels, unless specially otherwise shown, shall be at least *(8 in.) (specify)* longer than the figured width of opening covered.

(7k) Sills—All sills *(except slip sills)* shall be cut with *(lugs and)* wash in strict accordance with details.

(7k1) They shall, unless otherwise shown, be *(6 in.) (specify)* longer than figured width of opening. The width shall be such that *(in addition to the projecting face)* they shall be at least *(2 in.) (specify)* wider than figured depth of reveal.

(7k2) Unless otherwise shown, all window sills shall overhang the work below not less than *(1½ in.) (specify)* and shall be provided with *(¾ in.) (specify)* drips.

Note: *See par. (7e).*

(7k3) All window sills shall be plowed for water bars.

(7k4) Door sills shall be provided with accurately cut thresholds or lips as detailed.

(7k5) Slip sills shall be cut to fit reveals, allowing for *(¼ in.) (specify)* joints at ends.

(7l) Columns and Pilasters—*(Columns) (engaged columns) (pilasters),* etc. shall be cut with *(entasis) (flutes) (caps) (bases)* etc. in strict accordance with the detail drawings.

Note: *Entasis is not customary or recommended on pilasters, especially when fluted.*

(7l1) Column shafts shall be *(monolithic) (cut into the number of drums detailed).*

Note: *Column shafts up to 12 ft. in height generally cost no more monolithic than in drums. For the average column up to 24 ft. or more in height three sections or drums are recommended. It is inadvisable to joint the columns in drums to correspond with the ashlar courses.*

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(7l2) (Pilasters) (and) (engaged columns) shall have alternate stones sufficiently thick to bond *(4 in.) (8 in.)* into the masonry backing.

(7m) Steps, Platforms, Etc.—Steps shall be cut with riser and treads of dimensions detailed, with a lap of *(2 in.) (specify)* wider than the width of tread.

(7m1) All steps and platforms shall have at least *(4 in.) (specify)* bearing on bridge and cheek walls.

Note: *For special requirements, consult the Architects' Service Bureau.*

(7n) Clearance—A minimum clearance of 1 in. shall be maintained between the back of stonework and the face of *(fireproof covering of structural steel) (reinforced structural members).*

(7o) Raglets—Raglets for flashing, etc. shall be cut in the stone of sizes detailed where indicated.

Note: *See par. (3) page 23 of Appendix E.*

(8) Back Checking and Fitting to Structural Frame

Stone coming in contact with structural work shall be back-checked as detailed on the approved shop drawings, and where shown resting on structural work shall have beds accurately shaped to fit the supports.

Note: *In requiring back checking for structural work, the architect should see that the requirements of his drawings are not such that will impair either the lateral strength or bearing capacity of the stone. In no case should stone that has been channeled out for structural steel or reinforced concrete be filled with concrete or cement mortar or be detailed in such a manner that, when erected, expansion or deflection under load of the structural work will tend to split the stone.*

(9) Models

Note: *The location and general character of all carving should be shown and noted on the contract drawings. Where models are required they can best be identified by model numbers on these drawings. These numbers can then be listed in the specifications.*

(9a) All carving *(unless otherwise specified)* shall be executed from plaster models.

(9b) Where models are required for carved *(or sculptured)* parts, they are designated by numbers on the contract drawings.

(9c) Models *(designated by numbers on the contract drawings) (listed below)* shall be furnished by this contractor and made by a modeler of his selection. They shall be carefully executed from the sketches and details furnished by the architect. Adequate photographs of the work in the clay shall be submitted to the architect for approval. Models shall not be cast in plaster until final approval and acceptance of the work in the clay.

Note: *This method is successfully used on average work of average size.*

(9d) This contractor shall allow the sum of $..... to cover the cost of models *(listed below)* made under the architect's direction and supervision by a modeler to be *(selected) (approved)* by him. The above sum includes the cost of crating, shipping and delivery to the contractor's mill (or the building site as may be determined upon).

Note: *This method is advocated on the larger, more important work.*

(9e) All models shall be shipped to the plant where the cut stone is fabricated.

Note: *Even where carving is done at the building site, models are necessary for making shop drawings, and roughing out the stone.*

(10) Carving

(10a) All carving *(unless otherwise specified)* shall be executed by skilled carvers in strict accordance with the spirit and intent *(of the architect's detail drawings) (and) (or) (from plaster models (provided) (and) (or) (approved) by the architect).*

Continued on next page



(10b) This contractor shall allow the sum of $.....to cover the cost of carved sculptural work as *(listed below) (shown and noted on the contract drawings)* to be executed by a sculptor selected by the architect.

Note: *Here accurately list such sculptural work, unless shown and noted on contract drawings.*

(10b1) This sculptural work will be executed at the building after the stone has been set.

(10c) Wherever carved *(or sculptural work)* is to be executed at the building after the stone has been set, this contractor shall provide sufficient stock projecting beyond the normal line or face to assure proper execution of the sculptural detail in accordance with the *(architect's) (sculptor's)* explicit directions.

(10c1) This contractor shall rough out the *(carved) (sculptural)* work to be executed at the building. This shall only be done from *(models) (full size details)* furnished by the *(architect) (sculptor)* for this purpose.

(11) Inscriptions

All lettering *(and inscriptions)* shall be accurately executed from the architect's full size details.

(11a) The following shall be included:

Note: *Here list lettering and inscriptions to be cut. It is customary where complete lettering is not shown on the drawings for estimate that the character and number of letters required shall be indicated.*

(12) Cornerstone

(12a) The contractor shall furnish as located on the contract drawings a stone of shape and dimensions detailed for a cornerstone.

(12b) The top bed of the stone shall be centrally cut out to permit the insertion of a copper box approximately *(specify size)*. The upper edge of the recess shall be cut with a rebate below the top of the bed to permit the insertion of a 2 in. thick slab of limestone which is to be cemented in over the copper box.

(12c) The bottom bed of the stone shall be centrally cut out to permit the insertion of a copper box approximately *(specify size)*.

Note: *Select either (12b) or (12c) as desired.*

(12d) The face*(s)* of the stone shall be cut with the dates and inscription*(s) (detailed) (described and listed below)*.

(13) Incidental Cutting, Drilling, Etc.

Note: *Correlate with par. (27), page 16 of "Cut Stone Setting" division.*

(13a) Cutting for Anchors, Dowels, Cramps, Etc.—Cut holes and sinkages in stones for all anchors, cramps, dowels, etc., called for under this specification or indicated on the shop drawings.

(13a1) All ashlar and other stone forming wall facing of every description, including moulded work, shall be securely anchored to the backing masonry with *(3/16x1 in.) (1/4x1 1/4 in.) (specify)* flat steel anchors *(or round anchors of equivalent cross-section)* turned down at least 3/4 in. and countersunk below the top of the stone. All such anchors shall extend at least *(8 in.) (specify)* into the backing and be turned up 2 in.

Note: *The 3/16x1 in. ashlar anchor is the standard anchor for all ordinary work. For heavy monumental work or where a heavier anchor is desired, the 1/4x1 1/4 in. should be specified. Anchors made from 1/8x7/8 in. cold rolled strap iron may be more economical and are satisfactory for most work.*

(13a2) There shall be at least two (2) anchors to each stone over 2 ft. long or 3 sq. ft. in face area.

(13a3) Anchor holes shall be placed not less than 1 3/4 in. from the back or ends of any stone.

Note: *This clause will apply to all cut stone facing 4 in. or more in depth and thus should be included in practically all specifications covering exterior work. For anchorage of interior work 2 in. or 3 in. thick consult the Architects' Service Bureau.*

(13a4) Anchors are not required in bond stones, or in trim, belt courses, etc. which extend into the wall *(8 in.) (specify)* or more except where stones do not "balance."

Note: *See par. (7c) and (7c1), page 13.*



(13a5) All blocks of stone listed below shall be tied together with cramps, the tops of which shall be set a full *(3/4 in.) (specify)* below the top surface of the stone. *See (27c) page 16.*

Note: *List specifically here and indicate on contract drawings, copings, rails, imposts and similar stone requiring cramps.*

(13a6) All stones listed below shall be secured in position with dowels.

Note: *List specifically here and indicate on contract drawings, balusters, rails, coping and similar stone requiring dowels. See (27d), page 16.*

(13b) Lewis Holes—Lewis holes shall be cut in all stones weighing more than 200 pounds. No Lewis hole shall be cut in exposed portion of the work, except with written permission.

(13c) Cutting and Drilling for Other Trades—This contractor shall do all cutting and drilling of stone for *(electric conduits) (piping) (leaders) (metal windows and doors) (specify)*, etc., required for the installation of the work of other trades when necessary information is furnished in time to be shown on the shop drawings and details for the cut stone work.

Note: *All cutting and drilling in the field is much more expensive than that executed at the fabricating mill. When properly detailed, a minimum of field cutting is required.*

(13c1) Drilling and cutting incident to the installation of the following items are not included in this contract.

Note: *Here list such items. Some work such as the drilling of stone for metal railings, lamp or other standards, thresholds, metal door and window frames, bronze tablets or lettering, etc. should generally be done after setting of the cut stone at the expense of the contractor doing the metal work.*

(14) Field Cutting

Note: *Specify in detail any field cutting that will be required. Omit this heading under this division if the field cutting is to be executed by the "Setting Contractor." See also par. (10c.)*

(14a) This contractor shall furnish a fitter who shall remain on the work and do any cutting and fitting required during the entire period of setting.

Note: *Seldom required or warranted except on large complicated work.*

(14b) This contractor shall do all cutting and fitting in the field necessary to overcome any inaccuracies in his work or to make the work conform to conditions of the building. A sufficient number of experienced men to do all necessary field cutting shall be kept on the work during the setting period.

Note: *For use on important or difficult work where field cutting is considered necessary.*

(14c) This Contractor shall be reimbursed by the General Contractor for all cutting and fitting in the field necessary to overcome inaccuracies in the work of others.

(15) Loading and Shipment

Note: *Correlate with provisions of par. (1), page 11.*

(15a) The Cut Stone shall be carefully packed for transportation to destination with the exercise of all reasonable and customary precautions against damage in transit.

Note: *The boxing or crating of stone, while sometimes specified, is here purposely omitted due to the added and often unnecessary expense. It is best to simply require that the stone be carefully loaded as above, leaving it to the judgment and experience of the Cut Stone contractor as to the necessity of boxing such pieces as carved or other ornamental work.*

(15b) All cut stone shall be delivered promptly when ordered in accordance with the contract schedule and in the sequence in which it is to be set.

(15c) The *(General Contractor's) (Architect's)* representative will inspect each shipment of stone on its arrival and notify this contractor in writing of any damage and this contractor shall proceed with the immediate replacement of such pieces. The responsibility for the cost of such replacement shall be determined by the point of delivery fixed by the contract under which the stone is delivered. When the point of delivery is beyond the immediate control of this contractor the *(general) (setting)* contractor shall assume responsibility for the necessary proof of damage.

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CUT STONE SETTING



Note: *For "Cut Stone Fabrication" see separate division, page 11.*
Note: *For "Preface" to the specifications, see page 11.*

(16) Work Included

The work under this Contract shall include all labor and material for the Setting of the Indiana Limestone Cut Stone Work specifically mentioned in paragraph (1) of the "Cut Stone Fabrication" specifications.

Note: *See page 11.*

(17) Work Not Included

This Contract does not include the setting of Cut Stone Work specifically excepted under paragraph (2) of the "Cut Stone Fabrication" specifications.

Note: *See page 11. If par. (2) is not included, omit this par. (17).*

(18) Alternate Estimate

This Contractor shall include in his proposal an alternate estimate for the Setting of Indiana Limestone included in paragraph (3) of the "Cut Stone Fabrication" specifications.

Note: *See page 11. If par. (3) is not included, omit this par. (18).*

(19) Correlative Specifications

(19a) This Contractor shall familiarize himself fully with the provisions of the specifications covering the "Cut Stone Fabrication" division of this specification.

(19b) He shall also refer to the *(other) (General Masonry) (Structural Steel) (Reinforced Concrete) (Carpentry) (Roofing) (Sheet Metal Work) (specify)* divisions of the General Contract specifications and familiarize himself with the materials and labor furnished by others to facilitate or supplement conjointly the work under this contract.

(20) Co-operation

This Contractor shall co-operate with all other trades to the end that the Cut Stone Setting will conform to the general progress of the structure with the least interference possible.

(21) Derricks, Hoists, Etc.

(21a) All derricks, hoists, etc. for the *(unloading) (storage) (and) (setting)* of the Cut Stone at the *(storage) (and) (building site)* will be furnished by the General Contractor.

(21b) This Contractor shall furnish, erect and remove at his own cost and risk all derricks, hoists and equipment required for the expeditious *(unloading) (storage) (and) (setting)* of the Cut Stone work.

Note: *Select either (21a) or (21b) as may apply.*

(22) Delivery and Storage

Note: *Correlate these provisions with those of par. (1), page 11.*

Note: *Not only damage but discoloration sometimes very difficult to remove may result from a careless handling of cut stone during delivery and storage. Rigid observance of the requirements in this paragraph will prevent costly and annoying replacements and delays.*

(22a) All Indiana Limestone delivered *(f.o.b. cars at destination) (at curb at building site)* shall be carefully unloaded and delivered it to the *(storage) (and) (building)* site.

(22b) The Cut Stone shall be handled throughout by competent workmen and by such methods as will guard against soiling, mutilation or snipping *(in transit to and)* upon delivery at the *(storage) (and) (building)* site.

(22c) Stone shall be stored *(specify) (and) (at the building site) (where designated) (by the General Contractor) (specify),* on planking so set that the stone will rest entirely clear of the ground. Provide adequate protection from damage to arrises and from contact with anything which would result in the accumulation of dirt, dust, soot, mud, grease or other staining or disfiguring elements. The stone shall be covered with *(tarpaulin) (strong, non-staining waterproof paper) (or) (boards)* during extended periods of storage at *(destination) (and) (building site).*

(22d) All planking and lumber required for the fulfillment of the provisions above will be furnished by *(others) (this Contractor) (specify).*

Note: *If furnished by others, include the requisite clause under the "Carpentry" or other specification division.*

Note: *Stone is generally stacked in the same position in which it is set in the wall. Ashlar may, however, be stacked flat to save space, in which case it should be placed back to back and face to face. The faces are then separated by wood cleats or lath; but stone thus stored for extreme periods will develop drying out marks which will disappear only after a considerable time. Consequently, stacking on edge is safer as well as more convenient. For cleats use cypress, white pine, poplar, yellow pine without an excessive amount of resin. Rigorously avoid chestnut, walnut, oak, certain firs and other woods containing tannin.*

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(23) Scaffolding

(23a) The scaffolding required for the use of all trades, including that for the proper execution of work under this Contract will be furnished and erected by the *(General Masonry Contractor) (specify).*

Note: *Include the requisite clause under the General Masonry or other specification division.*

(23b) Adequate scaffolding and protective housings for the use of *(carvers) (and) (sculptors)* for the execution of carving at the building after the stone has been set will be provided by *(the Carpentry Contractor) (specify).*

Note: *Correlate with par. (10b) and (10c) page 14 of the "Cut Stone Fabrication" division. Include the requisite clause under proper specification division.*

(23c) Scaffold for Corner Stone—The *(Carpentry Contractor) (specify)* will furnish and erect a suitable platform and other frame structure required for the laying of the corner stone and every facility will be provided the Cut Stone Setting Contractor in connection with this ceremony.

Note: *Include the requisite clause under the Carpentry or other specification division.*

(24) Centering

(24a) All wood centering required for the setting of cut stone under this contract will be furnished, erected and removed by the *(Carpentry Contractor) (specify).*

Note: *Include the requisite clause under the Carpentry or other specification division.*

(24b) This Contractor shall inspect all centering and shall report *(to the architect) (specify)* any centering of insufficient strength or unsuitable for its purpose.

(24c) Centers shall not be removed until the mortar has sufficiently set to render the work self-supporting.

(25) Setting Mortar

Note: *Both theory and experience indicate that the most satisfactory results are obtained by setting cut stone facing and masonry backing in one mortar selected to meet the particular requirements of the individual building. This is not necessarily more costly than using two or more kinds of mortar and greatly simplifies construction work.*

Note: *See Appendix A, page 20 and par. (1), page 22 of Appendix D.*

Note: *The following three (3) types of mortar are recommended for setting limestone. The type best adapted to the particular work should be selected and included.*

(a) Non-staining Cement Mortar—*Both theory and extensive field practice prove that under ordinary conditions eminently satisfactory results are obtained when this type of mortar is employed in setting both facing and masonry backing. The proper backing mortar should therefore be provided for in the masonry specification.*

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***(b) Non-staining Cement-lime Mortar**—While this mortar has not been as widely used on large building operations and its use is not always permitted by city building codes for the highest type construction, it has given general satisfaction when used for setting both facing and masonry backing. Many ready mixed and so-called masons' mortars really belong in this class, some of which have been widely used with satisfactory results.*

(c) Waterproof Non-staining Cement Mortar**—Recommended whenever parging is required; for setting cut stone when masonry backing is laid up in ordinary staining cement mortar or when any of the construction materials such as water, sand, brick, tile, etc., are known to contain salts which may cause staining or efflorescence; and for walls exposed to excessive amounts of moisture.* ***These conditions, all of which have a tendency to produce staining and efflorescence, should be avoided whenever possible. *When such conditions are unavoidable, the waterproof nonstaining cement mortar should be used.*

(25a) General—All Indiana Limestone shall be set in carefully prepared *non-staining* mortar consisting of materials and mixtures specified below.

(25b) Materials—

***(25b1) Non-staining Cement**—(Specify) (brand)* made by *(specify manufacturer)* or equivalent, subject to the architect's approval. Non-staining cement shall in no case contain more than 2% of soluble alkali *(calculated as Na_2O).*

***Note:** The* INDIANA LIMESTONE COMPANY *will furnish data on non-staining cements which have fulfilled the above qualifications under test.*

***(25b2) Non-staining Waterproof Cement**—(Specify) (brand)* made by *(specify manufacturer)* or equivalent subject to the architect's approval. Waterproof cement shall contain not less than 2% of integral waterproofing compound ground with the cement. The integral waterproofing shall be water repellent, soap type which will prevent the passage, through the setting mortar, of staining elements from the backing material into the stone.

***Note:** The* INDIANA LIMESTONE COMPANY *will furnish complete data on integral waterproofing compounds and waterproofed cements which have been tested for the above qualifications.*

***(25b3) Hydrated Lime**—*Hydrated lime shall fulfill the requirements of the standard specifications of the American Society for Testing Materials.

***(25b4) Lump Lime**—*Lump lime shall fulfill the requirements of the standard specifications of the American Society for Testing Materials.

Lump lime shall be reduced to a paste by thorough and complete slaking with cold water and screening through a $\frac{3}{16}$ in. mesh screen into a settling box. Lime putty shall stand in the settling box not less than one week before use.

***(25b5) Sand**—*Sand shall be clean and sharp, free from loam, silt, vegetable matter, salts and all other injurious substances, with grains graded from fine to coarse. Screen through a 6-mesh screen.

***(25b6) Water**—*Water shall be clear, non-alkaline and devoid of salts or other injurious elements.

(25c) Mixtures—

***(25c1) Non-staining Cement Mortar**—*Cement mortar shall be composed of one (1) part of non-staining cement to three (3) parts of sand with the addition of one-fifth (⅕) part of hydrated lime based on the volume of the cement used.

***(25c2) Non-staining Cement-lime Mortar**—*Cement-lime mortar shall be composed of one-half (½) part of non-staining cement, one-half (½) part of *(hydrated lime) (lump lime paste)* to not to exceed three (3) parts of sand.

***Note:** Select either hydrated or lump lime.*

***Note:** Add the following clause (a) if lump lime paste is specified.*

(a) First thoroughly mix the lump lime paste and sand and stack to age; the cement shall be added and thoroughly worked into the lime and sand mixture in small batches just prior to use.

***(25c3) Non-staining Waterproof Cement Mortar**—*Non-staining waterproof cement mortar shall be composed of one (1) part of non-staining waterproof cement to three (3) parts of sand with the addition of one-fifth (⅕) part of hydrated lime based on the volume of cement used.

***(25c4) Retempering**—*Mortar shall be mixed only in such quantities as are needed for immediate use. No retempering will be permitted and materials which have been mixed for a period exceeding thirty (30) minutes shall in no case be used upon any portion of the work and must be thrown upon the dump.



(26) Pointing Mortar and Grout

(26a) General—All Indiana Limestone shall be pointed or grouted with carefully prepared *non-staining* mortar, consisting of materials and mixtures specified below.

(26b) Materials—

***(26b1) Non-staining Cement**—*Non-staining cement shall be as specified in par. *(specify)* above.

***Note:** if non-staining cement is not specified in par. (25) above, copy here the full text of par. (25b1).*

***(26b2) Lime**—*Lime shall be *(hydrated) (lump lime)* as specified in par. *(specify)* above.

***(26b3) Sand**—*Sand shall be *white* sand, otherwise it shall be as specified above in par. *(specify)* above.

***(26b4) Water**—*As specified in par. *(specify)* above.

(26c) Mixtures—

***(26c1) Pointing Mortar**—*Pointing mortar shall be composed of one (1) part of non-staining cement to not to exceed two (2) parts of white sand to which shall be added sufficient *(hydrated lime) (lime putty)* to make as stiff a mixture as can be worked.

***Note:** Select either hydrated lime or lime putty.*

***(26c2) Grout**—*Grout shall be composed of one (1) part of non-staining cement to not to exceed one and one-half (1½) parts of fine white sand, mixed in small quantities of as thick a consistency as can be poured into the joints. Grout shall be stirred vigorously until used.

***(26c3) Retempering**—*As specified in par. *(specify)* above.

(27) Anchors, Dowels, Etc.

(27a) General—The shop drawings as provided in par. *(specify—see par. 6, page 12)* of the "Cut Stone Fabrication" division require the location and detailing of all anchors, etc. All holes and sinkages in stones for all anchors, cramps, dowels, etc., and all Lewis holes are provided for in par. *(specify—see par. 13, page 14)* under the heading of "Incidental Cutting, Drilling, Etc.," of the "Cut Stone Fabrication" division.

This Contractor shall furnish and set all anchors, cramps, dowels, etc., shown on the approved shop drawings or that may be required to carry out the evident intent of par. *(specify—see par. 13, page 14)* of the "Cut Stone Fabrication" division.

All steel anchors, cramps, etc., shall be thoroughly galvanized after they have been bent.

***Note:** Asphalt coating of metal, sometimes resorted to, is not recommended in the better work. The added cost of galvanizing constitutes such a small item of expense compared with the benefits derived through assurance of permanent rust prevention that galvanizing as above is strongly advocated. Rust from anchors may cause streaks or blotches of rust stain on the stone often almost impossible to eradicate. Rusting anchors may also split the stone.*

(27b) Anchors—Anchors shall be *($\frac{3}{16}$x1 in.) ($\frac{1}{4}$x1¼ in.) (specify)* flat steel anchors *(or round anchors of equivalent cross section)* turned down at least ¾ in. into the stone, extending at least *(8 in.) (specify)* and turned up 2 in. into the backing.

***Note:** Correlate with paragraphs (13a1) and (13a2), page 14.*

(27c) Cramps—Cramps where required shall, unless otherwise detailed, be of *($\frac{3}{16}$x1 in.) (specify) (steel) (specify)* turned down at least *(1½ in.) (specify)* at each end and span at least *(8 in.) (specify)* on the flat.

***Note:** Cramps are sometimes dropped into sinkages on top of stone but on heavy stone work are generally set underneath with the ends turned up into cuts in the underside of stone. Cramps should always be galvanized—they are not recommended for baluster rails and light copings or light stone work.*

(27d) Dowels—Dowels shall, unless otherwise noted, be of heavy *(brass pipe) (specify)* of diameters and lengths detailed.

***Note:** The best dowels for balusters, baluster rails, mullions and all ordinary light work are made of ½ in. heavy brass pipe about 3 in. long. Where smaller dowels are necessary in slender work, such as tracery, ⅜ in. solid brass or bronze pins should be used.*

Continued on next page



(27e) Lewis Anchors — This Contractor shall provide all Lewis or suspension anchors of size and design detailed.

Note: *Wide lintels and horizontal members that must be supported by steel work above (this should be avoided whenever possible) should never be supported with expansion bolts. Always use Lewis anchors of the number and size required for safe support. Two large-size, well placed Lewis anchors are often preferable to four smaller ones. Never should more than four be used in a single stone and these placed two at each end. It is not practicable to so hang with Lewis anchors stone less than 6 in. in depth. For smaller stones cinch anchor bolts or equivalent may be used.*

(27f) Special Anchors—

Note: *Here describe any special anchors required, such as anchor bolts with top plate or washer for the anchoring down of large projecting stones, etc.*

(28) Grade Course

Limestone grade courses shall not be set until the foundations have been adequately waterproofed or otherwise protected by others against the danger of staining due to capillarity.

Note: *Where grade courses are of limestone the tops or recesses in the foundations should be thoroughly and permanently through-waterproofed with non-staining materials. Omission of this provision usually results in unsightly staining of the base course due to the soluble alkali salts in the foundation masonry (particularly if of concrete) being drawn up into the stone work. Provide this safeguard in the waterproofing or other appropriate specification division. (See Appendix B, page 20.)*

(29) Concrete Surfaces

All concrete surfaces, shelf angles, etc., against which limestone is to be applied as a facing material shall be coated with an impervious waterproof coating applied by others. This Contractor shall inspect all such work and shall report *(to the architect) (specify)* prior to the setting of the stone any portions not adequately so protected and thus subjecting the cut stone to the danger of stains.

Note: *This procedure is strongly recommended (see par. (2a) page 22 of Appendix D). Provide for this painting under the proper specification division.*

(30) Corner Stone

Note: *Correlate with par. 12, page 14.*

(30a) This Contractor shall set the corner stone provided in par. *(specify—see par. 12, page 14)* of the "Cut Stone Fabrication" division.

(30b) Set in non-staining cement mortar the 2-in. thick slab of limestone in the rebate provided for it over the recess containing the copper box.

Note: *Use this clause if clause (12b) page 14 is selected.*

(30c) The corner stone shall be set in a full bed of non-staining cement mortar.

(30d) At the conclusion of the ceremony, this Contractor shall build at least three courses of the exterior face stone work and the *(brick) (specify)* backing *(provided by others)* to the same height on top of the corner stone in quick-setting, non-staining cement mortar. Stone work shall be set as hereinafter specified with the joints raked out to a depth of ¾ in. for future pointing. Protect top of wall from damage by weather.

Note: *This clause is to prevent tampering with the record where recess is cut in the top of corner stone requiring rebate and the inclusion of par. (30b). In any case it is better when possible to set corner stone after walls are started, thus permitting immediate sealing with additional masonry work.*

(31) Damaged Stone

(31a) Only satisfactory stones shall be set in the walls.

(31b) Any stone showing flaws or imperfections in cutting, bruises or defects of any kind, when delivered on the site, shall not be set, but shall be referred to the architect *(or his authorized representative)* for determination as to responsibility and decision as to whether the stone shall be entirely rejected, made satisfactory by redressing or re-cut for another position in the wall.

(31c) Patching of stone of any description will not be permitted.

(31d) Should any damaged or defective stone be set in the wall, it is distinctly at this Contractor's risk and may, whenever discovered, be condemned, removed and replaced with a satisfactory stone, to the end that all of the work shall, upon completion of this contract, be acceptable in every detail.

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(32) Incidental Field Cutting, Drilling, Etc.

Note: *Correlate with par. (14), page 14 of the "Cut Stone Fabrication" division. Include here any provisions for field cutting not included under the "Cut Stone Fabrication" division.*

(32a) Incidental cutting, dressing, drilling, etc., shall be done by skilled workmen before the stones are set. Only under unavoidable conditions will the drilling, dressing of stone *(other than carving)* on the wall be permitted.

(32b) The drilling of stone for *(metal railings) (lamp or other standards) (thresholds) (metal door and window frames) (bronze tablets) (bronze lettering) (hardware) (specify)* shall be accurately executed by this Contractor, the cost thereof to be paid by the contractor installing these items.

Note: *Include correlative clause under proper specification divisions to provide for this cost item. It is recommended that such drilling be done by a skilled stone cutter rather than by a mechanic of another trade.*

(33) Back-Painting

Note: *The back-painting of stone is intentionally omitted from this specification as painting the sides and back of stone with bituminous waterproof compounds is strongly condemned. For full information regarding waterproofing of stone generally, see pages 20 and 21 of Appendix B.*

(34) Setting

(34a) All Indiana Limestone shall be accurately set in strict accordance with the contract drawings and the subsequently approved shop drawings.

(34b) Before setting, all stones shall be cleaned *on all side* by *(an approved steam cleaning process) (or) (washing clean, using when necessary fibre brushes and soap powder)* followed by a thorough drenching with clean water.

Note: *It is not sufficient to simply dip the stone in water or run a hose stream over it. It should be washed clean of all dirt and foreign matter of every kind. Clean stone and proper setting mortar are imperative to assure a building that will dry out to a beautiful clear light color.*

(34c) *(Except in freezing weather)* just prior to the setting, all stone not thoroughly wet shall be sponged off or drenched with clean water.

Note: *The wetting of stone prevents the absorption of moisture from the setting mortar, thus insuring proper hardening of mortar.*

(34d) All cut stone work shall be set by competent stone setters level, plumb, square and true with uniform joints to the full dimensions and levels shown.

(34e) Except as otherwise specially noted, every stone shall be set in *full* beds of mortar; with all vertical joints flushed *full.* Completely fill all anchor, dowel, Lewis and similar holes. All bed and vertical joints shall be *(¼ in.) (specify)* wide, *(except as specially otherwise noted).*

(34f) Soft wood wedges may be used only where necessary to prevent the crushing of mortar under heavy blocks, and shall be *thoroughly* soaked before use.

Note: *Only soft wood thoroughly soaked should be used. Lead buttons are preferable.*

(34g) *(Heavy stones) (or) (projecting courses) (specify)* shall not be set until the mortar in courses beneath has hardened sufficiently to support them.

(34h) Projecting stones shall be securely propped or anchored until the wall above has been built.

(34i) *(Large blocks of stone) (column drums) (specify)* etc., shall, in addition to the mortar bed, be set on an adequate number of lead buttons symmetrically disposed to sustain the weight until the mortar has set.

Note: *Buttons should be set from 3 to 6 in. from the circumference of columns and about 2 ft. apart.*

Continued on next page



(34j) The joints between all sections of columns shall be made with *(5 lb.) (6 lb.)* sheet lead cut back *(2 in.) (specify)* from the face and with center cut out to allow space for squeezing.

Note: *Advocated only for columns of large diameter consisting of heavy units or sections.*

(34k) The ends only of lugged sills and steps shall be embedded in mortar. The balance of the joint beneath the sill shall be left open until pointed.

(34l) All *(cornices) (coping) (projecting belt courses) (stones forming gutters) (specify)* etc., shall be set with the vertical joints unfilled. The exterior profile of these joints shall be caulked with *(rope yarn) (picked oakum)* and the joint filled *full* from above with mortar grout and raked out on top to a depth of ¾ in. After the grout has set, remove the caulking for pointing.

Note: *Rope yarn is advocated due to the greater ease of complete removal when stripping the caulking.*

(34m) Except as specially otherwise noted, mortar shall be raked out to the depth of ¾ in. from the face of the stone for pointing. Sponge the face of the stone clean along all joints.

(34n) Avoid splashing exposed faces of stone with mortar. Droppings and splashings shall be immediately removed with a clean sponge and water.

(34o) In no case shall stone work be set more than two courses in advance of the backing.

(35) Pressure Relieving Joints

(35a) At points indicated at *(each story) (specify)* furnish and set *(in strict accordance with the manufacturer's details and instructions)* Pressure Relieving Joints *(as made by) (name manufacturer) (specify or describe).*

Note: *Due to the fact that a steel column 20 ft. high, when loaded to 16,000 lb. per sq in. will be nearly ⅛ in. shorter than before the load was applied, the shelf angles instead of supporting the ashlar, may rest on the stone below and transfer the weight of the structure to the ashlar unless it can "give" a like amount. This condition is aggravated by movements due to temperature changes, wind pressure, etc. As buildings have become higher and masonry units larger, the provision of joints of a semi-plastic nature to permit these slight movements without spalling and cracking of the masonry have become increasingly important.*

For large work a most satisfactory solution is the provision of a relieving joint of corrugated lead with a sheet lead cover. For ordinary stone work it is sufficient to place these joints between windows at alternate stories.

(36) Parging

(36a) The backs of all stones and the exposed sides of all bonding stones projecting beyond the normal ashlar back shall be parged with a coat of waterproofed setting mortar not less than ½ in. thick before the masonry backing is built. Parging shall attain initial set before backing is laid.

Note: *Parging with lime mortar, due to its porosity, has been found ineffective in the prevention of staining and efflorescence. Waterproof cement mortar tends to prevent both staining and efflorescence when the back of the stone is completely covered and the mortar attains its initial set before the laying up of the masonry backing. For this reason such parging has been strongly recommended. The fulfillment of these conditions in actual construction, especially with the speed attained, is very difficult. Consequently the use of stainless cement in backing masonry as well as facing is recommended in this specification instead of parging.*

(36b) In the case of solid stone piers or columns, which are checked out to fit around concrete columns of concrete or steel fireproofed with concrete, a clear open space of at least 1 in. shall be maintained between the finished face of the column and the back of the stone.

Note: *This is necessary, otherwise expansion of the concrete may split the stone due to difference in expansion when heated. See par. (2b), page 22 of Appendix D.*

(37) Pointing



(37a) All face joints shall be brushed out *(raked if required)* clean to a depth of ¾ in. Carefully remove any wood wedges and loose mortar. Thoroughly wet the stone at joints and point *(flush) (specify)* with pointing mortar well driven into the joint and rubbed smooth with a jointer (to the section detailed).

Note: *The flush joint very slightly weathered is strongly advocated rather than beaded or similar sections. The joints of ashlar may be weathered or slightly concave if desired.*

(37b) Especial care shall be exercised in pointing up all washes to thoroughly protect the joint from the action of the weather.

(37c) The pointing of *(balustrades) (tracery) (tops of coping) (steps) (specify)* shall be done as the work progresses.

Note: *This practice should be encouraged wherever the conditions are such as to make this procedure practicable for the stone setting contractor. All delicate tracery, balustrades and similar work should always be so pointed when set.*

(37d) Thoroughly point up the open joints left under lugged sills to a depth of at least 1 in.

(37e) Wherever metal flashings are set in raglets, carefully point raglets flush with pointing mortar well driven into raglet.

Note: *The flashing or cap flashing should be secured in the raglet with soft lead wedges preferably, or crimped pieces of sheet metal spaced approximately 12 in. on centers. Caulking should be done with pointing mortar rather than with commercial elastic cement compounds which experience has shown either dry up and crack after a comparatively short period or soften and tend to run out of the joints in warm weather.*

(37f) The following top or wash joints in cut stone work shall be neatly and thoroughly caulked flush with *(lead wool) (approved caulking compound).*

Note: *Here list and locate.*

Note: *On the better class of work, the caulking of the joints in wide washes of cornices, coping, belt courses, etc. and the top joints of steps, platforms, balcony floors, etc. with lead wool assures excellent protection against leakage and consequent damage by frost. When so caulked these joints may be kept tight by occasional inspection and recaulking at a minimum cost. See also "Metal Flashing of Stone Joints" in par. 5, page 23 of Appendix E.*

Note: *Elastic caulking compound is also successfully used for this purpose and is less costly than lead. A large number of these compounds have recently been tested by the U. S. Bureau of Standards in Washington. Many of these proved of little value but a few have proven eminently satisfactory, both in these tests and in practical use in building. The trade names of tested compounds will be supplied by the Architects' Service Bureau.*

(37g) The joints in all *(steps) (platform slabs) (specify)* shall be caulked on the underside *(unless bedded over wing or foundation walls)* with *(rope yarn) (oakum)* and completely filled with *(molten lead) (stainless cement grout and pointed with approved elastic caulking compound)* well compacted and neatly finished flush with the stone surface.

Note: *The elastic caulking compound is lower in cost and its elasticity provides for slight movements in supporting masonry.*

(38) Protection of Finished Work

(38a) In general the covering and protection of finished work is included under the *(General Masonry) (specify) (and) (Carpentry)* contracts. This Contractor shall co-operate with these contractors and will be held jointly responsible for any damage resulting from neglect of these provisions.

(38b) During construction the tops of all walls shall be adequately and substantially covered by the contractor for *(General Masonry) (specify)* at night and during inclement weather or delays to insure against damage to finished work by weather.

Continued on next page



Note: The importance of this protection cannot be too strongly stressed. Much unsightly staining of stone work can be attributed wholly to neglect of this provision, especially when rain or wash water from concrete floors or other masonry is permitted to come in contact with the wall masonry. It is advisable to hold the "General Masonry" contractor responsible for this protection. Only when not included in the General Masonry division should the "Cut Stone Setting" contractor be held wholly responsible.

(38c) Walls shall at all times be protected from drippings during the pouring of concrete by tarpaulin or canvas supported on suitable outrigging provided by the *(General Masonry) (specify)* contractor.

Note: Include here and in other divisions where concreting may be carried on above the finished cut stone work and backing. Water and drippings from Portland cement concrete is a distinct menace to the cut stone work. For this reason whenever practicable concrete work should be finished prior to setting of cut stone.

(38d) Whenever necessary or as directed by the *(architect) (specify)* all *(projecting individual stones or courses) (sills) (doorways) (specify)* shall be protected against injury during construction by substantial wooden covering furnished and erected by *(the Carpentry Contractor) (specify). (Steps and platforms) (specify)* shall be continuously protected from injury until final completion. Wood containing excess of resin, tannin or other staining ingredients shall not be used unless set over adequate protective coverings of dry felt or resin sized building paper. Wood boxing and covering shall be maintained in substantial condition until removed *(by the Carpentry Contractor) (specify)* to permit the final cleaning down of stone work.

(38e) Contractor shall protect sills and horizontal courses or other stone work projecting beyond the face of wall with covering of *(boards) (red resin sized building paper, cut into strips of proper width, lapped 3 in. at ends and built an even ¾ in. into joints. This covering shall be secured with wooden wedges and weighted down and maintained until the pointing of the stone).*

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Note: Use this clause when setting contractor is to be responsible for protection of his work. Specify paper for residence and other small moderate cost work where the boxing or wood covering of finished work as in (38d) is considered unnecessary.

(39) Cleaning

Note: The best results are obtained when each stone is cleaned and thoroughly drenched just before it is set. Many contractors find this method also the most economical even taking into account the final cleaning which may be required. Cleaning may be done by hand, though the more rapid steam cleaning method is well adapted to both preliminary and final cleaning, and is recommended.

(39a) The exposed faces of all stone work set under this contract shall be properly cleaned down *(as the stone is being set and)* upon completion.

(39b) Cleaning shall be accomplished with a suitable steam cleaning process approved by the architect *(or)*

(39c) This cleaning shall be done by scrubbing with soap powder boiled in clean water, applied vigorously with stiff fibre brushes, adding clean, sharp, fine, white sand to the soap and water mixture where necessary. After scrubbing, drench all surfaces of the stone thoroughly with clear water.

(39d) The use of sand blast, wire brushes or acids of any kind will not be permitted under any circumstances for the cleaning of stone work.

ILCO-RIPLSTONE—MASTER SPECIFICATIONS

Note: This specification should be included in the "General Masonry" specification, preferably under a separate division. It should not be included with the "Cut Stone" specifications.
Note: Notes in italics are explanatory or advisory only and should not be included in the specifications.
Note: Wherever words or phrases occur in the body of the specification paragraph printed in italics and enclosed in parentheses, choose that word or phrase which applies to the particular work, omitting those that are irrelevant. Where the word "specify" occurs in italics enclosed in parentheses, add the particular word or clause applicable, optional with the specification writer.

(1) Work Included

(1a) The work included under this contract shall include all labor and material for the *furnishing* and *laying* of all exterior wall facing or ashlar (other than "Cut Stone Trim") in accordance with the drawings and as hereinafter specified.

(1b) For "Cut Stone" specifications included under a separate specification division, see pages *(specify).*

(1c) In general, this work shall include *(list and locate).*

Note: This paragraph ordinarily is not necessary.

(1d) Shop drawings will not be required.

Note: Indication of desired jointing scheme by sketch or reference to "ILCO Jointing Details" is sufficient.

(2) Stone

(2a) General—Stone shall be ILCO-Riplstone (Indiana Oolitic Limestone) produced by the INDIANA LIMESTONE COMPANY.

(2b) Stock—Stock shall be *(Rustic Gray) (Rustic Buff) (Variegated) (Old Gothic) (specify)* sawed on four sides.

Note: See paragraphs (6), (8) and (9), pages 5 and 6 under heading "Grading—Indiana Limestone."

(2c) Dimensions—

(2c1) Bed thickness shall be *(4 in.) (3 in.).*

Note: The stone should not be over 4 in. thick. This thickness is most easily broken to the required lengths and lays up with two brick widths or 8-in. tile backing for a 12-in. wall. Occasionally stone 3 in. thick can be used to advantage.

(2c2) Heights shall vary as required to be laid up in *(Range Work) (Random Ashlar) (specify)* as indicated on the drawings.

Note: Usually not over three (3) different heights are required, each (including allowance for mortar bed) in multiples of 2 in., 3¾ in. or 5 in., dependent on backing requirements. "Range Work" is usually preferable, due to the greater ease in laying it up, resulting in a much lower cost in the finished work as well as being more effective.

(2c3) Stone shall be furnished in sawed strips of promiscuous length varying from 3 ft. 6 in. to 6 ft. 5 in. which shall be broken up and jointed on the job to the lengths required to conform to the jointing scheme indicated on the drawings.

Note: These dimensions will cover all usual requirements and are sold for less than standard lengths. Adaptability to different architectural treatments is one of the great advantages of this type of construction.

(2c4) Facing shall be bonded to the masonry backing with bond stones. These shall be uniformly disposed and shall consist of approximately 10% of the superficial wall area. They shall extend into the backing about 4 in. and shall be placed in courses of relatively small height.

Note: The Building Officials' Conference at Madison, Wisconsin, in 1925, approved this bond as sufficient for Indiana Limestone Range Work or Random Ashlar wall facing backed up with brick or hollow tile. When Riplstone is used for facing masonry walls, bond stones are better than anchors, saving cost of both anchors and anchor holes, and furnish ample unity of action between backing and facing for both residence and non-bearing walls. The jointing details for such walls can usually be so selected that no additional sizes are necessary.

(2d) Finish—All stone shall be furnished with shot sawed finish with various degrees of reddish brown rust stain to give an interesting variation in color tone.

Note: See par. 3, page 8.

(2e) Joints—All joints shall be *(½ in.) (specify)* thick. End joints shall be *(vertical) (splayed) (specify), (rough cut) (cut straight) (specify).*

Note: ½-in. joints are recommended as the minimum thickness. Specify the type of end joint, whether vertical, splayed or a mixture of the two and the character of joint finish.

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(3) Mortar

Note: ILCO-Riplstone should be set in non-staining mortar as specified in detail in par. (25), page 15, under the "Cut Stone Setting" division of the "Cut Stone-Master Specifications." The selection of the type of mortar should depend on the character and cost of the work. It is strongly advocated that the backing in masonry walls be laid up in the same mortar instead of parging (see par. (4d)) to prevent unsightly staining of the stone work.

(4) Laying

(4a) Stone work shall be laid in strict accordance with the *(detail)* drawings to bond and joint as indicated.

Note: *The architect should include a sketch or detail showing roughly the general type and character of the jointing, size and disposition of stone facing and on masonry walls the general location and disposition of bond stone. An area of from 10 to 20 sq. ft. will suffice.*

(4b) *(Except in freezing weather)* all stone shall be thoroughly drenched with clean water just prior to setting.

(4c) Stones shall be laid with full beds of mortar with ½ in. joints *(raked back ¼ in.) (struck flush with the stone surface) (weathered) (specify)* as the work progresses.

Note: *A raked joint is appropriate and economical since it eliminates pointing.*



(4d) The backs of all stones and the exposed sides of all bonding stones projecting beyond the normal facing back shall be parged with a coat of waterproof non-staining mortar not less than ½ in. thick before the masonry backing is built. Parging shall attain initial set before backing is laid.

Note: *Include only where masonry backing is laid in other than non-staining mortar. See "note" par. (3).*

(4e) Stone veneer shall be anchored to the frame construction with *(heavy galvanized iron wall ties) (6 in. non-rusting spikes driven into the studding at a slight angle and bent over the back edge of stone).* Spike anchors shall be spaced not to exceed 24 in. apart vertically or horizontally.

Note: *The non-rusting spike anchor is preferable.*

(5) Cleaning

The stone work shall not be cleaned down after completion, but where necessary, the stone shall be washed free of dirt or other objectionable accumulations prior to setting.

All mortar droppings adhering to the stone shall be immediately removed. Sponge the stone free of mortar along the joints as the work progresses.

Note: *The face of the stone as shipped to the job is covered with a white powder-like material known as saw slush. If this slush is not removed, but is permitted to weather away after the stone is laid, some of the stone will take on added attractive color.*

APPENDIX A—Staining and Efflorescence

Disfigurations occurring on limestone due to seepage from masonry backing may be divided into three distinct divisions. First, efflorescence, which is a whitish deposit that appears many times on wall surfaces. Second, brown stain, which is a dark oak brown discoloration that closely resembles varnish and appears only on buff limestone. Third, gray stain, which is a grayish dark glassy film that occurs mostly on unseasoned gray stone.

Each of these is caused by water seeping through the backing materials, leaching out soluble salts and carrying them through to the surface of the stone. Any of the soluble salts found in brick, concrete blocks, tile, mortar, concrete and other building materials may cause efflorescence. These salts usually consist of magnesium sulphate, calcium sulphate, sodium sulphate, also in some cases sodium chloride. Only soluble fixed alkali salts, principally the carbonates and hydroxides of sodium and potassium, can produce the brown stain found on buff limestone.

Our research work shows us that under usual construction conditions these salts come only from certain types of cements which stain limestone.

Gray stain may be produced on unseasoned gray stone by water above leaching through the stone. The formation of gray stain on seasoned stone may be produced by water carrying small quantities of calcium sulphate through to the surface. This calcium sulphate undoubtedly comes from the cement used in the mortar and concrete.

It is thus evident that neither efflorescence, buff stain nor gray stain can occur without the presence both of water and of soluble salts and so can be prevented entirely by their elimination, and usually can be effectively suppressed by the elimination of either one. Since it is practically impossible, however, to entirely prevent moisture from entering wall masonry and since most building materials contain some soluble salts the only practical method is to reduce to a minimum the amount of water which can enter the wall and also to use building materials that are known to have the lowest possible content of soluble salts.

Brown stain and much of the gray stain may be prevented by using a non-staining cement in the stone setting mortar and in the mortar used in laying up the backing material. When the backing is set in a staining cement mortar much staining can be prevented by setting the stone and parging the back of it with a non-staining cement provided there is no seepage from the backing material into the stone. The use of a non-staining mortar will merely retard, not prevent, such seepage. The use of a non-staining cement has no bearing on the formation of efflorescence.

The use in the mortar of integral waterproofers of the water repellent type will prevent the penetration of water through the wall, and, consequently, the formation of both efflorescence and staining. The waterproofers consist of ammonium and calcium soaps (stearates) and are added to the mortar as it is being mixed in amounts as directed by the manufacturers. This is usually 2% by weight of the cement or cement and lime used. The mortar is then used as any other mortar for setting both facing and backing material or for parging the back of the stone facing. The result is a wall having each individual unit isolated with a waterproof mortar jacket. Any leaks that may occur will thus be isolated and water will not spread throughout the wall as it does when a waterproof mortar is not used.

It has been found that the waterproofers of the densifying type, while they may produce a superior concrete, do not produce a mortar tight enough to prevent efflorescence.

While the effectiveness of integral waterproofers as stated has been established without question, the use of *stainless* cement mortar is recommended in this specification pending the trial in actual contruction of waterproofed mortar made from ordinary cements.

APPENDIX B—Waterproofing Compounds

While we do not generally recommend the waterproofing of Indiana Limestone, there are types of construction, of which the terrace shown on ILCO Detail 8 is an example, where the use of suitable waterproofers is advisable. Consequently we believe the following summary of waterproofers and their uses based on facts obtained from our Research Department and from other authoritative sources will be of value in determining the proper use of the different types now most commonly sold.

There are two distinct classes of waterproofing materials; those of the colorless type which can be applied to exposed surfaces and the black type made up largely of bituminous material which should be used only on the back of the stone or on the face of the masonry backing or other places where the black color is not objectionable.

Continued on next page



Colorless waterproofing compounds are of two general types, those having a paraffin base and those having an aluminum stearate base.

The paraffin type has the disadvantage of darkening the color-tone of the stone for some time, also at times giving it a greasy appearance. This will in most cases gradually bleach out, leaving the stone with a satisfactory light color. The type is, however, fairly effective as a waterproofing agent, retaining its effectiveness for many years.

The paraffin waterproofer is recommended for use on exposed base or grade course stone for exposed walls or balustrades surrounding terraces such as that shown in ILCO Detail 8 and for the tops of copings and washes of main cornices. It is also recommended for use on trim jobs where limestone is practically surrounded by mortar or other building materials which may contain soluble alkali salts and thus become a potential source of staining or efflorescence. On such trim jobs all four sides and sometimes even the ends should be treated.

Aluminum stearate waterproofers have the advantage of not darkening or appreciably changing the natural color-tone of the stone, but they are not permanent and will generally lose their waterproofing value within two or three years. The manufacturers of aluminum stearate waterproofers contend, and there seems to be evidence to bear out this contention, that their product when properly applied will keep the stone clean and tend to lighten its color-tone. Aluminum stearate waterproofers are sometimes, though rarely, recommended for building exteriors in localities where the amount of soot and dirt in the atmosphere is excessive. It is recommended for some places on building interiors where finger marks or other forms of defacement are troublesome.

Black waterproofing compounds contain bituminous material as their principal base and may be generally divided into three types, as follows:

(1) Those preparations that consist of mineral asphalt or coal tar which is cut with volatile solvents such as gasoline to such a consistency that it may be applied with a brush.

(2) Asphalts which are emulsified in water with the aid of some inert emulsifying agent, to a somewhat stiffer consistency than Type 1.

(3) The mastic type, comprising those bituminous waterproofing compounds which are of such a consistency that they must be applied with a trowel or similar tool.

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Type one and two have many uses in building such as the waterproofing of foundations, dampproofing courses through walls at grade line and elsewhere and in any place where they can be applied to the backing material to break the capillarity between this backing and the stone facing. They also have been used quite extensively in the past for back painting stone, but this procedure is not now much used, due to the fact that it did not achieve desired results. One of these type should be applied as indicated in ILCO Detail 8 and in all cases where water containing alkali or vegetable matter might otherwise reach the back of Indiana Limestone facing.

Type three is generally used for waterproofing spandrels, in modern skeleton frame construction, on the top of vaulted stone ceilings, and roof construction or at other points at which it is desired to obtain a more thorough protection from moisture seepage or from contact with newly poured cement.

When limestone is coated on the back and beds with waterproofing applications the bonding property of the stone is materially impaired and provisions must be made to procure sufficient bond either with additional anchorage or bond stones.

Information giving classification of commercial waterproofers which can be recommended, specifications and detail instructions for application will be sent upon request. Revised bulletins on such subjects are constantly available.

APPENDIX C—Structural Steel Design

(1) General

It is most important that careful consideration of the characteristics and requirements of the limestone facing be taken into account in the preliminary layout of the structural steel.

The best practice is to detail the spandrel sections during the early stages when preparing the small scale drawings, thus establishing the ideal position of columns, girders and main beams in close relation to the architectural features of the design rather than endeavoring to study the facing material together with the details of support for enclosure walls after the main elements of the structural steel design have been definitely fixed.

This practice not only is of prime assistance to the Structural Engineer, but will often result in considerable economy in the steel work.

(2) Spandrels

When an Indiana Limestone facing is used, the spandrel sections should be kept as simple as possible. Much small steel, such as angles, channels and loose lintel steel, can frequently be omitted when a properly designed spandrel girder is placed in the right position for the support of both facing and backing of enclosure walls.

Masonry, and particularly stone work, is decidedly more rigid than steel. Therefore, the steel work for its support should be designed with this in view. It is also important to so detail the work that the stone facing will not be pinched between supporting members of the structural frame when slight movements due to temperature changes, settlement and wind pressure occur. In quite tall buildings, pressure relieving joints in the masonry are recommended. See par. 35, page 18 of "Cut Stone Setting" specifications.

Often a single deep built up plate and angle section is preferable to a plain rolled section or combination of shapes for spandrel members. This does not necessarily involve a greater weight of metal for spandrel girders or lintel members supporting masonry walls, but a different disposition of the material, usually resulting in a stiffer construction.

Any attempt to support lintels or walls over wide openings with steel sections that will deflect appreciably will usually produce arch action in the masonry, preventing the steel from carrying the loads as designed. This may cause excessive stresses at points in the masonry which will result in crushing the mortar, opening of joints and spalling or chipping off of corners or cracking of the stone.

On the other hand, too much steel in spandrel walls should be avoided; it is necessary only that the supporting members be sufficiently stiff to carry the actual load without putting stress in the enclosure wall masonry.

Stone lintels should be made self-supporting whenever practicable, thus simplifying the spandrel sections which need only support the spandrel panels and sills on the structural frame. Windows in pairs or groups with stone mullions supporting the lintels frequently give the appearance of greater structural stability to the design.

Where shelf angles for lintels must be used, it is often better to use loose lintels than to have them rigidly connected to the structural frame. Where connected to the frame, it is advisable to bracket or hang them from the spandrel girder with a slotted bolt connection that will permit some adjustment. Such steel members may thus be brought into the exact position for the support of the stone as fabricated without the necessity of expensive field fitting to compensate for the slight inaccuracies always found in construction.

Lookout angles and similar members for the support of projecting stone work should likewise never be rigidly connected but should always be fastened to the frame with a hooked or bolted connection over shim plates that will allow adjustment to the exact position required.

(3) Columns

There is a tendency to place wall columns too close to the face of the wall. It is good practice to so fix the column position that it will permit the thickness of stone facing and one course of brick work plus the proper allowance for joints between the outer face of steel and the normal wall face.

Placed in this position, the eccentric loading from walls can generally be balanced by the eccentric loading from floor girders and will usually allow the flanges of the columns to be turned out toward the face of the wall where they best serve for resisting wind stresses and for wind bracing connections, permitting the floor girder connections to be placed on the opposite flange.

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APPENDIX D—Mortars and Reinforced Concrete Construction

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(1) Mortars—Cause of Staining

Research and authentic tests have conclusively proven that in the majority of instances, the principal cause of staining on Indiana Limestone is soluble alkali salts contained in the cement, lime or sand of mortar, or in the brick or tile of the backing masonry. See Bulletin 33 of the Engineering Experiment Station of Purdue University, as well as other available publications.

It has also been demonstrated that the soluble alkali-content of the various cements parallels the degree of intensity of the staining produced on Indiana Limestone, when mortars of these various cements are placed in contact with it and kept in moist condition.

The cements that produce bad staining all show from 20% to 65% soluble material calculated as Na_2O by methods used at Purdue University, while those which were practically non-staining in their effect, even under the severe conditions of the test, run from 1% to 3%.

Hence the very definite recommendations as to mortars for the setting, pointing and parging of Indiana Limestone given in paragraphs (25), (26) and (36), pages 15, 16 and 18 of the "Cut Stone Setting" specifications and the suggested provisions given in the following heading.

Indiana Limestone *must never* come in contact with mortar containing ordinary unwaterproofed gray Portland cement. Moisture, passing through staining cement mortar or concrete and drawn into the stone facing in the drying out of walls, may be sufficient to cause staining that will at least temporarily mar the uniformity of the natural light color tone of the Limestone.

(2) Reinforced Concrete Construction

(2a) Dampproof Painting of Concrete—All surfaces of concrete with which either the Limestone or the immediate Limestone backing will come in contact should be thoroughly coated with a standard brand of Dampproof Paint or Asphaltic Waterproofing Compound. This should include all walls adjacent to the stone work whether reinforced concrete frame, concrete wall work or concrete fireproofing and floor construction. This dampproofing of concrete surfaces is less expensive than back-painting of the stone facing, which is not recommended.

A moderately heavy asphaltic or mineral bitumen dampproofing compound of well established brand is recommended. If a thin preparation is used or if the concrete is porous, two coats are advisable—a heavy impervious coating is imperative. See Appendix B, page 20.

(2b) Clearances—Where stone work is slabbed against or applied to a backing formed by concrete structural members, an ample allowance for back joint should be provided. A full 1-in. *minimum* should be allowed, though 1¼-in. is better, particularly at columns. However, a clearance of more than 1½ in. may cause difficulty with supporting angles, etc. With a 1-in. allowance the actual clearance will seldom average over ¾ in. The greater clearances make allowance for the irregularities in concrete work due to swelling and warping of forms, assure a reasonably thick back-joint for the proper protection of the stone and often obviate the necessity of expensive and improper field cutting and dressing.



In the case of solid stone piers or columns, where the stone is checked out hollow to fit around reinforced concrete columns or steel columns fireproofed with concrete the back joint should *not* be filled in or the stone bedded solid against concrete, since the expansion of concrete due to moisture and temperature changes is liable to split the stone. In such instances at least a full 1-in. clearance should be allowed between the finished face of concrete and the back of the stone.

It is equally important that ample clearance be allowed in connection with the bedding or support of stone work on concrete members.

(2c) Avoid Pouring Concrete Against Unprotected Stone Work—Concrete must never be poured against cut stone or against ordinary common brick or tile backing in contact with stone. Whenever possible, the concrete structural work should be completed before the stone facing is erected. Where the work must be carried up jointly as in the case of Limestone faced load-bearing walls carrying concrete floor construction, concrete ceiling slabs, mezzanine floors, stair landings, etc., always provide an impervious dampproof coated hard burned brick or hollow tile backing for the stone and a thoroughly waterproofed slab seat on the top of the wall against which the concrete may be poured.

Even when concrete floor construction is supported on a wall which will form a backing for stone work to be erected against it after the concrete has been placed, it is important to prevent this backing from absorbing water from the concrete. Such walls should be covered with waterproof felt paper or dampproofed before the concrete is poured.

(2d) Protection Against Wash, Splashing, etc.—There is always great danger of staining from the water washing over reinforced concrete fireproofing and floor construction during rainstorms. This wash should not be permitted to fall on and be absorbed by the stone or the brick or tile backing. Complete protection of the walls from all dripping or wash from the structural floors, scaffolding, etc. above, by tarpaulins or canvas supported by properly constructed outriggers should always be provided. Likewise provide protection against the splashing of stone work during the pouring of concrete. Whenever possible, pouring of concrete in walls should be finished before setting of cut stone.

(2e) Anchors, Sockets, Etc.—Build into the concrete any anchors, sockets, etc., required for the support or fastening of stone facing or enclosure walls. Anchors must usually be adjusted after setting of concrete. Several types of special fasteners for anchors have been developed for this work. Consult the Architects' Service Bureau for details.

Where the stone is to be supported on shelf angles fastened by bolts or sockets built into the concrete, it is advisable to drill these angles in the field to assure accurate location to fit the fabricated stone. Steel outlooks supporting stone should always be designed to permit adjustment.

APPENDIX E—Roofing and Sheet Metal Work

(1) General

Reference to paragraph (1) of Appendix D above, establishes that the staining of Indiana Limestone and efflorescence is principally due to the seepage into the stone of moisture carrying soluble alkali salts contained in the cement, lime or sand of mortar or in the brick or tile backing masonry.

The prevention, therefore, of the wash from roofs and water passing through the backing masonry in any appreciable quantity or the seepage through improperly filled or flashed joints in washes of Cut Stone work is imperative if efflorescence or unsightly discoloration of the stone is to be obviated.

In the majority of cases to assure permanently the best appearance of a stone building, it is advisable to carry the water back to a gutter and avoid any wash over the face of the building. Even when the cornice occurs at the base of a parapet or attic wall, it is often better to provide a metal-lined gutter at the foot of the wall than to pitch the top of cornice outward to drain over the face. In such instances, it is advisable to cover the cornice wash entirely with metal.

(2) Sheet Metal Work

Sheet copper as a material for flashing, gutter lining, etc., when applied to Indiana Limestone or other light-colored stone, must be carefully detailed to avoid the possibility of staining from the copper, since the wash soon becomes a metallic oxide staining solution. There should be no possibility of wash from copper flowing over the face of stone. The same provisions apply to bronze or brass railings, lamp standards, statuary or other ornamental features—proper drips should be provided in all cases. A coat of pure linseed oil applied to copper alloys before oxidation sets in and occasionally renewed will very much retard oxidation and thus tend to reduce staining.

Continued on next page



Sheet Lead, Zinc, Aluminum and Block Tin are preferable to copper.

Wherever copper is used for flashing, gutter lining, etc., applied directly to Indiana Limestone, a course of comparatively thin, smooth black waterproof paper should be laid between the copper and the stone to prevent staining due to sweating or condensation on the underside of the copper. Ordinary felt paper is not suitable and if used, only asphalt impregnated felt is permissible.

(3) Raglets

Metal cap-flashings should preferably be set into raglets rather than into the stone joints. Raglets can be cut in the stone horizontally, vertically or at any angle and can generally be provided at low cost if they run straight and are not stopped or stepped in a manner that prevents cutting by machine methods.

Raglets from ⅜ to ½ in. wide by from ¾ to 1 in. in depth are standard. The metal cap-flashing should be securely fastened in the raglet with soft lead or small crimped sheet metal wedges spaced about 12 in. apart and pointed flush with pointing mortar.

Molten lead should not be used for filling raglets as the temperature stresses often increased no doubt by the conversion of moisture into steam, have in several cases split the stone. Raglets are troublesome and expensive but we have no satisfactory substitute to offer.

Wood wedges should never be used to secure sheet metal flashings in raglets, even temporarily, since they will absorb moisture and swell and may readily split the stone, especially where, as is often the case, the raglet is close to the edge.

(4) Parapet Walls and Coping

Brick backed parapet walls are frequently a source of trouble, especially when surrounding blind balconies. Seepage through them often causes unsightly staining of the portions of the building walls below them. The conditions acting upon a parapet wall are more severe than upon the main walls of the building below the roof line, since it is exposed on both sides and the metal counterflashing at the back is difficult to maintain in a tight condition when secured in the usual brick joint. Again the brick itself often absorbs considerable moisture and the mortar joints seldom are perfect and allow driving rains to penetrate the wall.

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It is therefore recommended that the entire back of all parapet walls which are not faced with cut stone be backed up with vitrified brick or tile set in waterproof cement mortar. Otherwise they should be parged with waterproof cement mortar or covered with metal or impervious roofing material and the flashing be carried under the stone coping to within two inches of the front face of the wall. See ILCO Detail Sheet 15.

Much trouble with parapets may be avoided by facing the backs with cut or sawed stone. Under ordinary circumstances, where the parapet is not over 8, 10 or 12 in. thick, the cost of the stone parapet will be no more than if backed with brick, especially if this is waterproofed.

(5) Metal Flashing of Stone Joints

In connection with fine monumental buildings and for all important work where the best known protection is desired against the seeping of water through the vertical joints of horizontal members with wide washes, such as cornices, belt courses, coping, etc., a metal flashed joint as described below is strongly recommended. This applies particularly to those washes where it is not practicable or desirable to cover the entire top with sheet metal.

The vertical joints that are to be flashed should first be grouted full with setting mortar. Strips of pure block tin about $\frac{1}{32}$ in. thick and 4 or 5 in. wide are then placed over the joints and turned down ½ in. in raglets cut parallel to the joint. Strips should be carried nearly to the front of the projecting course and should be let into a raglet or joint on the back wall about 2 in. above the joint covered. Tin strips should be fastened into raglets with lead buttons spaced about 4 in. on centers and the raglets pointed flush with cement mortar. See ILCO Detail Sheet 15.

This takes the place of caulking with lead wool or elastic caulking compound and though more costly, is probably superior to any other method for use on the highest grade of work.

Block tin will not become dark but weathers to a color which blends with the stone and is scarcely noticeable, even when not above the sight line.

APPENDIX F—Cleaning

(1) Steam Cleaning

For more than ten years the Architects' Service Bureau of the Indiana Limestone Company and its predecessor, the Indiana Limestone Quarrymen's Association, have been working on the development of a method for cleaning Indiana Limestone buildings which would be effective and economical and free from the harmful results following the use of acids or sand blast.

The so-called steam cleaning method, developed largely by one of our research engineers with the aid of several cleaning companies, has now been in commercial use in nearly all parts of the United States for several years and we believe that it is the best solution of this problem yet found.

It is a machine method with which rapid work can be done at small labor cost. It is equally successful for cleaning new and old buildings not only of Indiana Limestone but also of brick, terra cotta and other building materials. The equipment is simple and no expert knowledge is necessary in the execution of the work. The cost is generally lower than that of any other method previously employed.

The equipment required is a steam boiler capable of producing clean steam at 150 lbs. pressure, steam and water hose to carry this pressure and a special nozzle. Cold water and steam are carried to the building face where they are mixed in a special nozzle, the cleaning being effected by a spray of very hot water impinged against the building at a high velocity, both heat and velocity being supplied by the high pressure steam.

All soot, grease and dirt are dissolved or carried away by the hot water, markings and texture of the stone being brought out more clearly than by any other method.

Some few forms of stain and encrustation which do not yield to steam treatment can be removed by special applications, directions for the use of which will be given upon request.

Several special portable boilers costing from $1100 up have been put on the market for the production of steam. The cost of this work when done by steam cleaning companies varies from 5c to 10c per surface square foot, depending on the size of the building and its condition.

Specifications for cleaning old and new buildings, special nozzles, description of equipment, detailed instructions as to the application of the method, names of available cleaning companies and of buildings which have been cleaned in various parts of the country will be furnished upon request by the Architects' Service Bureau.

(2) Acids

Except as noted below, acids should never be used on Indiana Limestone in connection with steam cleaning or any other process. Strong acids invariably attack the stone, producing unsightly spots and streaks.

There are a few conditions under which certain acids in a very dilute form may be used to advantage but such extreme care should be exercised that even these are rarely recommended.

(3) Scrubbing

When steam cleaning is not practical the best method is to scrub the surface of the stone with any white soap powder dissolved in *soft* water using an ordinary fibre scrub brush.

Do not use a wire brush or steel wool unless you are willing to find later small rust spots scattered over the surface of the building where particles of steel have lodged.

(4) Sand Blast

Sand blast as applied to Indiana Limestone is perhaps a little less harmful than the use of acids. After cleaning by this method the surface appears whiter but this whiteness is due partly to white stone dust and particles of sand imbedded in the pores and partly to "stunning" or bruising of the stone.

The worst feature of this method is that the surface is roughened and the pores of the stone which had been at least partially closed by weathering are laid open, resulting in a more rapid accumulation of dirt.

When Indiana Limestone is sand blasted the pressure at the compressor should be not over 30 or 40 lbs. per sq. in.

ILCO

INDIANA



LIMESTONE

J. E. SWEENEY

Mankato and Kasota Stone
Marble Mosaics

TELEPHONE
CHERRY 6202

2326 Union Trust Building
DETROIT, MICH.

REPRESENTING

T. R. COUGHLAN CO., Mankato, Minn.

BREEN STONE & MARBLE CO., Kasota, Minn.

Products

MANKATO and KASOTA DOLOMITIC LIMESTONES, suitable for both Exterior and Interior, of soft warm color, interesting texture and having unusual strength.

Description

Mankato and Kasota stone can be furnished in the following colors:

Gray; cream; light yellow; medium yellow; dark yellow; pink.

Fixture and Durability

Kasota and Mankato stone may be secured with pitted surface or free from pits. Because of their hardness, 14,200 lb. per sq. in. crushing strength and the absorption which averages below 3% (results from 10 tests) it is highly non-absorbent and wears well.

Uses and Design

These dolomitic limestones are well adapted to both exterior and interior use to produce effects both dignified and beautiful.

Both Kasota and Mankato stones may be used in carved surfaces, or with split or rock face surface.

Service Facilities

We maintain a service office to render the architectural profession every assistance possible in the use of the above products.

Inquiries from any architect receive prompt attention. You are invited to write for information or samples.

Recent Installations

The Eagles' Club, Russel Barr Williamson, Architect, erected at 24th and Grand Avenue, Milwaukee, Wisconsin, is exceptionally complete in every detail for the comfort and enjoyment of its members. The exterior was made equally inviting and attractive by the use of Mankato Gray Stone.

The Art Museum, Philadelphia, Pa., Zantzinger, Borie & Medary and Horace Trumbauer, Architects, is one of the most notable buildings yet constructed. Mankato Stone used throughout the exterior. Columns are of Mankato Yellow Stone. Steps and cornice are of Mankato Gray Stone. Wall ashlar includes all Mankato Ledges. It is a beautiful blending of soft warm colors.

The following list, including building, location and architect is representative:

Cathedral of St. Paul, Minn., Maginnis & Walsh
Basilica of St. Mary, Minneapolis, Minn., Slifer & Abrahamson
State Teachers' College, Mankato, Minn., C. H. Johnston
Fourth Church of Christ, Scientist, Detroit, Mich., Weston & Ellington
Little Sisters of the Poor, Detroit, Mich., Weston & Ellington
Union Trust Building, Detroit, Mich., Smith, Hinchman & Grylls
Detroit Stock Exchange, Detroit, Mich., O'Dell & Diehl
Saint Giles Roman Catholic Church, Chicago, Ill., Joseph McCarthy
Saint Paul's Church, Salem, Ohio, William Koehl

VICTOR OOLITIC STONE CO.

Producers of Victor Buff Limestone

BLOOMINGTON, IND.

Product

VICTOR BUFF INDIANA LIMESTONE.

Beauty and Attractiveness of Material

Victor Buff, in all grades, Select, Standard and Rustic, is of creamy light tint and may be identified as the only type of Indiana limestone to possess "color" as distinguished from "shade." This warm tinge of buff in white affords one of the most attractive divisions of the spectrum.

Adaptability to Design

Its qualification of uniform lightness renders it particularly desirable where emphasis is placed on architectural line or carving detail. There is no "dappling" to disguise line or architectural design. Its lightness of shade makes it further responsive to exterior floodlighting.

Durability—Physical and Visual

The United States Government lists Indiana limestone as one of the most weather-resisting of building materials. The *attractiveness* of Victor Buff is unusually time resistant because of its lightness of shade and fineness of grain; qualities which permit a minimum of lodgment for soot and dust.

Price

Buff as a class raw material has, for 73 years, been quoted at a premium over blue, or gray, or variegated. However, cut stone bids, based on our raw material, are frequently lower than similar estimates figuring the cheaper grades; this is largely due to the economy of processing Victor Buff.

Availability

The reserve of this beautiful stone is unlimited in the Victor properties. For thousands of years Victor will be able to produce the same quality of delicate cream buff, and Victor structures may be readily duplicated in color and texture in years to come.

Victor equipment now gives a capacity of 3,000,000 cu. ft. of cream Buff annually and that figure can be tripled on 90 days' notice. Three-quarter million cubic feet are maintained in storage stocks for immediate shipment.

A Unique Service for Architects

Due to Victor's peculiar position in the Indiana limestone industry, more and better bids can be secured for architects.

The VICTOR OOLITIC STONE CO., with the largest stone reserve in the industry, is also the largest raw stone producer *not owning cut stone plants.* Consequently, Victor can request bids from any number of cut stone contractors and be assured that each contractor will submit his best figure, it being evident to the contractor that Victor is not a competitor expecting an "accommodation bid."

When an architect specifies "Buff" and notifies the VICTOR OOLITIC STONE CO., full co-operation is immediately rendered.

Concerns Supplied by Victor

The following are a few of the 210 concerns whom Victor has supplied:

Ellis Stone Company	Chicago, Ill.
Fluck Stone Co.	Chicago, Ill.
Henry C. Arch & Son	Forest Park, Ill.
Geo. A. Fuller Co.	Philadelphia, Pa.
John J. Bolger	Norristown, Pa.
Jos. F. Carew, Inc.	Boston, Mass.
Brennan Stone Co.	Bridgeport, Conn.
Monahan McCann Corp.	Newark, N. J.
R. Young & Sons	Newark, N. J.
James O'Meara	Baltimore, Md.
A. T. Pettrillo	Mt. Vernon, N. Y.
R. B. Phelps	Washington, D. C.
Southern Cut Stone Co.	Bowling Green, Ky.
Hubert A. Meier	Detroit, Mich.
Ritchie Cut Stone Co.	Hamilton, Ont., Canada
S. H. Hurst	Toronto, Ont., Canada
Scott Brothers	Toronto, Ont., Canada
John Vokes & Son, Ltd.	Toronto, Ont., Canada
A. Foll & Sons	Omaha, Neb.
Rowat Cut Stone Co.	Des Moines, Iowa
Alexander King Stone Co.	Bloomington, Ind.
Bloomington Limestone Co.	Bloomington, Ind.
Central Oolitic Stone Co.	Bloomington, Ind.
Indiana Oolitic Limestone Co.	Bloomington, Ind.
Indian Hill Stone Co.	Bloomington, Ind.
Shawnee Stone Co.	Bloomington, Ind.
Walker Brothers Stone Co.	Bloomington, Ind.
H. A. Woolery & Son	Bloomington, Ind.
Bedford Cut Stone Co.	Bedford, Ind.
Ingalls Stone Co.	Bedford, Ind.
Harding & Cogswell	Elletsville, Ind.
H. J. Horner & Sons	Newark, N. J.
James McLaren & Sons	Brooklyn, N. Y.

A Few of the 603 Victor Buff Structures in North America

Mutual Life Insurance Co. Building, Newark, N. J.
U. S. Post Office, Yonkers, N. Y.
First National Bank, Bayshore, L. I., N. Y.
First National Bank, Mobile, Ala.
Seventh Avenue Apartment Hotel, Nashville, Tenn.
Presbyterian Church, Beaver Falls, Pa.
City Hall and Annex, Philadelphia, Pa.
Rose of Lima Church, Philadelphia, Pa.
Providence High School, Chicago, Ill.
Northwest State Bank, Chicago, Ill.
Presbyterian Theological Seminary, Chicago, Ill.
The Commons
Gymnasium
Westminster Church, Chicago, Ill.
War Memorial, Cornell University
Boldt Tower, Cornell University
Church of Immaculate Conception, Germantown, Pa.
Lying-In Hospital, University of Chicago
Circle Tower Building, Indianapolis, Ind.
West City Bank, Chicago, Ill.
Delmonico Hotel, New York, N. Y.

AMERICAN BLUE STONE COMPANY

Producers of Genesee Valley Blue Stone

101 Park Avenue, NEW YORK, N. Y.

QUARRIES AND MILLS: AMBLUCO, WYOMING CO., N. Y.

Products

GENESEE VALLEY BLUE STONE, a New York State blue stone for architectural exterior and interior building construction.

NATURCLEFT FLAGGING for Garden Walks, etc.

For AMBLUCO Non-slip Treads, Landings, Flooring, Thresholds and Wall Base for interior and semi-interior uses, see Manufacturers' Index.

Facilities

This company was organized and opened its first quarry in 1899. Later it purchased the Genesee Valley Blue Stone Company's property of about 200 acres and extensively developed the quarries which had been in operation since 1868 at what is now Ambluco, Wyoming County, N. Y. The blue stone is taken out to a depth of 100 ft. from the top of the ground.

Mills and yards are equipped with the most modern machinery so that large volumes of business can be shipped without delay. Sawed stock can be easily finished up by local cut stone contractors.

Genesee Valley Blue Stone

Color and Texture—A distinctive uniform shade of light blue, blending well with adjacent light colored surfaces, or giving a sharp clean contrast with dark materials. It is of a fine grain and even texture, being made up mostly of pure hard quartz as shown below.

MINERALOGICALLY CONSIDERED

Fine hard sand, mostly quartz	70%
Clay, as binding material	28%
Water	2%

In this blue stone, quartz, the essential constituent, being harder than the accessory minerals, is pre-eminent on the wearing surface, which makes the stone slip-proof and very durable.

Strength, Weight and Fire Resistance—Few, if any, stones have a greater crushing and transverse strength than this blue stone. Likewise, the stone has high tensile and shearing strengths.

The following table gives its crushing strength, as compiled from tests made by the United States Ordnance Department:

CRUSHING STRENGTH

Rockport granite (Kidder's Hand Book)	17,750 lb. per sq. in.
Vermont marble	Average 13,500 lb. per sq. in.
Genesee Valley blue stone	19,970 lb. per sq. in.

Although of great density it weighs only approximately 150 lb. per cu. ft. when cut ready to set.

It offers great resistance to extreme heat, and the dielectric strength test is among the highest of all natural stones.

Durability—Specimens of this blue stone have been critically and carefully analyzed by eminent mineralogists and pronounced one of the most durable of all stones. In abrasive tests it excels most other stones. Like all stones, it should be cut to set on its natural bed.

It is said by one who has been in the business all of his life and who has made careful study of the stone edifices in Europe, that this Genesee Valley Blue Stone is very much the same as the stone in the architecturally famous stairway of the court in the Bargello Palace, Florence, Italy.

CHEMICAL ANALYSIS

Silica	76.50%
Alumina	14.75%
Oxide of iron	6.35%
Water	2.00%
	99.60%

Adaptability—This blue stone has substantially all the good qualifications of the old genuine North River blue stone which has practically been out of the market since 1912, and has several advantages over such blue stones of the reedy rock character. Genesee Valley Blue Stone is a liver rock and does not produce natural split flagging and curbing. The sheets of stone in these AMBLUCO quarries, being of unusually low levels, represent early deposits and are, therefore, much harder and more compact than stone quarried from higher levels. The quarry blocks are from 2 to 4 ft. thick, permitting ashlar and base courses to be set on the natural bed with face against the grain, which condition rarely or never exists with other blue stones.

Cutter and Sawed Face Ashlar

Even more artistically effective than seam face granite, cutter face (vertical seam face) blue stone ashlar has been worked into buildings of the early American farm house and English Tudor styles. The cutter faces are permanently and beautifully stained many colors and soft shades, producing an old tapestry design when laid random. Also the combination of sand sawed and shot sawed faces furnishes a pleasing relief from the smooth planed and rubbed finishes.

Foundation Beds, etc.

Genesee Valley Blue Stone is unexcelled for engine, motor, pump, etc., foundation caps. It is also especially good for shelves and uprights of underground vaults. Garden seats and sundials are frequently made of it.

Specification Suggestions for Exterior Use

It is essential that Genesee Valley Blue Stone be specified, and better to guard against the substitution of inferior blue stones, mention this company's name and address as producers.

Specifications should require all blue stone (as well as most other stones) to be thoroughly seasoned and to be cut so as to set on its natural bed, especially when used for grade courses.

The practical finishes, in order of their costs are: Sand sawed; shot sawed; rock face; wet sand rubbed; fine axed (6-cut); horizontally (machined) tooled; and vertically (hand) tooled. This blue stone also takes most any finish applied to a natural stone. The sand sawed finish, showing no saw marks, is very uniform and brings out the character of the stone. This is produced by a slow process and does not burn and bruise the surface of a stone as does planing and axing.

Naturcleft Flagging

A natural split flagstone of definitely known qualities from the finest quarries in Pennsylvania. Its many soft mellow color tones are unequalled by any other similar material. Specify Naturcleft Flagging as furnished by the AMERICAN BLUE STONE COMPANY, New York, N. Y., and be sure to get the genuine.

Co-operative Service

Our organization, through its members' lifelong experience with blue stone, offers its knowledge in an impartial manner, unbiased by thought of personal profit.

THE BRIAR HILL STONE CO.

Golden Buff and Variegated Sandstone; Golden Tone Ashlar Wall Facing

GLENMONT, OHIO

Briar Hill Golden Tone Sandstone

Briar Hill Golden Tone Sandstone—rough blocks, semi-finished, ashlar, stone-brick or cut and carved ready to set in accordance with plans and specifications.

BRIAR HILL GOLDEN TONE SANDSTONE
TRADE-MARK

Readily available in practically every locality.

Varieties—Golden buff, variegated in either light or dark shades, and "run-of-quarry," which comprises all colors.

Variegations consist of banded, mottled, speckled, and clouded markings in an infinite variety of patterns and combinations.

The reproductions on the four following pages give an approximate idea of the remarkable range of colors found in Briar Hill Sandstone. All colors are tinged with an exquisite, subdued golden tone. The infinite number of intermediate shades and markings make it practical to select for color only in a very general way. *Use color, too, when you build with stone.*

Adaptability—Suitable for all classes of buildings, both for interiors and exteriors; effective as trim for seam face granite, field stone, brick or stucco, and especially adapted to gothic architecture, because of its easy working qualities.

Durability—Briar Hill Sandstone is permanent in texture and color. Positive proof of this is offered by an old church at Glenmont, cornerstone of which is illustrated below. Built of stone from this quarry in 1857, the original tool marks remain clean cut and sound. Age merely mellows the beauty of this colorful stone.

Physical and Chemical Properties—Results of physical and chemical analyses, compression, freezing and absorption tests gladly furnished on request.

Quarry—Our vast quarry holdings insure a practically unlimited supply of this stone.

Facilities—Our quarry and mill are thoroughly equipped with modern machinery, capable of handling any size project. Prompt, efficient execution of contracts assured at all times.

Price—Although distinctive and yielding infinite color resources to the architect's skill, Briar Hill Stone is reasonable in cost. It is, therefore, economically available for all classes of buildings. .

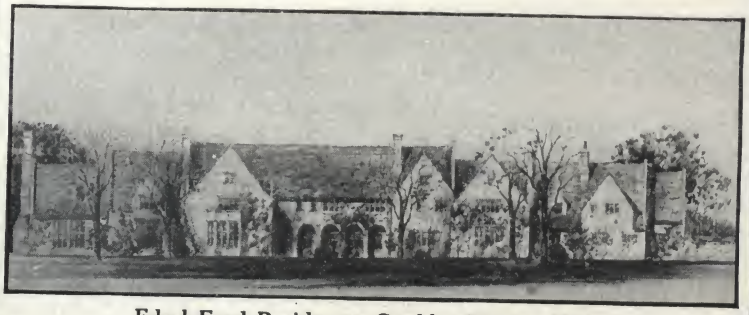
References

Some representative buildings (with architects) in which Briar Hill Sandstone has been used:

Harkness Memorial Quadrangle, Yale University, James Gamble Rogers
Washington Loan & Trust Co., West End Branch, Washington, D. C., Arthur B. Heaton
Farmers & Mechanics Bank, Framingham, Mass., Thomas M. James Co.
First National Bank, Boston, Mass., York & Sawyer
Sterling Memorial Library, Yale University, James Gamble Rogers
J. J. Emery Residence, Montgomery, Ohio, Delano & Aldrich
St. Paul's Church, Winston-Salem, N. C., Cram & Ferguson and Harold Macklin
M. M. Van Beuren Residence, Middletown, R. I., H. T. Lindeberg
First National Bank Building, Charlotte, N. C., Lockwood, Greene & Co.
University of Detroit, all buildings on new campus, Malcomson & Higginbotham
Middletown Savings Bank, Middletown, Conn., Hopkins & Dentz and Davis & Waldorff
Alfred G. Wilson Residence, Rochester, Mich., Smith, Hinchman & Grylls
Bioren Bank, Philadelphia, Pa., Arthur H. Brockie
W. E. Scripps Residence, Randall Beach, Mich., Clarence E. Day
Church of the Holy Child, Philadelphia, Pa., George I. Lovatt
Fordson High School, Fordson, Mich., H. J. Keough
Riverside Church (Chapel), New York, N. Y., Henry C. Pelton
Wardman, Shannon & Luchs Office Building, Washington, D. C., Arthur B. Heaton
Stuart Duncan Residence, Newport, R. I., John Russell Pope
St. Louis Church, Cincinnati, Ohio, Maginnis & Walsh



San Diego Trust & Savings Bank, San Diego, Calif.
Wm. Templeton Johnson, Architect



Edsel Ford Residence, Gaukler Pointe, Mich.
Albert Kahn, Inc., Architect



Immaculate Conception Church, Waterbury, Conn.
Maginnis & Walsh, Architects



Dayton Art Institute, Dayton, Ohio
Edward B. Green & Sons and Albert Hart Hopkins, Architects



Cornerstone Old Church, Glenmont, Ohio
Original tool marks remain clean cut and sound



Temple Beth Israel, Portland, Ore.
Morris H. Whitehouse & Herman Brookman, Associate Architects

Continued on next page



Briar Hill Golden Buff



Briar Hill Variegated (lighter shades)



Mecca Temple, New York, N. Y.
J. K. Knowles Estate and Clinton & Russell, Architects



Briar Hill Variegated (darker shades)

Color Illustrations about 1/6 actual size



Federal Reserve Bank, New York, N. Y.
York & Sawyer, Architects



Edward F. Fisher Residence, Detroit, Mich.
Richard H. Marr, Architect



Leonard Hall, Kenyon College, Gambier, Ohio
Abram Garfield, Architect



Entrance Detail—Harkness Quadrangle, Yale University
James Gamble Rogers, Architect



Church of the Good Shepherd Jacksonville, Fla.
Corbusier & Foster, Cleveland, Ohio, and Mellen C. Greeley, Jacksonville, Associate Architects



Harkness Hall, Yale University
Delano & Aldrich, Architects

Continued on next page



Briar Hill Ashlar

THE wall shown above in actual colors is built of stone which is furnished in standard heights and random lengths suitable for any number of different patterns in broken coursed ashlar, or straight coursed ashlar in varying heights.

While the wall pictured is of split faced ashlar, this material may also be obtained with sand or shot sawed face.

This stone is ready to set with very little additional labor by the mason on the job.

Write us for prices—you will be agreeably surprised.



Residence of W. D. McClintock, Detroit, Michigan

CLARENCE E. DAY, ARCHITECT — THOMAS H. HEWLETT, ASSOCIATE

THIS SPLENDIDLY DESIGNED HOME IS AN OUTSTANDING EXAMPLE OF THE USE OF BRIAR HILL SPLIT-FACE ASHLAR WALL FACING IN COMBINATION WITH CUT STONE TRIM OF BRIAR HILL GOLDEN TONE SANDSTONE. WITH RARE DISTINCTION, ARCHITECTURAL CHARM IS ACCENTUATED AND ENHANCED BY THIS WARM, FRIENDLY STONE.



Home, Birmingham, Michigan

A. L. WEEKS, ARCHITECT

AN INTERESTING COMBINATION OF BRIAR HILL SHOT-SAWED ASHLAR AND STONE BRICK, ILLUSTRATING THE FLEXIBILITY AND ECONOMY OF MATERIAL AND LABOR.

Continued on next page





ST. PAUL'S EPISCOPAL CHURCH, MT. VERNON, OHIO, *BEFORE* AND *AFTER* BEING VENEERED WITH BRIAR HILL GOLDEN TONE SPLIT-FACE ASHLAR. THE OLD BRICK WALLS (LEFT ILLUSTRATION) WERE NOT DISTURBED—THEY WERE SIMPLY COVERED WITH A NEW STONE FACING (RIGHT VIEW) OF GOLDEN TONE ASHLAR, 4 INCHES THICK.

RONAN & INGLESON, ARCHITECTS, COLUMBUS, OHIO

Old Buildings Can Be Modernized in Appearance with *Colorful* Natural Stone—*at Moderate Cost*



EITHER STONEMASONS OR BRICKLAYERS ARE CAPABLE OF SETTING BRIAR HILL ASHLAR. THE ILLUSTRATION SHOWS THE STONE SCORED WITH A STRAIGHT-FACED CHISEL OR COPING TOOL, PRIOR TO BREAKING TO THE DESIRED LENGTH.



AFTER BEING SCORED, THE STONE IS TAPPED GENTLY AND THE DESIRED BREAK IS EASILY ACCOMPLISHED. THE ASHLAR IS NOW READY FOR SETTING. NO EXPENSIVE CUTTING IS INVOLVED IN THIS OPERATION.

THE great beauty and effectiveness of Briar Hill Sandstone has made it famous from coast to coast. Noted architects, the country over, have employed it to individualize countless churches, banks, libraries, universities and schools. For many years, however, the relatively high cost of Briar Hill "cut" stone has tended to limit its use to buildings where a premium could be paid for its colorful beauty.

With nation-wide popularity sponsoring its distribution and ultra-modern quarrying facilities reducing production costs, Briar Hill Golden Tone Ashlar Wall Facing is now economically available everywhere for modernizing, renewing the youthful appearance of aged structures—as well as individualizing new ones—at decidedly reasonable expense.

To the patrician dignity possessed by virgin stone, Briar Hill Ashlar adds the warm, friendly tones of natural, softly glowing colors. With rare distinction, architectural charm is accentuated and enhanced by this exquisite, radiant sandstone. Its diversity of fine surface textures, rich variety of beautiful blending tints, convenient random lengths and variable course heights, afford a gloriously wide range for original and exclusive effects.

Architects Invited to Write for this Free Ashlar Booklet

Our new Ashlar Wall Facing Booklet illustrates numerous Briar Hill houses, pictures the stone in its own lovely coloring and contains many valuable suggestions. A copy will be sent to any architect for the asking. We will gladly estimate the cost of your buildings—individualized or modernized—with Briar Hill Golden Tone Sandstone. Just send us your blueprints—no cost or obligation.

Continued on next page



Briar Hill Stone Brick

Illustrated in actual colors on this page.

Cut to the size of ordinary face brick (*or in random lengths varying from 6 inches to 36 inches*), this flexible building material combines the warmth and color of Briar Hill Sandstone with the ease and simplicity of laying any standard building brick. Prices are very reasonable.

Bricks of Briar Hill Sandstone have high compressive strength, low moisture absorption, and can be laid with ordinary lime and Portland cement mortar with absolutely no danger of staining.

Specials, such as paving brick sizes, or the long, thin slabs sometimes used in country house work, are also available at reasonable cost.

We solicit inquiries from architects and will be glad to work out special sizes or color combinations for out-of-the-ordinary projects.

Write for samples and prices, delivered, in your locality.

Observe particularly, please, the cut stone trim of Briar Hill Sandstone, which has been tooled and sand-blasted to impart the mellow charm of primitive craftsmanship and incalculable age. A house of stone with this treatment has apparently weathered storms, sheltered and protected succeeding generations for centuries.

HOOSIER SANDSTONE COMPANY

Producers of Sienna Sandstone, Sienna Rubble Stone and Sienna Flagstone

BEDFORD, INDIANA

Sienna Sandstone is a colorful, close-textured, fine-grained stone, with such free working qualities that it may be used in any desired location.

Its rapid cutting qualities makes it reasonably economical in cost, while the fine close grain makes it possible to cut a sharp arris on artistic, sharp-outlined moulding in a manner not usual with sandstones. Intricate cutting and delicate carving can readily be executed on Sienna Sandstone without the slightest loss of detail.

The color definition in this stone is distinctly different from any other sandstone from quarries now in operation.

The sharply defined lines, with variations of color in a small area of surface, lends a charm to Sienna Sandstone exclusively its own.

Skillfully used by the artistic designer, Sienna Sandstone is like a palette of colors under the skilled painter's brush; ready for use to produce any result within the ability of the artist, and the more skilled the designer the better will be the result.

There are no harsh or irritating colors. The warm, soft tones blend with all of nature's colorings, producing just the right shade of contrast with deep shadows cast by trees in full foliage and the right harmony with bright green lawns to please the most exacting artist.

Unlike many of the coarse-grained sandstones, Sienna does not blacken so readily and become grimy with dirt. The close grain of the stone is responsible for this comparative freedom from discoloration.

Portland cements or prepared slow-setting cement mortars do not stain Sienna Sandstone. Any of these may be used without fear of staining or discoloring the stone.

Sienna Sandstone can be obtained in practically any size block and in any quantities desired.

Like all other highly colored stones and marbles, it is practically impossible to hold to an absolute uniform tone. The natural colors of the stone are such that they blend perfectly, making it almost impossible to get a harsh or restless wall surface.

The colors of the stone will come under two general classifications, namely, Light and Dark Variegated.

The fine grain of Sienna Sandstone makes it firmer than most sandstones. This is reflected in the physical tests, especially in compression and absorption. Full information regarding these tests will gladly be furnished upon request.







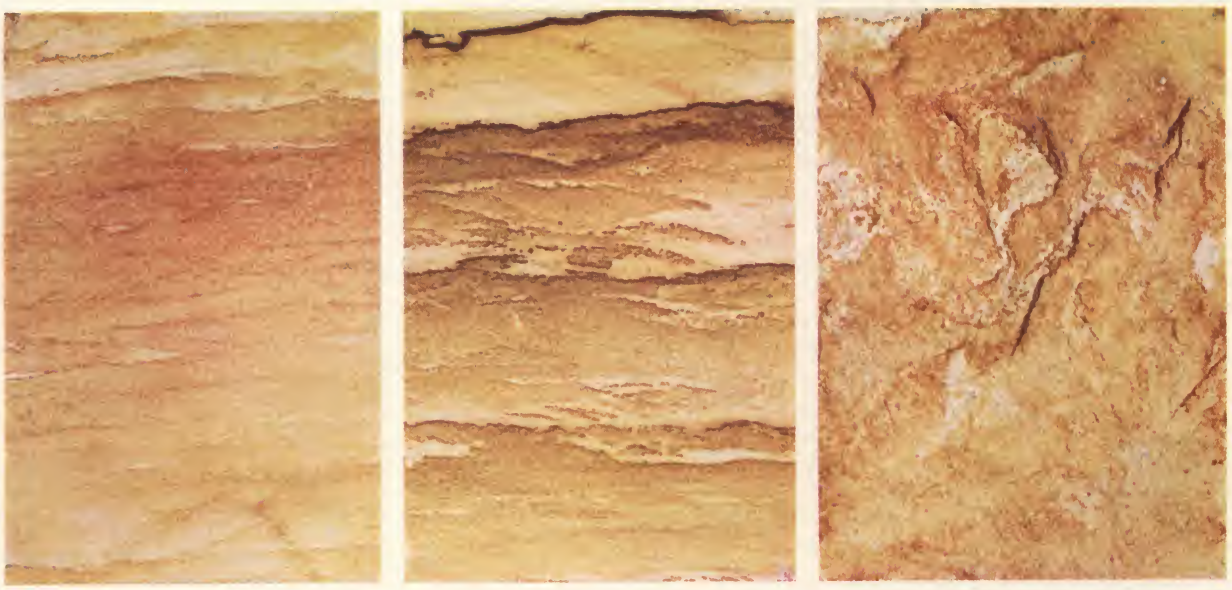
The color plates shown here are made direct from the stone. It has been our endeavor to faithfully reproduce the blend of colors without retouching or altering in any way. No printed process will bring to you all the color and life of this stone, but these reproductions will at least indicate its characteristics and color possibilities







Continued on next page



Sienna Sandstone may be finished smooth, sand or chat sawed or split faced. Split faced ashlar is particularly adapted to residence work and is generally furnished in strips of multiple heights to be broken to length by the mason at the job. The sample on the right of the panel above is an example of split faced Sienna Sandstone



Sienna Sandstone comes from a ledge formation; the ledges varying from three feet to twelve feet in depth.

Sienna Rubble stone, as pictured above, comes from a stratified formation making it possible to obtain any thickness from one-half inch up to eighteen inches in height. Regardless of the thickness of the stone when quarried, it can be readily split down to any desired thickness.

Sienna Rubble stone is a very rapid working stone. It splits readily and on a practically level bed, so that no time is lost by the mason in bedding down the stone before it is ready for the wall. The stone breaks readily to a line, so no time is lost in returning a corner.

The beautiful soft colors in Sienna Rubble stone make it possible to obtain the full effect of rubble masonry and at the same time add a warmth to the wall which is not ordinarily found in rubble work.

Sienna Rubble stone is an ideal medium for solid masonry walls and equally as effective when broken to wall thicknesses for veneer work.

Sienna Sandstone and Indiana Limestone are both splendid materials to use as trim for a field built of Sienna Rubble stone.

Sienna Flagstone: This Flagstone carries about the same colors as Sienna Rubble stone. It may be used just as it comes from the quarry with a semi-smooth surface, so desirable for exterior flagstone walks, or it may be honed to a perfectly smooth surface.

Either honed or quarry-faced flagstone may be obtained in irregular shapes, random rectangular or worked out to any pattern desired.

It would be impossible to write a short specification that would cover all the possible uses of Sienna Sandstone, Sienna Rubble stone and Sienna Flagstone. Each project will require its own specification and can only be written after the architect has decided upon the particular effect desired.

For blanket coverage this identification may be used: Sienna Sandstone, Sienna Rubble stone or Sienna Flagstone as produced by the Hoosier Sandstone Company, Bedford, Indiana.

GEORGE WASHINGTON STONE CORPORATION

Aquia Colonial Stone

OFFICE AND SAWMILL
ALEXANDRIA, VA.

QUARRIES: AQUIA CREEK, VA — CUT STONE PLANT: WASHINGTON, D. C.

Aquia Colonial Stone

Aquia Colonial Stone is distinctive and different. An exceptionally strong stone, it holds the lustre of its warm color tones indefinitely and offers to the designer a medium of expression not ordinarily found in quarry products.

Description

Finishes—Its attractiveness is broadened by economical finishes—"Continental," "Smooth Rubbed," "Antique Weathered" and "Rough Gang Sawn."

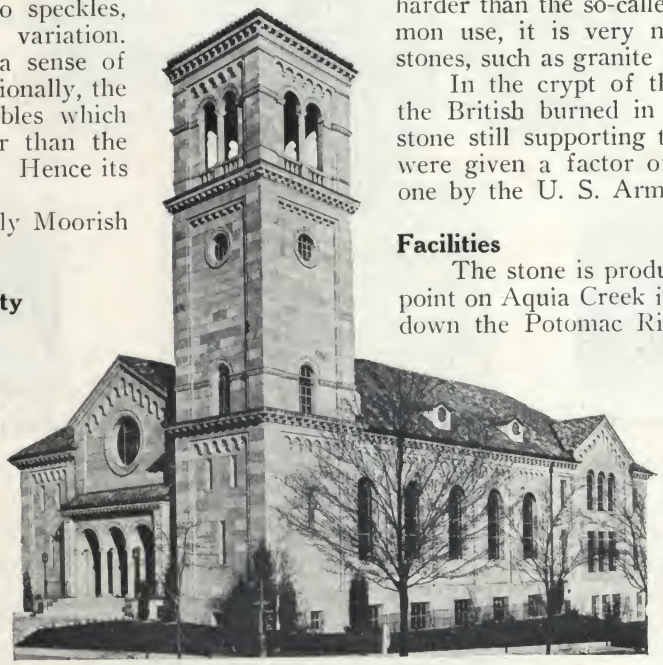
Colors and Markings—Its charm is governed by a warm tan-tone background with here and there patches of color ranging from cream to orange or reddish brown, which sometimes shorten into speckles, dependent upon the natural variation. Through it all there comes a sense of liveness and lightness. Occasionally, the markings include quartz pebbles which are held in a matrix harder than the granular particles themselves. Hence its unusual durability.

In all, the stone is slightly Moorish in effect.

Characteristics and Durability

Hand quarried by George Washington, the pick marks of the African slaves are still plainly seen on the old quarry workings, over some of which the water has run for more than a century. Modern machinery and methods give production and selection to this hard strong stone of color.

Its chief characteristic is its unusual cleanliness. Its stability is demonstrated by its ability to be quarried during low temperatures when most other stones freeze to the point of destruction.



Fourth Presbyterian Church, Washington, D. C.
APPLETON P. CLARK, JR., Architect

Uses of Aquia Colonial Stone

Aquia Colonial Stone lends itself readily to carving and is easily susceptible to the touch of artistic craftsmanship. Its pleasing figurations have given it employment in structures of outstanding importance by some of the country's most prominent architects. Besides buildings of utilitarian value, memorials, mausoleums, churches and chapels have also been built of it. Its colors add beauty and interest to interior work in stone, as well as to exteriors. Columns and balusters are successfully turned and while the stone is much harder than the so-called soft stones of more common use, it is very much less costly than hard stones, such as granite and marble.

In the crypt of the National Capitol, which the British burned in 1812, are columns of this stone still supporting the mammoth dome, which were given a factor of safety of seventy-five-to-one by the U. S. Army Engineers.

Facilities

The stone is produced at a somewhat isolated point on Aquia Creek in Virginia, about fifty miles down the Potomac River from Washington, and barged to the sawmill at Alexandria, Va., where shipments of sawn slabs and blocks are made to the cut stone trade. At Washington a cut stone plant fabricates the product into final finished form.

Architects and owners are assured of competitive prices from some of the principal cutting plants in the country.

Large sizes are readily obtainable.



Gallery of Fine Arts, Yale University, New Haven, Conn.
EGERTON, SWARTWOUT, Architect

References

Among the recent projects in which Aquia Colonial Stone has been used are the following:

BUILDING AND LOCATION	ARCHITECT
Harkness Hall, Yale University, New Haven, Conn.	Delano & Aldrich
Richmond Public Library, Richmond, Va.	Baskerville & Lambert
Knights of Columbus Home, Baltimore, Md.	George R. Callis, Jr.
Fort Lincoln Chapel and Fort Lincoln Mausoleum, Washington, D. C.	Horace W. Peaslee
Federal American National Bank, Washington, D. C.	Alfred C. Bossom
National Bank of North Philadelphia, Philadelphia, Pa.	W. H. Lee
National Bible Institute, New York, N. Y.	McKenzie, Voorhees & Gmelin
Immaculate Conception Church, Philadelphia, Pa.	Paul Monaghan
Chapel, Princeton University, Princeton, N. J.	Cram & Ferguson
Canadian Bank of Commerce, Toronto, Ont., Can.	Darling & Pearson

THE TAYLOR STONE COMPANY

Producers of Scioto Sandstone

McDERMOTT, OHIO

Scioto Sandstone

Scioto Sandstone is generally described as being a dense, fine-grained silica stone, possessing an unusually high compressive strength. Its widespread popularity for both exterior and interior construction insures a distribution that makes it readily available in practically every locality.

Scioto Sandstone ranges in color from a blue or pearly gray to a deep golden buff, the individual colors being designated as Blue, Gray, Buff and Tammany. The latter stone was so named because of the pronounced stripes which give it marvelous beauty.

Scioto Sandstone's durability is portrayed in some of the structures pictured here; the Cincinnati building, built in the eighteen seventies, was sandblasted in 1927 and revealed not a single flaw, or evidence of disintegration. At Buena Vista, Ohio, stands a house which was built in 1803. After 125 years, the rough hewn walls are in perfect condition, even the tool marks remaining sharp and clean.





Cincinnati-Covington Bridge, Cincinnati, Ohio



Public Library, Portsmouth, Ohio



Albany Avenue Bridge, Atlantic City, N. J.



Interior of St. Vincent's Church, New York, N. Y.



Courthouse, Calgary, Alta., Can.

Scioto Sandstone production is assured for countless years to come, because of the well nigh inexhaustible supply in our great quarry. Every modern facility has been employed in our quarry, our enormous seventeen gang mill, and our finishing department, to assure our patrons quality workmanship and excellent service.

Scioto Sandstone, possessing many superior qualities, readily recognized and appreciated by the architect and builder, is nevertheless reasonable in price, whether furnished in the block, sawed, planed, or cut ready to set.

Chemical Analysis

Silica	88.5%
Alumina	5.9%
Oxide of Iron	1.7%
Moisture	2.1%



Jewish Temple, Portsmouth, Ohio



Business Block, Cincinnati, Ohio

Calcium — Magnesium — Oxide — Titanium Traces.

Crushing Strength—10,500 lb. per sq. in.

Specifications for Scioto Sandstone

This stone shall be of uniform texture and color throughout, and shall be free from rust streaks, checks or seams. It shall be a hard, dense, fine-grained silicious stone, comprising at least 86% silica, with not over 6% alumina content, and have a compressive strength of not less than 10,000 lb. per sq. in.

To guard against inferior substitution, we respectfully suggest that, "Scioto Sandstone, produced by THE TAYLOR STONE COMPANY," be specified as the comparative standard.

Adaptability and Advantages

Scioto Sandstone is adaptable to all types of architecture. It has long been recognized as a superior stone for bridge construction because of its great strength; that its warm tones produce an incomparable effect in interior construction, is evidenced by its selection for exclusive interior use in four of New York City's greatest cathedrals; because of its fine-grained denseness it produces the finest detail in intricate carvings; it is a highly desirable stone for general trim, and unusually attractive for random ashlar work.

Continued on next page

Special Products of Enduring Stone

These creations of our master designer are offered as being worthy of your earnest consideration in your efforts to choose those finishing touches so essential to maximum beauty in modern architecture.

Scioto Sandstone possesses necessary qualities of rich texture, warm tones, great strength and durability, essential to pleasing effect and lasting satisfaction.



"Scioto" Natural Stone Crypts for Community Mausoleums

This beautiful stone is in keeping with the other fine materials employed in mausoleum construction. "Scioto" natural stone crypts are adaptable to any design of construction and any drainage and ventilating system. They are accurately machine finished ready to set — no costly forms to buy — no waiting for concrete to set— crypt erection can proceed continuously until finished. Scioto Stone is of uniform quality, free from ribbons, seams, checks, cracks and soft spots. Of a dense fine-grained nature it is practically non-absorbent and with a crushing strength of over 10,000 lb. per sq. in., is three times as strong as *good* concrete. "Scioto" natural stone crypts are of great value in sales promotion as our natural stone burial vaults have been sold by prominent cemeteries for 40 years. Our mausoleum expert is at your service—no obligation of course.

Location and name of architect or builder of recently constructed community mausoleums in your locality, in which "Scioto" Natural Stone Crypts were installed, will be sent on request.



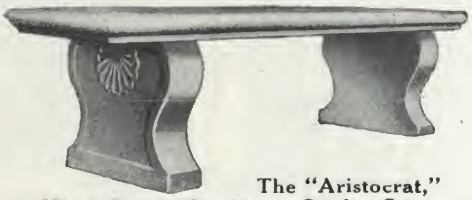
Crypt Construction, Forrest Hill Mausoleum, Canton, Ohio



Mantel of Scioto Sandstone

Garden Seats and Flagstones

Scioto Sandstone garden seats have met with instant approval wherever introduced. Although we have standardized on two designs that have proven the most popular, we can promptly furnish seats of any design. Our *"Natural Surface"* flagstone in rich but harmonizing colors of blue and buff, is particularly adaptable to rustic settings, while our sawed surface flagstone lends itself with pleasing effect to more formal surroundings. The proper complement of "Taylor" seats and flagstone walks will enhance the beauty of the most magnificent garden.



The "Aristocrat,"
Hand Carved Sandstone Garden Seat

Unmatchable Mantels of Scioto Sandstone

Nature was the artist who placed the beautiful stripes in our "Tammany" stone, thereby giving us an incomparable material for mantel construction. The stately mantel pictured here is one of our several standard designs, which have been developed to meet the taste of the most discriminating, and lend complete harmony to modern or periodic styles of interior decoration. "Tammany" stone is featured in our mantels, but we can furnish mantels in our blue, buff, or gray stone.

Floors of Scioto Sandstone

Ideal for solariums, corridors, vestibules, etc. Due to its dense fine-grained texture, it will dress down to a razor-hone finish and hold shellac or varnish better than wood. The harmonizing colors of buff, blue, gray and tammany may be incorporated in many attractive designs.

Catalogues

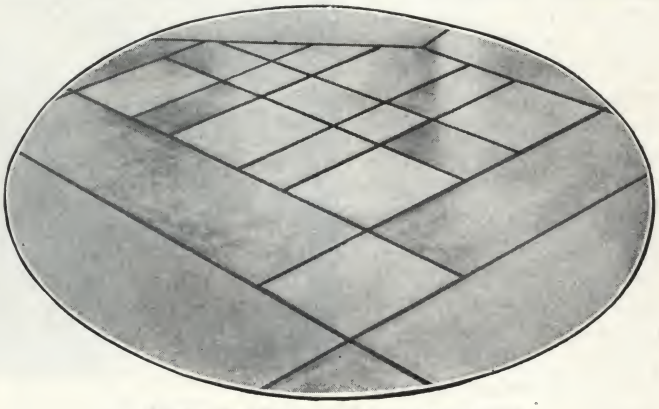
Individual catalogues covering in detail each of the products listed here, will be gladly mailed to you promptly upon receipt of your request. It will be a pleasure for us to furnish samples of Scioto Sandstone, give prompt quotations, and otherwise assist you in every way possible. Please consider us at your service.

Specialty Work

We are in position to promptly execute any special work not here referred to. Your inquiries will receive immediate attention.



Garden Walk and Seats of Scioto Sandstone



Attractive Floor of Scioto Sandstone

THE CAST STONE INSTITUTE

33 West Grand Avenue
CHICAGO, ILL.

Characteristics of Cast Stone

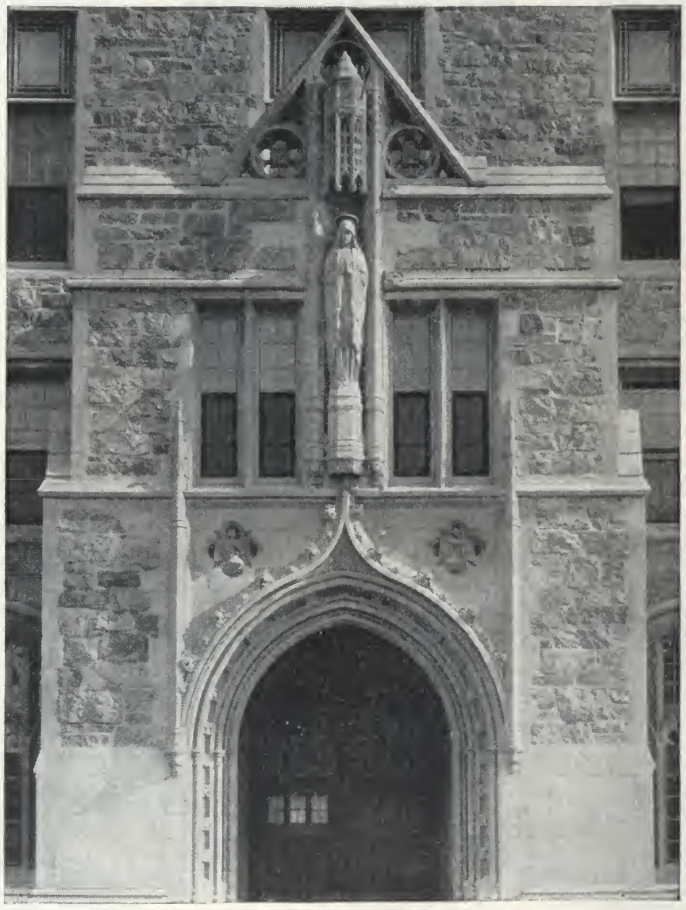
Cast stone is a building stone molded from concrete in which the aggregate is especially selected for durability and appearance. Its claim to recognition and usefulness is based on its own merits—its architectural versatility and permanence.

Advantages of Cast Stone

The ability to be fashioned easily and accurately is a property especially valuable in a building material. Cast stone possesses this property by virtue of its process of manufacture wherein natural stone is broken down, given the quality of temporary plasticity and molded into any desired shape or size. This property of being temporarily plastic gives cast stone the advantage of unlimited decorative possibilities. It also makes possible the shaping of pieces to meet any architectural or structural requirement.

One of the principal advantages of cast stone is the wide range of color permitted by its use. Different colored aggregates combined with mineral coloring pigments make possible this broad latitude of color treatments with full assurance that they will be satisfactory and lasting. Color is inseparably connected with architectural design. The possibilities of cast stone for the application of color to architecture are endless. Therein lies a field which offers to architects an unlimited opportunity for the expression of originality and decorative genius.

The ability of cast stone to remain clean and free from discoloration is another of its advantages. Disfigurement caused by dirt, soot and gases taken from the atmosphere by highly absorptive materials frequently obscures the beauty of buildings so far as architectural lines and decorative details are concerned. Proper design and careful setting will help to overcome this difficulty but the density and nonstaining properties of the material are factors of utmost importance. In this respect cast stone is unexcelled. Buildings faced with it, because of their freedom from discoloration, usually stand out in striking contrast to adjacent structures which are faced with other materials.



St. Mary's Hall, Boston College
MAGINNIS & WALSH, Architects, Boston

The uniformity of quality which is characteristic of cast stone gives it unusual dependability. Such dependability is an inherent advantage of scientific processes such as are used in the production of cast stone, wherein all ingredients are carefully selected and graded, accurately proportioned and thoroughly mixed.

Surface Finish

The appearance of cast stone depends largely upon the selection of materials and the nature and extent of surface finish. Beyond the point at which it comes from the mold there is considerable difference in the expense involved in finishing cast stone, depending upon the nature and extent of the treatment. Surface finish should be clearly indicated whenever cast stone is being specified. To assist architects and engineers in specifying cast stone the following classifications have been adopted:

Plain Cast Stone
Surfaced Cast Stone
Cut Cast Stone

Each class of cast stone has a field of use for which it is especially adapted. Which of the three classes is to be selected for a particular job depends upon the nature of the building, the style of architecture and the personal tastes of architect and owner.

Specifications

The production of cast stone is a highly specialized business requiring skilled and experienced craftsmen and extensive manufacturing equipment. As with all other highly manufactured products, cast stone is a reflection of the ability of its manufacturer. Under the circumstances, architects and engineers are urged to insist that cast stone be furnished and handled under the requirements of the following specification, which permits free and open competition but at the same time assures a product of durable and satisfactory quality.

Complete information on cast stone, together with a condensed form of specification and representative architectural details will be sent upon request.

Continued on next page

COMPLETE ARCHITECTURAL SPECIFICATIONS FOR CAST STONE

General

The work covered by this specification is subject to the provisions of the "General Conditions of the Contract" (Fourth Edition, copyrighted 1925), issued by the American Institute of Architects. The cast stone manufacturer and the erecting contractor shall be governed by all the requirements thereunder.

Work Included

This specification covers all labor, materials and services incidental to and including the furnishing and erecting of all cast stone as indicated on the drawings and specified herein.

Division of Work

The manufacturer shall be responsible for all labor, material, equipment and services necessary for and incidental to providing all cast stone covered by this specification.

The erecting contractor shall unload, receipt for, store and erect all cast stone covered by this specification and shall provide and install all anchors for same.

Drawings and Details

Scale and detail drawings will be furnished where necessary by the architects and they shall be accurately followed in the execution of this work.

The manufacturer shall prepare complete shop drawings and setting diagrams for all cast stone work, showing sizes, sections and dimensions of pieces, jointing, bonding, anchoring, and all other necessary details. Each piece of cast stone shall have a setting number.

Copies of all shop drawings shall be submitted to the architects, one set to be approved by the architects in writing thereon and returned to the manufacturer before the manufacture of cast stone is started.

The general contractor shall furnish to the cast stone manufacturer all information necessary to enable the cast stone manufacturer to properly check the cast stone with connecting structural work to insure that these shall be in perfect agreement.

Reglets, rabbets, slots, etc., as shown by the architects' drawings shall be provided in cast stone to receive all flashing, sheet metal work, or other work which comes in conjunction with the cast stone. Setting loops or Lewis holes shall be provided in the cast stone where necessary for hoisting purposes.

Kind and Finish

All cast stone used in this work shall be the product of a manufacturer having capacity and facilities for furnishing the quality, sizes and quantities of cast stone required without delaying the progress of the work and whose products have been previously used and exposed to the weather with satisfactory results.

All cast stone used in this work shall have a compressive strength of at least 5000 lb. per sq. in. and an absorption of not more than 7% nor less than 3% when tested in accordance with the American Concrete Institute tentative specification for cast stone (P-3-A-29T).

All cast stone used in this work shall be (Note: Designate which one of the following classes and finishes is desired, and also indicate the approximate color and texture or grain desired in the cast stone):

Plain Cast Stone.

Surfaced Cast Stone (hand rubbed finish, brushed finish, acid washed finish).

Cut Cast Stone (machine rubbed finish, bush hammered finish, machine tooled finish, crandalled finish, hand tooled finish, sawed finish).

Each manufacturer bidding under this specification shall submit samples showing the quality and finish of the cast stone which he proposes to furnish. All cast stone used in this work shall conform in every particular to the sample as selected by the architects.

Models and Carving

Clay or plaster models of all ornament shall be provided by the manufacturer and shall be approved by the architects either from photographs or by personal inspection before any work is executed therefrom.

Tests

The architects shall have the privilege of selecting pieces of cast stone at random for testing. Tests shall be made by a laboratory approved by both the architects and the manufacturer and shall be paid for by the manufacturer. The Testing Laboratory shall submit copies of test results to both the architects and the manufacturer.

Handling and Storing at Site

All cast stone when being removed from cars or trucks shall be handled throughout by competent workmen and by such methods as will guard against soiling, mutilation or chipping. The cast stone shall be stored at the building site, for whatever time, in such a manner that it rests entirely clear of the ground and be protected by proper means from damage to arrises and from contact with anything that would result in damage from accumulation of dirt, dust, grease or other staining or disfiguring elements. During extended periods of storage at the building site, the cast stone shall be covered with tarpaulins or stout non-staining paper. In no case shall the cast stone be stored under trees or other overhanging objects.

Setting Mortar

All cast stone shall be set in mortar composed of one volume portland cement, one volume cold lime putty and five volumes sand. Lime putty shall be made from the best quality lump lime slaked with cold water, screened through a $\frac{3}{16}$ in. mesh screen into a settling box, allowed to stand not less than one week and then mixed with sand and stacked to age. The correct amount of cement shall be thoroughly worked into the mixture

Continued on next page

in small batches just prior to its use for setting the cast stone.

Centering

All wood centering required for the proper setting of cast stone shall be furnished and erected by the general contractor.

Anchors

All anchors used in setting this cast stone shall be wrought iron, zinc coated or dipped in asphaltum or red lead after fabrication. They shall be of sizes and shapes as indicated on the setting diagram and shall be furnished by the erecting contractor.

Setting

The erecting contractor shall set the cast stone in accordance with the requirements of the drawings. All exposed surfaces of cast stone shall be cleaned and the mortar surfaces of each piece shall be sponged with clean water just before setting. Each piece shall be set accurately, true to line, level and plumb by competent stone setters, with full flushed joints, all anchor holes being filled. The face of the cast stone shall be kept free from mortar at all times.

Pieces of cast stone in heavy projecting courses and other heavy projecting members shall be propped up until the anchoring has been built in and sufficient work is in place above to securely hold such members in position. Heavy blocks of cast stone shall not be set until the mortar in the joints below has thoroughly set. The use of pinch bars except on the backs of cast stone shall be prohibited. Each piece of cast stone, except where otherwise specified, shall rest on a full bed of mortar in sufficient amount to fill out to the edges of the piece on all sides. Each piece of cast stone shall be adjusted on its bed by striking with a wooden mallet or ram. Any piece which does not find its proper bed and accurate bearing shall be lifted and re-set on a new bed of mortar. All anchors and dowels as provided for shall be set in position as the courses are laid. All holes around anchors and dowels shall be entirely filled with setting mortar. Joints shall be raked out ¾ in. deep on the face for pointing.

Only the end of lug sills shall be set in a full bed of mortar, balance of joint to be left open until pointed.

Grouting and Caulking

All cornices, copings and projecting belt courses and pieces forming gutters shall be set with the vertical joints dry. These joints shall be caulked on the exterior profile with oakum and shall then be filled to within ¾ in. of the top with liquid grout composed of one volume portland cement and one volume of fine sand premixed at least one hour before being used and of as thick consistency as can be poured into the joints. After grout has thoroughly set the top joint shall be filled with lead wool caulked tightly against the edges and left slightly convex on top, or with an approved elastic caulking compound. Oakum shall be removed and the face joints pointed as hereinafter specified.

Protection

All cast stone work after setting shall be properly protected from damage by means of boards or other suitable covering, where necessary, until completion of the work. The erecting contractor shall cooperate with the carpentry contractor who will furnish and erect the necessary protection for this work. The erecting contractor shall be responsible for all breakage and shall replace all broken pieces at his own expense.

Cleaning

When ready for pointing, the face of all cast stone shall be scrubbed with a fiber brush using soap powder and water and shall then be thoroughly rinsed with clean water. Any mortar splashed or dropped on the face of cast stone during setting shall be immediately washed off with a sponge and clean water.

Pointing

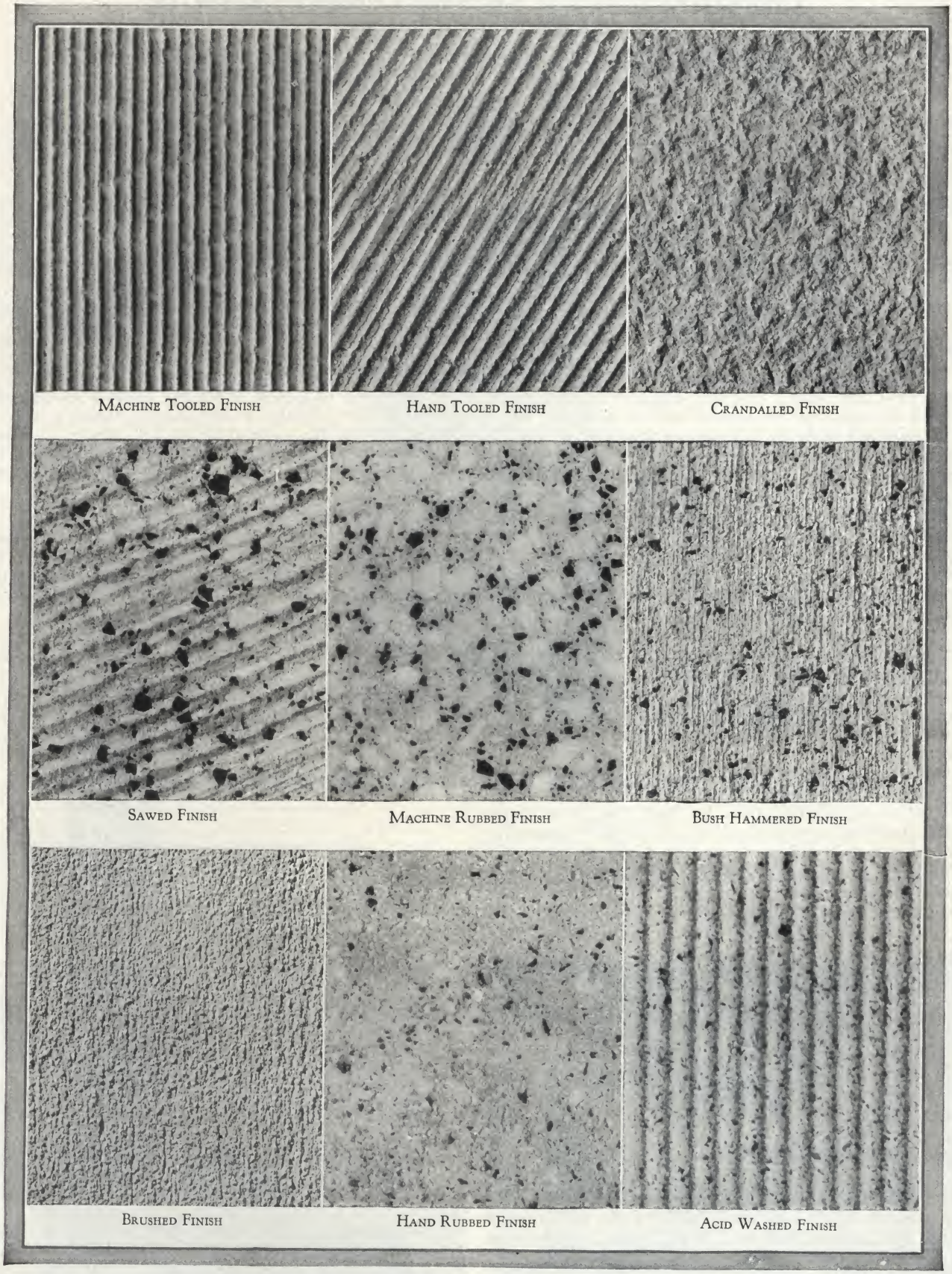
All face joints shall be brushed out clean to a depth of ¾ in., the joint dampened and then carefully pointed. Pointing mortar shall be composed of one volume of portland cement, one-quarter volume cold lime putty and three volumes of clean, sharp and well-graded sand, premixed in small batches and allowed to stand at least one hour before being used. The pointing mortar shall be packed solidly into all joints, completely filling them. The form of the joint shall be as directed by the architects.

Pointing shall not be done in freezing weather nor in locations exposed to hot sunshine unless properly protected.

Patching

The repairing of chipped or damaged cast stone shall be done only by mechanics skilled in this class of work, with materials furnished by this manufacturer and according to his directions.

Continued on next page



STANDARD FINISHES APPLIED TO CAST STONE

A wide variety of additional finishes can be had.

(The illustration of Acid Washed Finish shows tool markings moulded into the surface of the cast stone.)

AMERICAN KERAMENT CORPORATION

Manufacturers of Cold-Glazed Building Products

101 Park Avenue
NEW YORK, N. Y.

Products

COLD-GLAZED BUILDING PRODUCTS including: Colored Slabs, Ashlar, Trim, Window Sills, Spandrels, Grilles, Cornices, Doorways, Reliefs, and Decorative Pieces of all sorts.

For Tiles of Kerament, see Manufacturers' Index.

The Kerament Process

Since the discovery of cement and other artificial stone there has been a constant endeavor to develop a method of imparting permanent colored glazes to these bases not amenable to baking, particularly a method which was not subject to limitations of color, size or permanence. The Kerament (KERAmic-ceMENT) process successfully produces these permanent colored glazes on concrete and other units. This process was developed and perfected in Germany several years ago and is now widely used in building operations in practically all of Continental Europe. Kerament products have a permanent glaze of any desired lustre in an unlimited range of color or blendings of color. Ten years of practical use on interior and exterior surfaces throughout Europe, as well as rigorous tests conducted in government laboratories, have demonstrated its strength, waterproofness, immunity to all extremes of frost and climatic changes, ease of cleaning, permanence of lustre and color and freedom from staining by soot, grease, etc.

Kerament products have the strength and durability of concrete plus a brilliancy of color and variety of lustre comparable with the best faience or terra cotta products. In addition to its complete immunity from weather damage, its greatly lowered costs and wide range of size and design makes Kerament a product of first importance to architects interested in the use of interior or exterior colored glazed surfaces.

All of the rights and patents to the use of this process in the United States, including manufacture and sale, have been purchased by the AMERICAN KERAMENT CORPORATION.

Uses of Kerament

Kerament is used in oversized tiles, slabs, structural and decorative pieces in building exteriors, entire building and shop fronts, facades, arcades, subways, railway tunnels, etc.

Store Fronts and Facades

Kerament facings in permanent glazed color save more than 50% of the cost of any comparable materials for store front construction. By the use of standard units the architect can design with absolute freedom in his use of color. Kerament glazes are permanent. Installations fifteen years old show no deterioration of color, glaze or surface. The first cost of a Kerament store front is practically the same as face brick.

For store fronts we offer Kerament in standard size units as follows: flat tiles 6x12 in., 12x12 in. and 8x16 in. Pilaster facings in flutings, reeds and modern designs for standard pier widths. Coping in widths for 8, 12 and 16-in. walls.

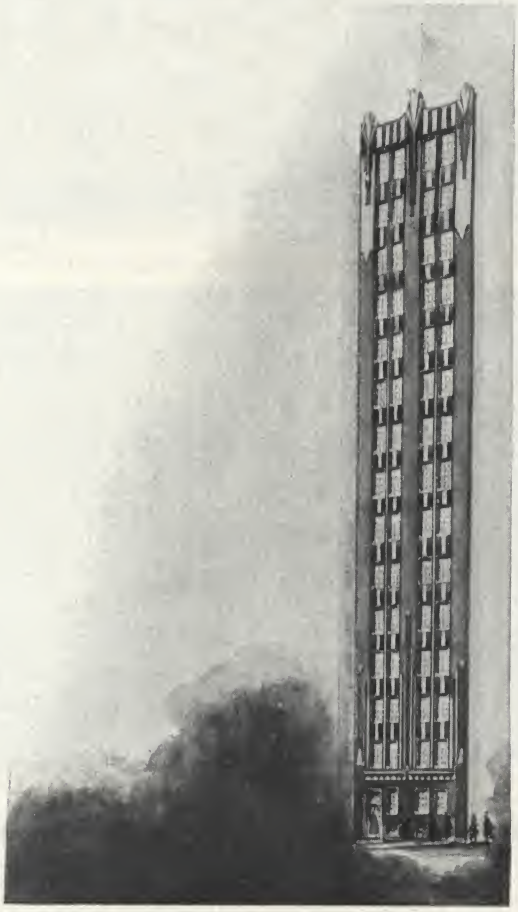
Write for our booklet of store front suggestions, showing full construction details, using our standard pieces. Complete store fronts for 25-ft. buildings, in Kerament, cost as little as $60, in any color or combination of colors, in a wide variety of textures.

Special Designs

Kerament in special pieces are made with complete accuracy from architect's details and sketches at surprisingly low costs. The architect who wishes to design in color can do so without increasing the cost of his projects beyond the usual permanent material costs.

American Manufacture of Kerament

All Kerament products sold in the United States are manufactured in our own plants. Our New York, N. Y., plant is now in full operation. Other plants are in course of completion. Write us for the address of the nearest distributor of Kerament products.



The striking color effects achieved in this 16-story apartment house to be erected at No. 9 Gracie Square, New York, N. Y., are achieved by Kerament spandrels, mullions and parapets, as well as the development of the ornamental elements of the whole facade. From the design of Oscar Goldschlag, Architect

ESTABLISHED 1870

THE GEO. RACKLE & SONS CO.

CLEVELAND, OHIO

RACKLE ARTSTONE FOR ORNAMENTAL BUILDING TRIM

Rackle Artstone is an attractive, everlasting and economical building material for ashlar, sills, cornices, balustrades, and all kinds of building trim, including Gothic window frames, for exterior and interior work.

This material, in a special shade of brown, was used extensively—chiefly in the upper stories—for pinnacles, panels, balustrades, etc., in one of the newest type sky-scrapers, the Grant Building, in Pittsburgh.

The interior view of the Grace Episcopal Church shown below illustrates the pleasing effect of Rackle Artstone when used for such elements of design as columns, arches, corbels and window trim. In the exterior view is illustrated the same pleasing effect when Rackle Artstone is used as relief and in contrast to the massive dignity of random rock-faced ashlar—and also its adaptability to window tracery and such delicate work as canopies over niches and the like.

Rackle Artstone is strong, a quality which is not only inherent in the material itself but is augmented by steel reinforcing. Such reinforcing is of especial value in Gothic window tracery and in all work of delicate detail.

Selection of Rackle Artstone by architects throughout a period of over sixty years testifies to its quality and to the skill of the Rackle staff. Difficult ornamentation is a specialty. The use of Rackle Artstone in this class of work enables the architect to effect economies of considerable importance.



Grant Building, Pittsburgh, Pa.
H. HORNBOSTEL, Architect

Artstone Colors and Finishes

An almost endless variety of colors is available. White, buff, gray, red and brown in various shades and combinations are used the most.

As to finishes, while smooth and tooled surfaces are still supplied, a distinct improvement has been brought about recently by the introduction of Artstone that is hand-finished while in a plastic condition. This results in a more artistic material, varying in appearance according to the method of finishing, and is far denser and more durable than was possible by the older processes.

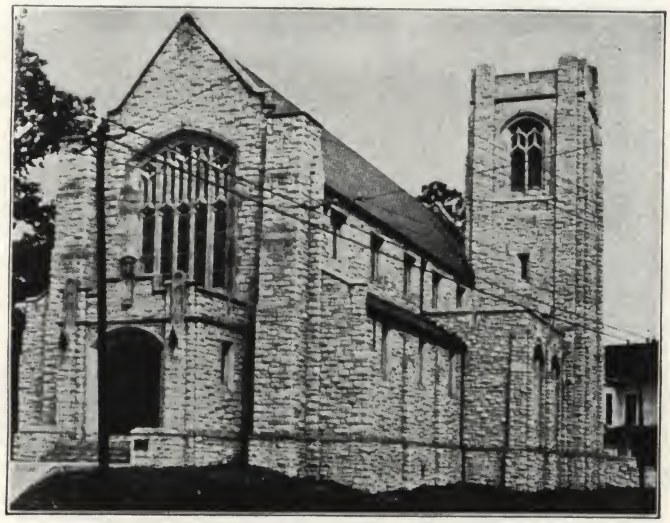
Samples of colors and finishes sent on request.

Co-operation with the Architect

The manufacturers of Rackle Artstone have always been careful to carry out with exactness the architect's ideas, and so it is always preferable to have complete information on all points from the designer of the building; but if the architect is not in a position to furnish every detail required by the contractor, the Rackle organization will often be found of service. Also on occasions when the architect feels the necessity for consultation, perhaps regarding an estimate, or the quality and tests of the material, or its adaptation to certain designs, the co-operation of this firm may be depended upon.

Some Users of Rackle Artstone

Western State Penitentiary	Rockview, Center County, Pa.	National Town & Country Club	Cleveland, Ohio
Warrington Apartments	Baltimore, Md.	Greenbrier Hotel	White Sulphur Springs, W. Va.
Professional Building	Portsmouth, Va.	Virginia Electric & Power Co.	Norfolk, Va.
Sewickley Academy	Sewickley, Pa.	Virginia Polytechnic Institute	Blacksburg, Va.
U. S. Post Office	Canton, Ga.	State Teachers' College	Fredericksburg, Va.
Architects' & Builders' Building	Indianapolis, Ind.	Virginia Military Institute	Lexington, Va.
Continuation School	Reading, Pa.	Church of Our Saviour	Baltimore, Md.
Calvary Baptist Church	Towson, Md.	Epiphany Evangelical Lutheran Church	Pittsburgh, Pa.
Church of The Covenant	Erie, Pa.	First Lutheran Church	Norfolk, Va.
Masonic Temple	Mattoon, Ill.	The Cleveland Club	Cleveland, Ohio
Beaty School	Warren, Pa.	Anshe Chesed Temple	Erie, Pa.
Second Presbyterian Church	Washington, Pa.	Citizens' National Bank	Raleigh, N. C.
Starr M. P. Church	Baltimore, Md.	Van Cleve Hotel	Dayton, Ohio
St. Joseph's High School	Oil City, Pa.	Torrance State Hospital	Torrance, Pa.



Exterior View



Interior View

Grace Episcopal Church, Cincinnati, Ohio
J. S. ADKINS, Architect

THE DECORATIVE STONE CO.

Producers of Cut Cast Stone

PLANT AND MAIN OFFICE

Chapel Street and Blatchley Avenue, NEW HAVEN, CONN.

NEW YORK OFFICE, 101 Park Avenue

DEXTONE

TRADE-MARK

Product

DEXTONE—a cut cast stone of great strength and durability. Its individual characteristics make it an ideal stone, either for trim in conjunction with brick or rough stone, or for entire buildings. It has been extensively used in this manner for banks and other monumental buildings.

It is offered on the merit of its own individual good qualities and not as a cheap substitute for any other material.

Pioneer in Producing Cut Cast Stone

This company has been one of the pioneers in the development and scientific manufacturing of cut cast stone and is justly proud of its twenty-five years of progressive growth. Good stone can only be produced where the thorough methods employed in its manufacture are carefully and conscientiously carried through. It requires special machinery and an organization with a thorough knowledge of the material to produce the finest stone.

METHODS USED IN PRODUCING DEXTONE

Importance of Sizing and Proportioning Aggregates

In making cast stone where the aggregate will be uniformly distributed throughout its entire mass, it is necessary to separate the sizes and reproportion them so that the same amount of each size is used in each mix.

The illustration shows the various sizes of aggregate which are used in the manufacture of Dextone. A battery of electrically vibrated screens makes it possible to use the exact amount of each size necessary to form a uniformly dense mixture. By means of this scientific proportioning the voids are reduced to a minimum and the stone materially strengthened.

The use of crusher-run aggregate should never be permitted. Where crusher-run (ungraded) aggregates are used it is not possible to obtain the uniform density and hardness which is a characteristic of Dextone.

Note: A large percentage of dust (80 mesh and under) is found in all crusher-run aggregates. Manufacturers without screening facilities are, of course, unable to separate out this undesirable size. Its use will give a cast stone the dead, chalklike appearance common to all inferior grades.

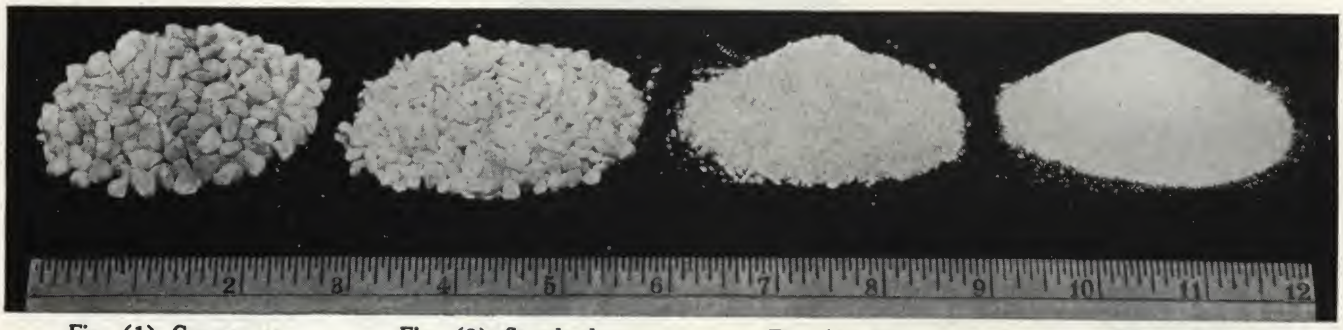


Fig. (1) Coarse
Suitable for mixtures where granite effect is desired. Stones in which this size is used show marked increase in strength

Fig. (2) Standard
The body aggregate of all standard mixes, the smallest coarse aggregate allowable in any full strength cast stone

Fig. (3) Fine
A clean, sharp, fine aggregate which gives the mixture necessary workability. It is sized to close limits

Fig. (4) Dust
Worthless as an aggregate and unsuitable for any full-strength cast stone. None of this size is used in the composition of Dextone

Privately Operated Quarry

These sized aggregates are produced at our own privately operated quarry. It is maintained for the sole purpose of making aggregates of sizes and degree of accuracy which are best suited for cast stone manufacture. In quarries where these materials are made as a by-product these ideal sizes are compromised in favor of other products. Our crushers and electrical vibrator screens are of the most modern and efficient type. The stone itself was selected because of its hardness and durability. It is grayish white in color and of sparkling crystal formation.

Dextone Is Cast in Sand Moulds

By this method any excess water is immediately taken up in sand and, within a few moments after casting, a mixture is in place in which water content has been reduced to a minimum without having lost, until that time, its workability. This conforms to the best practice recommended by the Portland Cement Association.

Importance of Water Control

Accurate control of the amount of water is an important factor in the production of a hard, dense stone. In the production of Dextone the correct water-cement ratio for each mix is automatically controlled. Note in the colored plates the perfect distribution of the aggregate as a result of this water control. This careful control is typical of the precise methods employed in the production of Dextone.

Two Weeks' Minimum for Curing

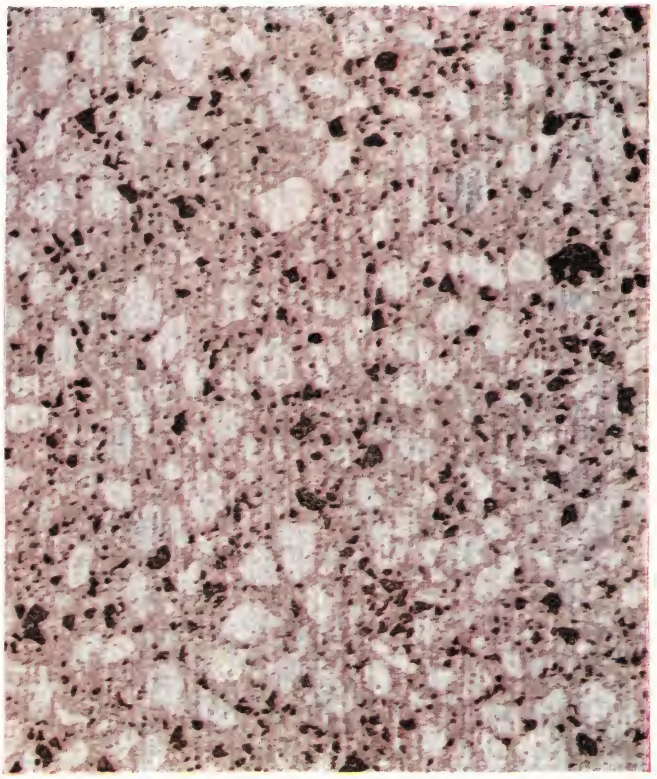
Too rapid drying out of unseasoned stone is another prevalent cause of loss of strength and shrinkage. Dextone is kept wet during this period.

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Representative Samples of
DEXTONE



Ohio Variegated



Connecticut Pink



Milford Brown



Plymouth Gray

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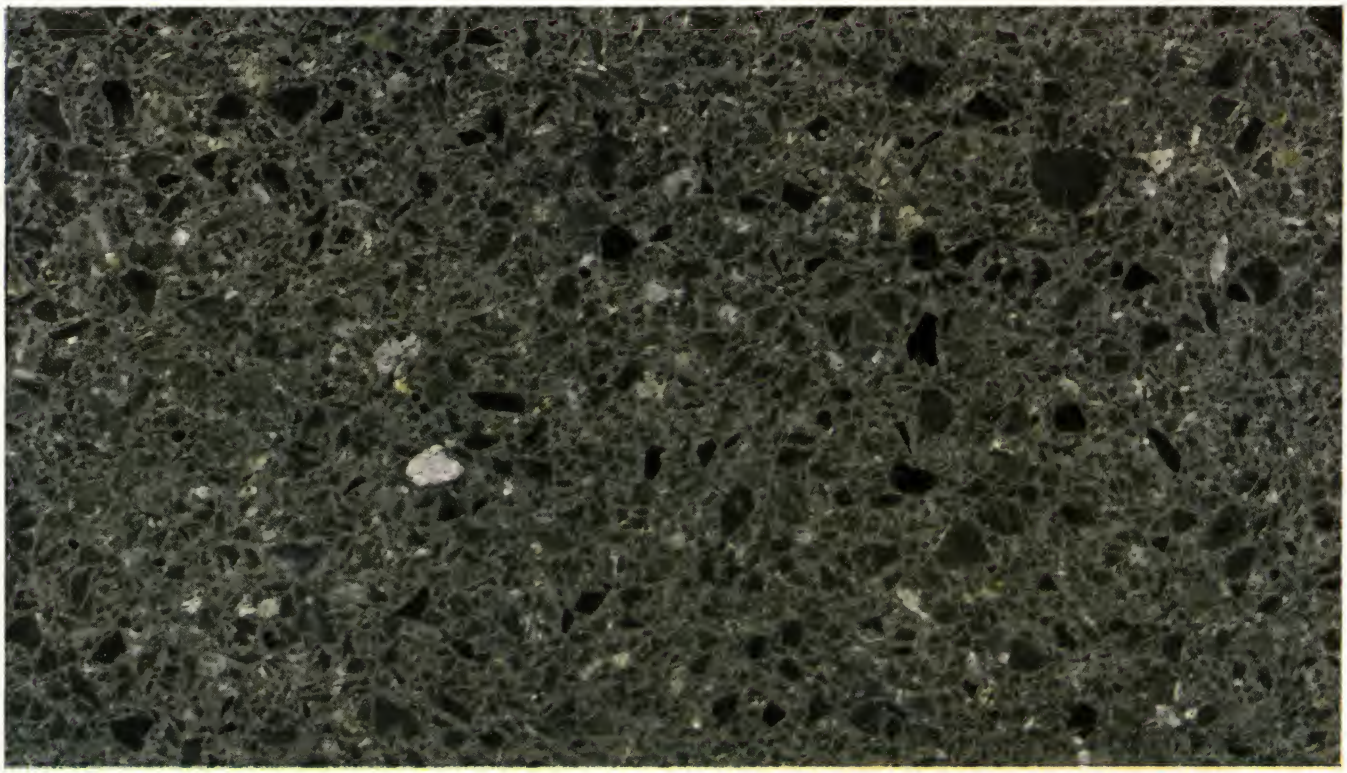
Representative Samples of
DEXTONE



Indiana Buff



Kentucky Light Gray



Dextolite—Verde

One of the many rich, unfading color obtainable in this new product. Always in polished surface.

Continued on next page

CAST STONE SHOULD BE CUT AFTER CASTING

The Reason for Specifying and Requiring "Cut Cast Stone"

In order to make sure that all irregularities in the castings are removed, all stones are made not less than ¼ in. oversize and after a proper period of curing are then cut down to exact size and profile by carborundum planers. In so doing, the film of rich cement and fine aggregate, which always settles to the face of a cast and is one of the principal causes of hair cracking as found in ordinary cast stone, is removed. The dense solid aggregate of the stone is clearly exposed. Where this operation is performed, it becomes increasingly important that the aggregates which are thereby exposed be uniformly graded and show a uniform distribution on all faces. *These two factors of aggregate selection and cutting from oversize castings are the two major elements of all good cut cast stone. Specifications must distinctly call for stone to be cast oversized and cut if the result shown in Fig. 1 is desired.*

All Dextone Is First Cut to Finished Size by Machinery Before Applying Final Texture

The cutting of the stones from rough to finished size and exact profile is done by carborundum cutting planers and rubbing machines. This method, although more costly than other methods, is absolutely necessary in the production of high grade cut cast stone. Only by this process are the sharp arrises, true profile, exposure of the aggregate and other characteristics of cut cast stone obtained. *These same cutting operations are necessary regardless of the ultimate surface treatment.*

Cutting to finished size should be regarded as a manufacturing operation separate and distinct from the ultimate surface texture which it is desired to obtain. Architects should demand in their specifications that all stone should first be prepared in this manner. *This operation adds to the cost of production but it is of such importance that this additional cost should be considered a necessity and not a matter of choice.*

On cheaper grades of stone the finished texture is often executed without first removing the film which causes fine hair cracks to develop. The difference between the two finishes is readily recognized and should be given due consideration when comparing the cost of Dextone with other materials.

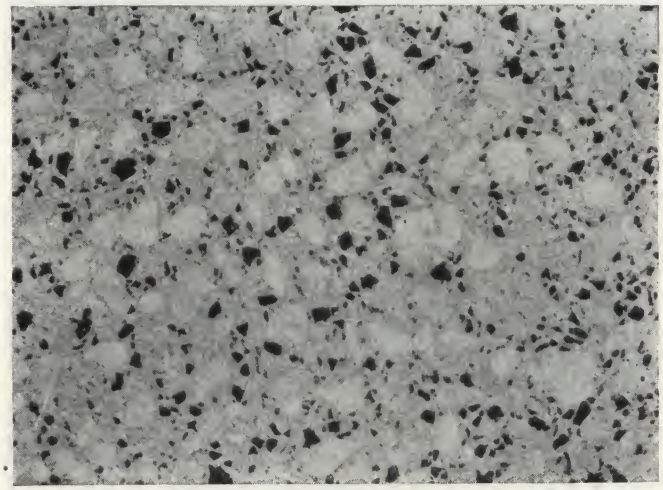


Fig. 1. Dextone with Aggregate Exposed by Machine Cutting
A representative piece of Dextone, from which ¼ in. of the cast surface has been cut. Lively, clean-cut, rocklike appearance is characteristic of a well-made cut cast stone. No cracks will develop in the surface

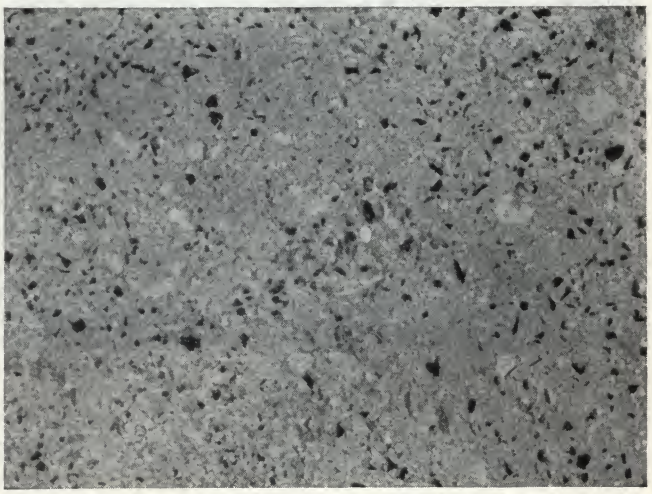


Fig. 2. Appearance of the Same Stone Before Cutting
A stone of the same mixture as Fig. 1, which has been finished by hand rubbing without removing the outside ¼ in. This surface will develop hair cracks common to poorer grades of cast stone

SOME GENERAL NOTES TO BE CONSIDERED WHEN SPECIFYING CUT CAST STONE

We are frequently asked by architects to match some natural stone such as limestone or sandstone. It is a simple matter to match any color tone required but we do not recommend trying to match the texture by using fine aggregates only. Cut cast stone should be used according to its natural characteristics which require graded aggregates in certain proportions to produce the best stone. We discourage the efforts to match the nature of fine grain stones by requiring fine aggregates only. The resulting product does not conform to the high standard for which Dextone stands.

The essential points to cover in a specification for cut cast stone are as follows:

(1) Aggregates must be sized by screening and proportioned to produce maximum density. Crusher-run aggregate not allowed.

(2) Minimum 5000 lb. compression. Minimum 3%, maximum 7% absorption.

(3) Must be made by the wet-poured process and in sand moulds.

(4) Stone must be of the same composition throughout and not faced.

(5) Mixed materials must be constantly agitated until placed.

(6) All stone must be made at least ¼ in. oversize on exposed surfaces, and then cut to correct size.

(7) Specify method of setting carefully.

(8) Quotations to be based on Dextone ..... manufactured by THE DECORATIVE STONE CO., New Haven, Conn. *(Insert color and finish desired.)* All surface tooled finishes shall be applied after first being planer cut.

Note: In this specification no mention has been made of sand finish, acid treated, brushed, gothic or any other finish which cannot be properly classified as cut cast stone. *Buyers should be aware that these finishes are often sold in competition with cut cast stone.*

Complete architect's working specifications covering manufacture and setting of any first quality cut cast stone are made up for your convenience and will be mailed on request.

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DESCRIPTION OF TEXTURES AND FINISHES

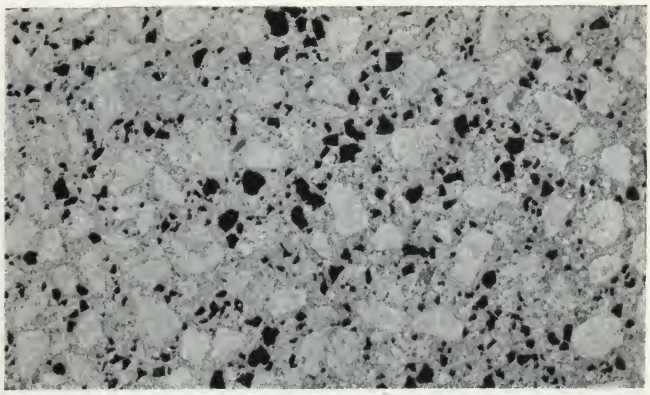
The following is a descriptive list of the finishes and textures in which Dextone is supplied. Two general classifications are noted conforming to the classifications adopted by The Cast Stone Institute: (1) Cut Cast Stone, (2) Surfaced Cast Stone. Although a third classification has been adopted by the Institute, (3) Plain Cast Stone, the types of stone which it includes are not shown in this list.

CUT CAST STONE—MACHINE CUT FINISHES

The finishes listed under this heading can only be produced where the facilities of carborundum planers, rubbing beds, etc. are available. All finishes produced in this manner are naturally more expensive than any of Surfaced Cast Stone finishes.

Planer Cut

Under this classification all stone is cast not less than ¼ in. oversize and cut to correct profile by stone cutting machinery and with all machine marks eliminated. The full body aggregate of the stone is exposed and due to this cutting operation is permanently insured against disfigurement. The irregularities in the castings are thereby eliminated and stones are cut to exact profile with beds and joints squared. It is a suitable finish for all purposes and for any class of building where a smooth finish is desired.



Planer Cut

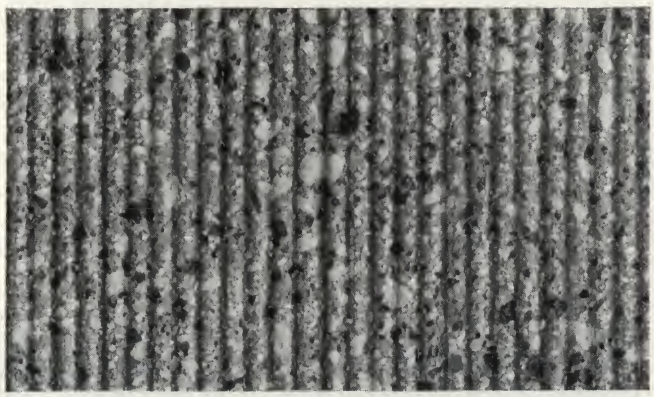
Honed

A subsequent operation to that of planer rubbing whereby all surfaces are smoothed with honing stones to give a semipolished effect.

As the difference between this finish and Planer Cut does not show up in a photograph, it is not illustrated.

Machine Grooved Tooled

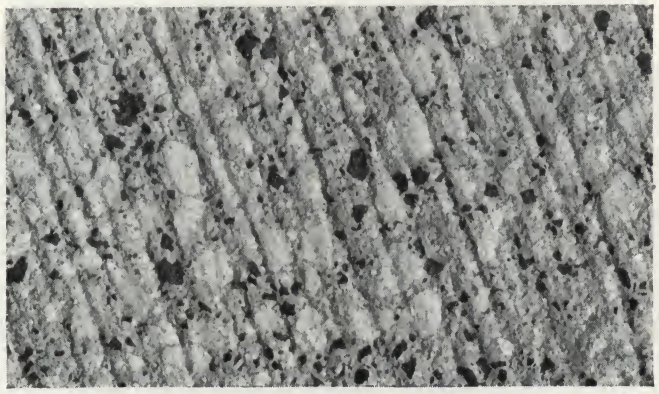
An operation similar to Planer Cutting, except that on all vertical surfaces a series of regular, evenly-spaced, half-round grooves are cut. It is supplied in various widths of cutting.



Machine Grooved Tooled

Sawn

A surface texture produced during the operation of machine cutting whereby irregular random, saw-cut effects are produced, a desirable finish for ashlar field with textured surface.



Sawn

SURFACED AND PLAIN CAST STONE

Surfaced Cast Stone

This general classification covers a wide range of finishes which are applied to cast stone without first cutting from oversized casts. They are cheaper, less satisfactory and less expensive than genuine cut cast stone. Finishes commonly supplied under this heading are rubbed, sand rubbed, matt, gothic, acid washed and numerous others.

Plain Cast Stone

No finishing operations of any kind are performed on this class of stone. Sand finish is the commonest of this variety. It is cast in sand moulds and without surface finishing of any kind. Suitable only where appearance is of small importance and where greatest economy must be exercised. No demands of quality should be made of this finish.

Continued on next page

CUT CAST STONE

Hand Tooled Finishes

All stones which are to receive hand-tooled texture are first prepared in the same manner as under planer rubbing. The tooling operations are merely for appearance and do not obviate the necessity of the preliminary cutting from oversized casts.

Bush Hammered

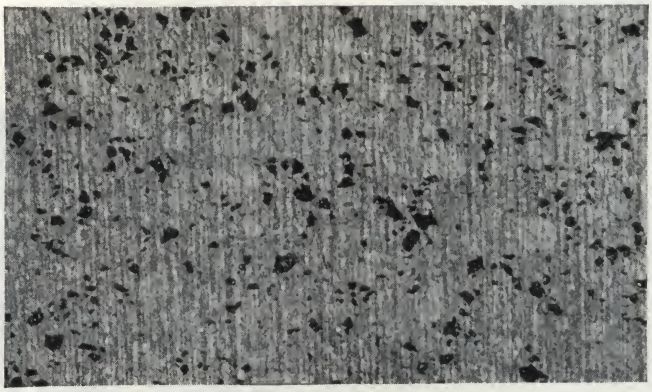
This finish is produced with a pneumatic hammer in various degrees of coarseness, as 6-cut, 8-cut, etc., which indicate the number of cuts per inch. It shows a series of parallel vertical fractures. It is one of the finest finishes to be had in Cut Cast Stone.

Bush-hammered, crandalled, and other hand-cut finishes are frequently sold under those designations on which the preliminary operation of machine cutting has not been done. Finishes so produced are, of course, cheaper and do not possess the same qualities as Cut Cast Stone.

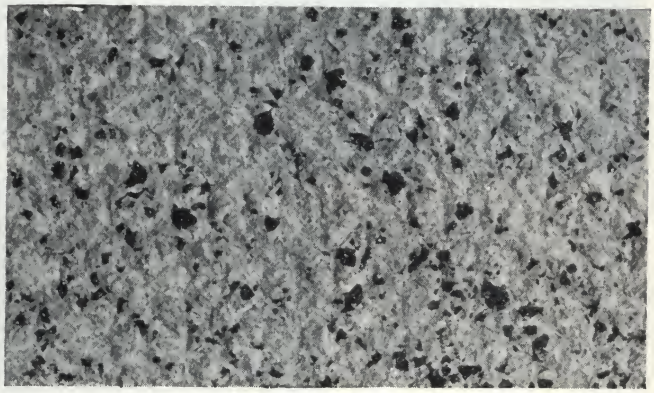
Crandalled

A coarse cutting, showing no direction of tooled marks and more suitable for heavy members.

This texture should not be used where fine detail is desired.



Bush Hammered



Crandalled

DEXTOLITE

During the past year a distinguished new product known as "DEXTOLITE" has been developed and is now offered for sale. Deep rich non-fading colors are obtained through the use of imported marble and rare color pigments, further emphasized and enriched by a high gloss polish.

It can be supplied in thin slabs or be treated like any cut stone.

The Guy & Rice Building, Middletown, Conn., shows DEXTOLITE used as ashlar facing for an entire street front, 2 stories.

The color plate shown elsewhere is representative of the many colors it is made in.

The obvious economies effected by modern manufacturing methods bring it within reach of the most modest building budget.

THE DEXTONE ORGANIZATION

Sales—The sales organization is made up of men who thoroughly understand the use and cost of Dextone. These men can render a genuine service in specification writing, selection of stone and in the best and most economical use of Dextone.

Drafting—Drawings of your stone job will be refreshingly clear and exact. Your design will be carefully and sympathetically developed. Special anchorage, unusual flashing problems, load bearing stones requiring special reinforcing will all come to you detailed at large scale and correctly designed. A practicing architect is retained to advise in all matters of design.

Models—Experienced architectural modelers are in the regular employ of the Dextone organization. Architects are urged to visit the studio during the preparation of models to better convey their intention to the modeler. After casting, all modeled work is carved by skillful stone carvers.

Laboratory—Constant testing of all materials used in the manufacture of Dextone is only one of the precautions taken to make it the best. This department is always ready to work with architects to develop some special aggregate or color effect which may be desired. Strength and absorption tests are conducted at regular intervals to guarantee that Dextone is meeting all requirements.

Servicing and Expediting Department—As soon as a contract is made this department is acquainted with all agreements and delivery schedules made by the salesmen. Their business is to expedite the work through all detailing and manufacturing processes to assure these deliveries being made. The contractor is kept informed as to progress at all times.

Supplementing this department an outside job service is maintained to make closer contact with the actual job. This service includes a check-up of job conditions, advice in matters of handling, setting, mortar, equipment, repairs and anything to protect the interest of the job. Architects are requested to make use of these men, a letter to the Company is sufficient. When so requested detail reports will be made to the architect. No charge is made for this service.

Plant Inspection—Architects and contractors are invited to visit the plant in company with their clients to inspect the complete facilities which are maintained.

Continued on next page

SOME OF THE OPERATIONS IN PRODUCING CUT CAST STONE



Left

Moulding and Casting

Showing the conveying bucket in which mixed materials are constantly agitated while in transit, and the precautions taken to secure proper placing and uniform spread of mixture in the mould.



Right

Carborundum Planer

The illustration shows a moulded member being ground to exact profile. The carborundum grinding wheel will cut to a depth of ½ in. if required. This wheel is precisely shaped in reverse and on continuous courses perfect fit is guaranteed without cutting at the job.



Left

Rubbing Bed

This machine is used only for cutting and finishing ashlar and other flat work. The coarseness or fineness of the finished texture is controlled by the abrasive used. Stones finished on this machine are automatically made true and plane.



Right

Hand Cutting

After stones are cut by machine to finish sizes the required texture is applied by pneumatic chisels. By changing tools the various cut textures are produced.

Continued on next page

How to Buy Cut Cast Stone

Architects are aware of the difficulties of enforcing the requirements of their specifications. This is frequently due to the use, in the specifications, of ambiguous terms.

(1) Make sure that all bids are based on the requirements of a specification which includes the recommended essential points. Do not permit alternates on cheaper finishes unless the specification specifically calls for them.

(2) Require that the concern from whom you are buying show evidence of plant equipped with screens, finishing machinery and all incidental equipment necessary in the production of Cut Cast Stone and can show representative work at least 10 years old.

(3) Many architects are now finding it to their advantage to take separate bids outside of the general contract for cast stone; thereby eliminating many of the commonly known trade practices, under which the true intent of their specification is evaded.



Sunrise National Bank, Baldwin, L. I.
H. T. Jeffrey, Architect Jamaica, L. I.

Architect Service

This company maintains a technical staff to assist architects and builders in all matters pertaining to the use of Dextone.

The service is without charge. It is maintained for the purpose of assisting those contemplating the use of cast stone in selecting the material best fitted to their needs, in making preliminary estimates and in drawing up specifications.

Where this service is utilized, it is frequently possible for our representatives to show the architect means whereby he can allow for the additional cost incidental to securing cut cast stone by the elimination of certain features of relatively less importance.

Representative Work, Location and Architect

Schools and College Buildings

Hartford Seminary Foundation, 6 Buildings, Hartford, Conn.
Allen & Collens, Architects

Yale University, 2 buildings, New Haven, Conn.
James Gamble Rogers, Architect

Junior High School, New Rochelle, N. Y.
Starrett & Van Vleck, Architects

Eastview School, White Plains, N. Y.
Starrett & Van Vleck, Architects

Roosevelt High School, Yonkers, N. Y.
G. Howard Chamberlin, Architect

New Roselle High School, New Roselle, N. J.
Frederick Elsasser, Architect

Northport School, Northport, L. I., N. Y.
Coffin & Coffin, Architects

Fair Haven Junior High School, New Haven, Conn.
Brown & Von Beren, Architects

Memorial High School, Pelham, N. Y.
Harte & Shape, Architects

Hunter College, New York, N. Y.
Thompson, Holmes & Converse, Architects

Central High School, Rye, N. Y.
Woolsey & Chapman, Architects

School No. 8, Linden, N. J.
H. B. Brady, Inc., Architects

Churches

St. Paul's Church, Yonkers, N. Y.
Cram & Ferguson, Architects

First M. E. Church, Bridgeport, Conn.
Allen & Collens, Architects

St. Bartholomew's Church, White Plains, N. Y.
Cherry & Matz, Architects

Church of the Epiphany, Brooklyn, N. Y.
Bastow & Way, Architects

Holy Name of Mary Church, Croton on Hudson, New York
Knappe & Morris, Architects

Our Lady of Mt. Carmel Church, Gloversville, New York
Morgan & Milliman, Architects

Larchmont Ave. Church, Larchmont, N. Y.
John Russell Pope, Architect

Banks

First National Bank, Palmerton, Pa.
Ernest Strassle, Architect

Lodi Trust Co., Lodi, N. J.
Rocker & Strassle, Architects

Sunrise National Bank, Baldwin, L. I.
H. T. Jeffrey, Architect

Union Center National Bank, Union, N. J.
Frederick Elsasser, Architect

Miscellaneous

Masonic Temple, Plainfield, N. J.
F. B. & A. Ware, Architects

Masonic Temple, Ansonia, Conn.
Orr & delGrella, Architects

Masonic Temple, Westfield, N. J.
John F. Jackson, Architect

Masonic Temple, Westville, Conn.
R. W. Foote, Architect

Masonic Temple and Scottish Rite Cathedral (interior work), Scranton, Pa.
Raymond Hood, Godley & Pouilhoux, Architects

Elks Clubhouse, New Haven, Conn.
Alfred W. Boylen, Architect

Isolation Building, Municipal Hospital, Waterbury, Conn.
Cross & Cross, Architects

New York Telephone Co. Building, Glen Cove, L. I., N. Y.
Voorhees, Gmelin & Walker, Architects

Conde Nast Press, 4 Pylons, Stamford, Conn.
Delano & Aldrich, Architects

Martling Lane Dam, Staten Island, N. Y.
Bureau of Engineering, City of New York

Infantry Barracks, San Juan, Porto Rico,
Office of Quartermaster General, U. S. A.

"Dextolite"

Guy & Rice Building, Middletown, Conn.
Towner & Sellew, Architects

Continued on next page



A color photograph showing actual wall of COTSWOLD ASHLAR
The trim stone is DEXTONE cut at random

Cotswold Ashlar

patent applied for

Manufactured exclusively by The Decorative Stone Company, New Haven, Conn.

COTSWOLD ASHLAR a new random ashlar in a great variety of color and bonding effects. Affords the architect a wider selection of color and bonding than ever before available in one material.

Opens up new color possibilities.
Made by a radically new and secret process.

Makes possible the use of a material with all the rugged beauty and inherent strength of stone at a remarkably low cost.

Presents the vigorous clean cut appearance associated with stone masonry.

Is a suitable and desirable load bearing material for all classes of building from the small home to the more impressive institutional buildings and churches.

Continued on next page

Cotswold Ashlar

Colors

Complete range light buff and gray to deep orange. Individual stones varied and showing stratified colors.

Subdued range, buff and light brown, slightly variegated and veined in individual stones.

Uniform colors, all shades of gray and buff.

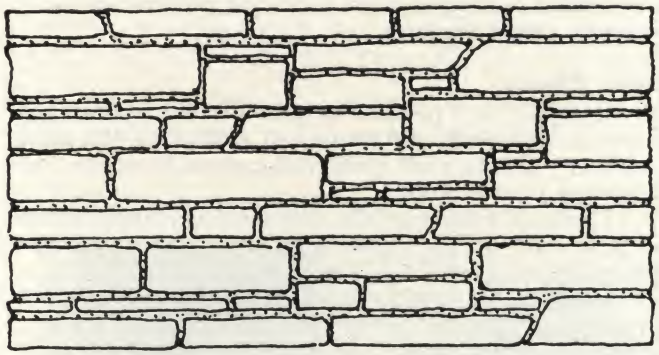


Fig. 1. Random Coursed Ashlar, Occasional Interruption in Coursing
3 heights, 1¾, 3¾, 6 in.

Texture

Variegated, high percentage showing vigorous horizontal texture, balance mottled surface with occasional blemish to heighten effect. Uniform, semi-smooth with faintly discernible horizontal markings.

Shape

Generally rectangular, faces show various projection not exceeding ½ in., edges generally straight but with sufficient irregularity to lose all hard mechanical appearance.

Bonding Surfaces

Flat and square with the face with numerous depressions and irregularities to insure perfect bond with mortar.

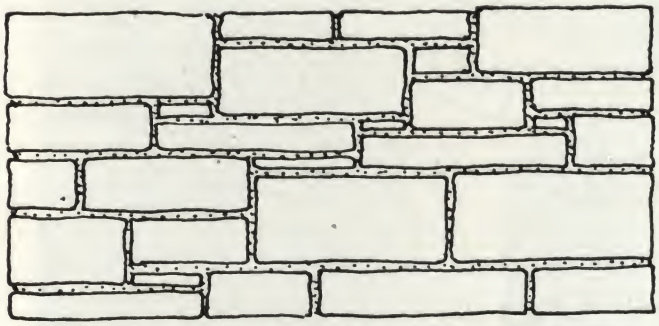


Fig. 3. Random Coursed Ashlar, All Coursing Broken
5 heights, 1¾, 3¾, 6, 8¼, 10½ in.

Sizes

Unlimited in variety and proportion. To facilitate its use standard heights have been adopted which bond in combination with each other and in non-repeating variety without cutting, except in length. Lengths are varied from one and one-half to three times their height and in such a manner that a minimum of fitting is required. Cotswold Ashlar is supplied either in standard proportion of long and short stones or as ordered.

Wall Bonding

Standard thickness 4 in., approximately 15⁄8 in. for bonding. No anchors required.

Bond

Three typical bonding schemes are illustrated but every conceivable bonding arrangement is possible with Cotswold Ashlar. It is handled in exactly the same manner as other random ashlars.

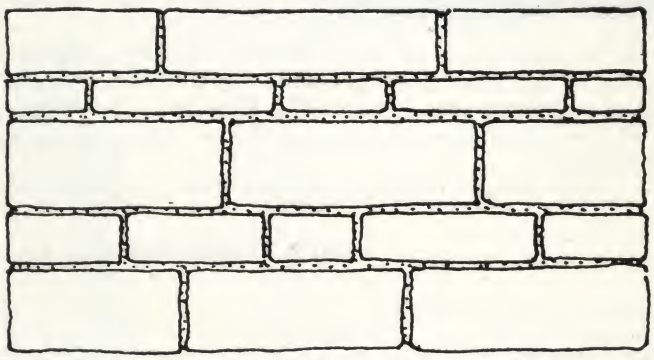


Fig. 2. Random Coursed Ashlar, no Interruption in Coursing
4 heights, 3¾, 6, 8¼, 10½ in.

Architect's Service

Advisory service covering all phases of its use. Sketches of typical bonding arrangements for use at the job will be supplied if desired. Samples will be supplied for erection at the job to check bondings and colors.

Specification

Face all walls where indicated on plans with Cotswold Ashlar made by The Decorative Stone Co., New Haven, Conn.

Color as selected by the architect.

Bond with 15⁄8 stones 8 in. thick. Sizes and bonding arrangement to be selected.

(State if possible in specification whether coursed ashlar, coursed with occasional interruption, or entirely random no coursing.)

Joints ¾ in. Where adjoining cut stone trim ⅜-in. joint.

Setting mortar: 1 part cement, 1 part cold lime putty, 5 parts clean sand.

Joints raked out 1 in. and pointed with 1 part cement, ¼ part cold lime putty and 3 parts sand, colored as required.

THE ECONOMY CONCRETE COMPANY

Cast Stone Building Trim

TELEPHONE
7-0120

Drawer E, Hamden Branch
NEW HAVEN, CONN.

NEW YORK OFFICE, 1632 Graybar Building, 420 Lexington Avenue

Experience and Facilities

THE ECONOMY CONCRETE COMPANY has been manufacturing cast stone for over twenty-five years and has a large plant with adequate facilities and a large and efficient organization. Its long experience has provided a knowledge of concrete technique and architectural style which the manufacture of a cast stone product requires.

Material

The use of this material not only does not impose limitations upon the use of ornamentation but also in itself contributes beauty without undue cost. It can be manufactured in any desired color, shape or size, depending upon the unit which will best fit in with the design. In all cases oversize castings are made allowing for the production of the finish desired.

Aggregate

THE ECONOMY CONCRETE COMPANY quarry and manufacture their own aggregate which is a hard, light-colored marble. This procedure insures uniformity and proper screening and grading, which is essential in the manufacture of a stone of uniform density throughout. It also reduces the possibility of unequal strength in the product and removes the liability of objectionable characteristics of stone produced with ungraded aggregates.

Any foreign material or fine dust produced in crushing is likewise removed and the fineness modulus of the mixture is held to a high and close standard.

Finishes

Practically all the finishes used for the cutting of natural stone are applicable to cut cast stone and are produced either by machine-cutting or hand tooling, as well as many interesting textures produced by various other methods ranging from hand and polished surfaces to rough sawed textures.

Color Effects

Not only is it possible to get different finishes but also different colors and variety of shades for the same building. This in itself lends variation and removes the monotony of monotones.

The wide range of color treatment is made possible in cast stone by the combination of different colored aggregates or mineral coloring pigments.

Many of the world's most beautiful stones are not practical for building purposes because of their scarcity or extremely high cost. However, their beauty and individuality can be used for architectural decoration through the medium of this product.

Additional Information and Specifications

Additional information and complete Architectural Specifications may be obtained from our main office or from our New York office.

Notable Installations with Locations and Names of Architects

BUILDING	LOCATION	ARCHITECT
West Wing Cadet Barracks	West Point, N. Y.	Cram, Goodhue & Ferguson
Gymnasium	West Point, N. Y.	Cram, Goodhue & Ferguson
St. Mary's Hall, Boston College	Boston, Mass.	Maginnis & Walsh
Church of the Nativity	Washington, D. C.	Milburn Heister Company
Harlem Park M. E. Church	Baltimore, Md.	George E. Savage
Ten Hills School	Baltimore, Md.	W. G. Beecher
St. Colman's Church	Ardmore, Pa.	Frank R. Watson
Kenilworth Apartments	Philadelphia, Pa.	Edwyn Rorke
Alden Park Manor Apartments	Philadelphia, Pa.	Edwyn Rorke
Cambridge Apartments	Philadelphia, Pa.	Edwyn Rorke
Sacred Heart Church	Newark, N. J.	Neil J. Convery
Central Grade School	Trenton, N. J.	Sibley & Licht
High School	Orange, N. J.	Ernest Sibley
Monastery of the Immaculate Conception	Albany, N. Y.	Gander, Gander & Gander
Elks' Building	New Brunswick, N. J.	Alexander Merchant
St. Peters Hospital	New Brunswick, N. J.	Maginnis & Walsh
Chapel, St. Lawrence University	Canton, N. Y.	B. G. Goodhue Associates
Ledyard Residence	Detroit, Mich.	Alfred Hopkins
Sears Roebuck Building	Pittsburgh, Pa.	Nimmons, Carr & Wright
Ryder Hall, Union College	Schenectady, N. Y.	H. Craig Severance
Covenant Presbyterian Church	Springfield, Ohio	George E. Savage
Princeton University Gymnasium	Princeton, N. J.	Aymar Embury II
High School	Floral Park, N. Y.	Knappe & Morris
Vine Street School	Hartford, Conn.	Isaac A. Allen & Son, Inc.
Peabody Museum, Yale University	New Haven, Conn.	Day & Klauder
Bingham Hall Tower, Yale University	New Haven, Conn.	Walter B. Chambers
Yale University Theatre	New Haven, Conn.	Blackall, Clapp & Whittemore
D. K. E. Fraternity House, Yale University	New Haven, Conn.	James Gamble Rogers
Medical School Group, Yale University	New Haven, Conn.	Henry C. Pelton
Wheelock-Dickinson Dormitory, Yale University	New Haven, Conn.	James Gamble Rogers
Yale Record Building	New Haven, Conn.	Lorenzo Hamilton
The Coxe Field Gymnasium, Yale University	New Haven, Conn.	Lockwood, Greene & Co., Inc.

Continued on next page



Bryn Mawr Presbyterian Church, Bryn Mawr, Pa.

KARCHER & SMITH, Architects

Erected by DOYLE & COMPANY, Philadelphia, Pa.

All exterior and interior trim of cut cast stone including piers and arches. Three-color variation with hand crandalled finish



Detail of Main Entrance and Other Features Including Tracery for the Large Front Window

NATIONAL TERRA COTTA SOCIETY

230 Park Avenue, NEW YORK, N. Y.

FOR ESTIMATES ADDRESS INDIVIDUAL MEMBERS

ATLANTIC TERRA COTTA CO.
19 W. 44th Street, New York, N. Y.; Glenn Building, Atlanta, Ga.

N. CLARK & SONS
116 Natoma Street, San Francisco, Cal.

CONKLING-ARMSTRONG TERRA COTTA CO.
Insurance Company of North America Building, Philadelphia, Pa.

CORNING TERRA COTTA CO., INC.
Corning, N. Y.

FEDERAL SEABOARD TERRA COTTA CORP.
10 E. 40th Street, New York, N. Y.

GLADDING, McBEAN & CO.
660 Market Street, San Francisco, Cal.; 621 So. Hope Street, Los Angeles, Cal.; 1500 First Avenue, So., Seattle, Wash.; 454 Everett Street, Portland, Ore.

KANSAS CITY TERRA COTTA & FAIENCE CO.
19th Street and Manchester Avenue, Kansas City, Mo.

O. W. KETCHAM
125 No. 18th Street, Philadelphia, Pa.

NEW YORK ARCHITECTURAL TERRA COTTA CO.
401 Vernon Avenue, Long Island City, N. Y.

THE NORTHWESTERN TERRA COTTA COMPANY
2525 Clybourn Avenue, Chicago, Ill.; E. 16th Street, Chicago Heights, Ill.; W. First Avenue and Umatilla Street, Denver, Colo.; 4417 Oleatha Avenue, St. Louis, Mo.

WASHINGTON BRICK, LIME & SEWER PIPE CO.
Washington Street and Pacific Avenue, Spokane, Wash.

WESTERN TERRA COTTA CO.
Franklin Avenue and Missouri Pacific Ry., Kansas City, Kan.

THE WINKLE TERRA COTTA CO.
Century Building, St. Louis, Mo.

Services of the Society

The NATIONAL TERRA COTTA SOCIETY is a bureau operated by the manufacturers of terra cotta in the United States for the technical and artistic improvement of product, the dissemination of authentic information relating to it and the assistance of the architectural and engineering professions in the proper and effective employment of this material. In addition to the Standard Specifications printed below the Society issues other helpful literature relating to the proper construction of terra cotta and the use of color in architectural design; also illustrated brochures pertaining to various classes of buildings.

Its individual member companies are also prepared to assist architects with counsel and recommendation upon the use of terra cotta in specific instances of application, and to furnish samples of their product when desired.

Important Features of Terra Cotta

Floodlighting—The advertising value of night illuminated or "floodlighted" structures is gaining widespread recognition by progressive business firms. Research by the Illuminating Engineers of the General Electric Company at Schenectady has shown conclusively that terra cotta is the ideal architectural material for structures to be floodlighted. Booklets free on request.

Color—Terra Cotta, of all structural materials, most fully meets the present day demand for color in architecture. An almost unlimited palette, including gold and silver, is ready to the designer's hand.

Modeling and Ornament—The directness with which sculpture, modeled ornament, etc., are translated into the finished terra cotta is responsible for a character and feeling of individuality not easily obtained in other processes.

Interiors—Freshness of appearance, and freedom from periodical upkeep of renewal, mark terra cotta interiors for lobbies, halls, foyers, corridors, and public rooms generally. In combination with color, modeled ornament and controlled illumination new architectural effects are readily achieved.

Standard Specifications for the Manufacture, Furnishing and Setting of Terra Cotta

These Specifications were prepared with the assistance of representatives of the Structural Service Committee of the American Institute of Architects and of the National Bureau of Standards, U. S. Department of Commerce, Washington, D. C.

Note: The Architect or Specification Writer will find it convenient to follow the Short Form Specifications beginning with Section 63.

The Short Form incorporates all the provisions of the Standard Terra Cotta Specification, but eliminates the necessity of mentioning them in detail.

Reference to the Glossary, Sections 50-62, will supply the surface finish, ceramic finish, and color data necessary to specify surface and color correctly.

The Corollary Clauses, Sections 85, 86, explain the setting option between mason and manufacturer.

Sections 87-91 under Corollary Clauses explain the specifications for flashing, sheet metal, structural steel, structural concrete and rough carpentry. These specifications form a part of the Terra Cotta Specification, although the materials are supplied and set in place by different contracting parties.

A—General Information

Drawings and Schedules

1. The Terra Cotta manufacturer shall be furnished with all drawings, details and other information necessary for the manufacture of Terra Cotta, including drawings for all classes of work with which the Terra Cotta engages.

2. Wherever Terra Cotta is required to match in contour, color, finish and surface treatment, existing Terra Cotta, as for example in connection with alterations or additions to existing work, the Terra Cotta manufacturer shall be furnished with the required profiles and samples of the original work, and other needed information.

3. The Terra Cotta manufacturer shall, before proceeding with manufacture, submit to the architect for his correction and approval, shop drawings showing jointing and construction of the Terra Cotta and provision made for all flashing and counter flashing. These drawings must conform as nearly as practicable to the architect's drawings, but shall be in accordance with good Terra Cotta structural practice.

4. All pieces of Terra Cotta shall be numbered. The Terra Cotta manufacturer shall provide two copies of the completed scale shop drawings to be used for setting and showing the piece numbering of the Terra Cotta, and the size of the joints to be used for setting the various portions of the work clearly indicated. These drawings shall be designated as the setting drawings.

Continued on next page

5. The Terra Cotta manufacturer shall furnish, as promptly as possible, a schedule of all special anchors, hangers, etc., necessary to secure and support the Terra Cotta in a manner approved by the architect.

B—Material

Quality, Tests

6. *Note:* In view of the researches now being conducted by the National Bureau of Standards at the instance of the National Terra Cotta Society, it seems inadvisable to attempt, at this time, to write either quality clauses in terms of crushing strengths, densities and elasticity, or specifications for tests. Clauses descriptive of the desirable physical characteristics and of tests to prove compliance of the material with such physical requirements will be prepared as soon as the necessary data are available and inserted in a later edition of this standard specification.

Modeling

7. All ornament shall be artistically modeled by the Terra Cotta manufacturer's staff artists. (Or, models made to Terra Cotta shrinkage scale will be furnished to Terra Cotta manufacturer, without cost to him, securely crated for shipment f.o.b. modellers' studio at .)

8. Photographs in duplicate of all ornament shall be submitted to the architect for his approval or correction, or, if he so desires, he may inspect all modeling at the factory. Such approval or inspection by the architect shall be made promptly. No ornamental work shall be burned until modeling has been approved.

Surface Finish, Ceramic Finish and Color

9. The surface finish, ceramic finish and color of all exposed surfaces of Terra Cotta shall be as indicated by the architect's drawings or as specified. For surface and ceramic treatments, see Glossary of Terms relating to Terra Cotta, which is hereby made a part of this specification.

10. The ceramic finish shall be applied to the Terra Cotta in such a manner as thoroughly to coat the exposed surfaces.

Samples

11. The Terra Cotta manufacturer shall submit samples of the color or colors of the ceramic finish to the architect for his approval, and all Terra Cotta shall conform without marked variation to the sample or samples so approved.

C—Design and Structure

Ends, Walls and Partitions

12. Walls shall not be less than one inch thick and partitions shall be of such thickness and so spaced as to perform their proper functions with regard to form and structure. Each piece of Terra Cotta shall be provided with the necessary anchor holes and hand holes and shall be so formed as properly to engage the structure. Beds generally shall be not less than 4 in. deep.

Washes, Weep Holes and Drips

13. Projecting courses, cornices and heavy ornamental detail may have washes, drips and weep holes, where shown on the approved shop drawings.

Preparation for Flashing

14. Where so shown the washes of all projecting cornices and other exposed horizontal surfaces shall have provision made for flashing. All surfaces where the wash pitches inward toward the structure and stops against superimposed work; all balcony floors, and all gutter grades shall have provision made for flashing.

15. Raggles shall be provided to receive gutter linings and flashings when the joints can not be used for the purpose. Raggles shall be not less than ¾ in. deep.

16. All capping courses, copings and sills except of the "slip" type, shall have stools and lugs at intersections with vertical surfaces.

Joints

17. All joints shall be straight and true and of an approximate uniform width of ¼ in. All Terra Cotta shall be laid out at the factory to test it for uniformity of joint widths and over-all dimensions. Where necessary to secure accurate dimensions and uniform joint widths, the material shall be sized straight and true.

D—Transportation, Storage and Protection

Shipment, Delivery and Care

18. Unless otherwise specifically agreed, all Terra Cotta shall be furnished by the manufacturer f.o.b. cars factory, with freight allowed to destination. All Terra Cotta shall be carefully packed in hay, straw, excelsior or other suitable material.

Replacements

19. If any pieces of Terra Cotta are damaged in transit, the manufacturer shall be immediately notified in writing by the setting contractor and proceed with the remaking of the pieces. The responsibility for the cost of such replacements shall be determined by the point of delivery fixed by the contract under which the Terra Cotta is delivered. If the point of delivery is beyond the immediate control of the manufacturer, the setting contractor shall assume responsibility for the necessary proof of damage.

E—Erection

Handling

20. The setting contractor shall receive the Terra Cotta on arrival at the freight yards and shall transfer it without damage from the cars to the building. When the Terra Cotta manufacturer delivers on trucks at the building the setting contractor shall unload and store the Terra Cotta. Terra Cotta shall be stored under cover not in contact with the ground, stacked without inflammable packing on wood laths or strips, so as to protect it from injury.

Mechanics

21. All Terra Cotta shall be set by mechanics experienced in the handling and setting of the material.

Cutting and Fitting at the Building

22. Notice of errors in the manufacture of the Terra Cotta shall be given to the manufacturer immediately upon discovery. Cutting or fitting due to such errors shall be done by the Terra Cotta manufacturer or shall be paid for by him if he fails to do the necessary cutting or fitting promptly upon receipt of notice.

23. Other necessary cutting and fitting of the Terra Cotta that may be required at the building, including all fitting around anchors, steel and iron work and reinforced concrete, shall be done by the contractor for setting Terra Cotta.

Supporting Metal Work and Anchors

24. *In Connection with Structural Steel*—Beams, channels, angles, T's, plates and fabricated members for supporting Terra Cotta and which are not secured to the structural steel by rivets or short bolts, as shown on the architect's drawings, together with all anchors, hangers, bolts, clips, straps, rods and pins for securing Terra Cotta, shall be furnished and set by the contractor for setting Terra Cotta.

25. *In Connection with Structural Concrete*—The contractor for structural concrete shall furnish and set all supporting metal work inbedded in the concrete and all shelf angles and continuous rods. All such metal work shall conform to the requirements of the setting drawings prepared by the Terra Cotta manufacturer.

26. All other loose iron such as clamps, hangers, clips, straps, and pins shall be furnished and set by the Contractor for setting Terra Cotta.

27. All anchors, hangers, bolts, clips, straps, rods and pins for securing Terra Cotta shall be of wrought iron or non-corroding soft steel.

28. Anchors, hangers, bolts, clips, straps, rods and pins for securing the Terra Cotta, except where otherwise shown or specified, shall be of the following minimum sizes:

29. Anchors:—(a) For ashlar or courses balanced on the wall, shall be ¼x¼ in. or ⅛x⅝ in., or No. 6 gauge galvanized wire.

30. (b) For projecting courses not balanced on the wall, shall be not less than ⅝-in. round or square bars or equal cross section.

31. Hangers shall be ⅝-in. diameter round bars or other shapes of equal cross section area.

32. Clips and straps shall be ⅜x2 in.

33. Pins shall be ½-in. diameter round bars.

34. Continuous rods on concrete wall faces to which Terra Cotta ashlar is clipped, shall be ⅝-in. diameter round bars which shall be secured to the masonry with ½-in. diameter round anchors placed not more than 2 ft. 0 in. on centers.

35. All steel or iron supporting metal work shall be clean and thoroughly protected with two coats of pure red lead and linseed oil paint, asphaltum applied hot, or other approved protective compound.

Protection of Supporting Metal Work

36. Metal work of every description, supporting Terra Cotta, shall be imbedded thoroughly in the masonry backing and when not so imbedded, metal work shall be protected against corrosion by encasing with cement mortar or in cement mortar masonry.

37. When the back of a Terra Cotta course comes in con-

Continued on next page

tact with iron or structural concrete in such manner as to prevent the encasing of supporting iron from the rear, an opening shall be made in the top to admit of the placing of the encasing mortar as required above.

Mortar

38. All cement used for setting mortar shall be a standard brand of Portland cement fulfilling the requirements both physical and chemical of the standard specifications for Portland cement adopted by the American Society for Testing Materials.

39. All sand used for setting mortar shall be clean, sharp and well graded in size.

40. All mortar for setting and pointing shall be composed of one volume of Portland cement to three volumes of sand. Hydrated lime, not to exceed 9 pounds to the sack of cement, shall be added.

41. The sand and cement and lime, if any, shall be thoroughly mixed dry before any water is added. The use of retempered mortar shall not be permitted.

Setting

42. All Terra Cotta shall be set true to a line and carefully laid in a solid bed of mortar. All rebates in bed and cross joints from front to back and top to bottom, shall be filled solid with mortar leaving no voids. Each piece of Terra Cotta shall be tamped into place, excess mortar cut off and struck with a jointer or trowel. All sills, wall copings and other capping courses, shall be set in a thick bed of mortar and well pounded down so that the mortar fills all spaces around bottom of webs of Terra Cotta.

43. All Terra Cotta projecting courses shall be so set that the arris casting a shadow shall be true to line.

44. When the Terra Cotta work is of such scope or character that the proper handling and setting of the Terra Cotta require special skill and knowledge, the Terra Cotta manufacturer shall, if required by the contract, furnish a competent Terra Cotta setter to assist in the sorting, selecting and handling of the Terra Cotta, to co-operate with the setting contractor, to assist him when cutting or fitting of the Terra Cotta is necessary, to advise as to interpretation of setting drawings, and to help generally in securing rapid, efficient progress during the setting of the Terra Cotta. For such service the setting contractor shall pay such setter full time at his regular wage rate. When the furnishing of such a competent setter involves traveling expenses, the setting contractor shall pay the same and also make an allowance for his board.

45. When the services of such a competent setter are not required under the contract, the Terra Cotta manufacturer may, at his own option and expense, send such a representative to the work who shall perform the above services, and the setting contractor shall co-operate with and aid and facilitate the performance of such services by such representative.

Pointing

46. All joints in Terra Cotta shall be pointed and struck as the setting progresses except in freezing weather. In freezing weather and when re-pointing is necessary, all joints shall be raked or cut out to a depth of ½ in. and the pointing mortar driven into the joint and struck with a jointing tool.

47. All joints in overhanging Terra Cotta, balustrades, parapets and free standing features shall have joints raked out one-half (½) inch, and pointed with an approved elastic cement.

Protection

48. All uncompleted walls including Terra Cotta and backing shall be protected by waterproof covering at night and at any time when liable to injury from storms or freezing.

(Note: All other protection required for projecting courses, jambs of openings, etc., is provided for under the work of other trades.)

Cleaning Down

49. Upon completion of the work, mason's wedges, shoring, supports and centering and all other false work and protections shall be removed and the Terra Cotta cleaned down. If satisfactory results can not be obtained by the use of abrasive soap or washing powder, a solution consisting of 1½ pints of muriatic acid to a gallon of water may be used. In the use of acid solutions only wooden pails and fibre brushes shall be employed.

Glossary of Terms Relating to Terra Cotta

Surface Finish

50. Surface Finish designates the texture of the surface of the clay body prior to application of Ceramic Finish.

51. It may be:

(a) *Smooth.*

(b) *Tooled or Drove.*
(b1) Eight lines to the inch.
(b2) Six lines to the inch.

(c) *Light irregular drag or combing.*

(d) *Heavy irregular drag or combing.*

(e) *Special.*

52. A special Surface Finish like "bush-hammered," "pitted," "vermiculated," etc., involves extra expense and, if required, should be clearly specified.

53. *Surface Finish for unglazed surfaces* may be smooth or may be tooled with a light or heavy drag. Flat surfaces of sufficient width may be tooled, while the curved surfaces of mouldings may be left smooth.

Surface Finish for glazed Ceramic Finish (whether lustrous or mat) is usually made smooth.

54. *Granite Colors,* if unglazed, may be made smooth or with irregular drag, or pitted. A bush-hammered or special surface involves extra expense, and if required should be clearly specified. If glazed Ceramic Finish is used for Granite Colors the surface treatment is usually smooth.

Ceramic Finish and Color

55. Ceramic Finish designates the surface and color applied by the ceramic processes of coating, glazing, burning, etc.

56. (1) *Unglazed Terra Cotta:* Terra Cotta with a Ceramic Finish producing an unglazed finish made in various shades of buff, gray, salmon, red and brown. Most colors thus made are vitreous.

57. (2) *Glazed or Enameled Terra Cotta:* Terra Cotta having an impervious Ceramic Finish of a glassy texture which may be either lustrous or mat (sometimes designated as full or dull glazes or enamels) made in various colors.

58. (3) *Granite Color Terra Cotta:*

(a) Unglazed Granite Color:—A mottled Ceramic Finish similar to unpolished granite.

(b) Glazed or Enameled Granite Color:—A mottled Ceramic Finish similar to polished granite, made either lustrous or mat.

59. (4) *Polychrome Terra Cotta or Faience:* Terra Cotta having two or more colors on the same piece.

(a) Polychrome, Unglazed:—Unglazed Terra Cotta having two or more colors on the same piece.

(b) Polychrome, Glazed:—Glazed Terra Cotta having two or more colors on the same piece.

(c) Polychrome, Blended Colors:—Made only in glazed Terra Cotta. If, in polychrome glazed work, the colors are not to be separated by definite lines or contours of ornaments, but are to be blended together by brush treatment, or the like, the term "Polychrome, blended colors" shall be used. The character of work expected should be explicitly described.

(Note: For polychrome work always clearly specify the work to be done and the number of colors on a single piece.)

60. (5) *Special:* There are a number of Ceramic Finishes used by individual manufacturers the processes for which are patented or the names copyrighted which are not included in this Glossary.

61. (6) *Semi-Glaze:* An ambiguous term which should never be used.

62. (7) *Fire-Gilding:* A coating of gold glaze either mat or lustrous, fixed by an additional burning. (The area of surface to be gilded should be clearly described.)

Short Form Specification for Incorporation in the Architect's Specifications

To be used in connection with Standard Specifications and the Standard General Conditions of the American Institute of Architects.

63. *Note to Architect:*—The Standard Specification does not state who shall set the Terra Cotta, who shall provide wood centering, scaffolding, hoists, cover boards and protection (except tops of walls against weather). It does not include any cement or concrete work in connection with forming gutter grades and washes on projecting courses and features, or the furnishing or setting of sheet metal flashings and gutter linings. It does not include the furnishing and erection of metal supporting members which are riveted or bolted with short bolts to the structural steel or structural concrete. It requires the architect to show on his drawings the sizes and arrangement of rolled or fabricated structural shapes used for supporting Terra Cotta. (See notes on corollary clauses at end of this specification for the work of other trades to take care of such omissions.)

General Conditions

64. The general conditions of the American Institute of Architects, Third Edition, shall form a part of this specification and contract and all work shall be subject to the provisions thereof.

Continued on next page

Work Included

65. The work included in the contract comprises the manufacture, (and) delivery (and setting) of all Terra Cotta in accordance with the contract drawings and these specifications.

66. All (here insert a complete description of work) shall be of Terra Cotta.

Work Not Included

67. The following items are not included as a part of the contract for furnishing (and setting) Terra Cotta.

(a) Masonry backing. See specifications for (.....).

(b) The furnishing and erection of metal supporting members which are riveted or bolted with short bolts to the structural steel. See specifications for (.....).

(c) Cement or concrete grading for gutters, washes, floors, etc. See specifications for (.....).

(d) Furnishing and setting sheet metal, see specifications for (.....).

Materials and Workmanship

68. All Terra Cotta work under this contract, except as hereinafter specified, shall be executed in strict conformity with the Standard Specification for the Manufacture, Furnishing and Setting of Terra Cotta, adopted by the NATIONAL TERRA COTTA SOCIETY; which Standard Specification is hereby declared and made a part of this specification with the same force and effect as if written herein in full.

Surface Finish, Ceramic Finish and Color

69. All Terra Cotta

(Note: If several textures or finishes are to be used give location of each.)

shall be

70. (1) *Unglazed.*

Surface Finish or flat members shall be

(a) *Smooth.*

(b) *Tooled or Drove.*

(b1) Eight lines to the inch.

(b2) Six lines to the inch.

(c) *Light irregular drag or combing.*

(d) *Heavy irregular drag or combing.*

(e) *Special.*

(Note: Special surface finishes like "bush-hammered," "pitted," "vermiculated," etc., should be described.)

71. The surface finishes of mouldings and curved surfaces generally shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

72. (2) *Unglazed Granite Colors*—Surface finishes of flat members generally shall be (a, b, c, d, e). The surface finish of mouldings and curved surfaces generally shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

73. (3) *Lustrous or Full Glazed or Enameled*—Surface finish shall be

(Note: Unless otherwise specified these surfaces are generally made smooth.)

74. (4) *Mat or Dull Glazed or Enameled*—Surface finish shall be

(See Note 3.)

75. (5) *Lustrous or Full Glazed or Enameled Granite*—Surface finish shall be

(See Note 3.)

76. (6) *Mat or Dull Glazed Enameled Granite*—Surface finish shall be

(See Note 3.)

77. The color of the Terra Cotta generally shall be (.....) as per approved sample or samples.

78. (7) The Terra Cotta comprising....(described here in detail....) shall be (two, three, four) color polychrome. Colors (....specify where....) shall be blended.

79. (8) The surface finishes of (....specify where....) shall be fire gilded with (mat or lustrous) gold glaze.

(Note: Sections 1, 2, 3, 4, 5, 6 are alternates. If there is no polychrome work or no fire gilding omit sections 7 and 8. Sections a, b, c, d, e, are alternates for surface finish.)

Delivery

80. The Terra Cotta manufacturer shall furnish and deliver (f.o.b. cars factory with freight allowed to destination) (on trucks at the site of the building) (and set) all the Terra Cotta as indicated on the drawings or as here described.

Setting

81. All Terra Cotta shall be set by (Terra Cotta manufacturer) (mason.....). For such anchors and metal work as are to be furnished by the setting contractor see Standard Specification.

(*Note to Architect:* If the Terra Cotta manufacturer is to set his material include the following clause in the Terra Cotta specification. See also suggested clauses at end of this specification to take care of these omissions and for incorporation in the specifications for the work of other trades.)

82. "Hoisting service, storage space, setting mortar delivered on the scaffold, outside and inside scaffolds, runways and platforms, water, temporary light and removal of refuse, shall be furnished to the Terra Cotta manufacturer free of charge by the (....mason contractor....)."

Terra Cotta Setter

(Note to Architect: If the work is of such scope or character that the proper handling and setting requires special skill, the following clause may be inserted:)

"The Terra Cotta manufacturer shall furnish at the expense of the setting contractor a competent Terra Cotta setter to assist in the sorting, selecting, handling and setting of the Terra Cotta."

Joints

83. (The Standard Specification does not require any joints to be rubbed. If rubbed joints are to be required it should be so stated here.)

84. (The Standard Specification requires all joints to be approximately ¼ in. wide. If joints of a different width are desired it should be so stated here.)

Suggestions for Corollary Clauses

85. 1.—If the Terra Cotta is to be set by the Terra Cotta manufacturer, a clause similar in purport to the following should be included in the general requirements relating to masonry or brick work:

86. "Terra Cotta will be furnished and set by the Terra Cotta manufacturer. Hoisting service, storage space, setting mortar delivered on the scaffold, outside and inside scaffolds, runways and platforms, water, temporary light and removal of refuse shall be furnished to the Terra Cotta manufacturer, free of charge, by the (mason contractor)." A provision should also be included to the effect that the (mason contractor) shall construct the brick (concrete) backing for the Terra Cotta and "The backing shall proceed simultaneously with the setting of Terra Cotta. Each piece of Terra Cotta shall be backed up solid with brick and mortar, so as to make a perfect bond and homogeneous mass between wall lines. This backing shall extend beyond the wall line when necessary to structural stability. If concrete is used it shall not be stronger than a 1 to 9 mixture."

Also a provision under which the (mason) contractor shall place all concrete or cement grading for gutters, washes and balcony, loggia or other floors.

87. In the case of parapet walls specifications should state that flashing if used shall be carried through the wall, or if flashing be not used the back of the parapet wall shall be damp-proofed and the waterproofing carried through the wall.

88. 2.—In the specifications for sheet metal work there should be included a clause similar in purport to the following:

"The washes on all cornices and other exposed surfaces, where shown or specified, shall be covered with ( ) which shall be turned up against vertical surfaces (cap flashed) and cemented into the raggles provided for the purpose in the Terra Cotta."

89. 3.—Structural Supports.

Under "Structural Steel," a clause similar in purport to the following should be included:

"Beams, channels, angles, T's, plates and fabricated members for supporting Terra Cotta, and which are secured to the structural steel with short bolts or rivets, shall be furnished and erected by the contractor for (structural steel.)"

90. Under "Structural Concrete" a clause similar in purport to the following should be included:

"Steel beams, channels, angles, T's, plates, fabricated brackets and outlookers and other members, bolts, rods, wires, anchors, and sleeves for supporting Terra Cotta, which are inbedded in the structural concrete, also shelf angles and continuous rods attached to structural concrete shall be furnished and set by the contractor for structural concrete, in strict accordance with setting drawings prepared by the Terra Cotta manufacturer." (For information as to the sizes and character of bolts, rods, anchors, etc., see Section E paragraphs 24 to 35 inclusive on "Supporting Metal Work and Anchors" of Standard Specification for the Manufacture, Furnishing and Setting of Terra Cotta. Such supports should be clearly shown on the drawings.)

91. 4.—Under "Rough Carpentry" or other suitable division of work, there should be included a clause providing that the contractor shall furnish, set and maintain all centering, cover boards, boxing and protection for Terra Cotta, and remove the same upon completion of the work.

ATLANTIC TERRA COTTA CO.

19 West 44th Street, NEW YORK, N. Y.

PLANTS

TOTTENVILLE, S. I., N. Y. PERTH AMBOY, N. J. ROCKY HILL, N. J.

NEW JERSEY DISTRICT OFFICE: 11 Halsey Street, NEWARK, N. J.

PHILADELPHIA DISTRICT OFFICE: 1003 Architects' Building, PHILADELPHIA, PA.

ATLANTA TERRA COTTA CO.

GLENN BUILDING, ATLANTA, GA.

PLANT: EAST POINT, GA.

(Eight miles from Atlanta)

SOUTHWESTERN DISTRICT OFFICE: DALLAS, TEX.

REPRESENTATIVES IN ALL IMPORTANT CITIES OF THE UNITED STATES AND CANADA

General

The Atlantic Company is so organized as to give the Architect and the Contractor service broader in scope than is usual with other building materials. There are various considerations that effect economy in Terra Cotta manufacture. The Atlantic Company is always ready to co-operate by showing how cost may be moderated. The development of the proper form of Terra Cotta construction is a regular part of Atlantic services. On many occasions the Atlantic Company acts as engineers as well as manufacturers.

Products

ATLANTIC TERRA COTTA is a handmade, burned clay structural material of the widest adaptability for exterior and interior construction and decoration, made in plain ashlar and any form of modeled and sculptured ornament and in any color or combination of colors.

WALL UNITS—Particularly adapted for interior walls and partitions. Atlantic Wall Units are made mechanically to standard size, a new and particularly serviceable form of Atlantic Terra Cotta. See next page following.

CHIMNEY POTS—See second page following.



FOUNTAINS and GARDEN POTTERY—Frequently made to order in accordance with special designs, but there are many of standard design which can be made from moulds on hand. There are a number of wall fountains; garden pottery follows in shape and size antique Florentine oil jars.

Publications

Monthly Magazine, "Atlantic Terra Cotta"—Printed for Architects and Draftsmen, fully illustrated, describing and illustrating the most recent development in Atlantic Terra Cotta as applied to modern buildings. Twenty pages and cover. Subscription free and list open. A.I.A. Standard File No. 9.

Wall Units—Containing 50 full page plates, this catalogue completely describes the new line of Wall Units for interior walls and partitions. Of great use to the designer in the Architect's office. Sent on request. A.I.A. Standard File No. 9C.

Chimney Pot Catalog—Illustrating and describing a long line of colors and sizes. Price list included. A.I.A. Standard File No. 5H 3.

Construction Drawings—A set of 10 drawings illustrating Terra Cotta construction.

SPECIALLY MADE TERRA COTTA

Description

Every piece of Atlantic Terra Cotta is made by hand in accordance with the architect's drawings and specifications, and is designed to occupy a certain place in a certain building. The price is based on the quantities for each particular building and there is no other unit for estimating purposes.

On every contract complete setting drawings are prepared which show the size and shape of every piece, its location and its attachment to the frame. These drawings are subject to the architect's approval. A complete set is sent to the contractor for guidance in the actual work of construction.

The Atlantic Modeling Studios and Ceramic Laboratories at each plant are headed by sculptors and chemists of training, education and experience. Color samples will be sent on request. Photographs of modeling on definite orders are submitted for the architect's approval.

Uses

Atlantic Terra Cotta is used independently for entire exteriors of buildings or any part thereof, or for interior side walls and ceilings. It is particularly suitable for office buildings, apartment houses, hotels, theatres, churches and high class buildings in general.

Hundreds of small shop fronts entirely of Atlantic Terra Cotta are built every year. Terra Cotta is low enough in price for the taxpayer type of small building and high enough in quality for the expensive shops of the Fifth Avenue class.

Colors

The palette of Atlantic Terra Cotta is practically without limit. There are sixty shades of unglazed gray, buff, brown and red. Textures are smooth or rough to any desired degree.

Whites, creams and ivories are either matt glazed or lustrous glazed. These colors are impervious and easily cleaned—the cleanest materials in architecture.

Conglomerate colors are shaded and blended, usually in rough texture, similar to natural geological formations but with definite Terra Cotta character and flexibility.

Abbochrome colors are a recent development and are also somewhat conglomerate in character, composed of from three to five different colors with a slightly

Continued on next page

SPECIALLY MADE TERRA COTTA (Continued)

luminous, somewhat rough texture. (Abbochrome colors have proved especially popular for they vary in tone and prevent the dull monotony of flat colors. They are unique with Atlantic laboratories.) Abbochrome gives an excellent effect for interiors as well as exteriors.

There is a wide range of bright and soft colors for polychromy. The opportunity for selection is exceptional, comprising blues, greens, yellows, tan, buff, orange, violet, purple, etc. Depth of tone gives Atlantic polychrome colors refinement and character.

Atlantic Gold is real gold burnished to any degree of lustre from dull matt to brilliant glazed.

Atlantic Silver is a real silver color made on a platinum base. These two colors are particularly effective combined with brilliant jet black glazed Terra Cotta. (Special Atlantic colors.)

Atlantic Scarlet Vermilion, an exclusive Atlantic color, is the brightest color in architectural polychrome.

Installations

New York Central Building, New York, N. Y., Warren & Wetmore, Architects
Chanin Building, New York, N. Y., Sloan & Robertson, Architects
400 Madison Avenue, New York, N. Y., H. Craig Severance, Architect
500 Fifth Avenue, New York, N. Y., Shreve, Lamb & Harmon, Architects
New Waldorf Astoria Hotel, New York, N. Y., Schultze & Weaver, Architects
Union Trust Building, Detroit, Mich., Smith, Hinchman & Grylls, Architects
Terminal Towers, Cleveland, Ohio, Graham, Anderson, Probst & White, Architects
Philadelphia Museum of Art, Philadelphia, Pa., Horace Trumbauer, C. C. Zantzinger and C. L. Borie, Jr., Architects
Smith Young Tower, San Antonio, Tex., Atlee B. & Robt. M. Ayers, Architects
Dade County Court House and Miami City Hall, Miami, Fla., A. Ten Eyck Brown, Architect; August Geiger, Associate
Atlanta City Hall, Atlanta, Ga., G. Lloyd Preacher & Co., Architects

WALL UNITS OF ATLANTIC TERRA COTTA

The catalogue of Atlantic Wall Units is designed particularly for the designer in the architect's office. By selecting units of the required bond he can assemble them readily on his drawings for a proposed wall or partition.

From the designer's drawings the Atlantic Company can figure the required number of Wall Units together with all accessory bases, miters, cap pieces and cut pieces that may be necessary.

If the Atlantic Company can be of assistance in preparing drawings for projected work or in other ways, do not hesitate to ask for service. No obligation involved.



Uses

For interior side walls and partitions—The field for Wall Units is practically unlimited and the architect will find many opportunities for their use.

Among the advantages are a sanitary service unaffected by heat, cold, dampness or chemicals; fire resistant and non-inflammable; economical to set; high coefficient of light reflection without glare; upkeep negligible.

There is no limit to color or surface texture. The Atlantic color palette comprises hundreds of colors. Walls of Atlantic Units are beautiful, brilliant or restful to the eye, practical, serviceable and economical.

Suggested uses are for lobbies, halls, corridors, partitions, dwarf walls, wainscots, for banks and office buildings, hotels, apartment houses, hospitals, operating rooms, laboratories, railroad waiting rooms, theatres, churches, dairies, food factories, etc.

Economy

Atlantic Wall Units will take the place of many far more expensive materials and will show a substantial saving without loss of character. In fact, the wide architectural adaptability of Terra Cotta permits exceptionally high class construction without material increase in cost.

One of the greatest savings in the use of Atlantic Wall Units is the economy of construction.

Adopt a closed back unit with the thickness of the required wall and score the back to take plaster. Build the wall entirely of Wall Units. There will be a finished Terra Cotta face on one elevation and the back will be ready for plaster.

This does away with the cost of furring and backing and the time saved will be an important factor of economy.

Dimensions and Description

Atlantic Wall Unit Ashlars measure 8x16-in. face, with bonds of 2, 4, 6, or 8 in., either open or closed back as desired. The closed back may be finished scored to engage with plaster or smooth as desired.

Every order includes all necessary base and cap mouldings, interior and exterior miters, jamb pieces and, in fact, every piece needed for complete coverage for the wall specified.

If a modeled, brightly colored band or frieze course is desired it can be supplied economically.

Modeled Wall Units

In addition to Wall Units with plain surfaces there are various forms of modeled ornament which may be employed or the designer can develop his own ornament.

To take advantage of the saving of mechanical quantity as opposed to handmade Terra Cotta it is important that pieces should repeat frequently. If one hundred or more exactly similar modeled pieces are called for, the price for modeled Wall Units would be only slightly higher than the price for plain units.

Modeled Wall Units give an excellent opportunity for polychrome treatment. Modeled units are invariably the open-back type.

See Plate 103 in Atlantic Wall Unit Catalogue.

Durability and Maintenance

The durability of a wall of Atlantic Units is assured. It will last at least as long as the building in which it is used and without depreciation. Even if it should become soiled the wall can be washed down with

Continued on next page

WALL UNITS OF ATLANTIC TERRA COTTA (Continued)

soap and water and restored to its original freshness. No other maintenance will be necessary.

Price

A lump price is quoted for all the Wall Units required for a specified project in accordance with the Architect's drawings.

Installation

Municipal and Magistrates Courthouse, Queens, New York, N. Y., Thomas C. Rogers, Architect.
Brooklyn State Hospital, New York, N. Y., Wm. E. Haugaard, Dept. of Public Works, Division of Architecture, New York City, Architect.
Driveway, Waldorf Astoria Hotel (New), New York, N. Y., Schultze & Weaver, Architects
Powerhouse and Service Building, American Museum of Natural History, New York, N. Y., Trowbridge & Livingston, Architects
Corridors in Nathan Hale School, Carteret, N. J., Simons & Sheridan, Architects
Fire Houses at Port Richmond, S. I., N. Y.—Rosebank and Dongan Hills, S. I., N. Y.—Fire Department, Division of Building, New York, Architects
Newtown High School, Elmhurst, N. Y., W. C. Martin, Board of Education, Brooklyn, N. Y., Architect
New Jersey State Hospital, Hillsdale, N. J., Department of Institutions and Agencies, Division of Architecture and Construction, Trenton, N. J., Architects
School No. 1, Somerville, N. J., John N. Pierson & Son, Architects
Carew Tower, Cincinnati, Ohio, W. W. Alschlager, Architect —Facing for corridor walls on forty floors
and many others.

CHIMNEY POTS OF ATLANTIC TERRA COTTA

The Atlantic Terra Cotta Co.'s catalogue "Chimney Pots," illustrates over thirty different designs, each design made in from four to ten different flue sizes and eight different colors. Any one of the Atlantic colors, hundreds in number, is available, however.

Chimney pots revive the old English tradition and they have proved immensely popular for country and suburban residences of the better class and the garden type of apartment house.

Color

Color selection makes the Atlantic line of chimney pots unique. The traditional natural clay shades of buff, red and gray with unglazed surface are available as well as many brilliant colorful glazes, covering a wide range and including white and black. Today, when roofing material is so full of color, colored chimney pots are frequently most appropriate.



Cost

The cost of Atlantic chimney pots is surprisingly low, running from $9.00 to $40.00, depending upon the size and the design. The most popular design and size sells for $14.50. This is a simple chimney pot with a 12-in. flue, in any color desired.

Smoked Topped Chimney Pots

A recent development, the smoked top chimney pots, illustrates an interesting way of giving an antique appearance. This is done by applying dull black with a clouded effect on the upper part of the chimney pot. The black fades into the base color gradually. The base color may be buff, red or gray. The appearance is unusual but not at all bizarre. In fact, black tones down the chimney pot remarkably.

Polychrome

In some cases polychrome combinations are used on the more decorative chimney pots or groups are arranged of chimney pots in different colors. Frequently black Terra Cotta is used in color combinations to give emphasis. Another way of making an interesting chimney pot group is to make one design but in a number of different flue sizes and of great variation in height. Sometimes as many as seven different chimney pots occur on one chimney stack with as many different sizes and as many different heights.

The simple chimney pot usually employed in such grouping comes in eight different flue sizes, from 9 to 24 in., and can be made in any desired height up to 4 ft.

Special

In addition to the standard sizes illustrated in the catalogue, many specially made chimney pots are manufactured in accordance with the architect's drawings. Some of these special chimney pots run to a height of 12 ft. and are sometimes of even greater height.

Catalogue

The catalogue and complete price list will be sent on request.

Architects

Among the architects who have specified Atlantic Chimney Pots are:

F. L. Ackerman
Phelps Barnum
Rolfe Bauhahn
C. L. Borie, Jr.
Geo. P. Butler
R. Candela
Robt. M. Carrere
Henry Chapman
Clark & Arms
Bradley Delahanty
Delano & Aldrich
Irving B. Ellis
Aymar Embury 2nd
M. F. Frechof
Julius Gregory
Charles B. King
Polhemus & Coffin
John Russell Pope
Emile Saarinen
Mott B. Schmidt
John J. Sheridan
Taylor & Levy
Andrew J. Thomas
John B. Thomas
Joseph Unger
John V. Van Pelt
Anthony J. C. Waldeier

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"Build with Architectural Terra Cotta"

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705 Insurance Co. of North America Building, 1600 Arch Street
PHILADELPHIA, PA.

(Works, Wissahickon Avenue and Juniata Street)

AGENCIES

AKRON, OHIO, Walter Brick & Clay Products Co., 177 So. Broadway
ALTOONA, PA., General Sales Supply Co., 1720 Margaret Avenue
BOSTON, MASS., E. Stanley Wires Co. Inc., 120 Boylston Street
BALTIMORE, MD., Frank E. Black, 1116 Lexington Building
CLEVELAND, OHIO, Harris-Murray Co., 560 E. 99th Street
COLUMBUS, OHIO, B. M. Freeman Co., Buckeye Building, 42 E. Gay Street
COLUMBIA, S. C., C. W. Turner, 58 Arcade Building
CLARKSBURG, W. VA., Thornton Fire Brick Co.
DETROIT, MICH., Toledo Plaster & Supply Co., 2842 W. Grand Boulevard
NORFOLK, VA., Southern Building Material Co., 235 Monticello Arcade Building
PITTSBURGH, PA., A. G. Starr Co., 300 Brushton Avenue
RICHMOND, VA., Earnest Bros., 805 E. Franklin Street
SCRANTON, PA., A. D. Parsons, Inc., Cedar Avenue
TAMPA, FLA., Stovall & Archer, Peninsular Telephone Building
TOLEDO, OHIO, Toledo Plaster & Supply Co., 1402 W. Bancroft Street
WILKESBARRE, PA., William H. Pierce, 904 Second National Bank Building
WILMINGTON, N. C., C. F. Howell

Product

Architectural Terra Cotta of highest quality.

Our machine made Architectural Terra Cotta Tile may be had in a wide variety of sizes. This tile is made either single or double faced and is adaptable for lining interiors, foyers, corridors, vestibules, banks, churches, restaurants, etc. Furnished glazed or unglazed. Pulsichrome or splatter finishes in colors that will please the most artistic and exacting architects and owners. Write for our catalogue.

Services

Our technical departments are always at your service, without obligation.



Drake Apartment Hotel, Philadelphia, Pa.
Ritter & Shay, Architects — Murphy-Quigley Co., Contractors

Use of This Material

Schools, colleges, churches, theaters, office buildings, banks, store buildings, garages and factory buildings, trimmed with Architectural Terra Cotta, become neighborhood beautifiers.

This material, which has stood the test of time and the elements, with all its color and surface treatment possibilities is the logical building material where durability, decorative qualities and color are required to make a complete and permanent design.

Representative Work

Philadelphia, Pa.

Benjamin Franklin Hotel, Horace Trumbauer, Architect
Wesley Building and Robert Morris Hotel, Ballinger Co., Architects
Scottish Rite Temple, Horace W. Castor, Architect
Atlas Storage Warehouse, George S. Kinsley, New York, Architect
Drake Apartment Hotel, Ritter & Shay, Architects
John H. McClachy Building, William Steele & Sons Co., Architects and Builders

Boston, Mass.

Batterymarch Building, Harold Field Kellogg, Architect

Richmond, Va.

Colonial Theater, Carneal & Johnston, Architects

Wilmington, N. C.

Cape Fear Hotel, G. Lloyd Preacher, Inc., Architects

Atlantic City, N. J.

Hotel Blenheim and Central Pier, Price and McLanahan, now Ralph B. Bencker, Architects
New Stanley Theater, Hoffman-Henon Co., Architects

Tampa, Fla.

First Baptist Church, Chas. M. Hart, New York, Architect

Jacksonville, Fla.

St. James Building, H. J. Klutho, Architect

New York, N. Y.

Broadway Tabernacle, Barney & Chapman, Architects

Harrisburg, Pa.

Doutrich's Store Building, Clayton J. Lappley, Architect
Office Building, Charles H. Lloyd, Architect

Trenton, N. J.

Stacy-Trent Hotel, Esenwein & Johnson, Buffalo, N. Y., Architects

Lancaster, Pa.

Brunswick Hotel, C. Emlen Urban, Architect

Miami, Fla.

Security Building, Robert Greenfield, Architect

Pittsburgh, Pa.

Clark Building and Stanley Theater, Hoffman-Henon Co., Architects

CORNING TERRA COTTA CO., INC.

Architectural Terra Cotta

MAIN OFFICE AND FACTORY

CORNING, N. Y.

AGENCIES IN ALL PRINCIPAL CITIES

ARCHITECTURAL TERRA COTTA

The staff of CORNING TERRA COTTA CO., INC., having been manufacturing Architectural Terra Cotta for more than forty years, is most cognizant of the need of a very close co-operation in executing the architects' desires and rendering the very rapid service to the general contractors which present day conditions demand.



St. Luke's Church, Buffalo, N. Y.

CHESTER OAKLEY, Architect

The above frieze of eighty-seven accurate Biblical figures, through collaboration of the architect and the staff of CORNING TERRA COTTA CO., INC., resulted in a superbly modeled picture, with perfect harmony of true ecclesiastical coloring

FEDERAL SEABOARD TERRA COTTA CORPORATION

Manufacturers of Architectural Terra Cotta

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ASHLAND 4-1220

10 East 40th Street
NEW YORK, N. Y.

FACTORIES: PERTH AMBOY, WOODBRIDGE, and SOUTH AMBOY, N. J.
AGENCIES IN ALL PRINCIPAL CITIES

Products

ARCHITECTURAL TERRA COTTA for exteriors and interiors of buildings of the permanent type.

Also Solid Back Machine Made Clay Building Blocks, glazed in all ceramic colors, particularly adapted to interiors, school corridors, power stations, hospitals and all places where a fire-resisting, light reflecting, sanitary wall is desired.

Quality

Federal Seaboard Terra Cotta is in every sense of the word a quality product. Graduate ceramic engineers trained in correct terra cotta technique, are constantly adding new color glaze combinations and textures to a palette which even now possesses a wonderful range of richness, giving the designer an almost unlimited choice of imperishable colors, backed by the qualities gained through many years of achievement in the production of terra cotta.



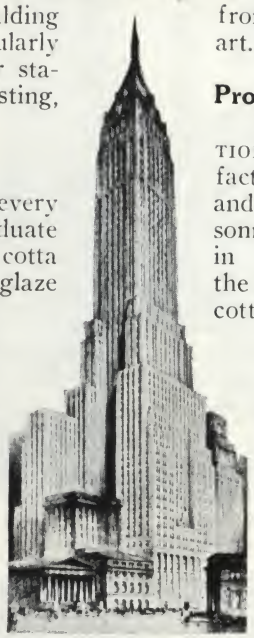
Grand Rapids Trust Co., Grand Rapids, Mich.
SMITH, HINCHMAN & GRYLLS, Architects
OWEN-AMES-KIMBALL CO., Builders



Esperson Building, Houston, Tex.
JOHN EBERSON, Architect
AMERICAN CONSTRUCTION CO., Builders

Modeling

Directing this department is an artist of exceptional ability and training, and under his guidance is a group of artists eminently qualified to create with stylistic correctness decorations in relief, ranging from the accepted classic forms to the modern art.



Bank of Manhattan Building, New York, N. Y.
H. CRAIG SEVERANCE and YASUO MATSUI, Architects
STARRETT BROS., Builders

Production

FEDERAL SEABOARD TERRA COTTA CORPORATION owns and operates three large and modern factories located at Perth Amboy, Woodbridge, and South Amboy, New Jersey, each with a personnel technically equipped to efficiently produce in large quantity the finest terra cotta.



Midland Bank, Medical Arts and Builders Exchange Buildings, Cleveland, Ohio
GRAHAM, ANDERSON, PROBST & WHITE, Architects
ARONBERG-FRIED CO., Builders
Midland Bank
LUNDOFF BICKNELL CO., Builders
Medical Arts and Builders Exchange Buildings

Service

Technical information on construction, design and color possibilities is promptly available upon request.

Price

For definite price, send us architects' elevations and floor plans and specifications, if available.

Approximate estimates of costs can be furnished from sketches.



10 East 40th Street Building, New York, N. Y.
LUDLOW & PEABODY, Architects
G. RICHARD DAVIS & CO., Builders

Representative Work

BUILDING AND LOCATION	ARCHITECT
Fisher Building, Detroit, Mich.	Albert Kahn
Williamsburg Savings Bank, Brooklyn, N. Y.	Halsey, McCormack & Helmer
Hotel New Yorker, New York, N. Y.	Sugarman & Berger
National City Building, New York, N. Y.	McKim, Mead & White
Hecht Stores, Washington, D. C.	Jarvis Hunt
Chase National Bank, New York, N. Y.	Graham, Anderson, Probst & White
Roxy Theatre, New York, N. Y.	Walter W. Ahlschlager
Barlum Building, Detroit, Mich.	Bonnah & Chaffee
Cathedral of the Sacred Heart, Newark, N. J.	I. E. Ditmars
Theatre (Loew), Kansas City, Mo.	Thomas W. Lamb
Library, Cleveland, Ohio	Walker & Weeks
Read House, Chattanooga, Tenn.	Holabird & Roche
Medical Arts, San Antonio, Tex.	Ralph H. Cameron
Hotel Roosevelt, New Orleans, La.	Favrot & Livaudais
Alamance County Courthouse, Graham, N. C.	Harry Barton
Packard Building, Philadelphia, Pa.	Ritter & Shay
Biltmore Hotel, Atlanta, Ga.	Schultzé & Weaver
Keith Memorial Theatre, Boston, Mass.	Thomas W. Lamb
Mastbaum Theatre, Philadelphia, Pa.	Hoffman-Henon
Buffalo Courier Building, Buffalo, N. Y.	Monks & Johnson
RCA-Victor Building, New York, N. Y.	Cross & Cross
Polsky Store, Akron, Ohio	Starret & VanVleck
Lefcourt Newark, Newark, N. J.	Frank Grad
Grove Arcade, Asheville, N. C.	C. N. Parker
Asbury Park Casino, Asbury Park, N. J.	Warren & Wetmore
Medical Arts, Knoxville, Tenn.	Manley & Young

ESTABLISHED 1810

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Manufacturers of Galloway Pottery

3200 Walnut Street, PHILADELPHIA, PA.

GALLOWAY POTTERY

Products

GALLOWAY GARDEN and DECORATIVE POTTERY and TERRA COTTA, including: Flower Pots, Boxes, Vases, Bird Baths, Sun Dials, Tables, Benches, Hermes and Statuary.

Also Architectural Terra Cotta.

For Galloway Hand Made Chimney Pots, see Manufacturers' Index.

Galloway Pottery for Garden and Interior Use

The Galloway organization has been making pottery for over a hundred years. The artistic worth, fine workmanship and durable quality of materials embodied in Galloway Pottery are all endorsed by our hundreds of pleased customer-friends.

The Galloway Pottery shown herewith represents only a few of the many original designs and replicas from antique art which we carry in stock or make to order. Careful workmanship makes Galloway Pottery a welcome addition to the finest interiors; its durability is an essential feature for out-of-doors decoration

Catalogue

Our latest catalogue of Galloway Pottery and schedule of Chimney Pots will be sent on request.

Galloway Pottery Finishes

We find that the most popular finish is the light stony gray. Red, buff and other colors can be made to order as well as a variety of glazes, which finish is especially well suited to jars.





Vases on Terrace
CHARLES A. PLATT, Architect



Pot or Well Curb No. 713, 32 In. Wide



Pedestal No. 755 Only 42 In. High

14½-in. base, 11-in. top, with 18-in. sphere 62 in. high



Pot No. 714, 32 In. Wide



Jar No. 278, 36 In. High



Jar No. 275, 45 In. High

Continued on next page

GALLOWAY POTTERY

Jars

Jars have a fascinating interest in a decorative treatment that no other object seems to possess. A pair of shapely, colorful jars will give a sparkling touch to an otherwise drab spot in the garden, sunroom or house.

Color

Jars are usually carried in the glaze finish, though the high-fired red unglazed terra cotta is a pleasing tone for many settings. Light stony-gray can also be had. Our high-fired glazes range through blues and greens of varying hues. In ordering state if you prefer the blue or green tone to predominate. Other colors will be made on order.



Large Jar in a Beautiful Setting
BENJAMIN W. MORRIS, Architect



No. 434
33x15 In.

Below:
No. 284
30x17½ In.



Left:
No. 277
20x15 In.

No. 438
37x18 In.

Left:
No. 403
22x21 In.

No. 72
22x19 In.
No. 73—Same without bands

NEW YORK ARCHITECTURAL TERRA COTTA COMPANY

AND

TERRA COTTA PRODUCTS CORPORATION

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STILLWELL 7400

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PLANTS: OLD BRIDGE, N. J. AND LONG ISLAND CITY, N. Y.

ARCHITECTURAL TERRA-COTTA, MACHINE-MADE TERRA-COTTA PRODUCTS, CLAY BUILDING BLOCKS, MACHINE-MADE ASHLAR

Quality

For forty-four years the New York Company has manufactured terra-cotta of the highest quality only. Its product meets the most exacting requirements of architect and owner.

Terra-Cotta

Ceramic finishes of proved merit cover such a wide range that the variety of selection presented to architect and owner is almost limitless. The New York Company presents the results of over forty years' constant research in this department. The New York Company applies these ceramic finishes to terra-cotta which has been fabricated to outlast the building of which it will form a part.

Only the highest grade of selected clays, scientifically mixed and thoroughly pugged, tempered and aged enter into the construction of the New York Company terra-cotta.

With solidly pressed faces, sides and ends, all of honest thickness, and with heavy struts adequately placed, each piece of New York Company terra-cotta carries with it the New York Company guarantee.



Lincoln Building, 60 East 42nd Street, New York City, N. Y.
J. E. R. CARPENTER, Architect
E. J. WILLINGALE, KENNETH B. MORTON and WILLIAM HARMON BEERS, Associate Architects
WARREN & WETMORE, Supervising Architects for Bankers
DWIGHT P. ROBINSON & CO., INC., Builders

Side by side, the new and the old. This interesting picture shows the new Lincoln Building under construction with New York Terra-Cotta, and alongside of it the Hotel Belmont in which the same material was used 28 years before. Warren & Wetmore, architects, who were engaged on both structures, and Marc Eidlitz & Sons, contractors, saw the advantages of New York Terra-Cotta as far back as 1902.

Service

The New York Company has at its command most complete facilities for the rendering of steady and dependable service to its customers.

Tee Pee Cee Standard Profiles

To meet the demand for selection of wide range of ceramic colors in standardized profiles for sills, copings, band courses, ashlars, mouldings, etc., we offer die run products made from precisely the same materials as the hand-made architectural terra-cotta, but at economy of price made possible only through standardization and machine fabrication.

Because of the standardized method of packaging, this Tee Pee Cee machine-made product is available for the smallest jobs at the same price per unit charged for larger quantities.

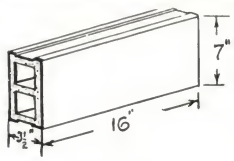
Small orders receive the same prompt and careful attention given to larger shipments.

For color plates, construction plates and specifications, see the three following pages.

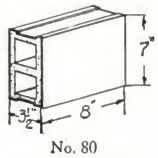
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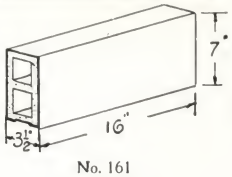
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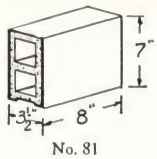
No. 160
Ashlar Block
7"x3½"x16"
1 Face



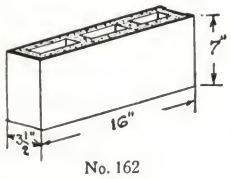
No. 80
Ashlar Half Block
7"x3½"x8"
1 Face



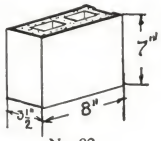
No. 161
Sill or Lintel
7"x3½"x16"
2 Face



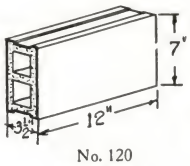
No. 81
Sill or Lintel
Half
7"x3½"x8"
2 Face



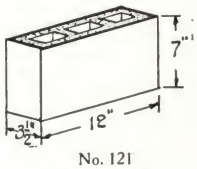
No. 162
Jamb Block
7"x3½"x16"
2 Face



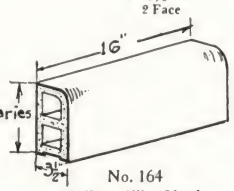
No. 82
Half Jamb
7"x3½"x8"
2 Face



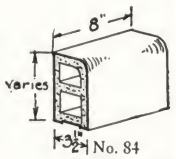
No. 120
Ashlar Block
7"x3½"x12"
1 Face



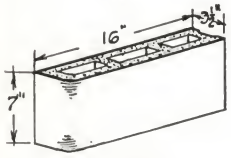
No. 121
Ashlar Block
7"x3½"x12"
2 Face



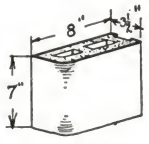
No. 164
Bullnose Sill or Lintel
7"x3½"x16"
2 Face



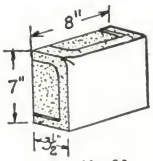
No. 84
Bullnose Half
7"x3¼"x8"—2 Face



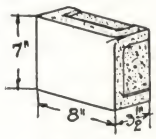
No. 165
Bullnose Block
7"x3½"x16"
2 Face



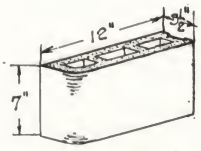
No. 85
Bullnose Half
7"x3½"x8"
2 Face



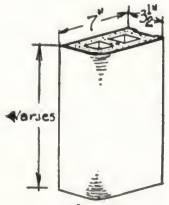
No. 86
Right Mitre
for Sill, Lintel
or Jamb



No. 87
Left Mitre
for Sill, Lintel
or Jamb

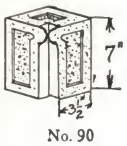


No. 122
Bullnose Block
7"x3½"x12"
2 Face

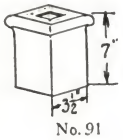


No. 166
Bullnose Jamb
14"x7"x3½"
2 Face

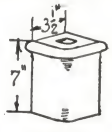
The Above Also Furnished 2", 5", 6" and 8" Thick, and 8" High to Course 8¼", for Bonding With Brick Backing.



No. 90
Square
Internal Mitre



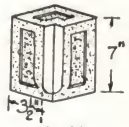
No. 91
Square
External Mitre



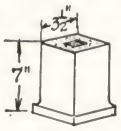
No. 92
Bullnose
External Mitre



No. 93
Bullnose
Internal Mitre



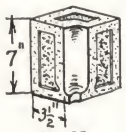
No. 94
Square
Internal Mitre



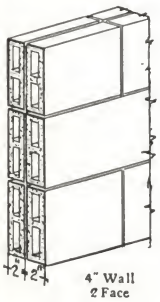
No. 95
Square
External Mitre



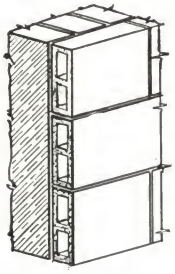
No. 96
Bullnose
External Mitre



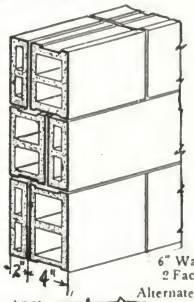
No. 97
Bullnose
Internal Mitre



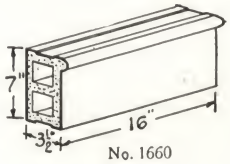
4" Wall
2 Face



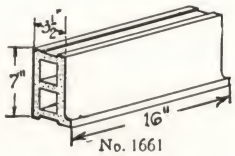
2" Block to Brick Wall



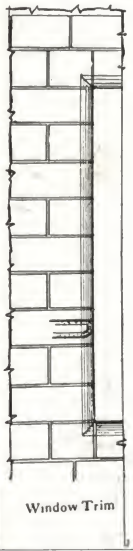
6" Wall
2 Face
Alternate Bond



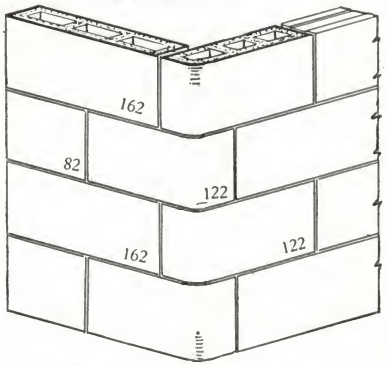
No. 1660
Capping

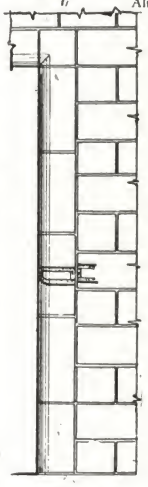


No. 1661
Base

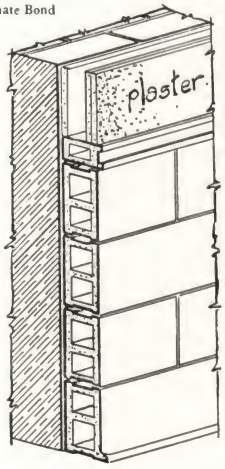


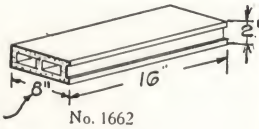
Window Trim





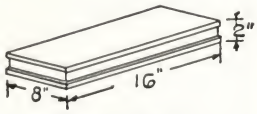
Door Trim



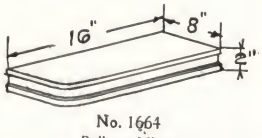


2", 4", 5"
6" or 7"
as required.

No. 1662
Capping



No. 1663
Mitre Square



No. 1664
Bullnose Mitre

FOR ECONOMICAL USE.

Course Heights—5", 7" and 8" (net).
Unit Lengths—1'-4", with Wire Cuts for Any Shorter Pieces as Required.
Thicknesses—2" Solid or Open Back, 3½", 5", 6" and 8".

For Working details to larger scale,–ask for Folder 9-C

CONSTRUCTION DETAILS OF MACHINE-MADE TERRA-COTTA PRODUCTS

Continued on next page

MACHINE-MADE TERRA-COTTA PRODUCTS, ASHLAR BLOCKS FOR WALL FACING OR FOR COMPLETE BONDED WALL; TEE PEE CEE CLAY BUILDING BLOCKS

The Need

During recent years, a widespread demand has become evident for a very economical terra-cotta in which the owner might get the benefit of standardized machine production, without sacrifice of the enduring quality and the wide color selection to be had in the hand-made architectural terra-cotta.

Development

To meet this demand our research and engineering departments began about six years ago the production of terra-cotta by machine through steam lubricated steel dies, with sections cut to standard lengths, then dried, sprayed and burned exactly the same as the hand-made product. This material combines all of the well-known advantages of architectural terra-cotta with all of the economies of mechanical quantity production.

These terra-cotta ashlar blocks may either be specified as a complete wall in and of themselves, or as facing, or to course and bond with brick backing. Used as facing, the ashlar usually courses 7¼ in. high by 1 ft. 4¼-in. lengths. Used to bond with brick backing the ashlar usually courses 8¼ in. high.

Diversified Uses

Since the impervious surface of terra-cotta requires no upkeep, but may be cleaned and re-cleaned with soap and water as long as the building stands, the material is ideal for public and semipublic buildings, hospitals and schools, also for laboratories, dairies, power plants, etc. A few installations are cited here:

Chemical Laboratory, Princeton University, Princeton, N. J., Chas. Z. Klauder, successor to Day & Klauder, Architects

Grade School, University Place, Port Chester, N. Y., Tooker & Marsh, Architects

Auditorium, Gymnasium Building, Canandaigua, N. Y., Wilson Potter, Architect

Residence, Stanwich and Taconic Roads, Greenwich, Conn., Thompson & Churchill, Architects

School for Church of Resurrection, Boston Post Rd., Rye, N. Y., Murphy & Lehmann, Architects

Pilgrim State Hospital, Brentwood, L. I., N. Y., William E. Haugaard, Architect

Brooklyn Technical High School, Brooklyn, N. Y., Walter C. Martin, Architect

Cord Meyer Garage, N. S. Roosevelt Avenue bet. 88th and 89th Streets, Elmhurst, L. I., N. Y., Robert Tappan, Architect

Commissary, New York Central R. R. Co., New York Central Engineers.

School, Marion Street and Waverly Avenue, Lynbrook, L. I., Oscar Lowinson, Architect

Grade School, Linden, N. J., H. B. Brady, Inc., Architects

Savarin Lunch Room, Pennsylvania Station, Gibbs & Hill, Architects

Squash Court for Gymnasium, Princeton, N. J., Aymar Embury 2nd, Architect

Bakery, 99th Avenue and 222nd Street, Queens Village, New York, N. Y., Henry Holder, Architect

School, Beacon, N. Y., Tooker & Marsh, Architects

Ursuline School, New Rochelle, N. Y., McGill & Hamlin, Architects

Belleville Isolation Hospital, Belleville, N. J., Sutton & Sutton, Architects

Economy

An independent survey conducted by the Department of Education of the City of New York disclosed that at unit price customarily used in our estimates this material which eliminates all cost of upkeep after first installation amortises as against 4 in. hollow tile, plaster and wall paint upon second repainting of the plastered wall.

Construction Details

It affords us much pleasure to present the construction sheet shown on preceding page and our engineering and laboratory departments are at the service of architects who desire more particular and detailed information.

For working details to larger scale, ask for Folder No. 9c.

Other Products

Machine-made window sills, mouldings, band courses, ashlars to match and the Grueby terra-cotta products block.

Estimates

Estimates may be had upon the square foot or unit basis, but we recommend adherence to the long-established usage of the architectural terra-cotta industry, whereby, as manufacturers, we issue lump sum estimates upon quantities which we compute from architect's elevations and floor plans.

It should be noted that where special hand-made blocks are required to furnish a complete job, we include them in such estimates and fabricate the specials in our departments for hand-made work.

Suggested Form of Specification

Machine-made clay building block facing, glazed [unglazed], and of color to be selected by architect, to course 7 in. high, net size (8 in. high net size when shown to bond with brick), x 16 in. long net size, with cuts to break joint, and with all necessary mitres, bullnose and angle blocks, sill, lintel, jamb, cove base and capping blocks to make a complete job.

These blocks are to be fabricated of carefully selected, thoroughly ground, screened and pugged architectural terra-cotta body, with ample grog [grit] component so that the block will burn straight and true.

Thickness of blocks shall be from 2 to 8 in., as required to suit architect's details.

Blocks shall have solid back, and shall be glazed on exposed faces and returns only, so that bed joints and backs shall afford good absorptive surface for adhesion of mortar or plaster.

Blocks shall be as made by the TERRA COTTA PRODUCTS CORPORATION or the NEW YORK ARCHITECTURAL TERRA COTTA COMPANY, or equal and shall be carefully packed for delivery to mason contractor.

For specifications for hand-made architectural terra-cotta, see pages of the National Terra Cotta Society in this section

THE NORTHWESTERN TERRA COTTA COMPANY

WORKS AND MAIN OFFICE
2525 Clybourn Avenue, CHICAGO, ILL.

OTHER OFFICES
DENVER, COLO. ST. LOUIS, MO. MILWAUKEE, WIS. CLEVELAND, OHIO COLUMBUS, OHIO

OTHER PLANTS
CHICAGO HEIGHTS, ILL. DENVER, COLO. ST. LOUIS, MO.

SALES AGENCIES IN ALL PRINCIPAL CITIES

Products

ARCHITECTURAL TERRA COTTA for exteriors and interiors, in plain, ornamental or sculptured design, in all finishes, and in any desired color or combinations of color.

Also Northwestern Terra Cotta in stock designs; Northwestern Multi-unit Sills for steel sash windows; Northwestern Chimney Pots; Northwestern Garden Pottery; Northwestern Faience.

Northwestern Service

More than fifty years of practical experience has equipped THE NORTHWESTERN TERRA COTTA COMPANY with both personnel and plants that insure a service unsurpassed in this industry.

For the *architect:* Northwestern experts co-operate with the architect, from the concept of the building, to furnish the technical information necessary to secure desired results.

For the *builder:* Northwestern executives give personal attention to the making of prompt and proper deliveries, thus reducing labor cost and obviating time penalties.

For the *owner:* Northwestern reputation and responsibility guarantee both the quality and the character of Northwestern Terra Cotta, which in turn insures a satisfactory yield on the owner's investment.

Northwestern Facilities

Plants located at Chicago, St. Louis, Denver and Chicago Heights. THE NORTHWESTERN TERRA COTTA COMPANY is the largest as well as the oldest company engaged in the manufacture of terra cotta in America.

THE NORTHWESTERN TERRA COTTA COMPANY has production facilities adaptable to the largest as well as to the smallest jobs.

Northwestern Terra Cotta

Glazed Northwestern Terra Cotta is impervious to moisture, and is made in any one of three degrees of gloss, viz.: bright, satin and matt.

Unglazed Northwestern Terra Cotta is covered with a slip coating of varying degrees of hardness and sheen.

Either glazed or unglazed material may have a plain, pulsichrome, speckled, mottled, granite, old ivory, fire flashed, shaded, blended, or special color treatment.

All ceramic finishes are applied over a mechanical surface finish as selected: either smooth, tooled, drove, irregular drag or combing, bush hammered, rugged, pitted or special.

Northwestern Quality

Northwestern Terra Cotta is made from special fire clays, carefully selected by laboratory tests to produce a finished product rarely equaled and never surpassed for beauty and durability.

The Northwestern staff of ceramic experts, trained through three generations of constant improvement, are past masters of design, of color and of texture—the three essentials in architectural terra cotta.

Northwestern Specifications

In making out specifications for any terra cotta structure, always use the word "Northwestern," in connection with the color treatments, mechanical and ceramic finishes desired, and thus secure that quality of product and that character of service which has established Northwestern leadership for over half a century.

Northwestern Color Service

Recognizing the tremendous possibilities for the use of color architecturally, and appreciating the problems that will come with this development, THE NORTHWESTERN TERRA COTTA COMPANY has established a Consulting Color Service and places it at the disposal of any architect who may have a color problem to solve.

There is no charge for this service, neither does it carry with it any obligation from the architect to the company. It brings to you the results of years of thought, study and experiment in the application of color to interiors and exteriors of buildings of all classes.

There are certain well-defined principles for the application of color to exteriors. These principles have been worked out not only by our own staff, but by consulting colorists of authority and repute, to the end, we hope, that this service may be the most practical and helpful ever offered to architects by any building material manufacturer.

Buildings Recently Constructed with Northwestern Terra Cotta, with Names of Their Architects

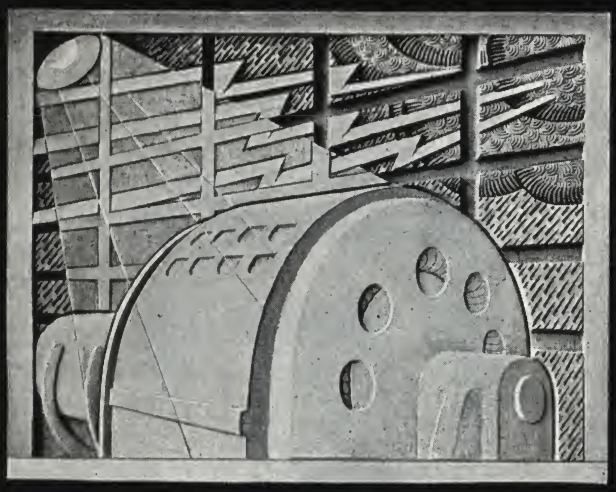
Merchandise Mart, Chicago, Ill.
Graham, Anderson, Probst & White
Civic Opera (20 Wacker Drive), Chicago, Ill.
Graham, Anderson, Probst & White
Southwest Bell Telephone Building, Kansas City, Mo.
Hoit, Price & Barnes
Cincinnati and Suburban Telephone Co., Cincinnati, Ohio
Hake & Kuck
Carbide and Carbon Building, Chicago, Ill.
D. H. Burnham & Company
Professional Building, Kansas City, Mo.
Chas. A. Smith and G. E. McIntyre
American Insurance Union Building, Columbus, Ohio
C. Howard Crane
Pittsfield Building, Chicago, Ill.
Graham, Anderson, Probst & White
Dome, Fine Arts Building, Chicago, Ill.
Graham, Anderson, Probst & White
State Bank Building, Chicago, Ill.
Graham, Anderson, Probst & White
Steuben Club, Chicago, Ill.
K. M. Vitzthum & Company
Missouri Pacific Building, St. Louis, Mo.
E. M. Tucker, Mauran, Russel & Crowell
Mountain States Telephone Building, Denver, Colo.
Wm. M. Bowman
Mather Tower, Chicago, Ill.
Herbert H. Riddle
One LaSalle Street Building, Chicago, Ill.
K. M. Vitzthum & Company

Continued on next page



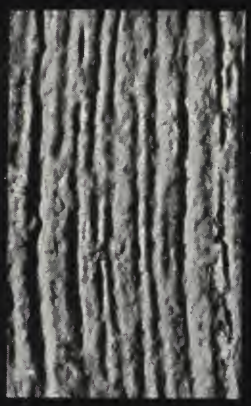


COMBED 252





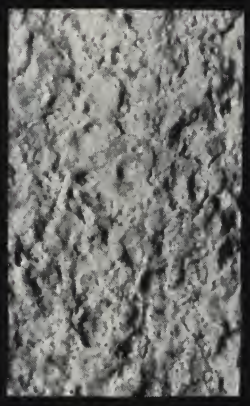
COMBED 200



COMBED 250



RUGGED 101



ROUGH 501

NORTHWESTERN TERRA COTTA can be obtained in a variety of textures, ranging from the shallow relief to rugged or modeled surfaces. Broken surfaces are now widely used for decorative effects, as well as for the reason that the light reflecting qualities of rough textured Terra Cotta make floodlighting economical in that less equipment and current are required than for smooth surfaces.

THE NORTHWESTERN TERRA COTTA COMPANY

DENVER · CHICAGO · ST. LOUIS



TOOLED 4B

O. W. KETCHAM

Ornamental and Structural Burnt Clay Products

121-125 North 18th Street, South of Parkway

PHILADELPHIA, PA.

FACTORY: CRUM LYNNE, PA.

BRANCH OFFICES

NEW YORK, N. Y., Bush Terminal Building, 130 West 42nd Street

WASHINGTON, D. C., Metropolitan Bank Building

Products

ARCHITECTURAL TERRA COTTA; HAND MADE "AGEART" TERRA TILE.

FACE BRICK; ENAMELED BRICK; SALT GLAZED "ATHENA" BRICK; FLOOR BRICK.

HOLLOW TILE FIREPROOFING.

Also Paving Brick.

Architectural Terra Cotta

We manufacture all kinds for exterior and interior work, decorative or plain of all colors and finishes, as well as polychrome.

Face Brick

Our line consists of all colors and finishes, together with moulded brick.

The most intricate shapes and design.

Salt Glazed "Athena Brick"

Made of three shades. Numbered 102, 103 and 104 with radius jamb and sill moulds. Also moulded base and cap, and special sanitary floor brick.

Floor Brick

In different sizes, glazed and unglazed, for use in packing houses, battery rooms, milk dairies, etc.

Enameled Brick

These can be had of the following colors: white, green, blue or brown.

Made of standard sizes and shapes.



"Ageart" Terra Tile

Special hand made roofing tile made of any form, finish or color or blended colors.

Hollow Tile

Made in standard sizes, shapes and different weights for exterior and interior construction.

Services

Architects desiring expert advice on architectural terra cotta construction, brick or fireproofing may feel free to call upon us for such service.

Extensive exhibits of our products may be seen in all our offices.

Descriptive booklets or samples may be had on request.



A Few Examples of Terra Cotta Work Executed by O. W. Ketcham

HOLLOW BLOCK CONSTRUCTION
CHIMNEY POTS AND COPINGS

Anness Hollow Tile & Clay Co....A668
Bannon, P., Pipe Co....A669
Certain-teed Products Corp....A738–741
Clay Products Co., Inc. of Indiana....A670–676
Dickey, W. S., Clay Mfg. Co....A749
Galloway Terra Cotta Co....A750
Heath Cube Service....A732–733
Kraftile Co. A734–735
Ludowici-Celadon Co. A751
Maurer, Henry, & Son....A731
Nailcrete Corp. A744
National Building Units Corp....A745–747
National Fireproofing Corp....A677–730
National Stone-Tile Corp....A748
Pursell Co. A752
Raritan Hollow Tile Corp....A736
Structural Gypsum Corp....A742–743
Whitacre-Greer Fireproofing Co....A737

ESTABLISHED 1900

ANNESS HOLLOW TILE & CLAY COMPANY

Manufacturers of Hollow Building Tile

WOODBRIDGE, N. J.

Products

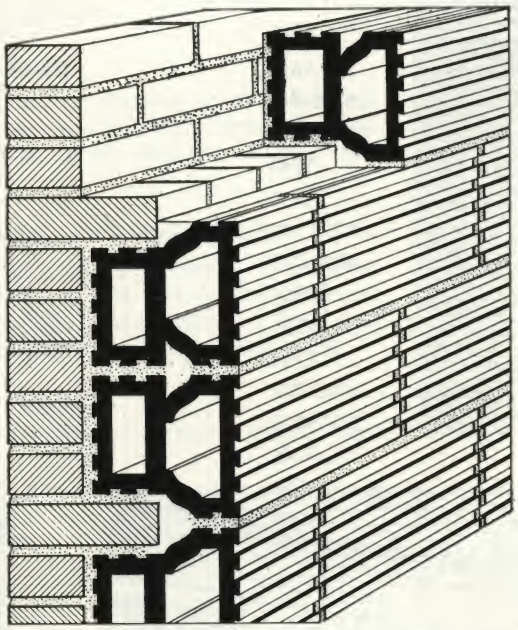
A complete line of ANNESS HOLLOW TILE for load bearing walls, including necessary jambs, lintels and sills, also partitions, furring, column covering, etc.

Anness Bell Backer Hollow Tile

A system of hollow tile wall construction which eliminates *all* continuous mortar joints through the wall. It insures a wall weighing only 70% of a solid brick wall of the same thickness, thereby saving in the amount of steel required for wall columns and spandrel beams at a cost of approximately 70% of a solid brick wall.

Sizes—Anness Bell Backer Hollow Tile are made in 8, 10 and 12 in. thicknesses and in various heights to accommodate special sizes of brick and mortar joints.

Each 8 in. Anness Bell Backer Hollow Tile, with ½ in. mortar joints, lays 0.715 sq. ft. of wall surface.



Anness Bell Backer Hollow Tile in a 12-in. Wall

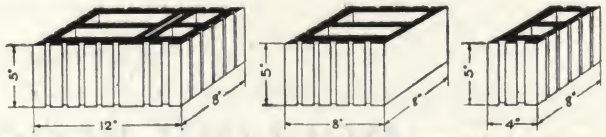
STANDARD SIZES AND APPROXIMATE WEIGHTS

Type	Size, in.	Number of cells	Weight per piece, lb.
Load-bearing	3¾x12 x12	3	20
Load-bearing	6 x12 x12	6	30
Load-bearing	8 x12 x12	6	36
Load-bearing	10 x12 x12	6	42
Load-bearing	12 x12 x12	6	48
Load-bearing	12 x12 x12	9	52
Bell backer	8 x 7¾x12	2	26
Bell backer	10 x 7¾x12	2	33
Bell backer	12 x 7¾x12	3	36
Utility block	8 x 5 x12	4	17
Utility block	4 x 5 x12	2	10
Backup	3¾x 5 x12	1	9
Backup	8 x 5 x12	2	16
Partition	2 x 8 x12	2	10
Partition	2 x12 x12	3	15
Partition	3 x12 x12	3	15
Partition	4 x12 x12	3	16
Partition	6 x12 x12	3	22
Partition	6 x12 x12	6	24
Partition	8 x12 x12	6	30
Partition	10 x12 x12	6	36
Partition	12 x12 x12	6	40
Furring	1½x12 x12	3/2	8
Furring	2 x12 x12	3/2	9

Anness Utility Block

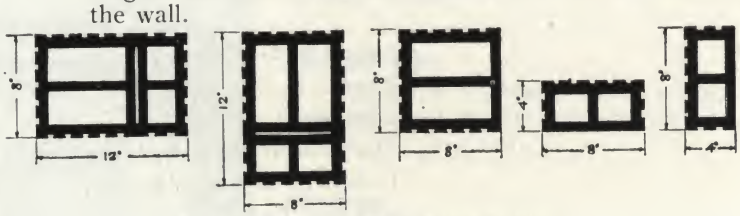
Combines the good qualities of brick and tile. Eliminates all costly and unsightly patchwork.

Balanced for one hand set in a complete closed unit, one and one-half bricks long. Readily divisible with trowel into two completely closed end units of brick and half-brick lengths.



One Unit **The Divisions of the Unit**

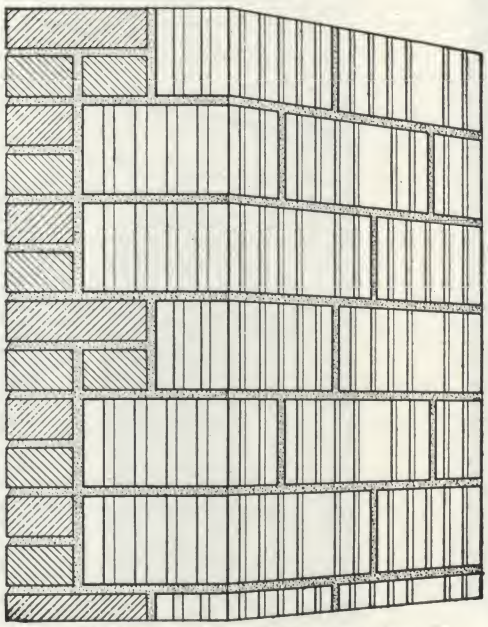
Provides and completes five positions in the wall without waste, and can be used to build any required length or thickness in multiples of brick and half brick lengths in closed end set construction to the end of the wall.



Five Positions in Wall Construction

The 8x5x12 Utility Block is supplemented with a 4x5x12 in. size, also divisible into brick and half-brick lengths. This is used particularly for column covering, pipe chases and other wall details.

Utility jambs, terminals, pipe chases and all wall details show the same desirable construction that a through section of the wall would show. It is very easy to show a through section of any wall, but Utility Blocks only can build details in the same design and construction from start to finish in any required header bond.



Utility Block Wall Construction

P. BANNON PIPE CO.

Hollow Tile Fireproofing and Patent Lidded Pipe

LOUISVILLE, KY.

Products

HOLLOW TILE FIREPROOFING; SHALE BRICK; FIRE BRICK; WALL COPING; FLUE LININGS; CHIMNEY TOPS; SEWER PIPES; PATENT LIDDED PIPE and EXPANSION PIPE SUPPORTS.

Also, Vitrified Culvert Pipe; Drain Tile; Glazed Conduit Pipe (for underground work); Vitrified Paving Brick and Blocks; Boiler and Grate Tile.

Hollow Tile and Shale Brick

Hollow Tile—For fireproofing of every description. Made of shale. For partitions and furring tile, 1½ to 16 in.; building tile, 6-cell and 9-cell, 6 to 12 in.; book tile, back up blocks; column covering; standard arch floor tile, 6 to 16 in.

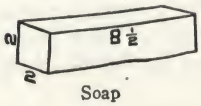
Shale Brick—Are manufactured hollow; with rough texture face, and common.



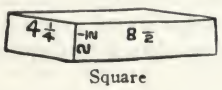
HOLLOW TILE SIZES

Fire Brick

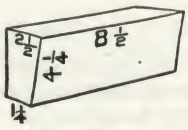
All shapes and sizes.



Soap



Square



Side Wedge

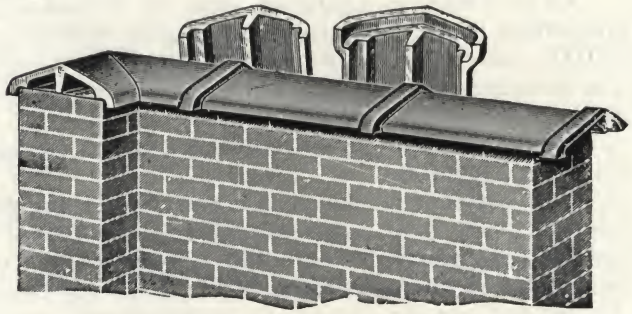


Circle, 36, 40 and 44

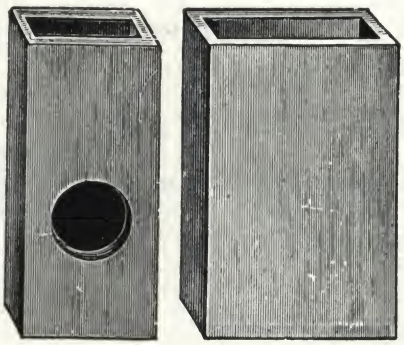
FIRE BRICK SIZES

Wall Coping

Made of best fire clay and shale, thoroughly vitrified, glazed to render surface as smooth as glass. Tile is shaped to fully cover wall, protecting same from action of the elements; also secures the top course of brick.



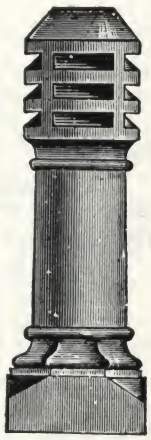
WALL COPING, HIP SHAPE
With or without rib



8½ x 13 in., pipe hole

13 x 13 in.

FLUE LININGS



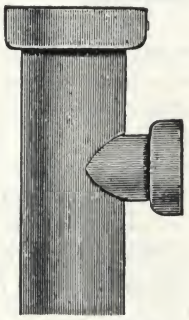
No. 14
CHIMNEY TOP

Sewer Pipe and Fittings

Made of vitrified salt glazed fire clay and shale.

The salt glazed surface, being smooth, clean and impervious, protects pipe and fittings from dampness, frost, all acids and sediments.

It is durable, low in cost, convenient for construction, and because of its smooth glazed surface has greater carrying capacity than any other material. It can be laid by unskilled labor.



SEWER PIPE
T-Branch



LIDDED PIPE
For conducting steam and water pipe



Plate E, Single Line

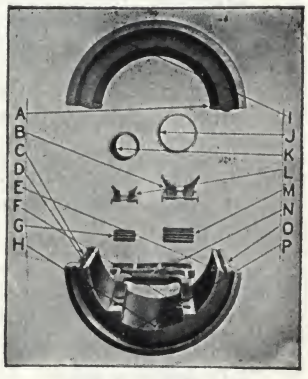


Plate F, Double Line

DETAIL OF CONDUIT

Reference letters point as follows:

Plates E and F—A, reinforcement inside along score cut on both sides of lid half; C, outer open scores; D, trenchlike fracture; E, inner open scores; F, support anchoring pocket; H, drainage space; I, hub of lid half; O, cement shelf and outer reinforcement at each side of lower half; P, hub of lower half.

Plate E, only—B and J, standard covering; K, 6-in. iron pipe; L, saddle receiving K, direct; M, 4⅛x2-in. toothed roller (meshes in rack of saddle and cradle); N, No. 15-F-15 cradle (the finger supported style).

Plate F, only—B, saddle for main line J; L, saddle for return line K; G, roller for return saddle; M, roller for main line saddle; N, No. 16-P-15-D cradle (the rib supported, boss-anchored style)

CLAY PRODUCTS COMPANY, INC. OF INDIANA

Manufacturers of Ar-Ke-Tex Tile, Including Insul-Glaz, Cream Buff Stippled Tile, Caentile and Mottled Tile

GENERAL OFFICES
BRAZIL, IND.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

A structural clay tile with a finely finished face, known as AR-KE-TEX TILE. This includes the following textures:

Insul-Glaz Tile.
Stippled Tile.
Caentile (Smooth and Wire Cut).
Mottled Tile (Cream Brown and Cream White)

Also manufacturers of Velveduct, a Vitrified Glazed Clay Conduit, Building Conduit, Textured Interlocking Tile, Filter Bed Tile and Raggle Block.

AR-KE-TEX
ART-CERAMIC-TEXTURE
TRADE-MARK

Material

AR-KE-TEX Tile is a wall material combining the many advantages of structural tile with textured finishes which in quality and appearance are acceptable for either interior or exterior walls of the highest class of projects. The following textures of AR-KE-TEX Tile have a common base of vitrified fire clay and differ only in the texture of the finish.

Insul-Glaz Tile—Insul-Glaz Tile combines all the qualities that have ever been demanded in a salt glazed tile with imperviousness of face and close shading in color range.

Stippled Tile—Stippled Tile introduces a light color blend of cream buff, adaptable to a wider range of architectural effects than any shade ever developed.

Caentile—Caentile, like all other AR-KE-TEX Tile is a vitrified clay tile with colors and textures of buff gray face brick.

Mottled Tile—Mottled Tile is made in several mottled color finishes including cream brown or mottled cream white.

Insets—Colored insets for decorative effects in walls are available in a wide variety of colors in geometric designs. A few of these are shown on page 6 with a list of the colors available. Insets make possible unique wall treatments and effects at comparatively small cost.

Qualities

Vitrification—Thorough vitrification of AR-KE-TEX Tile makes this material impervious to the action of acids, alkalis, grease and oil and with a very low, if any, absorption through the face.

Super Quality—The standard of perfection in each particular finish, all tile being carefully re-selected to eliminate any with defects sufficiently noticeable to mar the wall effect.

Commercial Quality—Such tile as do not measure up to the highest standard of perfection but are distinctly first quality tile are classed as commercial quality. Commercial quality, while exhibiting some of the defects of ordinary first quality tile, is nevertheless excellent material for a wide range of uses.

Color

Insul-Glaz in all qualities is furnished in a light tan color with only slight variations in shading.

Stippled Tile is furnished in a close range of cream buff stippling with very little variation.

Caentile is supplied in full range of blended buff gray shades.

Mottled Tile in both Cream Brown and Cream White follows a closely blended range of shade.

Other colors in the Mottled Tile can be furnished on special order.

Construction Features of Ar-Ke-Tex Tile

AR-KE-TEX Tile have many advantageous construction features. Among them the following stand out: fire, acid, oil and grease resistant; insulation; sanitary finish; high crushing strength and low dead weight; indestructibility and attractiveness of finish; economy and rapidity of erection; permanency of color and finish; readily cleaned; minimum upkeep; low relative cost.

Some of the Principal Uses

Among the principal uses of AR-KE-TEX Tile are: for bearing or partition walls in public, semi-public or commercial buildings where one or more of the construction features listed above are a necessity. It has been widely used in school buildings—particularly in corridors, playrooms, workshops, basements, gymnasiums, laboratories, lavatories, for wainscots, etc. It has also been used in many hotels, natatoriums, hospitals, food preparation plants, power houses, warehouses, and other types of structures too numerous to mention.

Facilities and Service

CLAY PRODUCTS COMPANY, INC. OF INDIANA operates three plants with a combined capacity in excess of 150,000 tons or more than 20,000,000 units per year. The plant locations are such that shipments can be made over any one of four trunk line railroads.

Ample stocks of standard units are always on hand for prompt shipment.

The Company maintains an engineering department which is ready at all times to render assistance to the architect, engineer or builder in the solution of construction problems where AR-KE-TEX Tile may be involved.

Special sizes or shapes are manufactured to meet unusual conditions.

Continued on next page

Pertinent Data Regarding Ar-Ke-Tex Tile

Wall Thicknesses Which Can Be Built with Ar-Ke-Tex Units—***Veneer***—¾ in., 1⅜ in. and 1⅞ in. (exclusive of mortar backing) (¾ in. in straight run of wall only).

Single Faced—3¾, 6 and 8 in.

Double Faced—4¼, 6¼, 8, 10¼, 12¼, 16½ in. and up.

All walls from 4¼ in. may be of one finish of tile on one face and of a different finish of tile on the other face, e.g., a 4¼-in. wall may be Insul-Glaz Tile on one face and Mottled on the other face.

NUMBER OF AR-KE-TEX TILE REQUIRED PER SQUARE FOOT OF NET WALL

Thickness, inches of		Number of faces tile finished	Quantities required per sq. ft. of net wall,* using ½-in. joints
Veneer Tile	Wall		
¾	....	1-veneer	1.05 No. 60
1⅜	....	1-veneer	1.05 No. 250 without lugs
1⅞	....	1-veneer	1.05 No. 250
...	3¾	1	2.10 No. 400 or 1.05 No. 650
...	4¼	2	2.10 No. 250
...	6	1	2.10 No. 60
...	6¼	2	1.05 No. 250 plus 2.10 No. 400
...	8	1	2.10 No. 800
...	8	2	4.20 No. 400 or 2.10 No. 650
.	10¼	2	1.05 No. 250 plus 2.10 No. 800
...	12½	2	2.10 No. 400 plus 2.10 No. 800
...	16¼	2	4.20 No. 800
...	12¼	1-other face brick veneered; brick header every 6th course	0.70 No. 400 plus 1.40 No. 800 plus 7 face and 1 common brick

Brick Displacement—Brick displaced by Ar-Ke-Tex Tile; one 5x8x12 equals 6 brick and one 5x4x12, 3 brick.

Crushing Strength—Approximately 3400 lb. per sq. in. of gross bearing surface.

Absorption—Through face, imperceptible; less than 5% of own weight in 48 hours.

Weight of Wall—Weight of Ar-Ke-Tex Tile walls as compared to brick of equal thickness are given in the following table:

AR-KE-TEX TILE	EQUIVALENT BRICK WALL*	
Wall thickness in.	Weight per sq. ft. in lbs.	Weight per sq. ft. in lbs.
4	35	43
8	60	84
12	95	125

*Brick taken at 125 lb. per cu. ft.

Mortar Clinch—The ½-in. round holes in the exterior webs of the tile assure a permanent mortar clinch in the vertical joints of the tile wall, an important factor in exposed tile construction with horizontal cells.

Hand Smoothed Edges—All cut edges are hand smoothed in the green, so that finished faces will be free from any roughness or feather edges.

Mortar and Mortar Color—Ar-Ke-Tex Tile may be laid in any kind of mortar made according to good practice with joint size and color to suit the individual taste of the architect or his client.

Cutting Tile—We recommend the installation on every project of a portable electric saw with an abrasive disc for cutting Ar-Ke-Tex Tile when necessary. Our representative in each locality will gladly furnish complete data to the contractor regarding a suitable saw. On a number of recent projects, such saws, besides assuring excellent tile installations, have saved time and money for the contractor by the precision with which mortises, mitres, odd lengths, etc., may be cut.

Double Faced Walls—It is not recommended that double faced walls be built of one tile extending through the wall, but rather of two units as shown in details on plates following. This procedure will permit of alignment of both faces at a cost no higher than would be necessary with two faced sorting and gauging.

Tests—The testing laboratory of the University of Wisconsin has made a series of tests on Ar-Ke-Tex Tile. Copies of the reports of tests will be sent upon request.

The following results of tests on three blocks are taken from one of the certified reports:

TEST ON STANDARD 5x8x12-IN. BLOCK

No.	Strength per sq. in.	*Percent of voids	Weight lbs.	Weight after 48 hr. immersion lbs.
Clay P. C. 4	3950	45.3	20.00	20.15
Clay P. C. 5	3690	44.5	19.02	19.13
Clay P. C. 6	3700	45.4	19.73	19.80

*Not including 10 small round holes lengthwise, 5 in. each vertical web.

Sorting, Packing and Shipping

Ar-Ke-Tex Tile are sorted for one face only, except No. 250's and 650's and shapes which are sorted for faces as marked on details.

Ar-Ke-Tex Tile are packed in the car with extreme care and thoroughness, each tile being wrapped and carefully packed.

All super-quality units may be packed in heavy cartons, six to a package. Insets are packed in wooden boxes. Shipped by carload lots the minimum loadings are:

5x8x12, 3000 pieces
5x4x12, 5000 pieces

Samples

Actual size or miniature samples of any finish of Ar-Ke-Tex Tile will be sent without charge to architects on request.

New Developments—Clay Products Company, Inc. of Indiana, the original creators of textured tile, are constantly improving processes and adding new textures, colors and units. To supplement the information in this catalog, a technical bulletin, "Better Walls," is issued each month.

To insure having this additional data, during the period that you are using this catalog at the time that you may require it, Clay Products Company, Inc. of Indiana and their distributors will be pleased to place you on their mailing list on your request, without obligation. When you are designing or specifying a project on which textured tile is to be used, be sure you have the latest information.

When Specifying

When specifying give texture, quality, color, whether bullnose or square closures, and whether cove base and wainscot cap units are desired. Also whether random ashlar coursing is to be used.

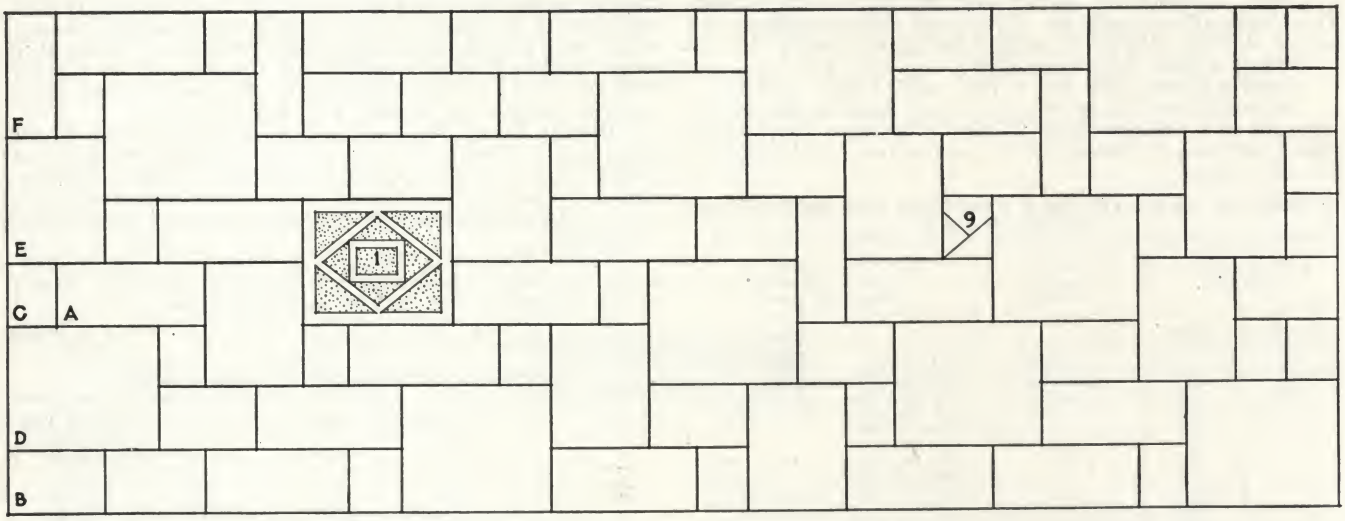
Typical Installations

The application of Ar-Ke-Tex Tile to the interior or exterior of buildings of almost every type is evidenced by the following list of some of the more recent projects on which this material has been used:

Buildings and Location	Architect
Power Plant, U. S. Bureau of Standards, Washington, D. C.	W. H. I. Deming
Campbell Soup Co., Manufacturing Bldg. and Power House, Camden, N. J.	Battey & Kipp
Campbell Soup Co., Manufacturing Bldg., Warehouse and Power Plant, Chicago, Ill.	Battey & Kipp
11 Substations, Duquesne Light Co., Pittsburgh, Pa.	Byllesby Eng. & Mgmt. Corp.
Lasell Gymnasium, Williams College, Williamstown, Mass.	Densmore, LeClear & Robbins
Fisher Bldg., Detroit, Mich.	Albert Kahn, Inc.
Pevely Dairy, St. Louis, Mo.	C. G. Schoelch Co.
Arena and Pavilions, National Exhibition Co., St. Louis, Mo.	Sohrmann-Kiewitt-Hollingsworth
Michigan State Hospital, Urania, Mich.	Albert Kahn, Inc.
Michigan Bell Telephone Co., Detroit, West Fort Street Substation	Smith, Hinchman & Grylls
Russell A. Gunn Residence, Palmer Woods, Mich.	Cyril Edward Schley
Upper Darby High School, Upper Darby, Pa.	Heacock & Hokanson
Franklin & Marshall College, Engineering Bldg., Lancaster, Pa.	Chas. Z. Klauder
LaFayette College, Engineering Bldg., Easton, Pa.	Chas. Z. Klauder
DuPont Powder Co. Cafeteria, Wilmington, Del.	DuPont Engineering Co.
St. Joseph's Hospital, Milwaukee, Wis.	E. Brielmaier & Sons
St. Norbert's Gymnasium, DePere, Wis.	W. G. Reynolds
Standard Oil Company of Indiana (nine filling stations—various locations)	
Wisconsin Power & Light Co., Power Plant, Sheboygan, Wis.	Sargent & Lundy
Community Hospital, West Bend, Wis.	E. Brielmaier & Sons
Y. W. C. A. Building, Milwaukee, Wis.	Fitzhugh Scott
LaCrosse Telephone Co., LaCrosse, Wis.	Wells E. Bennett
Cleveland Electric Illuminating Co. Power Plant, Avon, Ohio	Private Plans
Power Plant, Ashtabula, Ohio	Dickerson & Rhoads
O P. & M. J. VanSweringen, Private Garage, Chagrin Falls, Ohio	Philip L. Small, Inc.
Lincoln Garage and Service Station, Cleveland, Ohio	Walker & Weeks
Medical Arts and Builders Exchange Bldg., Super Service Station, Cleveland, Ohio	Graham, Anderson, Probst & White
Cleveland Union Station, Kitchen of Restaurant, Cleveland, Ohio	Graham, Anderson, Probst & White
Roberts School, Cambridge, Mass.	Chas. R Greco

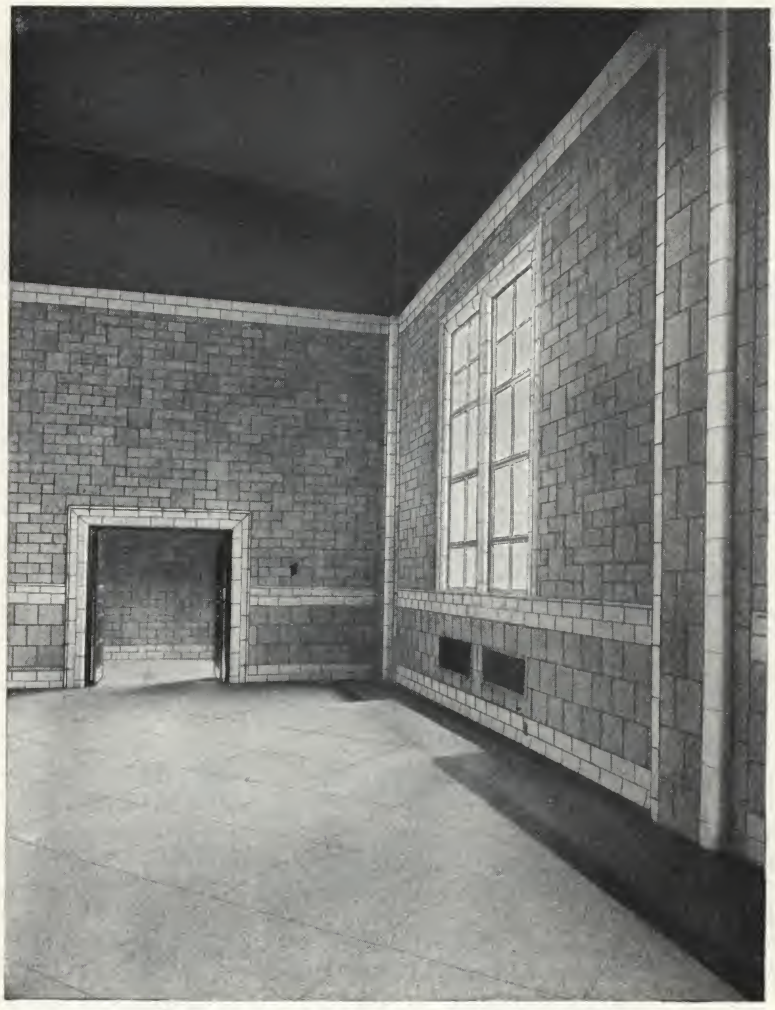
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RANDOM ASHLAR COURSING



To those architects who may consider standard brick or tile coursings monotonous in larger wall areas or whose project demands the unusual in wall effects, Random Ashlar Tile Coursing offers a distinct diversification.

In Random Ashlar Bond VI shown above, the introduction of occasional double-height tile in 12, 8 and 4-in. lengths together with 4 and 8-in. lengths of standard stretchers, is all that is necessary to produce this desirable wall effect in textured tile, originated by Clay Products Company, Inc. of Indiana. Colored insets may be used if desired, to attain further diversification. The detail above shows two insets, Design No. 1, size 10¼x12 in. and Design No. 9, 5x3⅞ in.



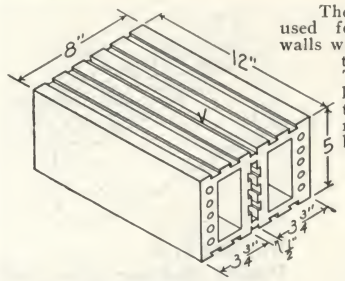
Interior—Pachyderm House in Detroit Zoo

Typical Application of Random Ashlar Coursing

The illustration at the left, typifies the use of random ashlar coursing. In this building the wall effect is further enhanced by a combination of standard textures of Ar-Ke-Tex Tile. Another outstanding feature is the unusual application of standard fittings such as the use of sill stretchers for pilasters vertically. It is from such ingenious use of these standard elements that individual designs are created. Innumerable combinations are possible without departing from the use of standard stock units and textures, therefore individualism is attainable with Ar-Ke-Tex Tile without added cost.

Ar-Ke-Tex Tile representatives are experienced in the application of tile to various types of construction and design. The benefit of their practical knowledge of this material is at the disposal of any architect or contractor.

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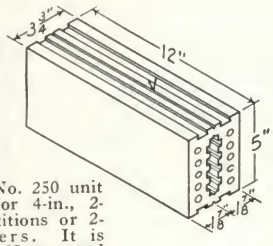


The No. 650 unit is used for 4-in. partition walls which must be plastered on back face The tile are double kerfed for splitting at point marked V, top and bottom

No. 650—Selected 2 faces.
No. 800—Selected 1 face.
Standard Stretcher.

Standard Short Lengths

2	in. L—	652 Selected 2 faces 802 Selected 1 face
3⅞	in. L—	654 Selected 2 faces 804 Selected 1 face
5⅞	in. L—	656 Selected 2 faces 806 Selected 1 face
8	in. L—	658 Selected 2 faces 808 Selected 1 face
10	in. L—	650 Selected 2 faces 810 Selected 1 face



The No. 250 unit is used for 4-in., 2-faced partitions or 2-in. veneers. It is kerfed at V, top and bottom

No. 250—Selected 2 faces.
No. 400—Selected 1 face.
Standard Stretcher.

Standard Short Lengths

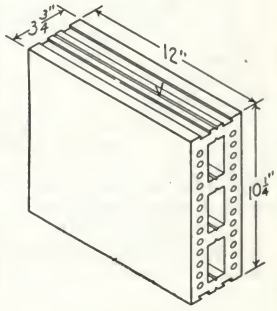
2	in. L—	252 Selected 2 faces 402 Selected 1 face
3⅞	in. L—	254 Selected 2 faces 404 Selected 1 face
5⅞	in. L—	256 Selected 2 faces 406 Selected 1 face
8	in. L—	258 Selected 2 faces 408 Selected 1 face
10	in. L—	250 Selected 2 faces 410 Selected 1 face

No. 900
Double Height Stretcher

This tile is designed principally for use in Random Ashlar Coursing, but can also be furnished for solid coursings for wainscots, etc. by special arrangement.

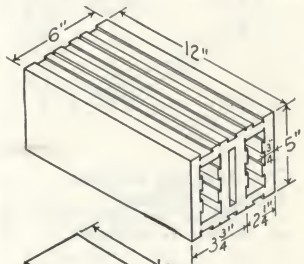
This unit is furnished kerfed at V for 2-in. veneer, but is selected for 2 faces on special arrangement only.

Closure units marked with * shown in this catalogue are also furnished in 10¼-in. heights



Standard Short Lengths

3⅞ in. L—No. 904
5⅞ in. L—No. 906
8 in. L—No. 908



No. 60
5x6x12-in. Stretcher

Nos. 64, 66, 68, standard 4, 6, and 8-in. short lengths.

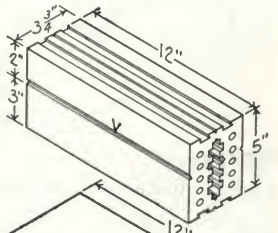
Selected for one 5x12-in. face.

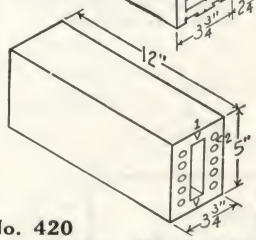
From this unit can be split 5x12x¾-in. slabs for extra thin veneer when specially required.

2-face selection is obtainable by special arrangement

No. 400 S. H.
Short Height Stretcher
(Kerfed for splitting at V)

For use in the occasional place that standard stretchers will not fit; for instance under beams the depth of which do not permit full courses to conform to adjacent walls



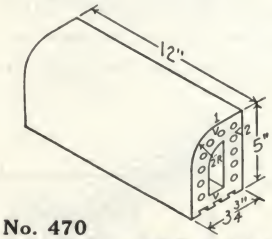


No. 420
4-in. Square Sill or Lintel

Nos. 424, 426, 428, standard 4, 6 and 8-in. short lengths.

No. 420K, kerfed at V-V1.

No. 420SK, kerfed at V-V2

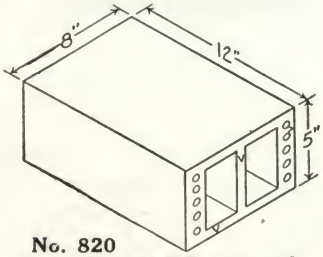


No. 470
4-in. Bullnose Sill or Lintel

Nos. 474, 476, 478, standard 4, 6, and 8-in. short lengths.

No. 470K, kerfed at V-V1.

No. 470SK, kerfed at V-V2

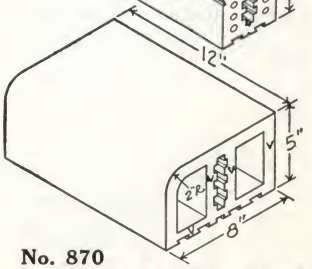


No. 820
8-in. Square Sill or Lintel

Nos. 824, 826, 828, standard 4, 6, and 8-in. short lengths.

No. 820K, kerfed at V-V.

Selected for 2 adj. faces

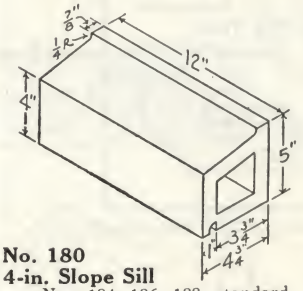


No. 870
8-in. Bullnose Sill or Lintel

Nos. 874, 876, 878, standard 4, 6, and 8-in. short lengths.

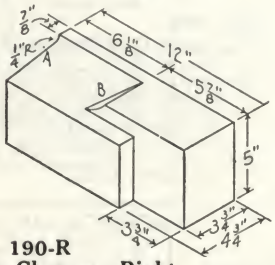
No. 870K, kerfed at V-V.

Selected for 2 faces adj. to B/N only



No. 180
4-in. Slope Sill

Nos. 184, 186, 188, standard 4, 6, and 8-in. short lengths.

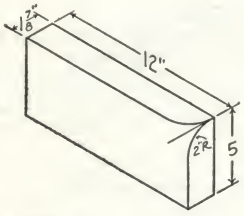


No. 190-R
Lug Closure—Right

(For projecting slope sill.)

No. 190-L, left hand.

By cutting this unit between A and B, short lengths of No. 180 can be eliminated.

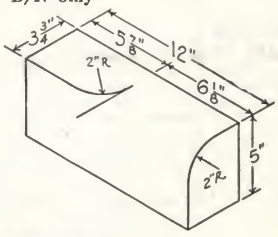


No. 490-L
Bullnose Starter—Left

(Use where B/N Jamb meets B/N Sill or Lintel.)

No. 490-R, right hand.

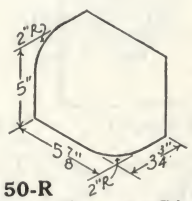
Selected for 1 face shown.



No. 495-L
Bullnose Starter—Left

(Joins B/N Jamb with B/N Sill or Lintel)

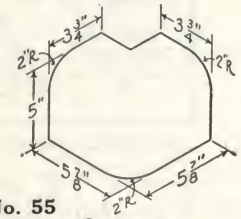
No. 495-R, right hand



No. 50-R
Bullnose Closure—Right

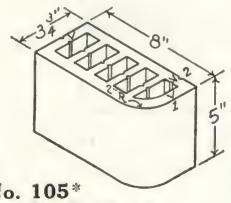
(Use for Bullnose Stretcher or for sill or lintel tile when used as coping or cap.)

No. 50-L, left hand



No. 55
Bullnose Corner

(Use for Bullnose tile when used as coping or cap)



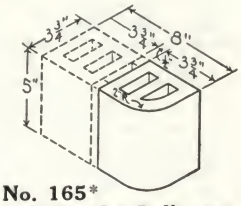
No. 105*
Header Bullnose

No. 100*, square.

Selected for 2 faces adj. to B/N.

No. 105K, No. 100K, kerfed at V-V1.

No. 105SK, No. 100SK, kerfed at V-V2

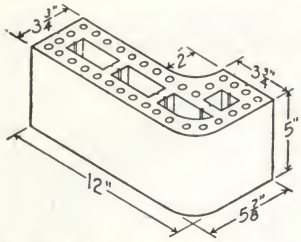


No. 165*
Half Header Bullnose

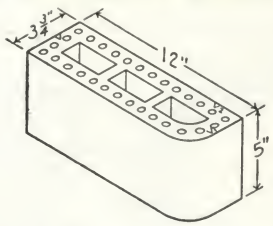
No. 160*, square.

Scale 1″ = 1′ 0″

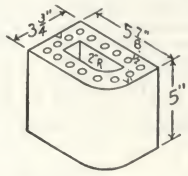
Continued on next page



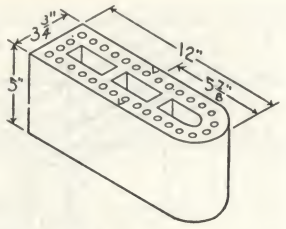
No. 445* or No. 435*
4-in. Corner Bullnose
No. 445 for External.
No. 435 for Internal.
No. 440*, External Square



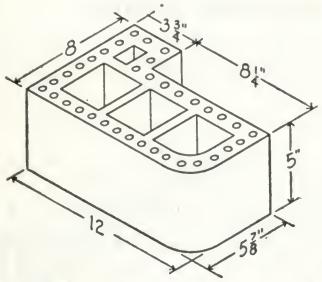
No. 455*
4-in. Full Jamb Bullnose
No. 450*, 4-in. Full Jamb Square.
Nos. 455K, 450K, kerfed at V-V1.
Nos. 455SK, 450SK, kerfed at V-V2



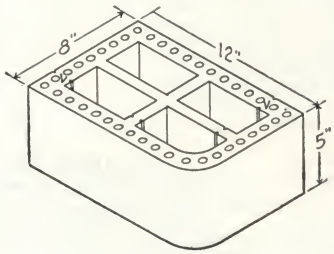
No. 465*
4-in. Half Jamb Bullnose
No. 460*, 4-in. Half Jamb Square.
Nos. 465K, 450K, kerfed at V-V1.
Nos. 465SK, 450SK, kerfed at V-V2



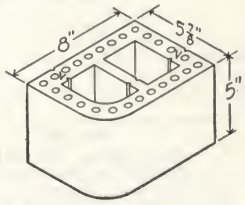
No. 455 D.B.
Double Bullnose 4-in. Full Jamb
Selected for 3 faces adj. to B/N.
No. 465 D.B. for Half Jamb (kerfed at V-V for splitting).
Use for 4-in. 2 faced walls without jamb frames or casings



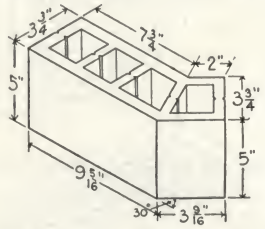
No. 845
8-in. Bullnose Corner
No. 840, Square Corner.
Selected for 2 faces adj. to B/N



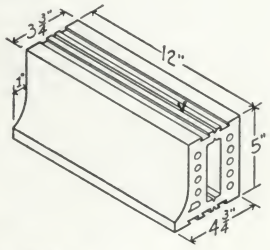
No. 855
8-in. Full Jamb Bullnose
No. 850, 8-in. Square Full Jamb.
Nos. 855K, 850K, kerfed at V-V.
Selected for 2 faces adj. to B/N



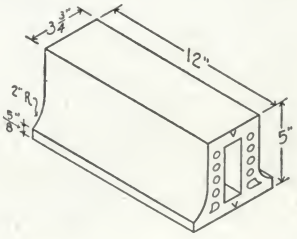
No. 865
8-in. Half Jamb Bullnose
No. 860, 8-in. Square Full Jamb.
Nos. 865K, 860K, kerfed at V-V.
Selected for 2 faces adj. to B/N



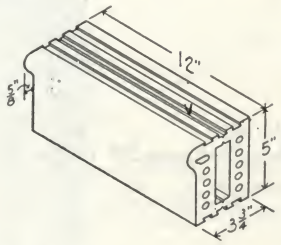
No. 480 Ext. or Int.
Octagon Corner
Selected for either external or internal as specified



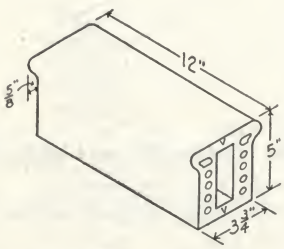
No. 500
Cove Base Stretcher
Nos. 502, 504, 506, 508, standard 2, 3⅞, 5⅞ and 8-in. short lengths.
Kerfed at V for 2-in. Veneer.
Finished 1 face only.
No. 520, smooth top and face.
No. 520K, kerfed



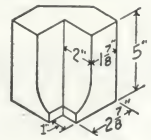
No. 580
Double Face Cove Base Stretcher
Nos. 584, 586, 588 standard 4, 6, and 8-in. short lengths.
Kerfed at V-V for splitting.
Selected for 2 opposite faces only



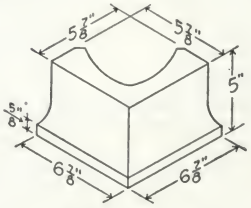
No. 700
Wainscot Cap Stretcher
Nos. 702, 704, 706, 708, 710 standard 2, 3⅞, 5⅞, 8 and 10-in. short lengths.
Kerfed at V for splitting.
Finished 1 face only.
No. 720, smooth top and face.
No. 720K, kerfed



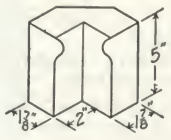
No. 780
Double Face Wainscot Cap Stretcher
Nos. 784, 786, 788 standard 4, 6, and 8-in. short lengths.
Kerfed at V-V for splitting.
Selected for 2 opposite faces only



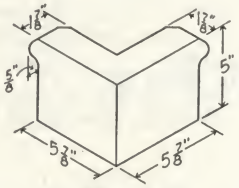
No. 530—Int.
Internal Square Corner for Cove Base



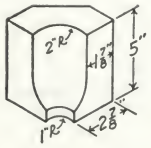
No. 530—Ext.
Exterior Square Corner for Cove Base



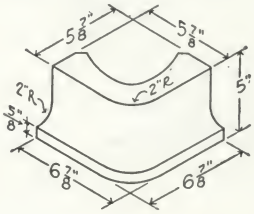
No. 730—Int.
Internal Square Corner for Wainscot Cap



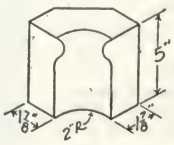
No. 730—Ext.
Exterior Square Corner for Wainscot Cap



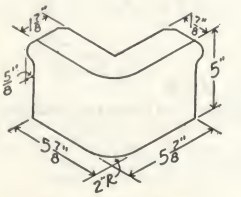
No. 535—Int.
Internal Cove Corner for Cove Base



No. 535—Ext.
Exterior Bullnose Corner for Cove Base



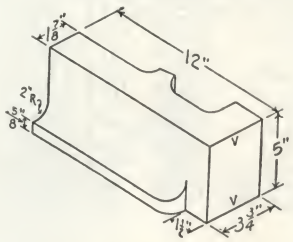
No. 735—Int.
Internal Cove Corner for Wainscot Cap



No. 735—Ext.
Exterior Bullnose Corner for Wainscot Cap

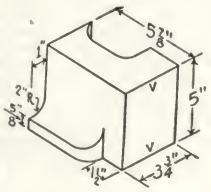
Scale 1″ = 1′ 0″

Continued on next page



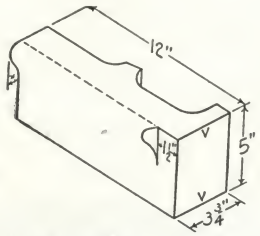
No. 550-R
Cove Stop—Right—12 In.

Furnished also in left, 12 in., No. 550-L.
Furnished also kerfed at V-V. Right, No. 550RK; left, No. 550LK



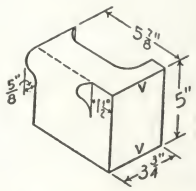
No. 560-R
Cove Stop—Right—6 In.

Furnished also in left, 6 in., o. 560-L.
Furnished also kerfed at V-V. Right, No. 560RK; left, No. 560LK



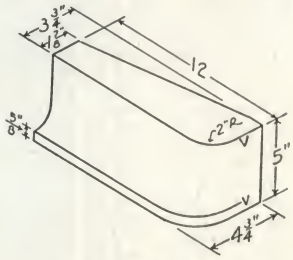
No. 750-R
Cap Stop—Right—12 In.

Furnished also in left, 12 in., No. 750-L.
Furnished also kerfed at V-V. Right, No. 750RK; left, No. 750LK



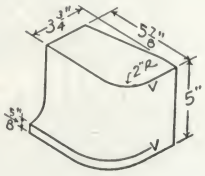
No. 760-R
Cap Stop—Right—6 In.

Furnished also in left, 6 in., No. 760-L.
Furnished also kerfed at V-V. Right, No. 760RK; left, No. 760LK



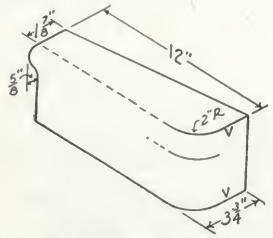
No. 555-R
Cove Stop Bullnose—Right—12 In.

Furnished also in left, 12 in., No. 555-L.
Furnished also kerfed at V-V. Right, No. 555RK; left, No. 555LK



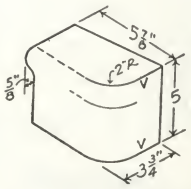
No. 565-R
Cove Stop Bullnose—Right—6 In.

Furnished also in left, 6 in., No. 565-L.
Furnished also kerfed at V-V. Right, No. 565RK; left, No. 565LK



No. 755-R
Cap Stop Bullnose—Right 12 In.

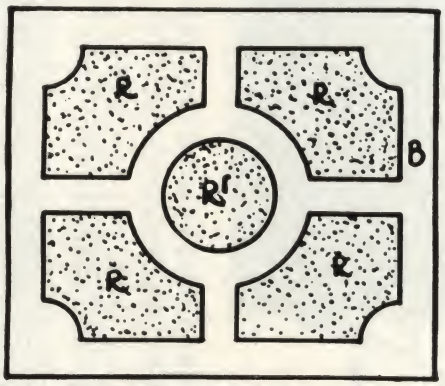
Furnished also in left, 12 in., No. 755-L.
Furnished also kerfed at V-V. Right, No. 755RK; left No. 755LK



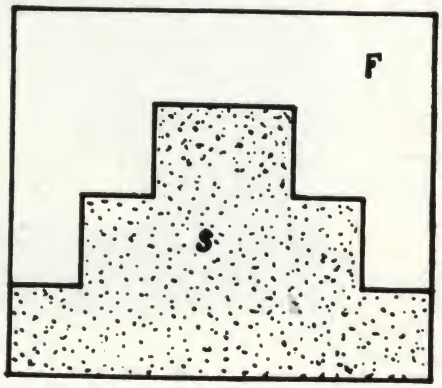
No. 765-R
Cap Stop Bullnose—Right 6 In.

Furnished also in left, 6 in., No. 765-L.
Furnished also kerfed at V-V. Right, No. 765RK; left, No. 765LK

INSETS

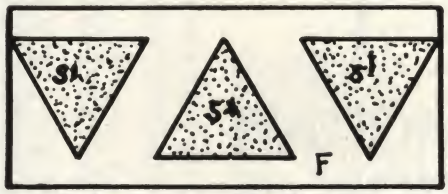


Design No. 7—Recessed ¼ In. or Stenciled

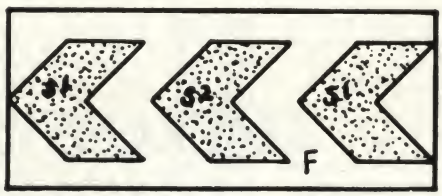


Design No. 8—Stenciled Only

BORDERS



Design No. 11—Stenciled Only



Design No. 12—Stenciled Only

Colors Available—Green or blue in light, medium or dark shades. Also brown, tan, buff, orange, cream, pink and white.

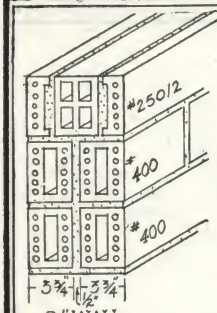
For fields and borders of rosettes, mottled cream brown and cream buff stippled are used.

Note: Where the use of colored insets or borders is contemplated, send us full details or write us for suggestions.

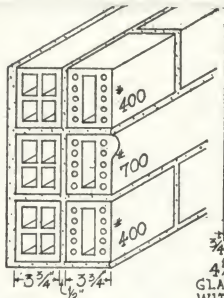
STANDARD AR-TEX ART CERAMIC TEXTURES UNITS

Scale 1″ = 1′ 0″
Insets, Approx. 2″ = 1′ 0″

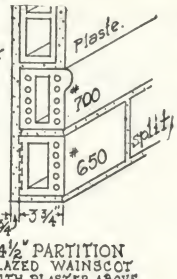
Continued on next page



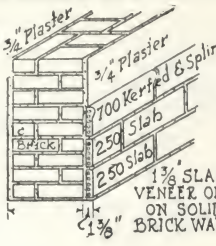
8" WALL
FACED TWO SIDES



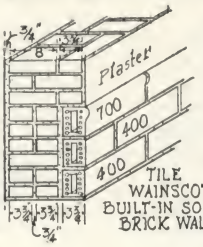
8" TILE WALL
ONE FACE GLAZED
ONE FACE PLASTERED



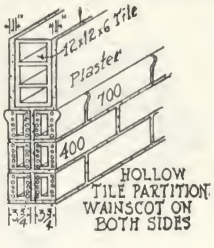
4½" PARTITION
GLAZED WAINSCOT
WITH PLASTER ABOVE
ON ONE FACE
PLASTER THROUGHOUT
ON OTHER FACE



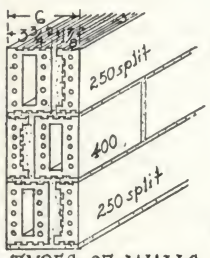
1⅜" SLAB
VENEER ON
ON SOLID
BRICK WALL

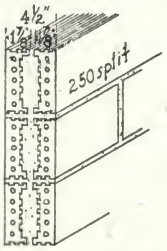


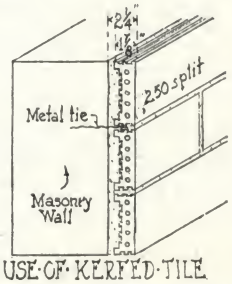
TILE
WAINSCOT
BUILT-IN SOLID
BRICK WALL



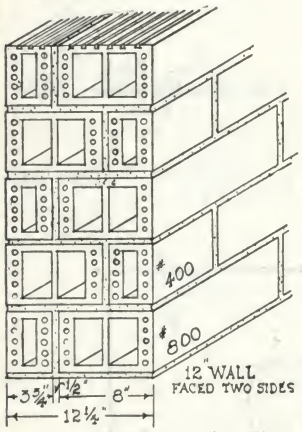
HOLLOW
TILE PARTITION
WAINSCOT ON
BOTH SIDES



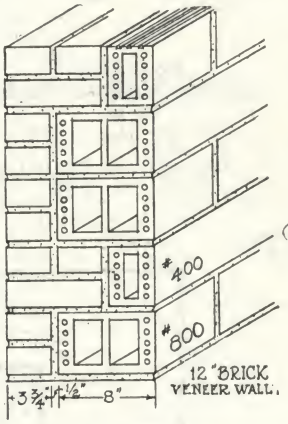




TYPES OF WALLS ILLUSTRATING THE USE OF KERFED TILE

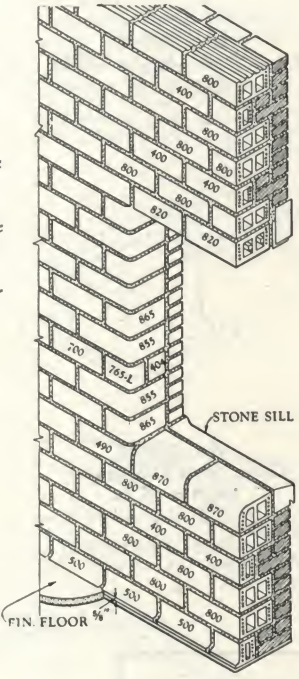


12" WALL
FACED TWO SIDES

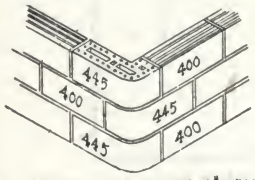


12" BRICK
VENEER WALL

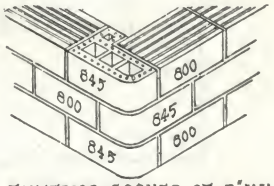
TYPES OF WALLS AND WALL BONDS



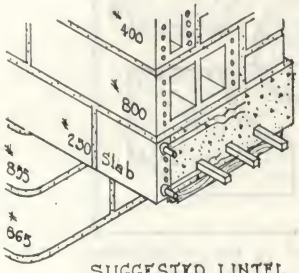
A TYPICAL BRICK
VENEER WALL
SECTION



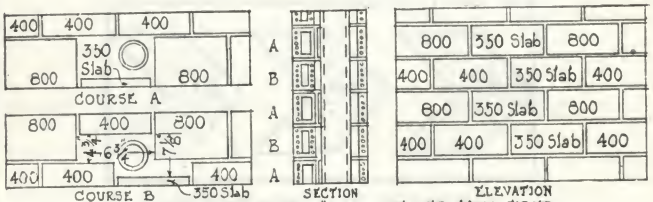
EXTERIOR CORNER OF 4" WALL
THIS CORNER TILE IS NOT FINISHED ON
8¼"x 5" OR 2¼"x 5" FACE



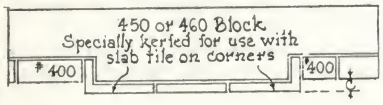
EXTERIOR CORNER OF 8" WALL
THIS CORNER TILE IS NOT FINISHED ON
3½"x 5" FACE.



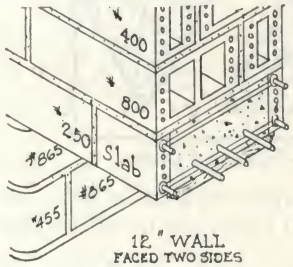
SUGGESTED LINTEL
CONSTRUCTION
USING SLAB-TILE, DOWEL-PINS
AND WIRE-TIES



CHASE CONSTRUCTION IN 12" WALL FACED TWO SIDES



USE OF SLAB TILE AS COLUMN
VENEER TO REDUCE PILASTER
WIDTH & WIDTH OF PROJECTION
C = 1⅞"



12" WALL
FACED TWO SIDES

COURSE HEIGHTS

Courses	½-in. joint ft.	½-in. joint in.	⅜-in. joint ft.	⅜-in. joint in.	¼-in. joint ft.	¼-in. joint in.	⅛-in. joint ft.	⅛-in. joint in.
1	0	5½	0	5⅜	0	5¼	0	5⅛
2	0	11	0	10¾	0	10½	0	10¼
3	1	4½	1	4⅛	1	3¾	1	3⅜
4	1	10	1	9½	1	9	1	8½
5	2	3½	2	2⅞	2	2¼	2	1⅝
6	2	9	2	8¼	2	7½	2	6¾
7	3	2½	3	1⅝	3	0¾	2	11⅞
8	3	8	3	7	3	6	3	5
9	4	1½	4	0⅜	3	11¼	3	10⅛
10	4	7	4	5¾	4	4½	4	3¼
11	5	0½	4	11⅛	4	9¾	4	8⅜
12	5	6	5	4½	5	3	5	1½
13	5	11½	5	9⅞	5	8¼	5	6⅝
14	6	5	6	3¼	6	1½	5	11¾
15	6	10½	6	8⅜	6	6¾	6	4⅞
16	7	4	7	2	7	0	6	10
17	7	9½	7	7⅜	7	5¼	7	3⅛
18	8	3	8	0¾	7	10½	7	8¼
19	8	8½	8	6⅛	8	3¾	8	1⅜
20	9	2	8	11½	8	9	8	6½
21	9	7½	9	4⅞	9	2¼	8	11⅝
22	10	1	9	10¼	9	7½	9	4¾
23	10	6½	10	3⅝	10	0¾	9	9⅞
24	11	0	10	9	10	6	10	3
25	11	5½	11	2⅜	10	11¼	10	8⅛
26	11	11	11	7¾	11	4½	11	1¼
27	12	4½	12	1⅛	11	9¾	11	6⅜
28	12	10	12	6½	12	3	11	11½
29	13	3½	12	11⅞	12	8¼	12	4⅝
30	13	9	13	5¼	13	1½	12	9¾
31	14	2½	13	10⅝	13	6¾	13	2⅞
32	14	8	14	4	14	0	13	8
33	15	1½	14	9⅜	14	5¼	14	1⅛
34	15	7	15	2¾	14	10½	14	6¼
35	16	0½	15	8⅛	15	3¾	14	11⅜
36	16	6	16	1½	15	9	15	4½
37	16	11½	16	6⅞	16	2¼	15	9⅝
38	17	5	17	0¼	16	7½	16	2¾
39	17	10½	17	5⅝	17	0¾	16	7⅞
40	18	4	17	11	17	6	17	1
41	18	9½	18	4⅜	17	11¼	17	6⅛
42	19	3	18	9¾	18	4½	17	11¼
43	19	8½	19	3⅛	18	9¾	18	4⅜
44	20	2	19	8½	19	3	18	9½
45	20	7½	20	1⅞	19	8¼	19	2⅝
46	21	1	20	7¼	20	1½	19	7¾
47	21	6½	21	0⅝	20	6¾	20	0⅞
48	22	0	21	6	21	0	20	6
49	22	5½	21	11⅜	21	5¼	20	11⅛
50	22	11	22	4¾	21	10½	21	4¼
51	23	4½	22	10⅛	22	3¾	21	9⅜
52	23	10	23	3½	22	9	22	2½
53	24	3½	23	8⅞	23	2¼	22	7⅝
54	24	9	24	2¼	23	7½	23	0¾
55	25	2½	24	7⅝	24	0¾	23	5⅞
56	25	8	25	1	24	6	23	11
57	26	1½	25	6⅜	24	11¼	24	4⅛
58	26	7	25	11¾	25	4½	24	9¼
59	27	0½	26	5⅛	25	9¾	25	2⅜
60	27	6	26	10½	26	3	25	7½

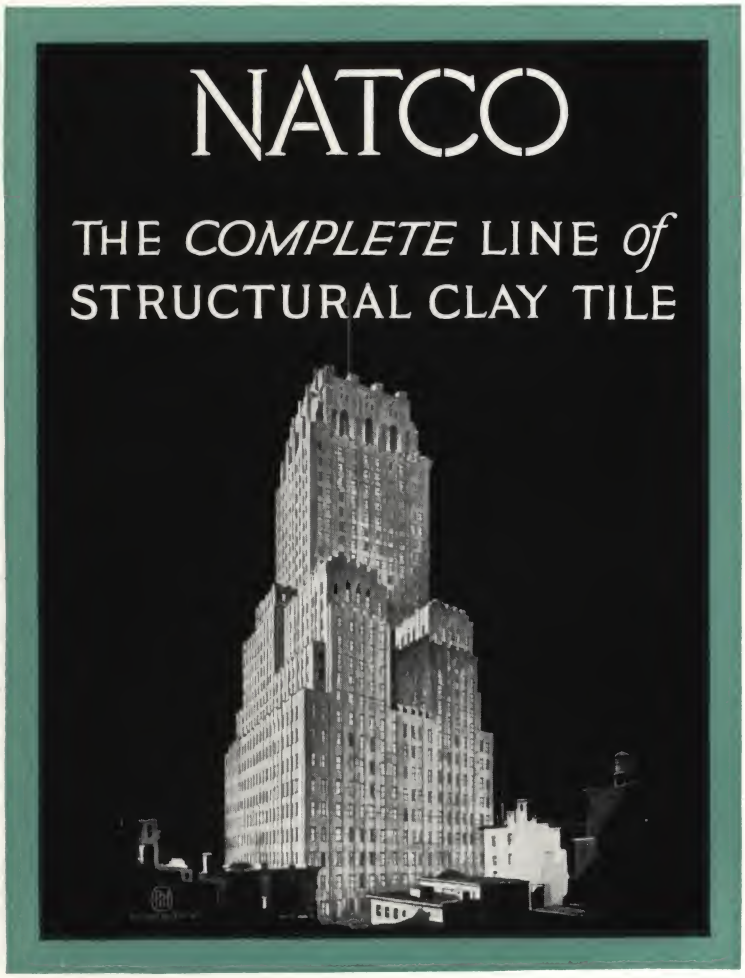
Notes: If cove base tile is used deduct 1⅛ in. from figures shown in above table, for heights from finished floorline. For window opening heights add thickness of one mortar joint.

DETAILS OF AR-KE-TEX CONSTRUCTION

MISC SCALES

NATCO

THE *COMPLETE* LINE *of*
STRUCTURAL CLAY TILE



Represented by

[ ]

NATIONAL·FIREPROOFING
·CORPORATION·

General Offices: Fulton Building, Pittsburgh, Penna.

NATCO PRODUCTS INDEX

INTERIOR WALLS

Natco Vitritile ..... Pages 4 to 27 inc.

A particularly attractive load bearing, structural tile for interior walls and partitions—also furnished kerfed or split for furring. Available in salt glaze, or the new fritted glaze, in a wide range of charming colors. (See color charts.) Beautifully glazed, sanitary, easily cleaned—eliminates the necessity of plastering or painting.

Natco Partition Tile..... Page 43

Light, strong, easily and economically laid. Fireproof, indestructible, resists the passage of cold, heat and sound.

Natco Furring Tile..... Page 42

Applied to the interior of exterior walls—prevents dampness from penetrating and discoloring plaster.

EXTERIOR WALLS

Natco Vitritile..... Pages 4 to 27 inc.

A particularly attractive glazed load bearing, structural face tile—sanitary—easily cleaned.

Natco Vitribrick..... Not illustrated

A beautifully salt-glazed structural unit, 3¾x8x5". Permanent in character, form and finish. Dead air cells provide insulation. Effects outstanding economies in labor, mortar and laying-time.

Natco Double Shell Load Bearing Tile

..... Pages 28 to 31 inc.

Furnished with 12x12" scored face for various thicknesses of walls. Double shell construction—resists cold and dampness—provides effective base for stucco and plaster.

Natco Triple X Load Bearing Tile.... Page 32

Has 12x12" scored face for different wall thicknesses. For structures where stucco exterior is desired. Economical, quickly and easily laid, permanent.

Natco Header Backer Tile..... Page 33

Combined with brick in load bearing and curtain walls. Mechanically bonded, light in weight, substantial and permanent. Meets every brick and mortar joint condition.

Natco Unibacker Tile..... Page 34

Provides effective bond between tile and brick facing. But one unit required for entire wall. Insures rapid, economical construction.

Natco Heath Cubes..... Page 31

7¾x7¾x7¾" load bearing units. For use with or without brick facing.

Natco Interlocker Tile..... Page 42

Forms a mechanically bonded wall with or without brick facing.

Natco Storage Bins..... Not illustrated

For the storage of coal, grain, ashes, sand, silage and various other materials, Natco Circular Glazed Hollow Tile Storage Bins, reinforced with steel bands, are recommended for permanence, economy and fire safety. These bins vary in size from 8 ft. in diameter to 30 ft. and can be built 50 ft. in height. Descriptive literature on application.

Natco Face Tile (Tex-Tile).. Pages 35 to 41 inc.

Furnished glazed or unglazed, 5x12" face for 8" walls and 10⅜x12" face for ashlar random bond. Attractive texture face in several beautiful color ranges. Double shell construction. For residences, office and commercial buildings, etc.

Natco Face Tile (Combed Face)

..... Pages 35 to 41 inc.

5x12" combed exterior face—interior smooth, sanitary, easily cleaned, for 8" walls. (Also furnished unglazed when desired.) Double shell construction. For industrial and factory buildings, etc.

Natco Face Tile (Smooth "Tex" Finish)

..... Page 53

Natco Face and Common Brick..... Page 53

FIREPROOFING

Natco Girder and Column Covering

..... Pages 50 to 52 inc.

Well burned Natco Hollow Tile has no equal as a covering for structural steel or iron—is best non-conductor of heat—is not destroyed by fire or water—all necessary shapes and sizes furnished.

FLOORS

(Also adapted to flat roofs)

Natcoflor ..... Pages 44 and 45

Combination of special shaped Natco Tile with 2" wide reinforced cement grout joints. Saves dead load, floor depth, labor costs and insurance—all tile ceiling.

Natco Flat Arch Floors..... Pages 46 to 48 inc.

Afford great strength and fire safety with minimum weight. Can be laid winter and summer because they require no concrete fill or costly forms. All tile ceiling.

Natco Combination Floors—(Standard One and Two Way Systems)..... Page 49

Adapted for all classes of buildings where long span fireproof floors are required. Minimizes dead load and provides a good plastering surface.

Natco Segmental Arch..... Page 45

Particularly adaptable for warehouses, lofts, factories, sidewalks or where great strength is required and a flat ceiling is not necessary.

ROOFS

(See also Floors above)

Natco Book Tile..... Page 48

A permanent, non-spalling roof of high insulating value due to the enclosed air spaces. Particularly adapted for mill buildings and similar structures—also for buildings where a light, pitched roof is required.

Continued on next page

NATIONAL FIREPROOFING CORPORATION

Manufacturers of Natco Structural Clay Tile

Fulton Building

PITTSBURGH, PA.

BRANCH OFFICES

NEW YORK, N. Y. Chanin Building
CHICAGO, ILL. Builders Building
PHILADELPHIA, PA. Architects Building
BOSTON, MASS. Textile Building

IN CANADA: National Fire Proofing Co. of Canada, Ltd., TORONTO, ONT.

The Corporation

Established in 1889, the National Fireproofing Corporation has been in business continuously since that time. It is the only concern in the world manufacturing a complete line of structural clay products.

Beside the branch sales and service offices listed above, the company also operates as contractors for fireproof construction in hollow building tile in the Chicago district.

Facilities

The total production of the National Fireproofing Corporation approximates a million tons of structural clay products annually. This production comprises structural clay tile to meet every building need.

The Corporation operates twenty-two plants in seventeen different localities, in close proximity to the principal tile markets of the country. In addition, it operates a plant in Hamilton, Ontario. It owns or leases over 5000 acres of clay deposits. It is estimated that the deposits thus controlled contain not less than 56,000,000 recoverable tons of clay, which, at the normal rate of operation, is sufficient to last more than fifty years.

Reliability

The rating of the Corporation in Dun and Bradstreet, together with its long record of fair dealing with its customers is the best possible guarantee of its dependability and stability.

Branding

All structural clay tile manufactured by the National Fireproofing Corporation is branded with the trade mark name

TRADE NATCO MARK

"NATCO." Special types bear, in addition, marks of identification, such as Natco XXX, Natco Header Backer, Natco Unibacker, etc. All tile intended for load bearing walls are so branded.

The Product

Natco Structural Clay Tile is made from special clay, found only in certain favored localities. This clay is mined and moulded into scientifically designed shapes that provide maximum strength and durability with a minimum of weight. These shapes are dried, then placed in large kilns where they are exposed to a temperature of over 2000 degrees varied to suit the structural or non-structural use of the ware.

The Complete Natco Line

Natco, The Complete Line of Structural Clay Tile, comprises units to meet every building need in structures of every kind.

You have a single source of supply, backed by one united, uncompromising responsibility. Along with the tremendous production facilities of the Corporation you have the stability, the experience and the practical knowledge of the needs of the field that has come with over forty years in business.

Engineering Service

The Corporation maintains an adequate and efficient Engineering Department. This department is anxious to co-operate and show you how you can most economically and satisfactorily use Natco Structural Clay Tile to the best advantage in every type of construction.

ADVANTAGES OF NATCO STRUCTURAL CLAY TILE

Permanence

Made of selected clay, cured and burned under the careful supervision of graduate ceramic engineers, Natco tile is permanent in form and structure. It is unaffected by heat, cold, dampness and chemicals—never warps or disintegrates.

Strength

Natco Tile is scientifically designed for the purpose to which it is to be applied. The aim is to obtain maximum strength, with minimum weight.

Minimum Weight

Natco Structural Clay Tile, while equal or superior to other materials in strength, insulating qualities, and fire safety, affords through its lightness considerable savings in dead load as well as in steel and foundation costs.

Insulating Qualities

With Natco Structural Clay Tile, the enclosed dead air spaces provide positive insulation against rapid changes in temperature. In wall construction where any of the types of double shell tile are used, the double shell construction itself, with its wide non-continuous mortar joints, together with the moisture stops at each end acts as an additional barrier against the passage of cold, heat and moisture.

Due primarily to its insulating qualities, Natco Structural Clay Tile has no equal as a covering for steel. In floor construction, its insulating qualities give it a distinct advantage over other types of floors.

Fire Safety

Made of raw material—clay—which is absolutely non-inflammable, and then exposed during manufacture to over 2000 degrees of heat, Natco Tile is obviously fire-resistive. Its rate of heat transfer is very low, so that it is the ideal material to shield steel work in skeleton buildings.

Soundproofness

Due to the dead air spaces which resist the passage of sound, walls and floors of Natco Structural Clay Tile are more nearly soundproof than any solid structural materials.

Installations

So many outstanding buildings all over the country have been constructed of Natco Structural Clay Tile, that it is out of the question to give even a partial list. In thousands of public buildings, skyscrapers, hospitals, schools, institutions of all kinds, residences, industrial and commercial buildings, and other types of buildings, Natco Structural Clay Tile has been used and is giving perfect satisfaction.

Distribution

Natco plants are strategically located near the principal tile markets of the country. Wherever possible, orders are placed with those plants most advantageously located in order to make savings in transportation charges.

Shipping

Natco Tile are loaded by experts, under close supervision, assuring that the cars will come through with a minimum of breakage. On material such as Vitritile, cardboard wrappers are used, to assure arrival in first class condition.

Single Source of Supply

Instead of buying wall tile one place, floor tile another, you can—by using Natco—fill all tile needs from a single source of supply. Shipments may be better arranged to suit your needs, car load lots may be made up instead of expensive partial shipments and all responsibility will rest with one company.

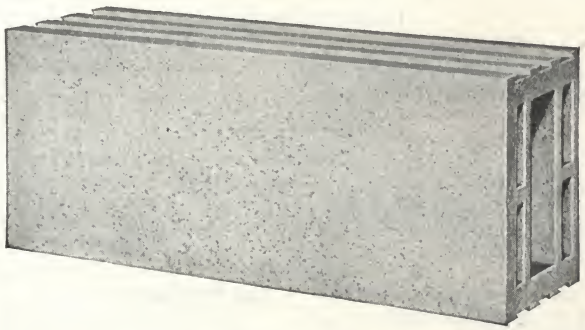
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WALLS OF PERMANENT BEAUTY WITH NATCO VITRITILE

Fritted Glazed—Salt Glazed

General

Natco Vitritile is an extremely attractive finished face structural fire clay tile for use in both interior and exterior load-bearing and non-load-bearing walls and partitions.



Strength and Insulation

Numerous official tests prove its high crushing strength and adaptability for load-bearing walls, as well as for wall facing. Double shell construction, with its enclosed air space, most effectively resists the passage of heat, cold and dampness through the walls.

Accuracy as to Shape and Size

All the tile are selected as to shape and run exceptionally true to size. Each piece is hand leathered or smoothed at the edges, resulting in neat horizontal and vertical mortar joints; ¼″ to ⅜″ mortar joints are generally recommended.

Colors and Finishes

The many different finishes and colors in which Natco Vitritile is furnished, greatly increases its field of use. In addition to the beautiful salt glazed finish, it is available in a fritted glaze finish in very attractive mottle effects.

Fritted Glaze and Salt Glazed Vitritile—These finishes are entirely unaffected by dirt, grease, chemicals and heat—thus are easily cleaned and kept clean.

Sizes of Natco Vitritile

Vitritile in all finishes is manufactured in four different thicknesses, three for wall tile and one for furring as follows:
3¾″ Vitritile, furnished one or two sides, finished.
6″ Vitritile, furnished one or two sides, finished.
8″ Vitritlie, furnished one side, finished.
Above sizes are also furnished one side scored for plaster.
1⅞″ Vitritile, for furring brick, stone, concrete, etc.
All sizes of Vitritile are furnished select one face, but the 3¾″ and 6″ tile is also furnished select two faces for two-faced partitions of these thicknesses.

Proper shapes are provided for corners, closures, sills, lintels, base and cap to give a pleasing finish to a building.

While we have standard shapes to take care of practically every building condition, we are also equipped for special cutting, such as for stair slopes, corners greater than right angles, or the necessary tile to make 2″ or 3″ courses when working up to ceiling lines, etc. Special attention is given to work requiring shapes to take care of such special conditions.

Engineering Service

Our Engineering Department will be glad to recommend the most economical and practical methods of using this material to secure the most attractive results.

Rapid and Economical Construction

In that the 3¾″x5″x12″ unit is equivalent to approximately three brick, the 6″x5″x12″ to four and one-half brick, and the 8″x5″x12″ to six brick, and are at the same time, quickly and easily handled and laid, considerable time, labor and mortar savings are effected. With each tile laid, a portion of the finished wall is put in place. There is no depreciation—the tile does not disintegrate or weather—there is no painting or other maintenance expense. Plastering is eliminated.

Adaptability

The field for use is practically unlimited. Vitritile is ideal for walls and wainscots in laboratories, schools, airports, restaurants, hotel kitchens and supply rooms, hospitals, gymnasiums, natatoriums, corridors, substations, subways and subway stations, public comfort stations, lavatories, shower rooms, garages, abbattoirs, basements, filling stations, etc.

Packing and Shipping

Each tile of the Select or standard grade is placed in a corrugated paper container and carefully loaded and braced in cars, thus insuring safe arrival at destination. The Second quality is packed in straw and lath.

CLASSIFICATIONS AND COLOR

Select Quality

Includes tile free from chips or other imperfections that would affect the appearance of the finished wall. This quality is available in three different shade ranges in the Salt Glaze and in a variety of mottle effects, in Fritted Glaze.

Colors

Fritted Glaze—The beautiful mottled effects available are illustrated on succeeding pages. A complete description of the fritted glaze process and and its advantages appears on the following page. On special orders fritted glaze is also finished in luminous matt whites, and midnight matt blacks (not illustrated).

Salt Glazed—Full mingled shade range No. 200 includes all colors from the lighter to the darker, and makes a most pleasing effect. The No. 50, or light shade range, has a slight blending of the lighter colors. In that more pleasing effects are obtained through the use of Natco Salt Glazed Vitritile in blended shades, it is not furnished in uniform colors.

For cove base there is a special chocolate brown dark shade available, known as shade range No. 90. This is desirable where a contrast in color is wanted between the cove base and upper walls. Wainscot cap, sills, etc., can also be furnished in the No. 90 shade when desired. Sufficient time must be allowed to manufacture such items after receipt of order. All shade No. 90 cove base items carried in stock for prompt shipment.

Standard or Commercial Quality—Salt Glazed Only

Includes all tile which, due to slight facial imperfections, cannot be classed as select. No chipped tile, or tile not structurally sound, are included. The full range of color only is furnished in this classification. This grade is suitable for industrial and commercial buildings and similar structures.

Second Quality—Salt Glazed Only

Includes tile with small chips or other facial imperfections, which do not impair the strength of the walls where used. On account of its low price, this grade of Vitritile is especially suitable for use in place of rough finished concrete, brick or tile in foundations, load-bearing walls, etc., where, while the appearance may not be so important, at the same time a sanitary and light colored, permanent surface can be obtained at approximately the same cost. It is not sorted for color.

Continued on next page

NATCO FRITTED GLAZE VITRITILE NOW OFFERS A NEW MEDIUM OF EXPRESSION TO ARCHITECTS



8510-L

FRITTED GLAZE-A PLEDGE OF PERMANENCE

NEW fields of color composition, color harmony, are open with the advent of Natco Fritted Glaze Vitritile. The comprehensive line of structural units, suitable for interior or exterior walls and partitions, are painted with flame into beautiful luminous matt whites, striking blacks, (not illustrated) and seven delightful and unique mottled effects, ranging through cream tans and cream browns.

Beautiful When Installed—the Beauty of this New Material Endures

The Natco Fritted Glaze process, scientifically developed, is a pledge of permanence. The glaze is as permanent as that on the finest English Glazed Brick—the standard of excellence in materials of this type.

Continued on next page

8530-L



NATCO *FRITTED GLAZE* VITRITILE

OPENS NEW FIELDS OF COLOR COMPOSITION AND HARMONY

8530-S



8515-L

NATCO FRITTED GLAZE represents the successful culmination of a determined attempt to produce a glaze so permanent—so impervious—so immune to the destructive agencies of time, the elements, chemical attack, staining, checking, and crazing—that it will easily meet the most exacting requirements. The fritted glaze process is the most effective method science has devised of holding crawling, peeling, blistering, cracking and pinholing to a microscopic minimum.

Tests and experiments early disclosed that the ordinary processes of raw mixing, spraying, and kiln-burning which are in common use were powerless to attain these ideals. Only by the scientific fritted glaze process could they be realized.

Natco's frit is made of a number of various compounds, which are mixed, melted at 2300°, chilled and then ground to an impalpable powder. This powder represents a **new** and homogeneous compound, which melts at a much lower temperature. The successive coats of glaze material (sometimes as many as 7) are applied to the tile on a patented "G Mottling" machine, developed by a ceramic expert. This machine does its work with

ALSO FURNISHED IN MATT WHITE AND MATT BLACK—NOT ILLUSTRATED

Continued on next page

8520-L



8520-S

NATCO *FRITTED GLAZE* VITRITILE IS FURNISHED IN A COMPLETE VARIETY OF SHAPES AND SIZES



8535-L

absolute precision, substituting for the uncertainties of makeshift methods unvarying excellence of results. When the tile is kiln-burned, the frit causes the glaze to mature at a lower temperature; form a more intimate bond with the tile; give—because the various elements have been pre-melted, instead of merely fused, together—more uniform results; and yield a silica glaze equivalent to that on the finest English glazed brick—the accepted standard of excellence.

Colors are prepared in the same painstaking, scientific way. Instead of merely mixing a dye-powder with the glaze, Natco utilizes **calcined** colors; the various compounds required to produce the desired shade are blended, burned, wet-ground and the resulting powder screened, before it is added to the glaze. Color variation is thus reduced to a minimum.

The added care needed, the added expense, of the scientific Natco Fritted Glaze process is abundantly justified in the increased service, the assured satisfaction, the well-founded confidence that Natco's product offers to the user. Fritted glaze is a triumph of the ceramic art, a pledge of permanence to you.

ALSO FURNISHED IN MATT WHITE AND MATT BLACK—NOT ILLUSTRATED

Continued on next page

NATCO SALT GLAZED VITRITILE



SHADE RANGE No. 50 (SALT GLAZED) VITRITILE

Consists of a mingling of the lightest shades



SHADE RANGE No. 90 (SALT GLAZED) VITRITILE

Designed particularly for cove base – can also be furnished for wainscot cap, trim, etc., when there is time available for manufacture. Cove base shapes are carried in stock at all times.



SHADE RANGE No. 200 (SALT GLAZED) VITRITILE

Full shade range—includes all shades from light to dark

Continued on next page



View of interior of Columbus Hospital, Chicago



Cafeteria at Camden County Vocational School, Merchantville, N. J.
LACKEY & HETTEL, Architects



Solarium of the Hahnemann Hospital, Philadelphia, Pa.
PETTIT AND FERRIS Architects



Power Control Room in Koppers Building, Pittsburgh, Pa.
GRAHAM, ANDERSON, PROBST & WHITE, Architects



Swimming Pool, Colored Y. M. C. A., Montclair, N. J.
MAY & HILLARD, Architects



Interior in plant of Becker Dry Cleaning Co., Chicago
NEWHOUSE & BURNHAM, Architects



Laboratory of the Pittsburgh Coal Co., Library, Pa.



Office interior of Pittsburgh Tube Co., Monaca, Pa.
HARRY S. BAIR, Architect



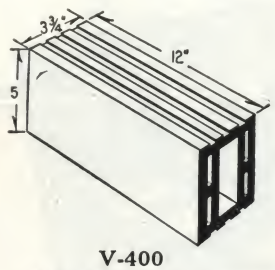
Interior of Janssen Dairy, Hoboken, N. J.
MAX BEYER, Architect



Club Room at State Armory, Latrobe, Pa.
JOSEPH F. KUNTZ, Architect

A FEW TYPICAL NATCO VITRITILE INSTALLATIONS

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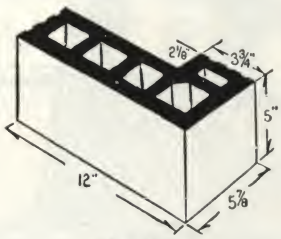
V-400

3¾"x5"x12" Wall Stretcher (smooth two sides), also furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



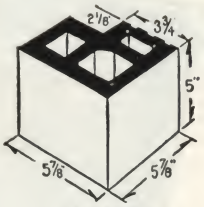
V-890

3¾"x5"x12" Wall Stretcher (smooth one side, scored one side), also furnished in 2", 3", 4", 5⅞", 8", and 10" lengths



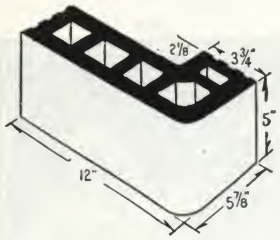
V-4100

3¾"x12"x5" Square External and Internal Corner



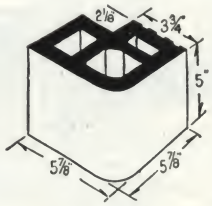
V-4105

3¾"x5⅞"x5" Square External and Internal Half Corner



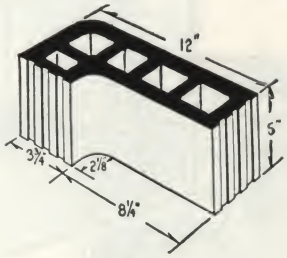
V-4110

3¾"x12"x5" Bullnose External and Square Internal Corner



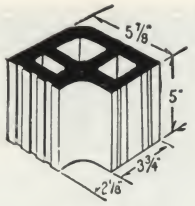
V-4115

3¾"x5⅞"x5" Bullnose External and Square Internal Half Corner



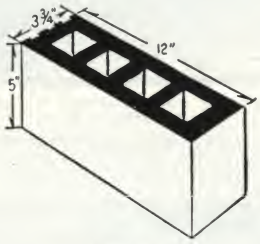
V-4120

3¾"x12"x5" Bullnose External and Coved Internal Corner



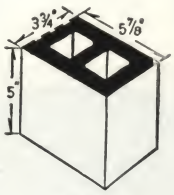
V-4125

3¾"x5⅞"x5" Bullnose External and Coved Internal Half Corner



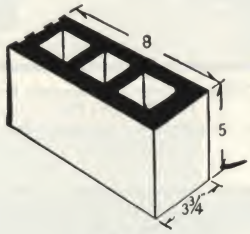
V-420

3¾"x12"x5" Square Full Closure



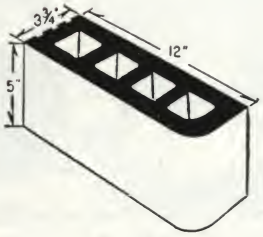
V-426

3¾"x5⅞"x5" Square Half Closure



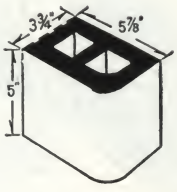
V-4280

3¾"x8"x5" Square Pilaster



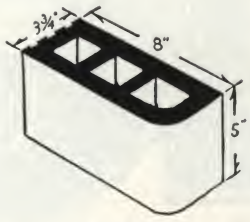
V-430

3¾"x12"x5" Single Bullnose Full Closure



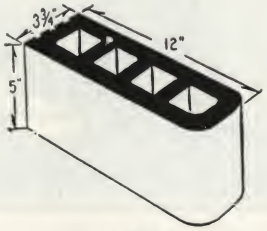
V-436

3¾"x5⅞"x5" Single Bullnose Half Closure



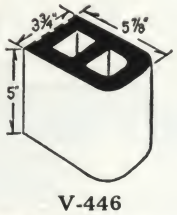
V-4380

3¾"x8"x5" Single Bullnose Pilaster



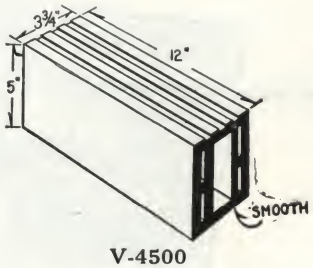
V-440

3¾"x12"x5" Double Bullnose Full Closure



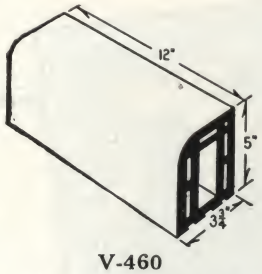
V-446

3¾"x5⅞"x5" Double Bullnose Half Closure



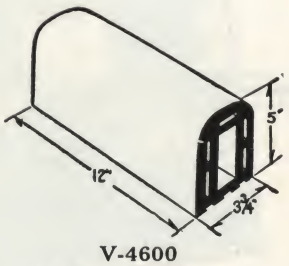
V-4500

3¾"x5"x12" Square Sill or Lintel Tile. Also furnished in 5⅞" and 8" lengths



V-460

3¾"x5"x12" Single Bullnose Sill or Lintel Tile. Also furnished in 5⅞" and 8" lengths

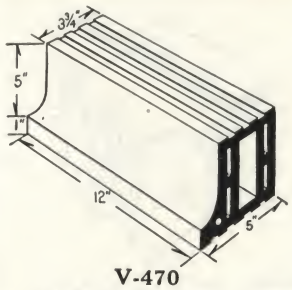


V-4600

3¾"x5"x12" Double Bullnose Coping Tile. Also furnished in 5⅞" and 8" lengths

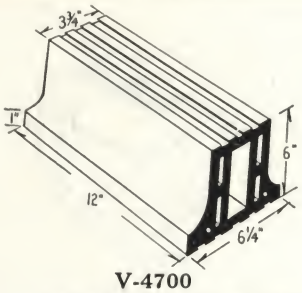
NATCO VITRITILE—3¾" SIZE

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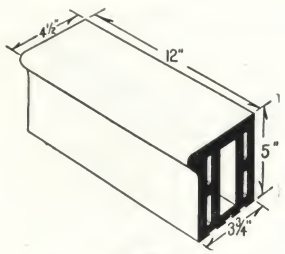
V-470

3¾"x6"x12" Single Cove Base. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



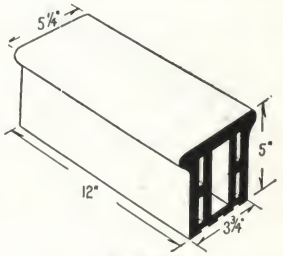
V-4700

3¾"x6"x12" Double Cove Base. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



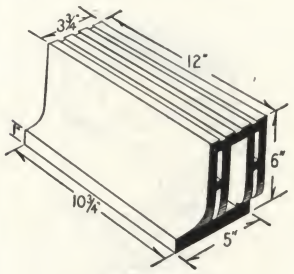
V-480

3¾"x5"x12" Single Wainscot Cap. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



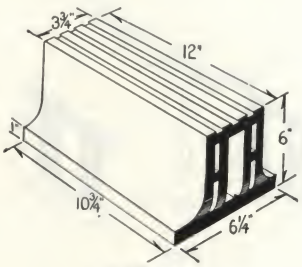
V-4800

3¾"x5"x12" Double Wainscot Cap. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



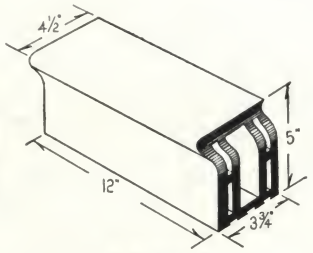
V-K470-R

3¾"x6"x12" Single Cove Base, coped right (coped left opposite hand). Furnished in 3", 4", 5⅞" and 8" lengths



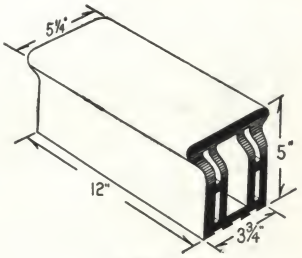
V-K4700

3¾"x6"x12" Double Cove Base, coped. Furnished in 3", 4", 5⅞" and 8" lengths



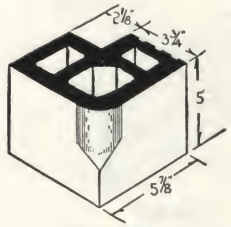
V-K480-R

3¾"x5"x12" Single Wainscot Cap, coped right (coped left opposite hand). Furnished in 3", 4", 5⅞" and 8" lengths



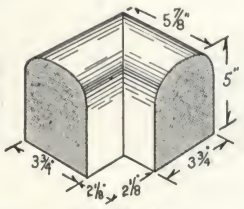
V-K4800

3¾"x5"x12" Double Wainscot Cap, coped. Furnished in 3", 4", 5⅞" and 8" lengths



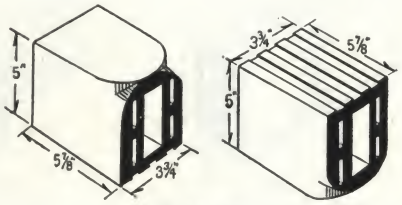
V-C4075

3¾"x5⅞"x5" Chamfered Corner



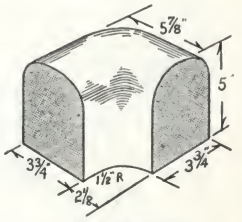
V-C4600

3¾"x5⅞"x5" Double Bullnose Coping Square External and Internal Corner



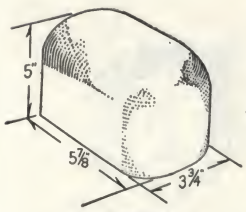
V-S4600

3¾"x5"x5⅞" Combination Bullnose Sill or Lintel Starter, for use with Bullnose Sills, Lintels and Jambs



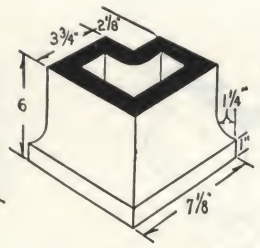
V-C4620

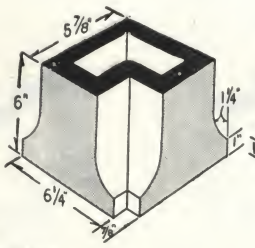
3¾"x5⅞"x5" Double Bullnose Coping Bullnose External and Coved Internal Corner



V-C4660

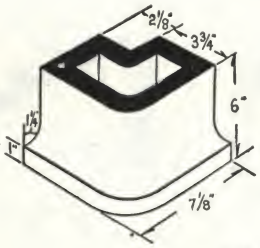
3¾"x5"x5⅞" Double Bullnose Coping Closure. Used with V-4600

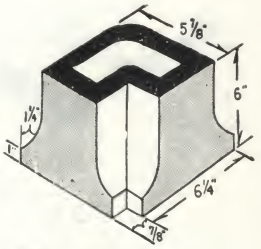




V-C4700

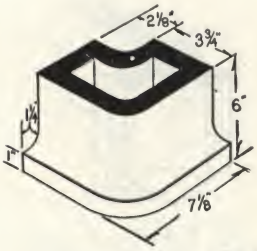
3¾"x5⅞"x6" Square External and Internal Cove Base Corners





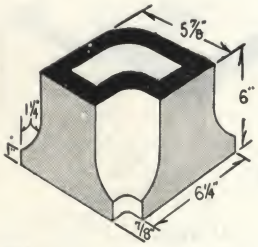
V-C4710

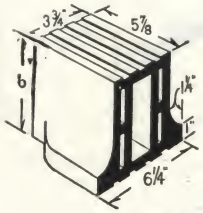
3¾"x5⅞"x6" Bullnose External and Square Internal Cove Base Corner

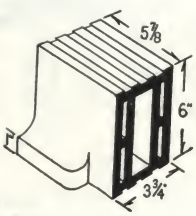


V-C4720

3¾"x5⅞"x6" Bullnose External and Coved Internal Cove Base Corner

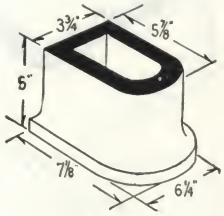






V-S4700

3¾"x6"x5⅞" Double Cove Base Stop

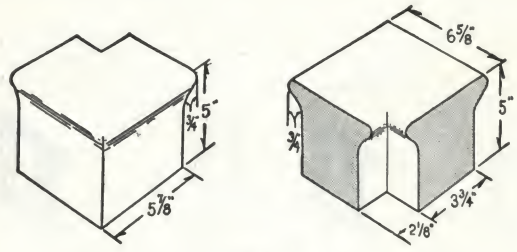


V-S4750

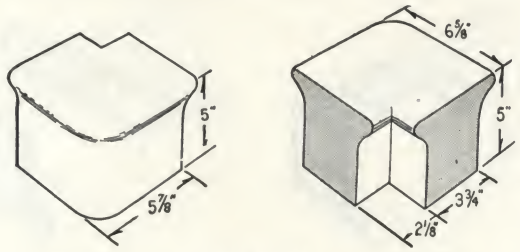
3¾"x5⅞"x6" Cove Base Double Bullnose Closure

NATCO VITRITILE—3¾" SIZE

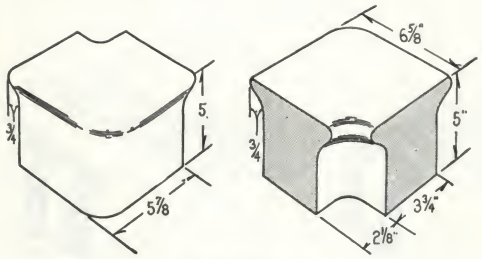
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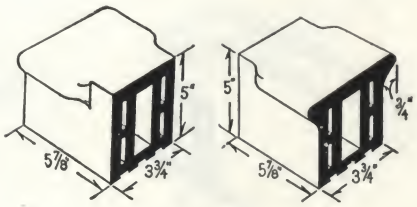
V-C4800
3¾"x5⅞"x5" Square External and Internal Wainscot Cap Corner



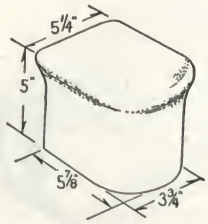
V-C4810
3¾"x5⅞"x5" Bullnose External and Square Internal Wainscot Cap Corner



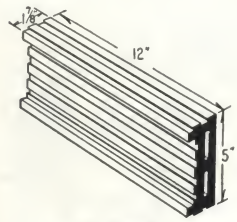
V-C4820
3¾"x5"x5⅞" Bullnose External and Coved Internal Wainscot Cap Corner. 1½" Radius of Internal Cove and Bullnose



V-S4800
3¾"x5"x5⅞" Double Wainscot Cap Stop



V-S4850
3¾"x5⅞"x5" Wainscot Cap Double Bullnose Closure



V-4900
1⅞"x5"x12" Furring Stretcher. Also furnished in 2", 3", 4", 5⅞", 8" and 10" lengths

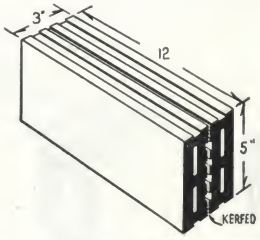
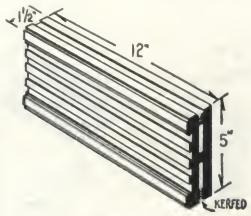
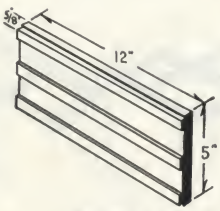


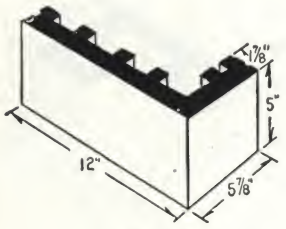
Fig. A
Refer to V-4901 and V-4902 at right



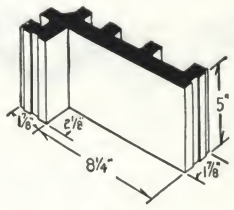
V-4901
1½"x5"x12" Slab. Shipped in pairs in single block, which is kerfed to split. (See Fig. A at left.) This slab furnished for use at pipe chases and conduit spaces. Furnished in 6" and 12" lengths only



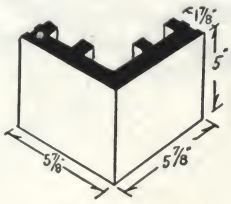
V-4902
⅝"x5"x12" Slab. Shipped in pairs in single block, which is kerfed to split. (See Fig. A and V-4901 at left.) This slab furnished for use at electric conduits and outlets. Furnished in 12" length only



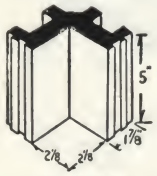
V-4101
1⅞"x12"x5" Furring, Square External Corner



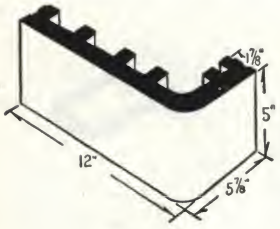
V-4102
1⅞"x8¼"x5" Furring, Square Internal Corner



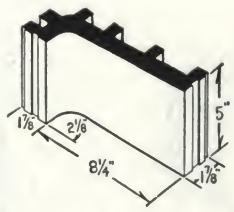
V-4106
1⅞"x5⅞"x5" Furring, Square Half Corner. (External)



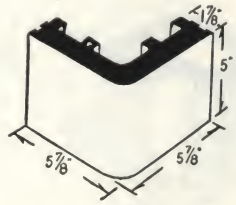
V-4107
1⅞"x2⅛"x5" Furring, Square Half Corner. (Internal)



V-4121
1⅞"x12"x5" Furring, Bullnose External Corner



V-4122
1⅞"x8¼"x5" Furring, Coved Internal Corner



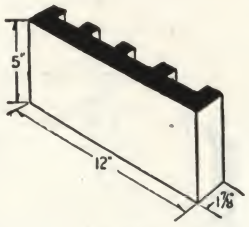
V-4126
1⅞"x5⅞"x5" Furring, Bullnose Half Corner. (External)



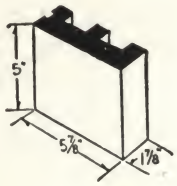
V-4127
1⅞"x2⅛"x5" Furring, Coved Half Corner. (Internal)

NATCO VITRITILE—3¾" and 1⅞" SIZES

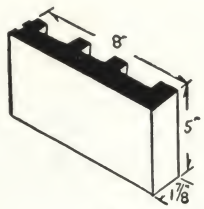
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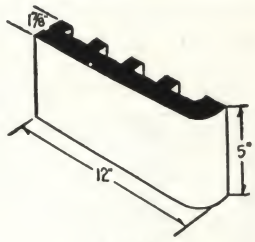
V-421
1⅞"x12"x5" Furring, Square Full Closure



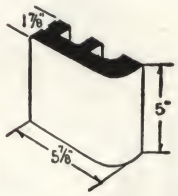
V-427
1⅞"x5⅞"x5" Furring, Square Half Closure



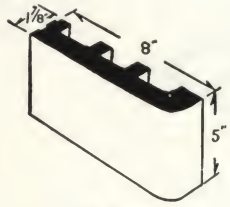
V-4282
1⅞"x8"x5" Furring, Square Pilaster



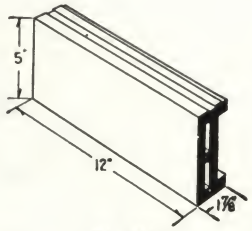
V-441
1⅞"x12"x5" Furring, Bullnose Full Closure



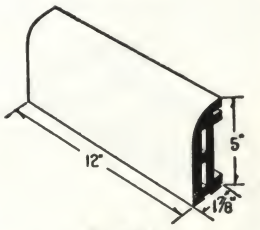
V-447
1⅞"x5⅞"x5" Furring, Bullnose Half Closure



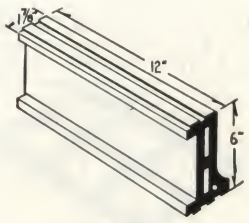
V-4382
1⅞"x8"x5" Furring, Bullnose Pilaster



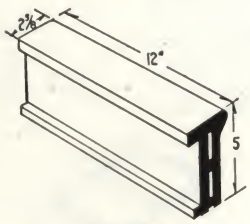
V-4501
1⅞"x5"x12" Furring, Square Sill or Lintel Tile. Also furnished in 5⅞" and 8" lengths. (Note: one face and one edge finished)



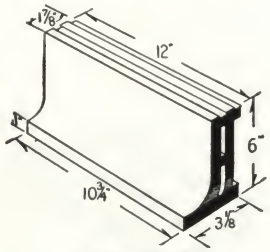
V-4601
1⅞"x5"x12" Furring, Bullnose Sill or Lintel. Also furnished in 5⅞" and 8" lengths



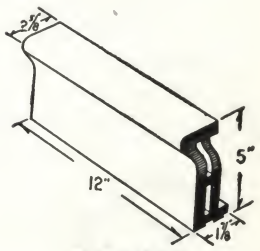
V-4701
1⅞"x6"x12" Furring, Cove Base. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



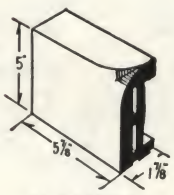
V-4801
1⅞"x5"x12" Furring Wainscot Cap. Furnished in 2", 3", 4", 5⅞", 8" and 10" lengths



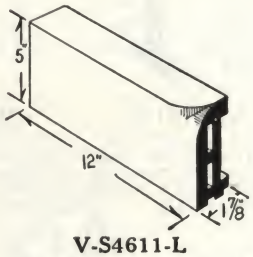
V-K4701-R
1⅞"x6"x12" Furring, Cove Base, coped right (coped left opposite hand.) Furnished in 3", 4", 5⅞" and 8" lengths



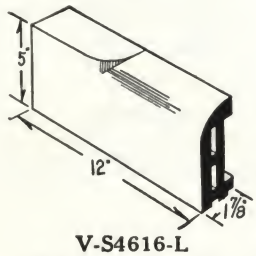
V-K4801-R
1⅞"x5"x12" Furring Wainscot Cap, coped right. (Coped left opposite hand.) Furnished in 3", 4", 5⅞" and 8" lengths



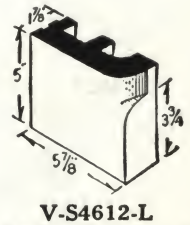
V-S4601-L
1⅞"x5"x5⅞" Furring, Bullnose Sill or Lintel Starter, left hand. (Right hand opposite)



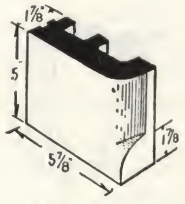
V-S4611-L
1⅞"x5"x12" Furring, Bullnose Sill or Lintel Starter, end type, left hand. (Right hand opposite)



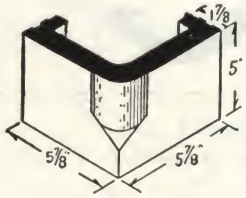
V-S4616-L
1⅞"x5"x12" Furring, Bullnose Sill or Lintel Starter, center type, left hand. (Right hand opposite)



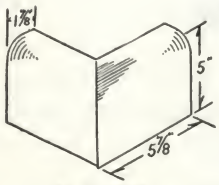
V-S4612-L
1⅞"x5"x5⅞" Furring, Bullnose Sill Starter (for 1⅞" Sill) left hand. (Right hand opposite)



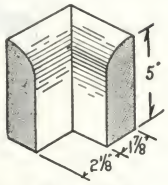
V-S4614-L
1⅞"x5"x5⅞" Furring, Bullnose Sill Starter (for 3¾" Sill) left hand. (Right hand opposite)



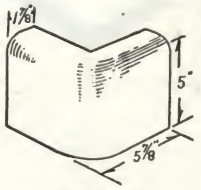
V-C4076
1⅞"x5⅞"x5" Furring. Chamfered Corner. (External)



V-C4601
1⅞"x5⅞"x5" Furring, Bullnose Coping, Square External Corner



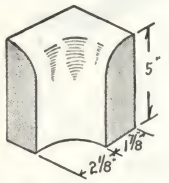
V-C4602
1⅞"x2⅛"x5" Furring, Bullnose Coping, Square Internal Corner



V-C4621
1⅞"x5⅞"x5" Furring, Bullnose Coping, Bullnose External Corner

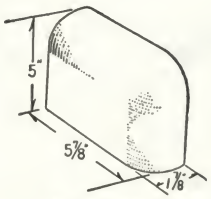
NATCO VITRITILE—1⅞" SIZE

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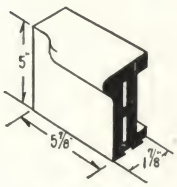
V-C4622

1⅞" x 2⅛" x 5" Furring, Bullnose Coping, Coved Internal Corner



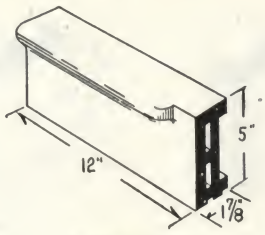
V-C4661-L

1⅞"x5"x5⅞" Furring, Bullnose Coping Closure, left hand. (Right hand opposite)



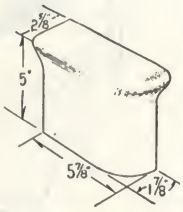
V-S4801-R

1⅞"x5"x5⅞" Furring, Wainscot Cap Stop, square open end, right hand. (Left hand opposite)



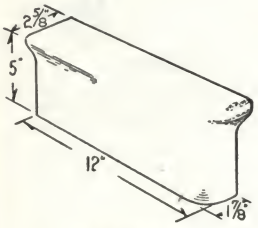
V-S4811-L

1⅞"x5"x12" Furring, Wainscot Cap Stop, square open end, left hand. (Right hand opposite)



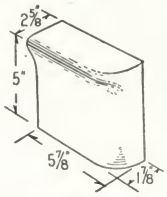
V-S4851-L

1⅞" x 5⅞" x 5" Furring, Wainscot Cap Bullnose Closure, left hand. (Right hand opposite)



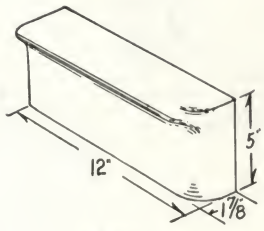
V-S4852-L

1⅞"x5"x12" Furring, Wainscot Cap, Bullnose Closure. (Right hand opposite)



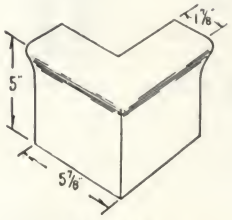
V-S4861-L

1⅞" x 5⅞" x 5" Furring, Wainscot Cap, Bullnose Stop, left hand. (Right hand opposite)



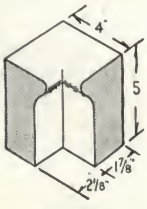
V-S4812-L

1⅞"x5"x12" Furring, Wainscot Cap, Bullnose Stop, left hand. (Right hand opposite)



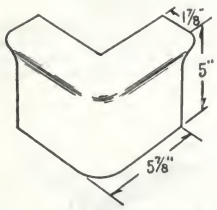
V-C4801

1⅞"x5⅞"x5" Furring, Wainscot Cap Square External Corner



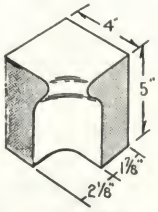
V-C4802

1⅞" x 2⅛" x 5" Furring, Wainscot Cap Square Internal Corner



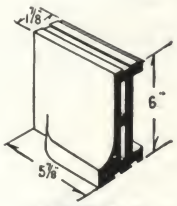
V-C4821

1⅞"x5⅞"x5" Furring, Wainscot Cap Bullnose External Corner



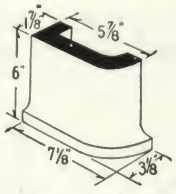
V-C4822

1⅞"x2⅛"x5" Furring, Wainscot Cap Coved Internal Corner. 1½" radius of Internal Cove



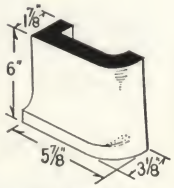
V-S4701-R

1⅞"x6"x5⅞" Furring, Cove Base Stop, square open end, right hand. (Left hand opposite)



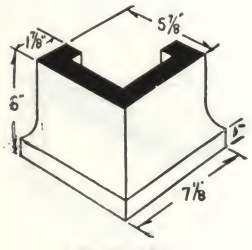
V-S4751-L

1⅞"x5⅞"x6" Furring, Cove Base Bullnose Closure, left hand. (Right hand opposite)



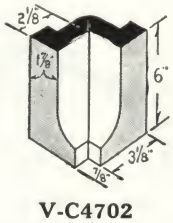
V-S4761-L

1⅞"x5⅞"x6" Furring, Cove Base Stop, Bullnose, left hand. (Right hand opposite)



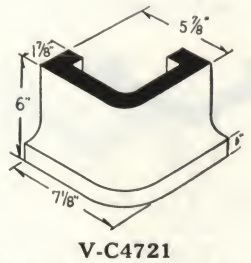
V-C4701

1⅞"x5⅞"x6" Furring, Cove Base Square External Corner



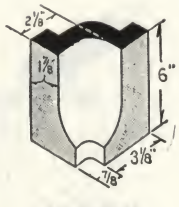
V-C4702

1⅞"x2⅛"x6" Furring, Cove Base Square Internal Corner



V-C4721

1⅞"x5⅞"x6" Furring, Cove Base Bullnose External Corner



V-C4722

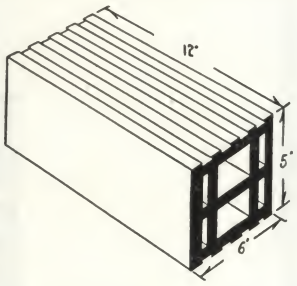
1⅞" x 2⅛" x 6" Furring, Cove Base Coved Internal Corner. 1½" radius of Internal Cove

NATCO VITRITILE—1⅞" SIZE

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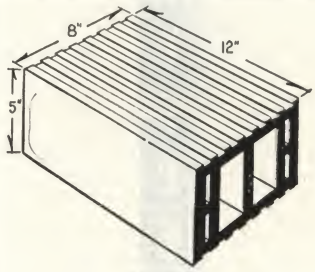
No special fittings are required for the 6″ walls. Use the 1⅞″ and 3¾″ size fittings together.

V-600
6″x5″x12″ Wall Stretcher (smooth two sides)



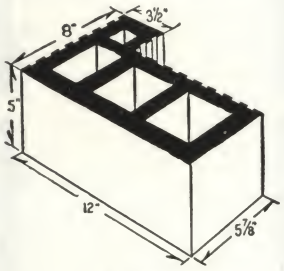
Natco Vitritile 6″ Partitions are especially suitable for elevators and stairway enclosures.

V-6000
6″x5″x12″ Wall Stretcher (smooth one side, scored one side). Both shapes furnished in 2″, 3″, 4″, 5⅞″, 8″ and 10″ lengths

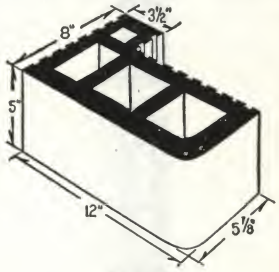


V-800
8″x5″x12″ Wall Stretcher (smooth two sides)

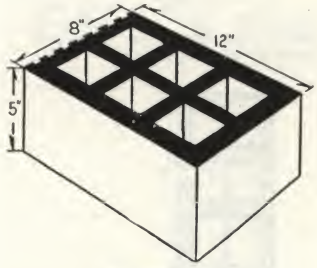
V-8000
8″x5″x12″ Wall Stretcher (smooth one side, scored one side). Both shapes furnished in 3″, 4″, 5⅞″ and 8″ lengths



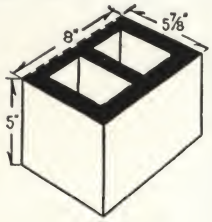
V-810
8″x12″x5″ Square Corner



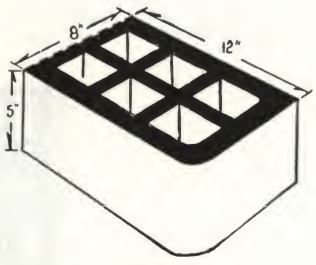
V-811
8″x12″x5″ Bullnose Corner



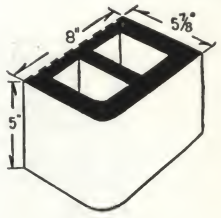
V-820
8″x12″x5″ Square Full Closure



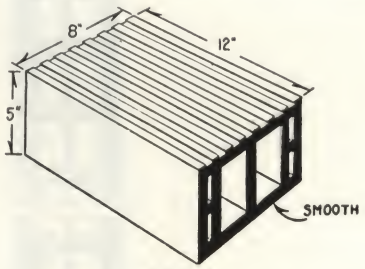
V-826
8″x5⅞″x5″ Square Half Closure



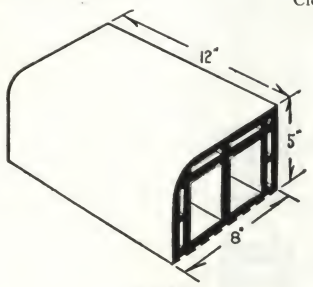
V-830
8″x12″x5″ Bullnose Full Closure



V-836
8″x5⅞″x5″ Bullnose Half Closure



V-850
8″x5″x12″ Square Sill or Lintel. Also furnished in 5⅞″ and 8″ lengths



V-860
8″x5″x12″ Bullnose Sill or Lintel. Also furnished in 5⅞″ and 8″ lengths

Directions for Ordering Shapes

(1) Be sure to order all pieces by number as given under each shape.

(2) *Short Lengths*—All numbers under shapes in which short lengths are furnished, denote 12″ lengths. When ordering shorter lengths give this same number with length wanted. For example, if a 3″ length of V-400 is wanted, mark V-400-3″, or, if the half or 5⅞″ length is desired, order V-400-6″.

(3) 3¾″ corners, jambs, cove base and wainscot caps, etc. (Shapes V-420, V-426, V-430, V-436, V-4100, V-4110, V-4120, V-470 and V-480) will be furnished scored on one side for use with shape V-890 in 3¾″ partition plastered on one side, when so ordered, and when sufficient time is allowed for manufacture. Scored fittings are not ordinarily carried in stock. Be sure to specify whether external or internal side of corners are to be scored.

(4) When ordering corners in one face material (Shapes V-4100, V-4110, V-4120, V-C4700, V-C4710, V-C4720, V-C4800, V-C4810 and V-C4820) of select one face material, do not fail to specify whether the select face is internal or external.

(5) Mitered and other unusual shapes may be procured by special agreement, but must be submitted for approval before ordering.

NATCO VITRITILE—6″ and 8″ SIZES

Continued on next page



Fig. 1

Two faced 3¾" Vitritile wall (V-400) showing use of double cove base



Fig. 2

Two faced 3¾" Vitritile wall showing use of double cove base. Double wainscot cap used as chair rail



Fig. 3

Two faced 3¾" Vitritile wall showing double cove base. Double wainscot cap used near ceiling



Fig. 4

3¾" Vitritile wall (V-890) plastered one side, showing single Vitritile cove base and terrazzo base opposite

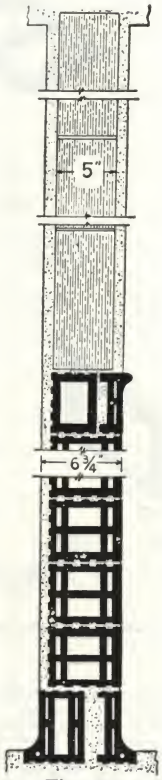


Fig. 9

6" Vitritile wall (V-6000) illustrating wide adaptability of Vitritile to secure any desired effect

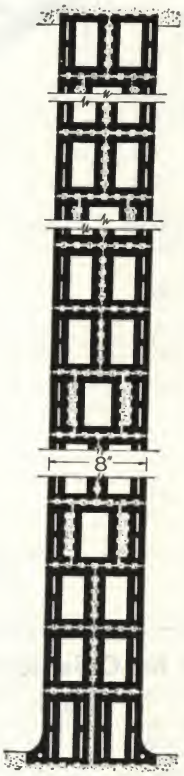


Fig. 10

8" Vitritile wall (V-890 and V-4900 bonded)

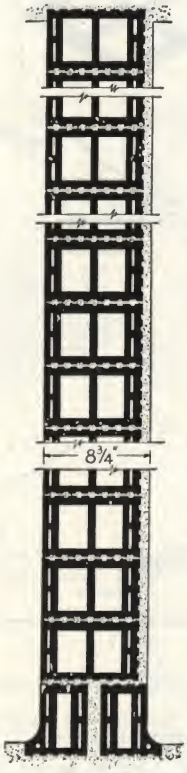


Fig. 11

8" Vitritile wall (V-8000) plastered one side

DETAILS OF DIFFERENT WIDTHS OF WALL SECTIONS

SCALE ¾" = 1'-0"

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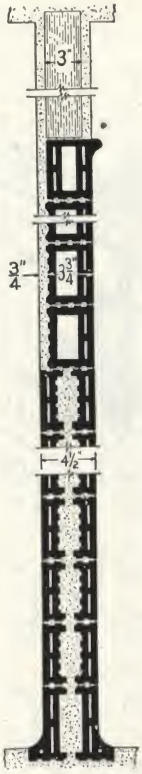


Fig. 5

4½" Vitritile two faced wall, illustrating the adaptability of Vitritile where plaster above begins at different elevations on opposite sides

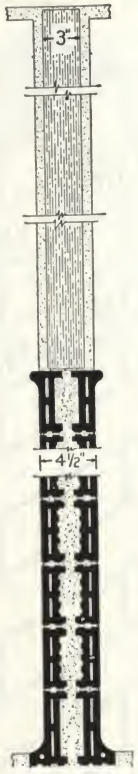


Fig. 6

4½" Vitritile two faced wall (V-4900) wainscot effect. Wainscot cap used as chair rail



Fig. 7

6" Vitritile wall (V-890 and V-4900 bonded)

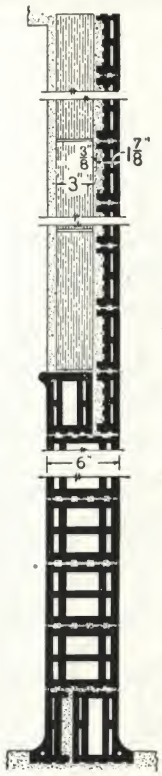


Fig. 8

6" Vitritile wall (V-600) with plaster one side above chair rail

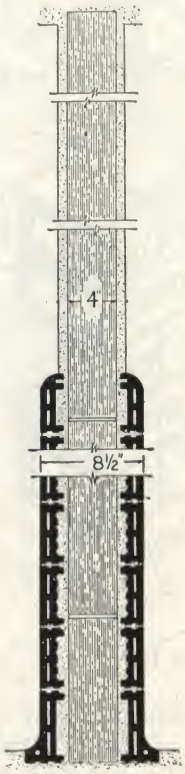


Fig. 12

1⅞" Vitritile furring used as wainscoting

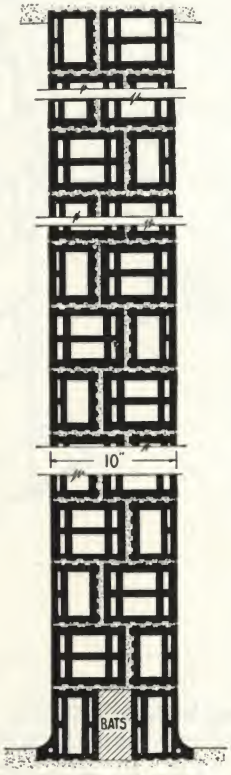


Fig. 13

10" Vitritile wall (V-600 or 6000 and V-890 bonded)

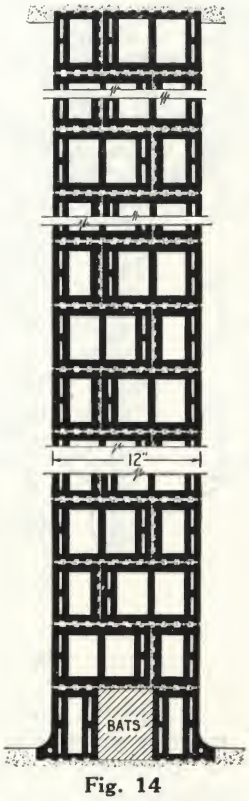


Fig. 14

12" Vitritile wall (V-800 or 8000 and V-890 bonded)

DETAILS OF DIFFERENT WIDTHS OF WALL SECTIONS

SCALE ¾" = 1'-0"

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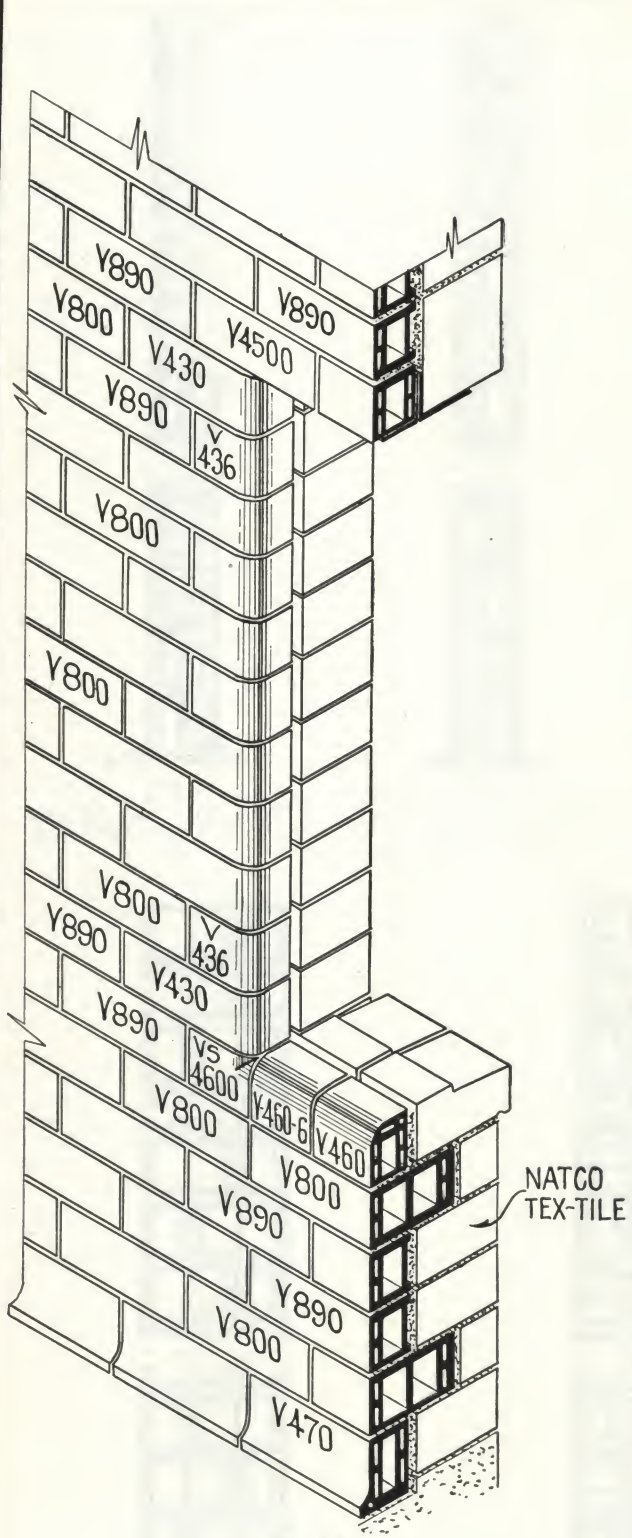


Fig. 15

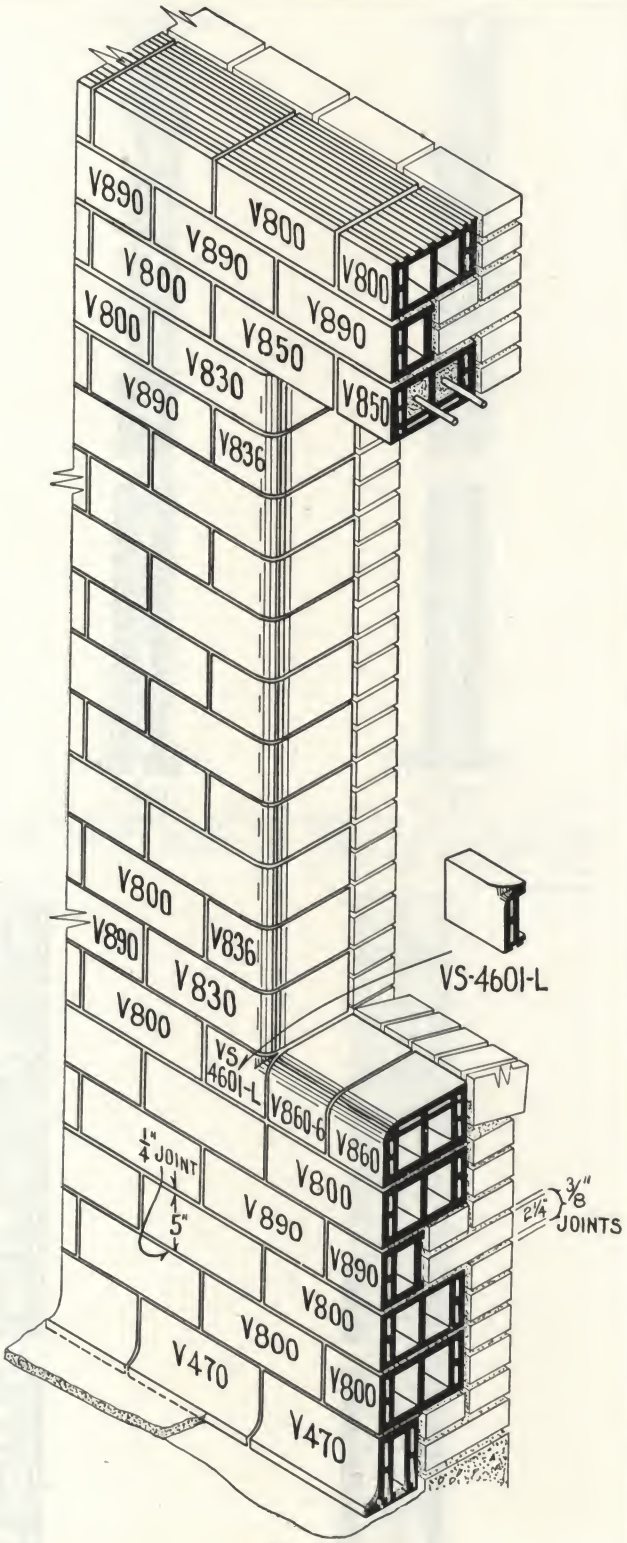


Fig. 16

Figs. 15 and 16 illustrate clearly how Vitritile is used as the structural part of exterior walls. Fig. 15 shows its use in connection with Natco Tex-Tile or Natco Glazed or Unglazed Combed Face Tile. Fig. 16 illustrates the same construction with an exterior of brick. Note perfect bond for maximum strength.

DETAILS OF VITRITILE CONSTRUCTION

SCALE 3/4" = 1'-0"

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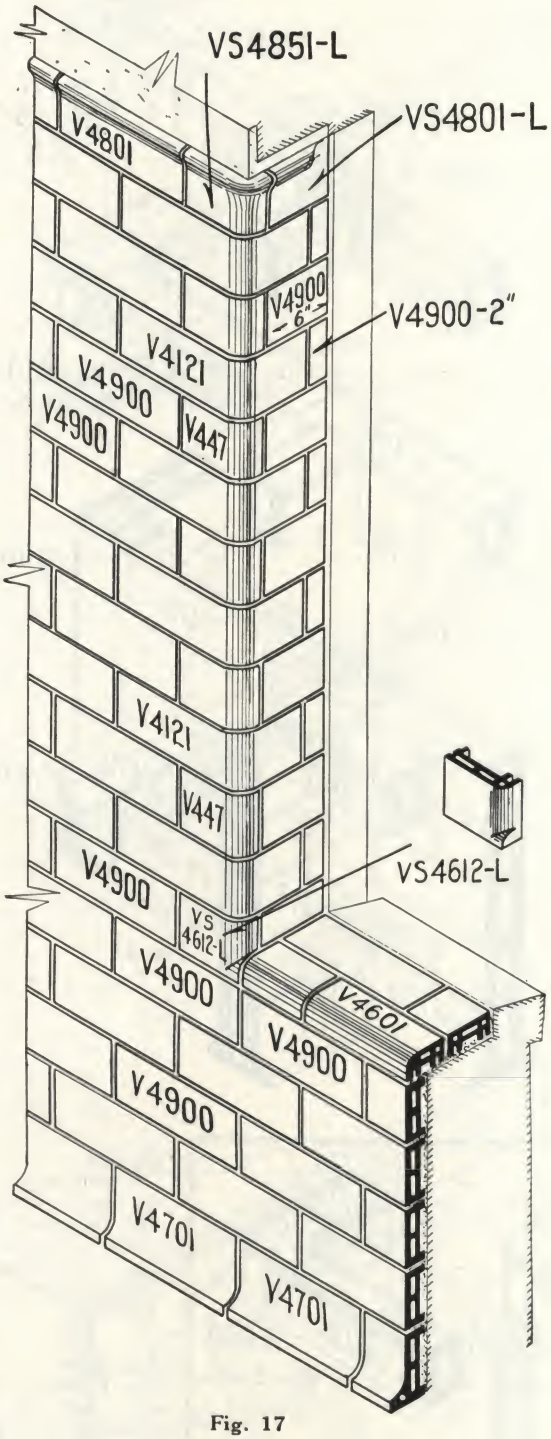


Fig. 17

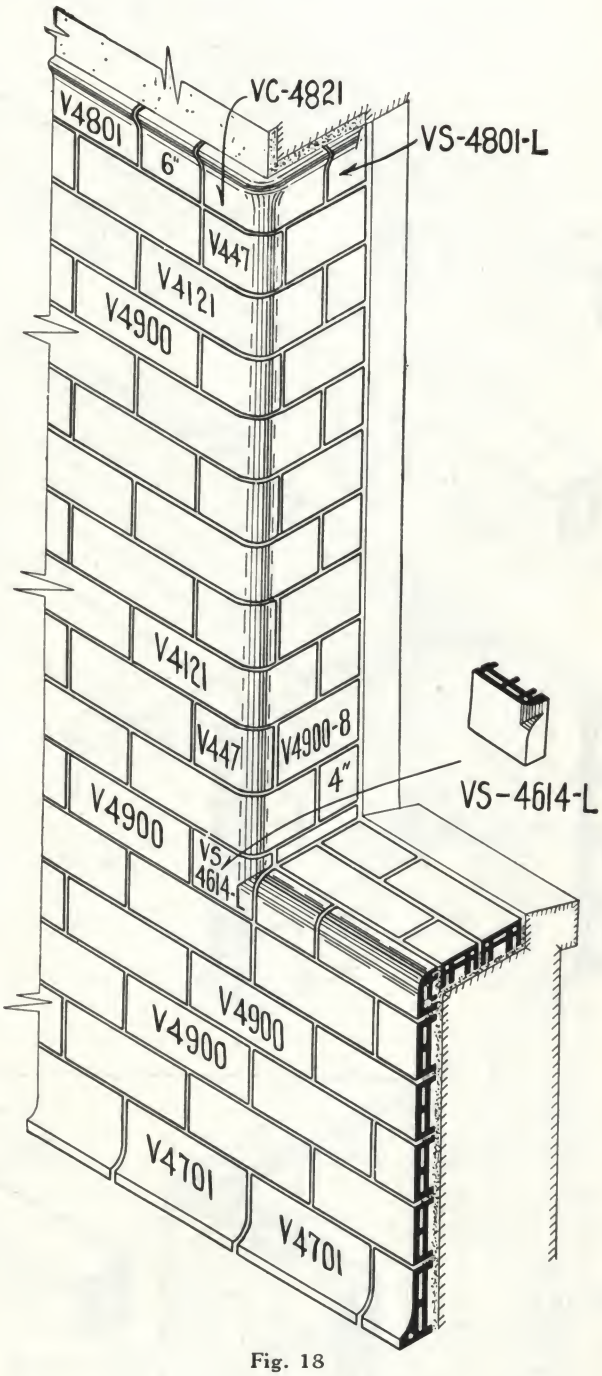


Fig. 18

Figs. 17 and 18 illustrate the use of Natco Vitritile Furring. Note attractive effects produced by use of bullnose jambs and sills. Choice of sills 1⅞", 3¾" or 5" high is made possible by three standard heights of sill starters, namely VS-4612, VS-4614 or VS-4601. This is very helpful in connection with the question of heights of sills from floors. See also Fig. 16 for VS-4601-L.

DETAILS OF VITRITILE CONSTRUCTION

SCALE ¾" = 1'-0"

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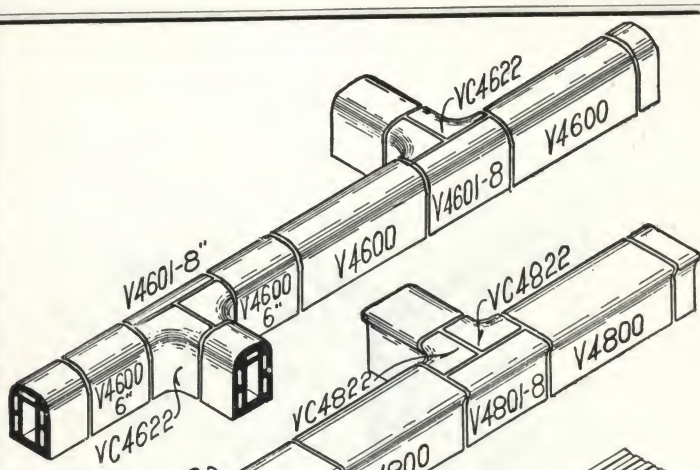


Fig. 19-B

Fig. 19-A

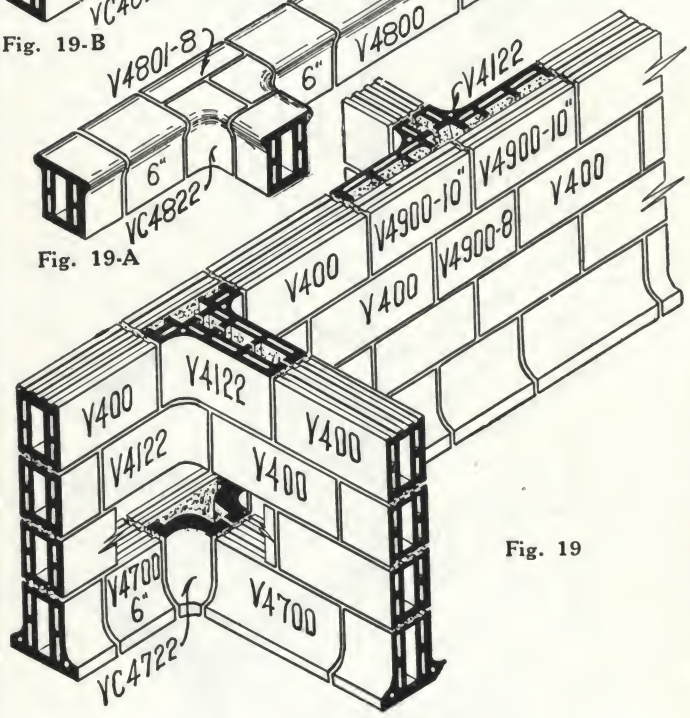


Fig. 19

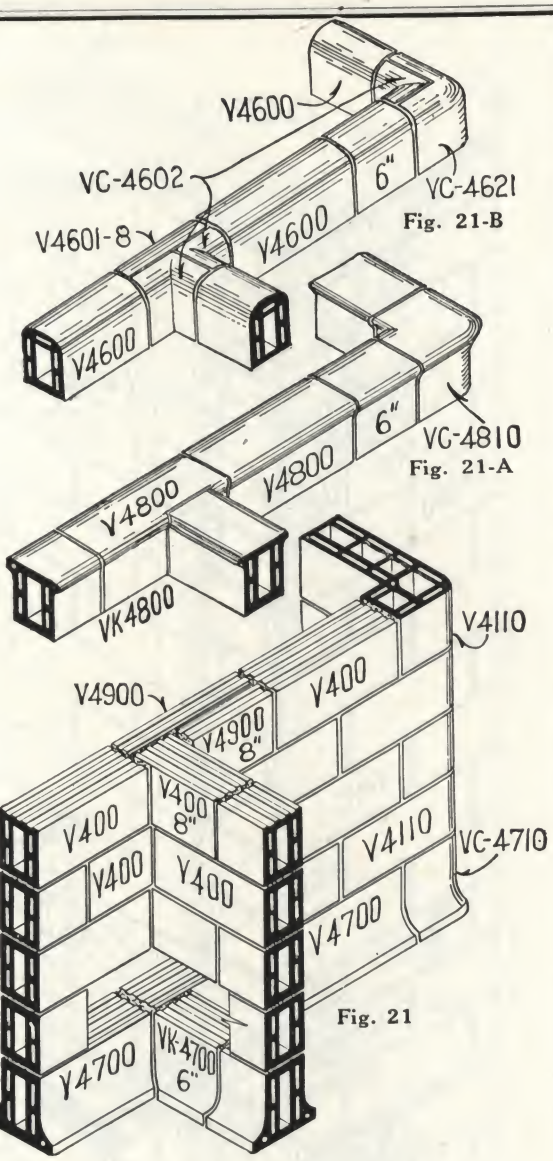


Fig. 21-B

Fig. 21-A

Fig. 21

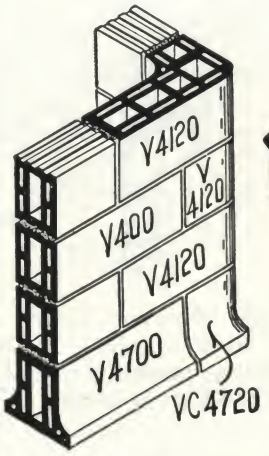


Fig. 20

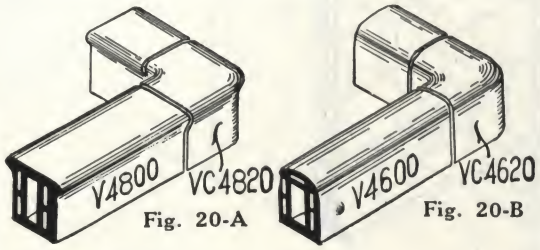


Fig. 20-A

Fig. 20-B

Fig. 19
Illustrates use of cove internal corners in two faced partitions. Bonded cross partition.

Fig. 19-A
Wainscot capping used as top course of low partitions. See Fig. 19.

Fig. 19-B
Alternate construction showing bullnose coping as top course for low partitions. See Fig. 19.

Fig. 20
Illustrates use of cove internal and bullnose external corners in two faced partitions.

Fig. 20-A
Wainscot capping used as top course of low partitions. See Fig. 20.

Fig. 20-B
Alternate construction showing bullnose coping as top course of low partitions. See Fig. 20.

Fig. 21
Illustrates use of square internal and bullnose external corners in two faced partitions. Bonded cross partition.

Fig. 21-A
Wainscot capping used as top course of low partitions. See Fig. 21.

Fig. 21-B
Alternate construction showing bullnose coping as top course for low partitions. See Fig. 21.

DETAILS OF VITRITILE CONSTRUCTION

SCALE ¾" = 1'-0"

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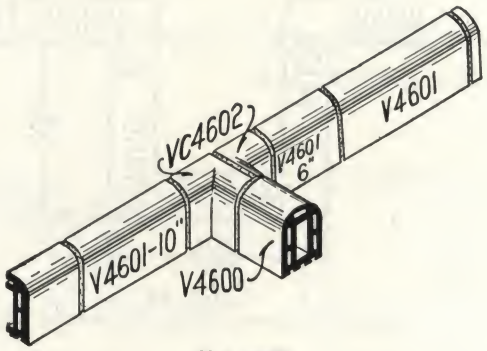


Fig. 22B
Alternate construction showing bullnose capping used in connection with construction as shown in Fig. 22 below

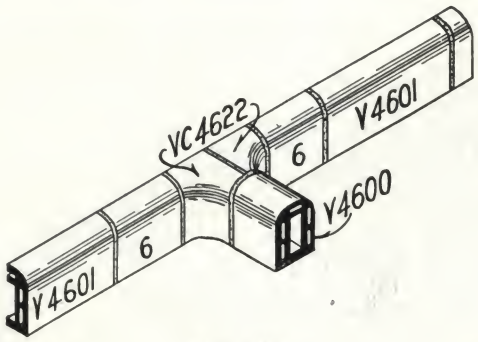


Fig. 23B
Alternate construction showing bullnose capping used in connection with construction as shown in Fig. 23 below

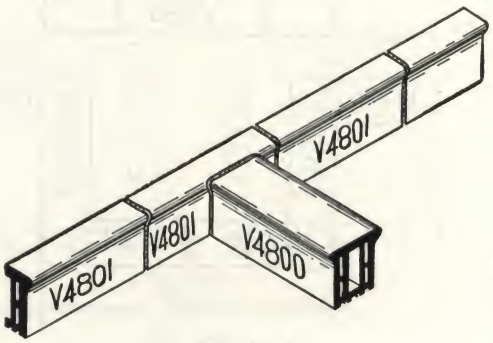


Fig. 22A
Wainscot capping used in connection with construction as shown in Fig. 22 below

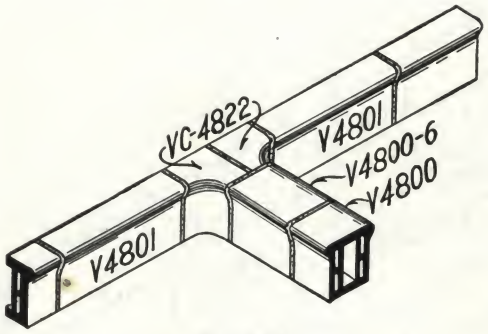


Fig. 23A
Wainscot capping used in connection with construction as shown in Fig. 23 below

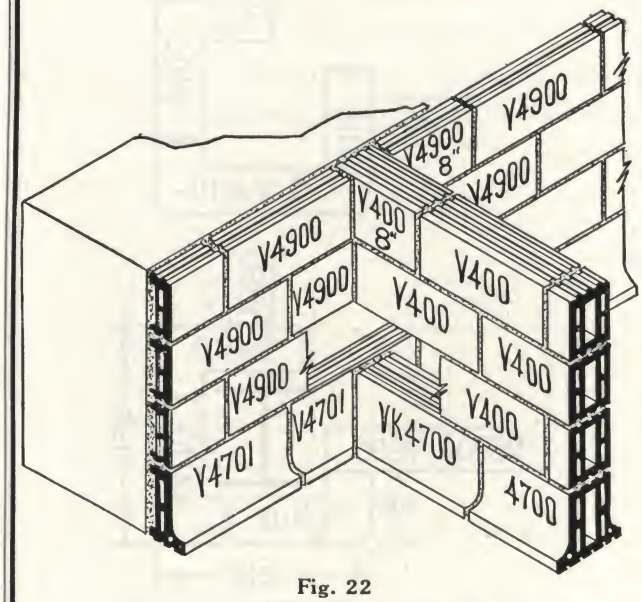


Fig. 22
Shows method of bonding partitions into furred walls—square internal corners

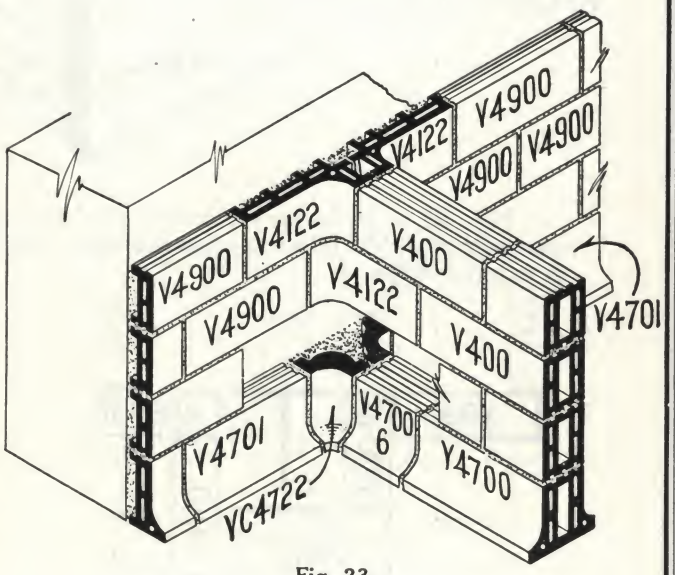


Fig. 23
Shows method of bonding two faced partitions into furred walls—coved internal corners

DETAILS OF VITRITILE CONSTRUCTION

SCALE ¾" = 1'-0"

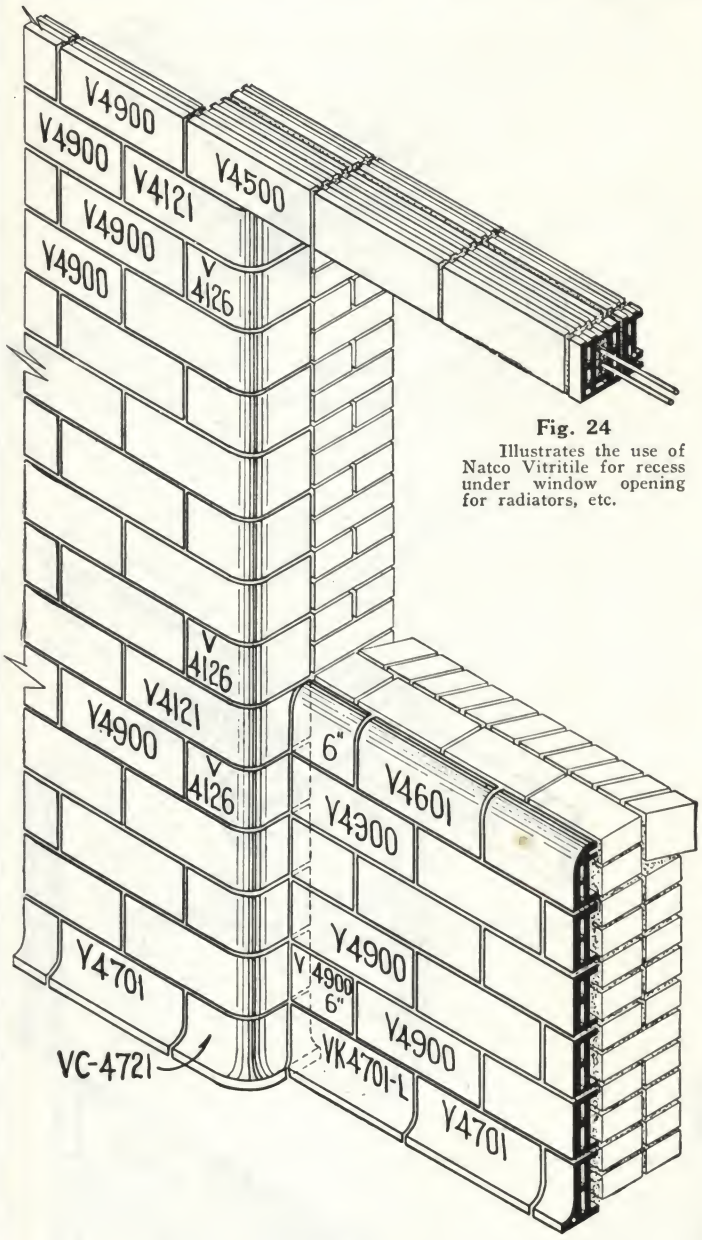


Fig. 24
Illustrates the use of Natco Vitritile for recess under window opening for radiators, etc.

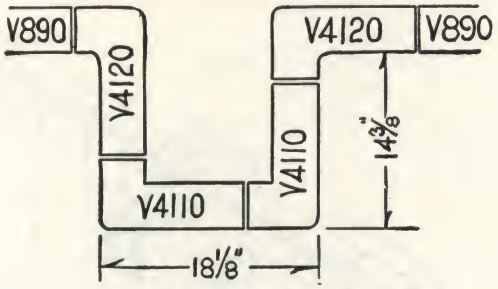
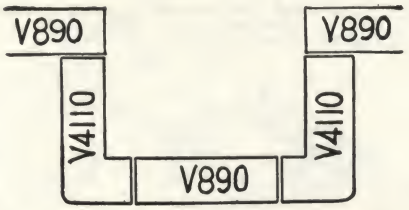


Fig. 26
One course shown—reverse for alternate courses



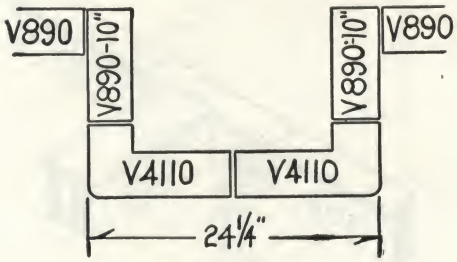
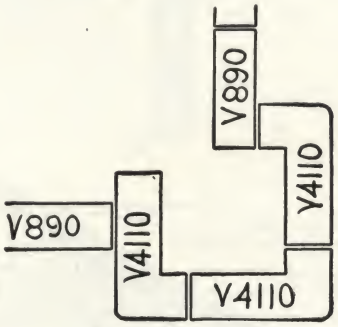


Fig. 27
Alternate courses shown



Figs. 25 to 28, inclusive, show typical arrangements of 3¾" Vitritile for enclosing steel columns in exterior walls.

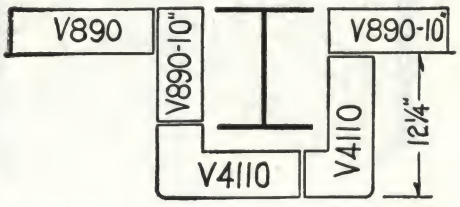


Fig. 25
One course shown, reverse for alternate course

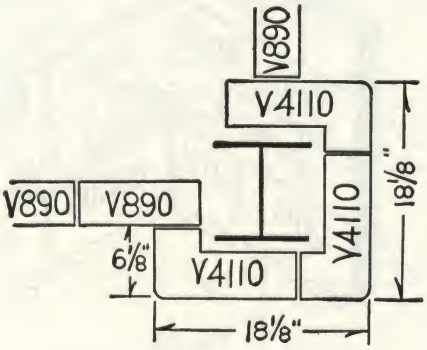


Fig. 28
Alternate courses shown

DETAILS OF VITRITILE CONSTRUCTION

SCALE ¾" = 1'-0"

Continued on next page

TYPICAL ARRANGEMENT OF 1⅞" AND 3¾" VITRITILE FOR ENCLOSING FREE STANDING COLUMNS

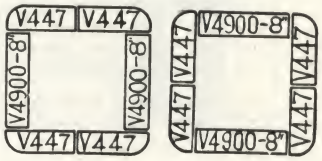


Fig. 29
Alternate courses of 1⅞" Vitritile covering for 8" column

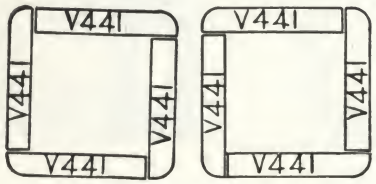


Fig. 30
Alternate courses of 1⅞" Vitritile covering for 10" column

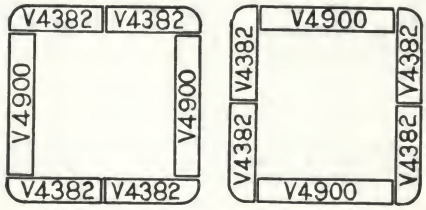


Fig. 31
Alternate courses of 1⅞" Vitritile covering for 12" column

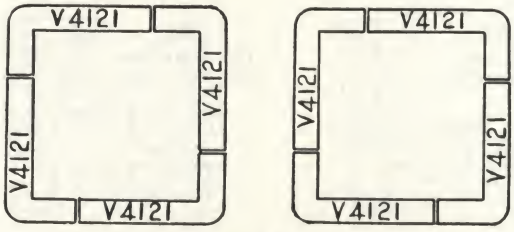


Fig. 32
Alternate courses of 1⅞" Vitritile covering for 14" column

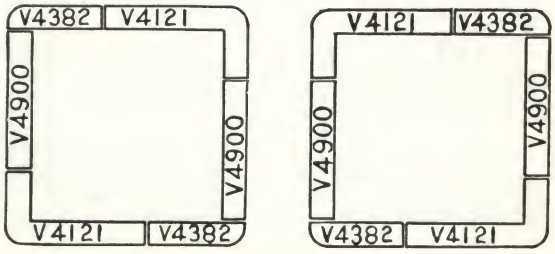


Fig. 33
Alternate courses of 1⅞" Vitritile covering for 16" column

Illustrations on this page are typical of what can be done with Natco Vitritile to fireproof and permanently beautify the structural members of buildings, no matter what the construction may be.

The types of construction shown are simply suggestive, and adaptations of them can be made to take care of practically every condition.

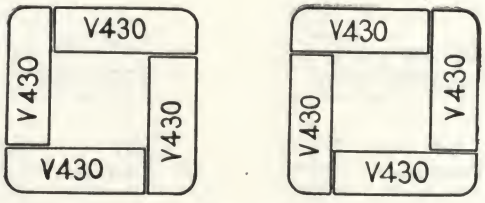


Fig. 34
Alternate courses of 3¾" Vitritile covering for 8" column

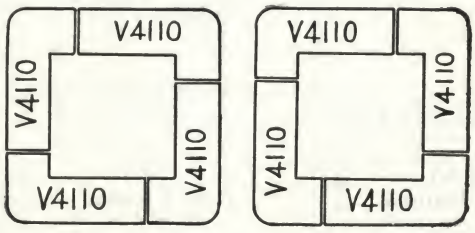


Fig. 35
Alternate courses of 3¾" Vitritile covering for 10" column

DETAILS OF VITRITILE CONSTRUCTION

SCALE ¾" = 1'-0"

Continued on next page

TWO-FACED PARTITIONS OF VARIOUS THICKNESSES WITH SQUARE INTERNAL CORNERS AND BULLNOSE EXTERNAL CORNERS

(*NOTE:* Wainscot cap course similar to "A" course)

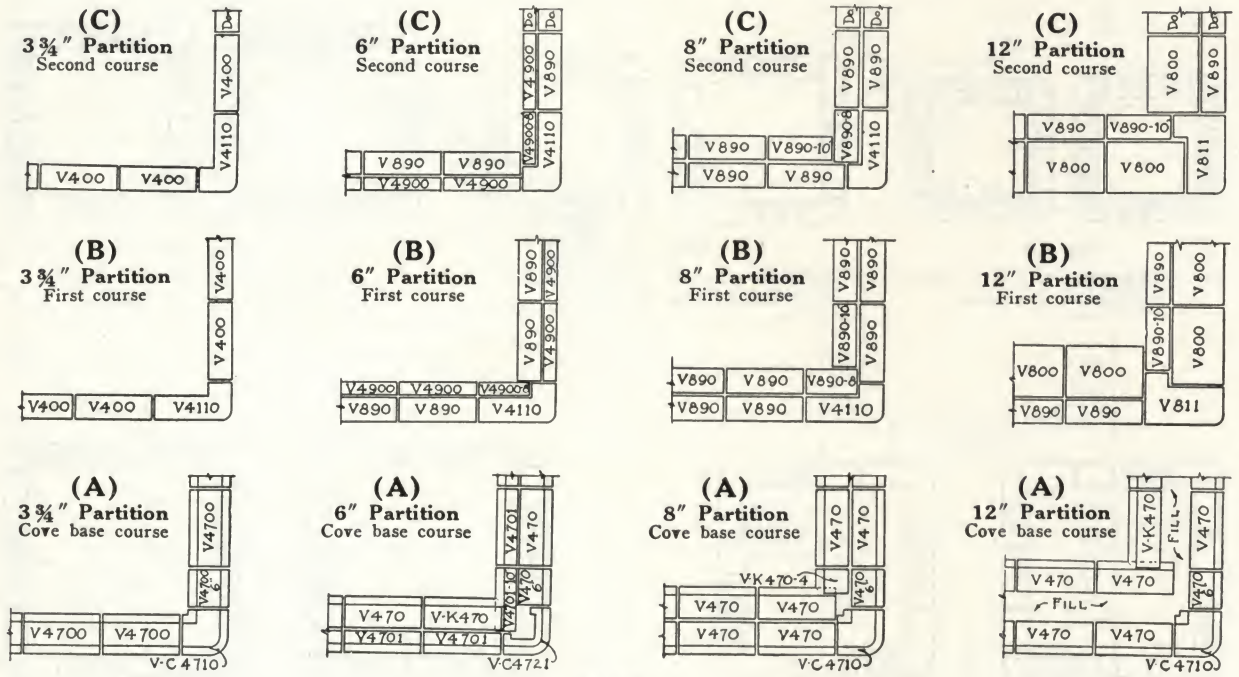


Fig. 36

TWO-FACED PARTITIONS OF VARIOUS THICKNESSES WITH COVED INTERNAL CORNERS AND BULLNOSE EXTERNAL CORNERS

(*NOTE:* Wainscot cap course similar to "A" course)

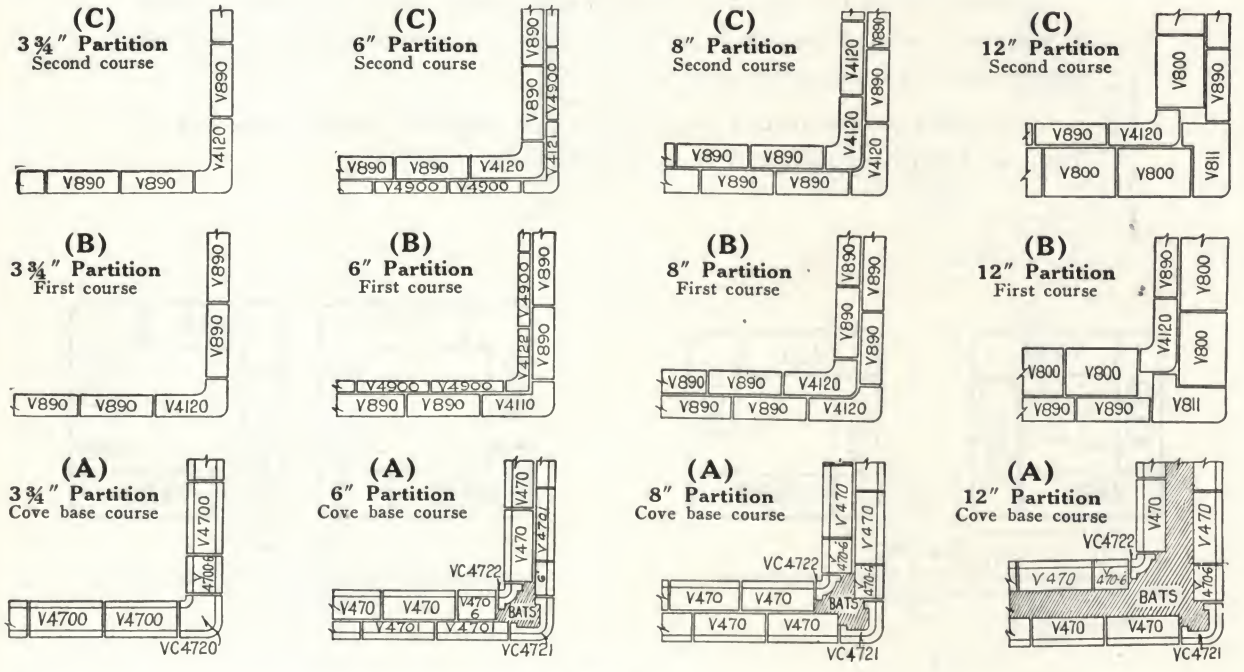


Fig. 37

NATCO VITRITILE CORNER DETAILS

SCALE ¾" = 1'-0"

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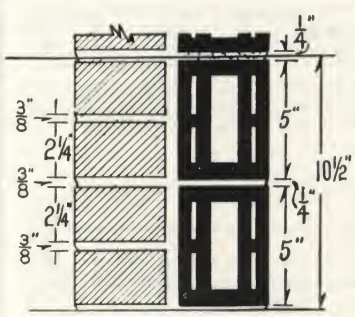


Fig. 38

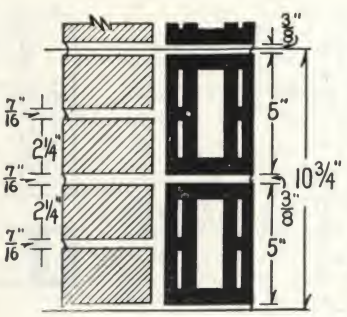
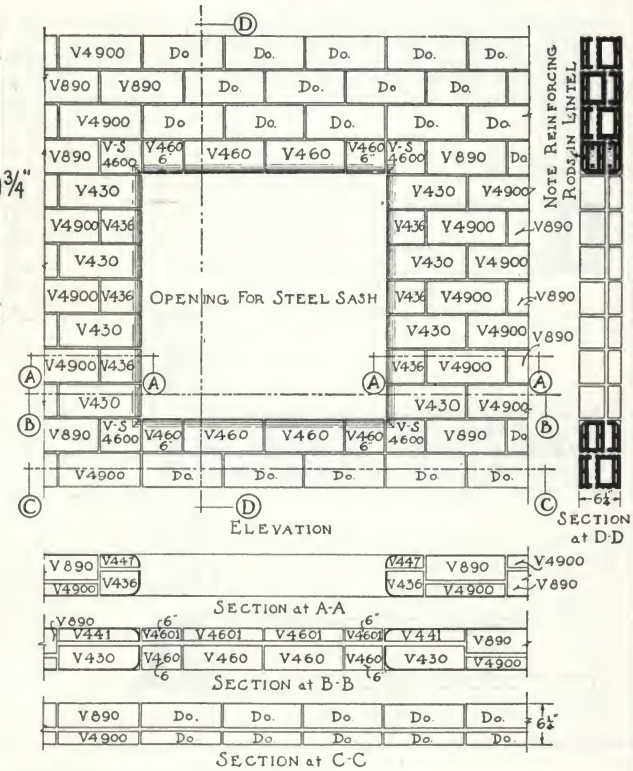


Fig. 39

Typical Relationship Between Brick and Tile Mortar Joints

Scale 1½" = 1' 0"



Not drawn to scale.

Fig. 40

Treatment of Openings in 6" Natco Vitritile Partition for Steel Sash

Illustration shows use of bullnose sills, lintels and jambs; V-600 or V-6000 may be used in place of V-890 and V-4900

HEIGHT TABLE

Tile { 3¾" x 5" x 12" / 8" x 5" x 12" }
Joints ¼"

Course No.	Height
1	— 5¼"
2	—10½"
3	1'— 3¾"
4	1'— 9"
5	2'— 2¼"
6	2'— 7½"
7	3'— 0¾"
8	3'— 6"
9	3'—11¼"
10	4'— 4½"
11	4'— 9¾"
12	5'— 3"
13	5'— 8¼"
14	6'— 1½"
15	6'— 6¾"
16	7'— 0"
17	7'— 5¼"
18	7'—10½"
19	8'— 3¾"
20	8'— 9"
21	9'— 2¼"
22	9'— 7½"
23	10'— 0¾"
24	10'— 6"
25	10'—11¼"
26	11'— 4½"
27	11'— 9¾"
28	12'— 3"
29	12'— 8¼"
30	13'— 1½"
31	13'— 6¾"
32	14'— 0"
33	14'— 5¼"
34	14'—10½"
35	15'— 3¾"
36	15'— 9"
37	16'— 2¼"
38	16'— 7½"
39	17'— 0¾"
40	17'— 6"

The table above is used to determine the heights of walls which will best lay up without cutting tile, using ¼" bed joints. For instance, should you desire to build a wall 7' 0" high you will note that it will require 16 courses.

By varying the thickness of the mortar joints these dimensions may be slightly changed.

LENGTH TABLE

Tile { 3¾" x 5" x 12" / 8" x 5" x 12" }
Joints ¼"

No. Tile	Length
1	1'— 0"
1½	1'— 6⅛"
2	2'— 0¼"
2½	2'— 6⅜"
3	3'— 0½"
3½	3'— 6⅝"
4	4'— 0¾"
4½	4'— 6⅞"
5	5'— 1"
5½	5'— 7⅛"
6	6'— 1¼"
6½	6'— 7⅜"
7	7'— 1½"
7½	7'— 7⅝"
8	8'— 1¾"
8½	8'— 7⅞"
9	9'— 2"
9½	9'— 8⅛"
10	10'— 2¼"
10½	10'— 8⅜"
11	11'— 2½"
11½	11'— 8⅝"
12	12'— 2¾"
12½	12'— 8⅞"
13	13'— 3"
13½	13'— 9⅛"
14	14'— 3¼"
14½	14'— 9⅜"
15	15'— 3½"
15½	15'— 9⅝"
16	16'— 3¾"
16½	16'— 9⅞"
17	17'— 4"
17½	17'—10⅛"
18	18'— 4¼"
18½	18'—10⅜"
19	19'— 4½"
19½	19'—10⅝"
20	20'— 4¾"
20½	20'—10⅞"

The table above shows the length of walls and pilasters that will best lay up without cutting tile, using ¼" vertical mortar joints. For instance, should you desire a wall 9'-2" long you will note that it will require 9 tile.

To find width of openings, add two mortar joints or ½" to each dimension above.

The dimensions herein given are for the convenience of estimating only, and we, therefore, recommend that all joints be made uniform, ¼", ⅜" or whatever size may be agreed upon, and disregard bond to obtain the best results.

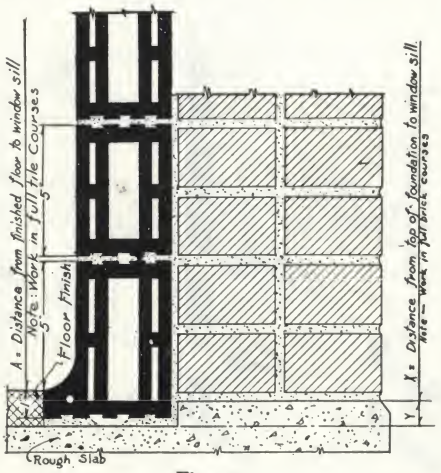


Fig. 41

Not drawn to scale

Suggestions for Starting Natco Vitritile Cove Base from Masonry Foundation

(1) Establish sill height (A) above the finished floor in full courses of tile.

(2) Having sill length (A) and thickness of brick courses, distance (X) can be determined.

(3) With top of foundation fixed, figure distance (Y) to suit thickness of floor finish.

Note: Illustration shows ¼" joints in Vitritile and ⅜" exterior brick joints.

NATCO VITRITILE—DESIGN DATA

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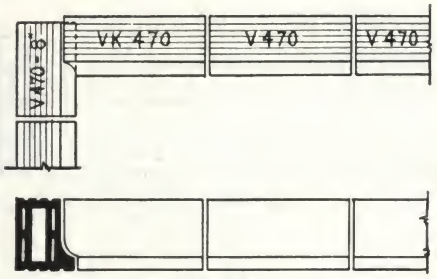


Fig. 42

Left
Plan and Elevation of Intersection of 3¾" Single Cove Base, showing use of coped cove base, V-K470. (left hand.)

Right
Plan and Elevation of Intersection of 3¾" Single Wainscot Cap showing use of coped wainscot cap, V-K480 (left hand).

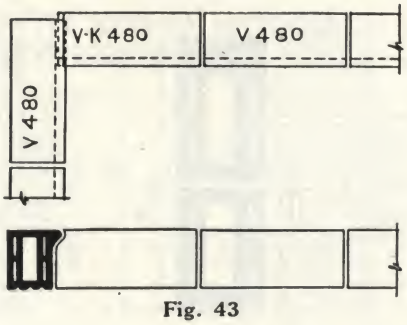


Fig. 43

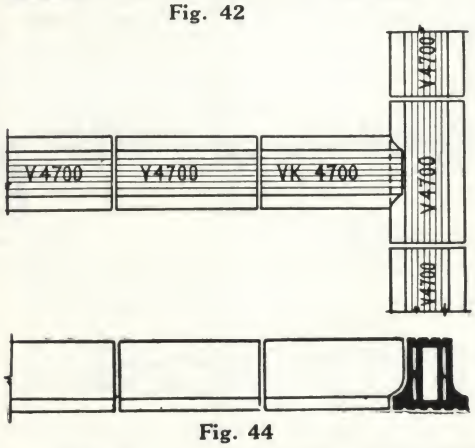


Fig. 44

Left
Plan and Elevation of Intersection of 3¾" Double Cove Base showing use of coped cove base, V-K4700.

Right
Plan and Elevation of Intersection of 3¾" Double Wainscot Cap showing use of coped wainscot cap, V-K4800.

Scale ¾" = 1' 0"

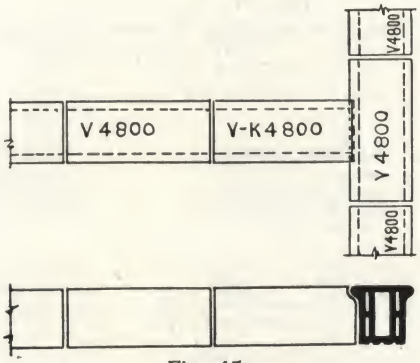
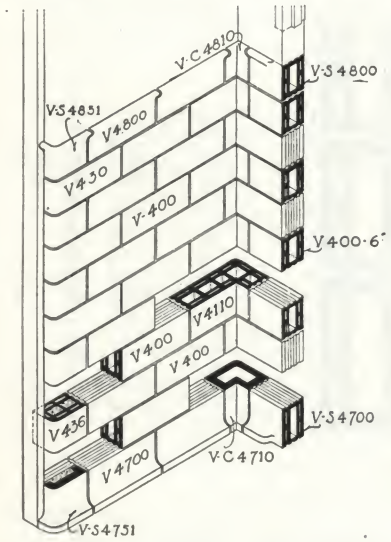


Fig. 45

DOOR CONSTRUCTION—TWO-FACE PARTITIONS

3¾" double-faced partition showing three types of door construction. Note use of various types of door stops and method of filling jamb tiles with mortar at door at left to stiffen the construction.



At left hand, door stops VS-4761 and VS-4861 may be used instead of VS-4751 and VS-4851 respectively.

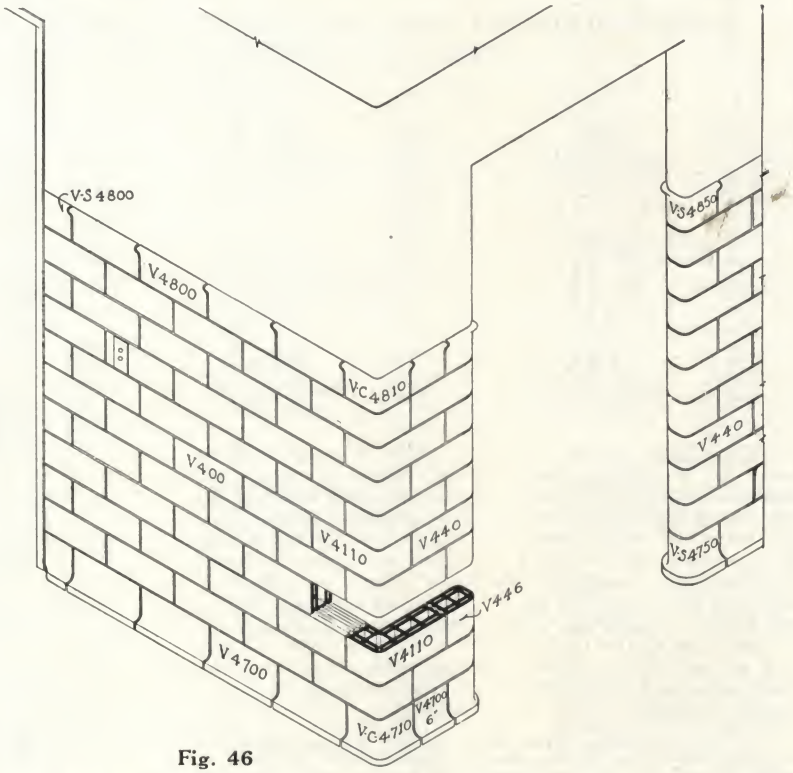


Fig. 46

Not drawn to scale

NATCO VITRITILE DETAILS

Continued on next page

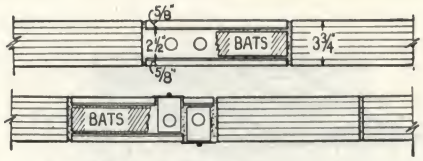


Fig. 47
Illustrates the use of V-4902 for working around electrical conduit in 3¾" two faced wall

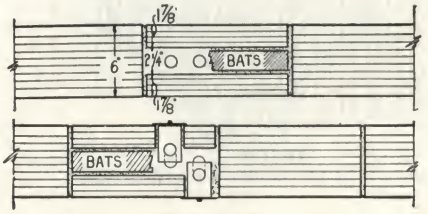


Fig. 48
Illustrates the use of V-4900 for working around electrical conduit in a 6" wall

Figs. 47 to 51 inclusive show method of enclosing electric conduit and fittings, also water, vent and soil pipes within Vitritile walls. Space is obtained by use of 5/8", 1½" and 1⅞" thickness of Vitritile as may be necessary to face the wall at the conduit or piping.

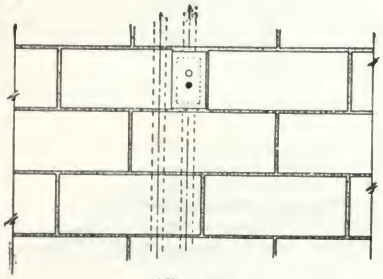


Fig. 51
Shows flush plate in place. Dotted lines indicate conduits

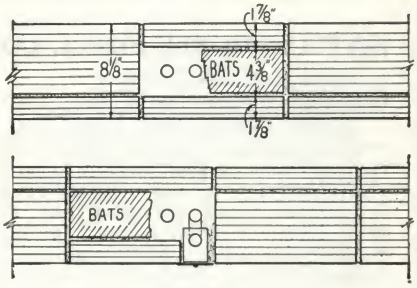


Fig. 49
Illustrates the use of V-4900 for working around electrical conduits in 8⅛" wall of bonded V-600's and V-4900's

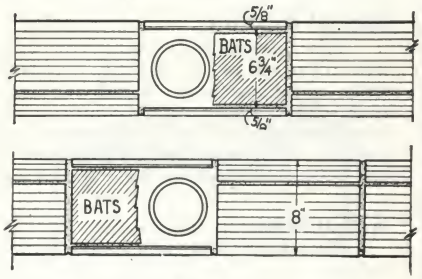


Fig. 50
Illustrates the use of V-4902's for taking care of large pipes in 8" walls of bonded V-600's or 6000's and V-4900's

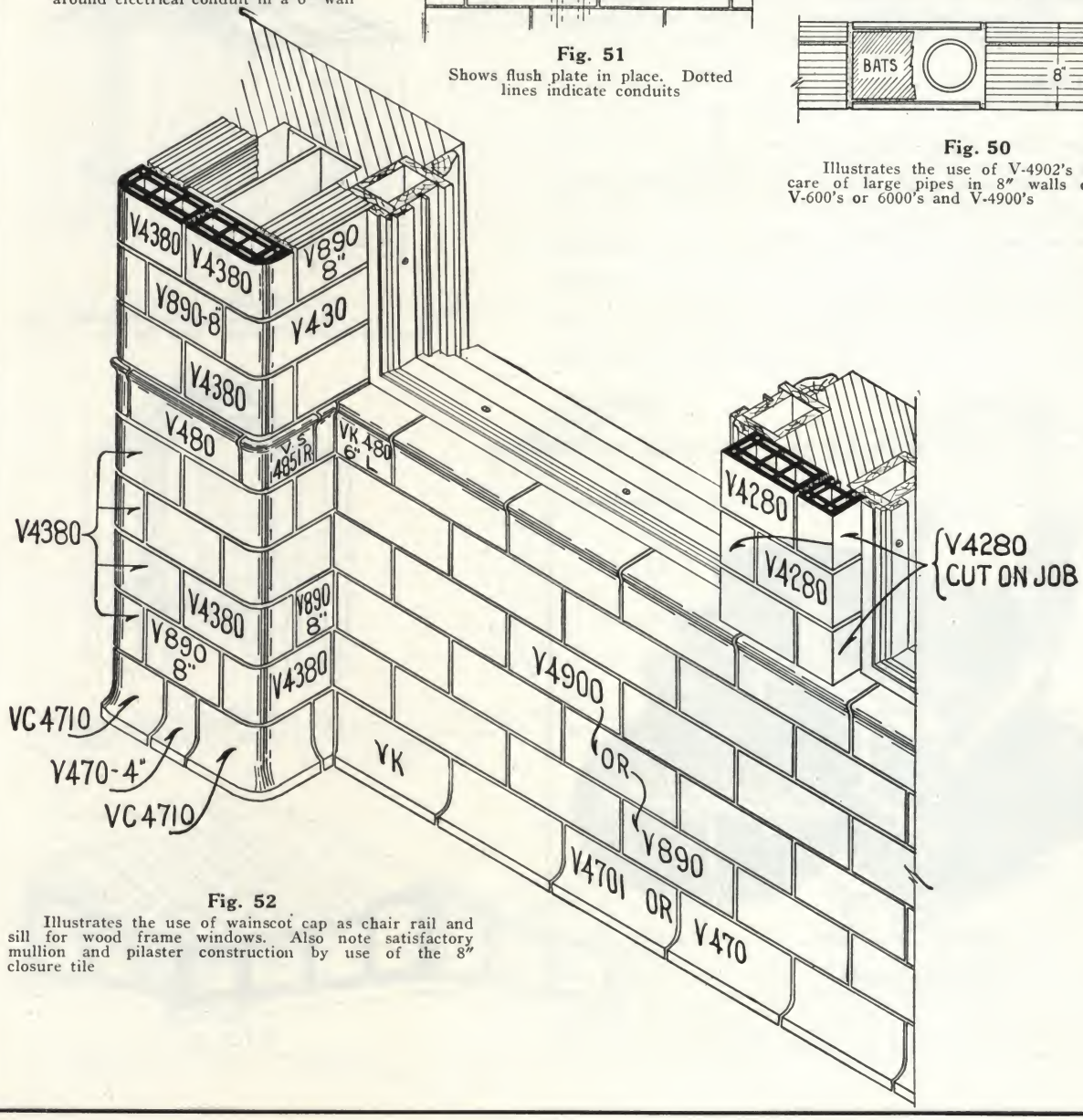


Fig. 52
Illustrates the use of wainscot cap as chair rail and sill for wood frame windows. Also note satisfactory mullion and pilaster construction by use of the 8" closure tile

NATCO VITRITILE DETAILS

SCALE ¾" = 1'-0"

Continued on next page

NATCO DOUBLE SHELL LOAD BEARING TILE

General

Natco Double Shell Load Bearing Tile is designed for vertical web load bearing walls to receive exterior stucco and interior plaster applied directly to the tile surfaces. The standard wall units have 12″ x 12″ dovetail scored faces and are furnished in four (4) thicknesses—6″, 8″, 10″, and 12″ to meet the various wall thickness requirements. Beside the standard wall units, complete dovetail scored complementary accessory units are furnished in each thickness for sills, jambs (for both wood and steel windows), lintels, corners, joist closures, joist bearing slabs, joist fillers, etc. to obviate cutting and fitting.

With properly staggered joints all webs are brought into vertical alignment developing maximum wall strength.

Special Feature

The outstanding feature of this tile is the double shell web construction on the two exposed faces which provides a wide, non-continuous, keyed mortar joint on both beds and ends. This non-continuous mortar joint not only permanently seals the outside face cell structure, materially increasing insulation, but most important, it positively prevents moisture passage by capillary attraction from the exterior to the interior.

Advantages

Fireproof—Furnishes the maximum in permanent fire safety.

Low Labor Cost—The completeness of the line speeds erection by obviating the usual cutting and fitting.

Maximum Insulation—The mortar sealed double shell exterior and interior face construction adds materially to insulation, comfort and economy.

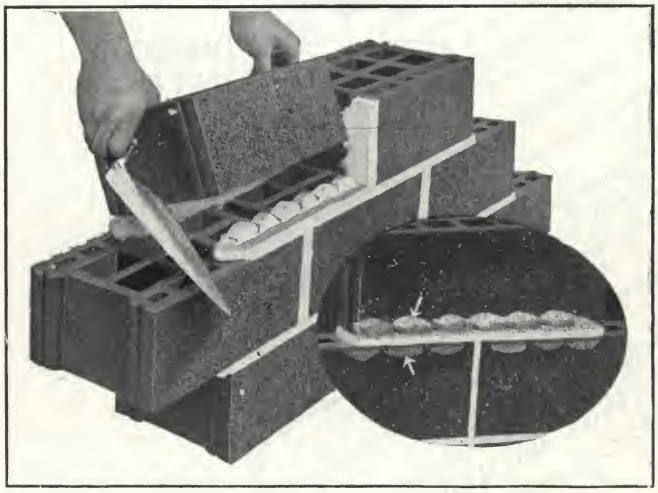
Permanent Stucco and Plaster Base—The dovetail scored tile surface provides the ideal stucco and plaster base.

Prevents Interior Plaster Stains—The non-continuous mortar joints prevent discoloration on the interior.

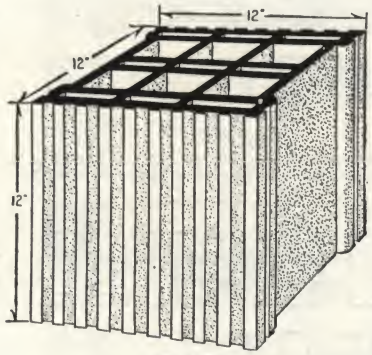
Ideal for Pipe Installation—The vertical voids furnish provision for pipe chases for conduit and other piping easily accomplished without shattering the tile and with the minimum patching.

Adaptability

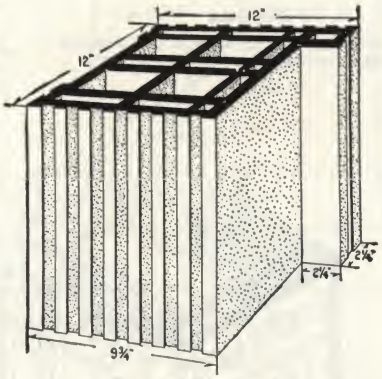
Specially adapted to the best class of buildings requiring stucco exteriors.



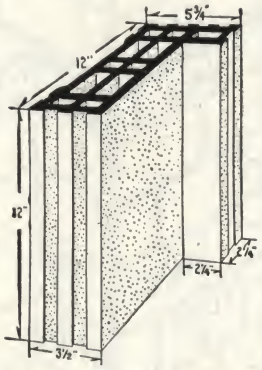
The illustration shows how the mortar keys into the small cells of the Natco Double Shell type of tile. Note the non-continuous mortar joints which seal the outside cells and prevent transmission of heat and moisture through the wall. (Cut shows Natco Double Shell Face Tile described on Natco Pages 35 to 41 inc.)



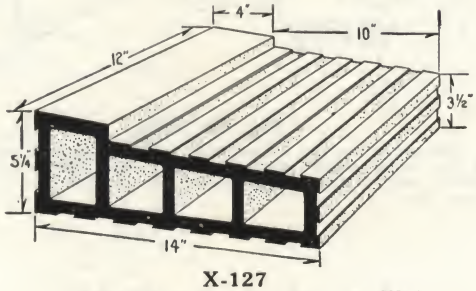
D-120
12″ x 12″ x 12″ Double Shell Wall Tile



D-123
12″ x 12″ x 12″ Double Shell Full Jamb for Box Frame Windows. (See Fig. 7)



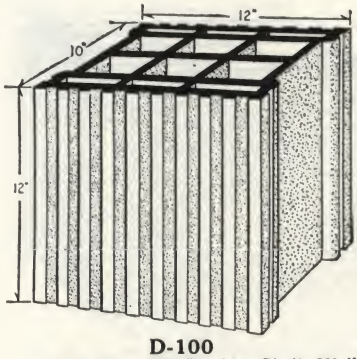
D-124
12″ x 5¾″ x 12″ Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



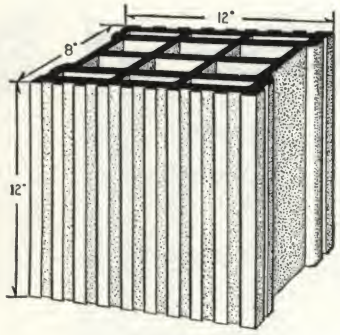
X-127
14″ x 5¼″ x 12″ Sill for 12″ Wall. (See Fig. 10)

NATCO DOUBLE SHELL LOAD BEARING TILE

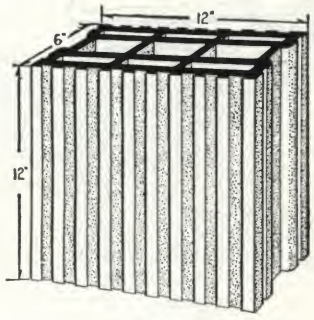
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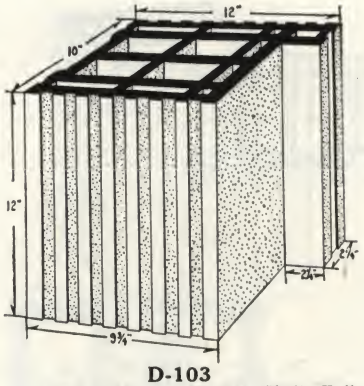
D-100
10" x 12" x 12" Double Shell Wall Tile



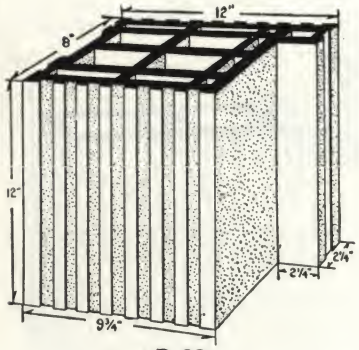
D-80
8" x 12" x 12" Double Shell Wall Tile



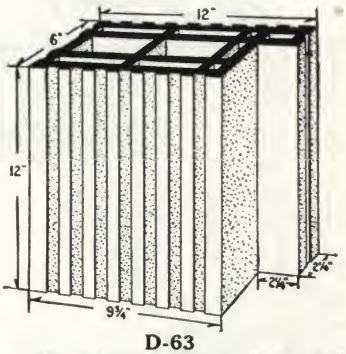
D-60
6" x 12" x 12" Double Shell Wall Tile



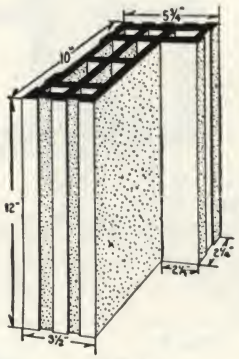
D-103
10" x 12" x 12" Double Shell Full Jamb for Box Frame Windows. (See Fig. 7)



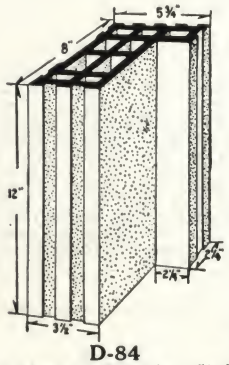
D-83
8" x 12" x 12" Double Shell Full Jamb for Box Frame Windows. (See Fig. 7)



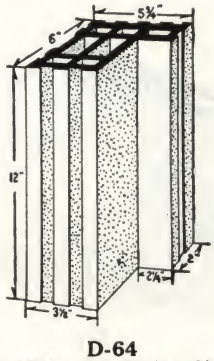
D-63
6" x 12" x 12" Double Shell Full Jamb for Box Frame Windows. (See Fig. 7)



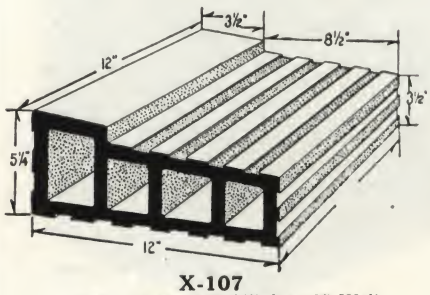
D-104
10" x 5¾" x 12" Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



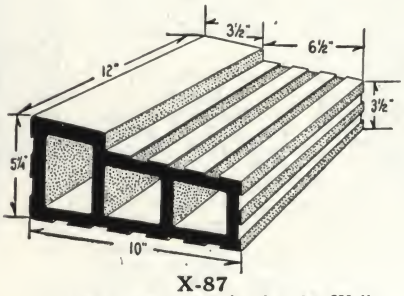
D-84
8" x 5¾" x 12" Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



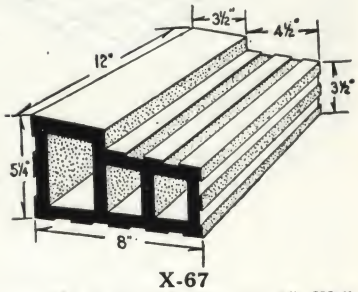
D-64
6" x 5¾" x 12" Double Shell Half Jamb for Box Frame Windows. (See Fig. 7)



X-107
12" x 5¼" x 12" Sill for 10" Wall. (See Fig. 10)



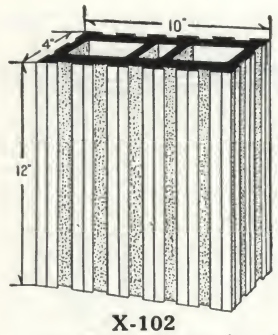
X-87
10" x 5¼" x 12" Sill for 8" Wall. (See Fig. 10)



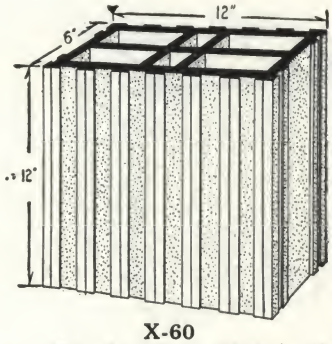
X-67
8" x 5¼" x 12" Sill for 6" Wall. (See Fig. 10)

NATCO DOUBLE SHELL LOAD BEARING TILE

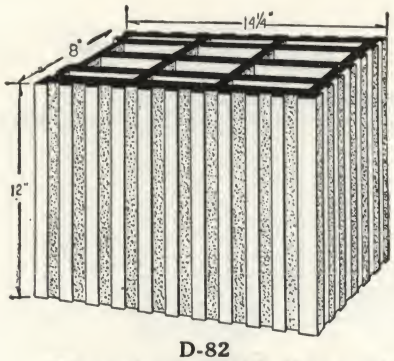
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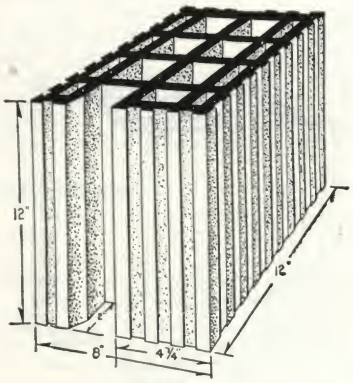
X-102
10 x 4″ x 12″ Corner for 10″ wall. (See Fig. 5)



X-60
6″ x 12″ x 12″ for 6″ and 12″ Walls. (See Figs. 3 and 6)

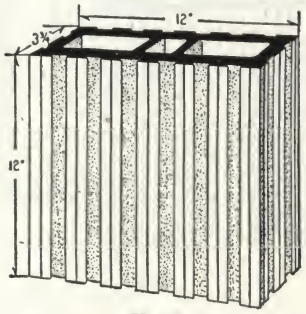


D-82
8″ x 14¼″ x 12″ Double Shell Corner for 8″ Wall. (See Fig. 4)

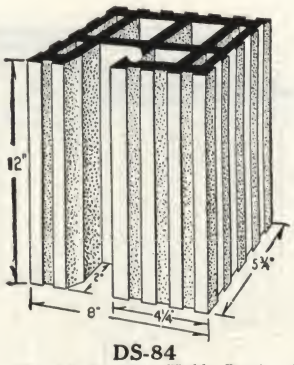


DS-83
8″ x 12″ x 12″ Full Jamb or Lintel Tile for Steel Sash and Plank Frame Window and Doors. Recess in tile takes care of flange on steel sash or wood weather strip on box frame. This tile is also used as a Full Closure Tile

4″ x 1″ x 12″ }
6″ x 1″ x 12″ } **Slabs** { 8″ x 1″ x 12″
{ 12″ x 1″ x 12″



X-40
3¾″ x 12″ x 12″ Joist Closure also cut 10½″ high for use as joist filler. (See Fig. 1)



DS-84
8″ x 5¾″ x 12″ Half Jamb for Steel Sash and Plank Frame Windows and Doors. Recess in tile takes care of flange on steel sash or wood weather strip on box frame. This tile also used as a Half Closure Tile

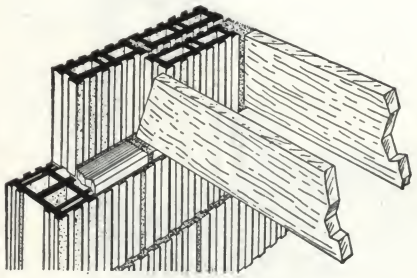


Fig. 1

Fig. 1
Shows method of building wood joists into wall. 3¾″ x 12″ x 12″ tile are used for the exterior face of wall and by using 1″ tile slabs for the joists to rest on, they get a solid and flat bearing surface and the load is evenly distributed. The space between joists is filled with 3¾″ x 12″ x 10½″ filler tile to make a solid wall to top of joists. Joists may be spaced as desired. Illustration shows joists 14″ on centers

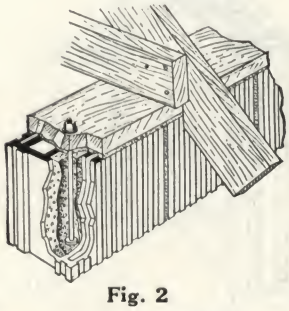


Fig. 2

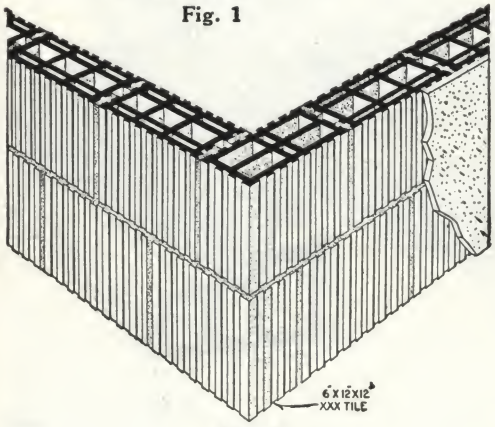


Fig. 3

Fig. 2
Bolting of roof plate to top of wall is necessary in any masonry wall to anchor roof and prevent its dislodgement due to high wind pressure

Fig. 3
Corner construction in a 6″ Double Shell Load Bearing Wall

Fig. 4
Corner construction in an 8″ Double Shell Load Bearing Wall

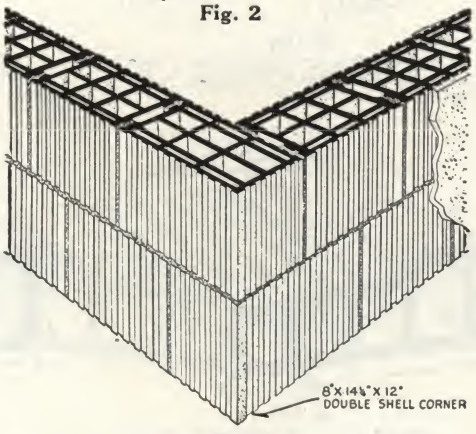


Fig. 4

NATCO DOUBLE SHELL LOAD BEARING TILE

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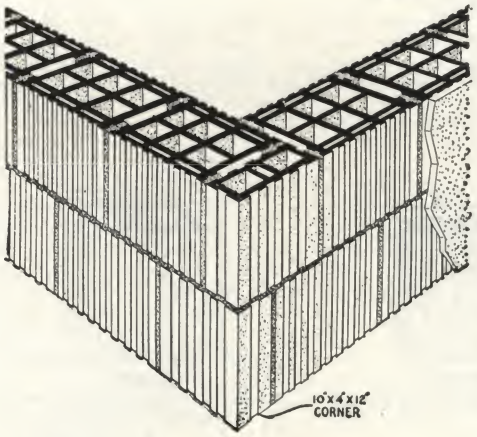


Fig. 5

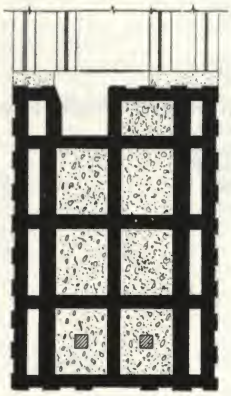


Fig. 8

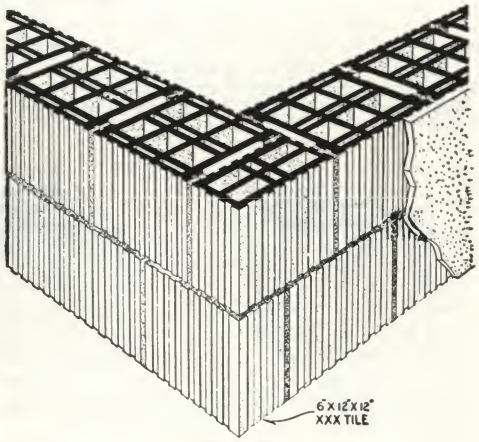


Fig. 6

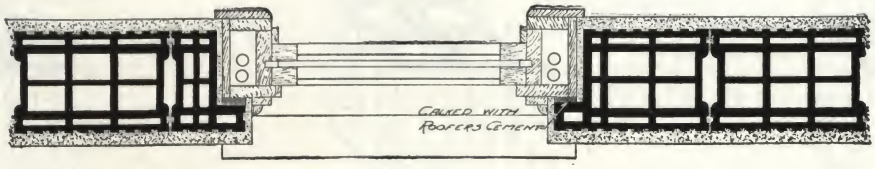


Fig. 7

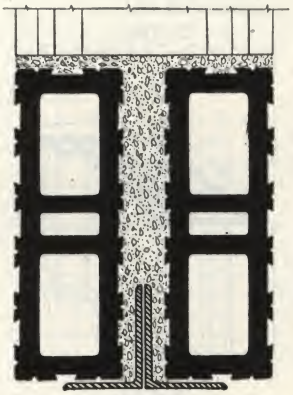


Fig. 9

Fig. 5—Corner construction in a 10" Double Shell Load Bearing Wall.

Fig. 6—Corner construction in a 12" Double Shell Load Bearing Wall.

Fig. 7—Longitudinal cross section showing use of full and half jamb tile with box frame. Recess in tile provides space for sash weight box.

Fig. 8—Reinforced lintel made by placing steel rods in bottom cells of steel sash full jamb and filling cells of tile with concrete. For use with steel sash, reverse tile and construct as above.

Fig. 9—Lintel construction over wide openings, using 3¾"x12"x12" tile for wall facings and steel angles for carrying load.

Fig. 10—Section at window sill showing fitting of frame to sill and waterproofing between frame and sill with roofers' cement.

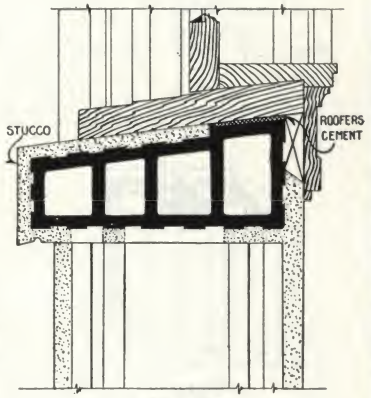


Fig. 10

NATCO DOUBLE SHELL LOAD BEARING TILE



NATCO HEATH CUBES

Natco Heath Cubes are standardized hollow structural clay tile units, cubical in shape, dimensioned according to the established measurement of brick work. Their size, 7¾"x7¾"x7¾", exactly that of six brick, permit the substitution of Natco Cubes wherever brick has been figured.

Standard Natco Cubes have two opposite faces smooth and two scored faces. They are also made with four scored faces. The Standard Half Cube has one face and one end smooth. The Standard Header Cube is scored four sides but on special order the inside face can be made smooth.

With Natco Cubes, it is possible to build an all-tile wall, regardless of the number of openings, piers, pilasters, chases or corners.

Natco Cubes are furnished in either whole or fractional units. Ordering a sufficient number of Header Cubes will save time and possible waste on the job. Since two Half Cubes can be set in place of one whole cube, it is advisable to make your estimate on this shape generally. Quarter Cubes can be split from Half Cubes as needed. In any case, the whole cube is always divisible into any shape on the job.

NATCO HEATH CUBES

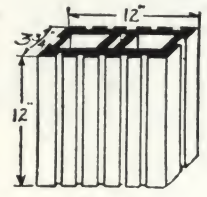
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NATCO XXX LOAD BEARING TILE

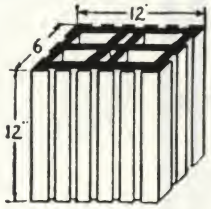
Natco XXX Load Bearing Tile is furnished for construction similar to that of Natco Double Shell Load Bearing Tile, where a lighter weight tile is required. It is extensively used in the eastern tile market.

Full and Half Jamb Tile, as illustrated below, are manufactured at our Eastern Plants *only*. For illustrations and description of Full and Half Jamb Tile as shipped from our Central and Western Plants, see details under Natco Double Shell Load Bearing Tile on preceding pages.

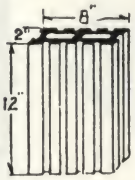
Standard Wall Tile



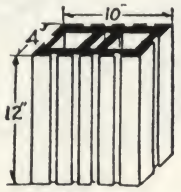
X-40
3¾"x12"x12" XXX Wall Tile



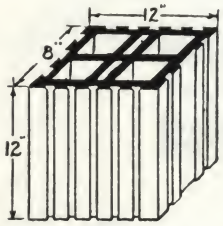
X-60
6"x12"x12" XXX Wall Tile



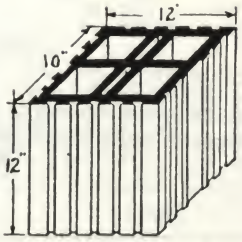
X-82
8"x2"x12" Corner for 8" wall



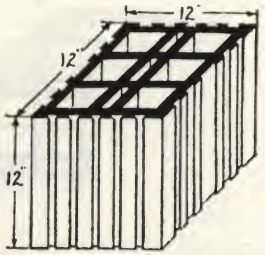
X-102
10"x4"x12" Corner for 10" wall.
See Fig. 5, page 27



X-80
8"x12"x12" XXX Wall Tile

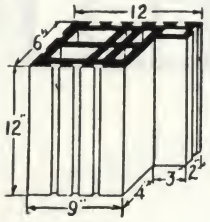


X-100
10"x12"x12" XXX Wall Tile

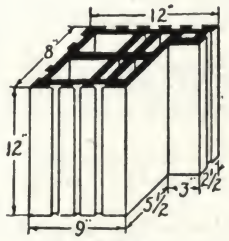


X-120
12"x12"x12" XXX Wall Tile

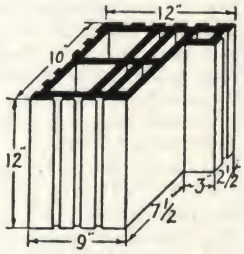
Full and Half Jamb Tile



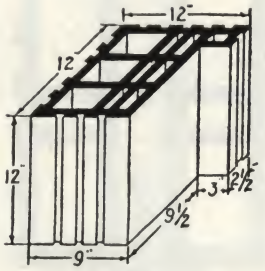
X-63
6"x12"x12" XXX Full Jamb for Box Frame Windows



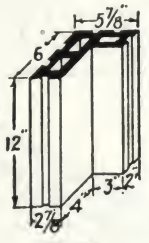
X-83
8"x12"x12" XXX Full Jamb for Box Frame Windows



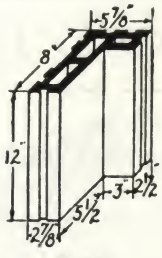
X-103
10"x12"x12" XXX Full Jamb for Box Frame Windows



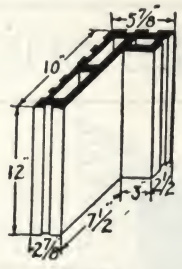
X-123
12"x12"x12" XXX Full Jamb for Box Frame Windows



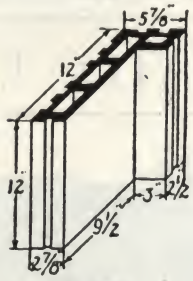
X-64
6"x5⅞"x12" XXX Half Jamb for Box Frame Windows



X-84
8"x5⅞"x12" XXX Half Jamb for Box Frame Windows

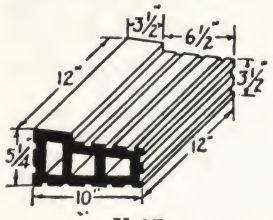


X-104
10"x5⅞"x12" XXX Half Jamb for Box Frame Windows



X-124
12"x5⅞"x12" XXX Half Jamb for Box Frame Windows

Sills



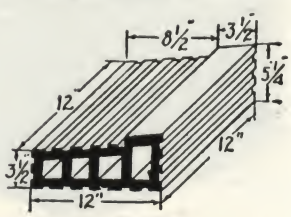
X-87
10"x5¼"x12" Sill for 8" Walls

X-127
14"x5¼"x12" Sill for 12" Walls.
See page 24

X-67
8"x5¼"x12" Sill for 6" Walls
See page 25

Slabs

Eastern Plants	Central and Western Plants	
6"x1"x12"	4"x1"x12"	10"x1"x12"
8"x1"x10"	6"x1"x12"	12"x1"x12"
8"x1"x12"	8"x1"x12"	



X-107
12"x5¼"x12" Sill for 10" Wall

NATCO XXX LOAD BEARING TILE

Continued on next page

NATCO HEADER BACKER

General

Natco Header Backer Tile is particularly well adapted for exterior load bearing walls faced with brick since the perfect bond every sixth brick course between brick and tile allows the full thickness of the masonry wall to be calculated for load carrying capacity.

For brick faced curtain or closure walls in steel or reinforced concrete skeleton construction, Natco Header Backer walls are ideal in point of economy. Due to a reduction of 25 per cent in dead weight over solid brick construction, savings in structural steel run into tons and foundation costs are materially reduced. It is the only tile giving a 10″ wall with an all tile backing.

Western Header Backer

The Western Header Backer is designed structurally similar to the Double Shell Load Bearing Tile and has all its advantages. (See Natco Page 28.)

Eastern Header Backer

The Eastern Header Backer is designed structurally similar to the Triple X Load Bearing Tile. The 1″ shell and web thickness fulfill New York Building Code requirements. (See Natco Page 32.)

Displacement

One (1) 8″ x 5″ x 12″ Header Tile and one (1) 8″ x 12″ x 10½″ Backer Tile including ½″ bed and vertical joints lay up 1.43 sq. ft. of wall surface; or conversely, there are required 700 Headers and 700 Backers to lay up 1000 sq. ft. of wall surface.

Backer Height

A 10½″ backer is standard and fulfills requirements in the majority of buildings. If necessary, however, the backer tile can be made of a special height to meet any ordinary brick and mortar joint condition.

Advantages

Strength—The perfect bond every sixth course of face brick gives maximum load bearing strength for wall thickness.

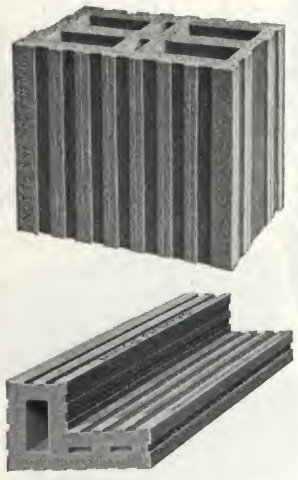
Lightness—Approximately 25 per cent lighter than solid brick masonry walls of equal thickness. The 10″ and 14″ thicknesses are not obtainable in solid brick masonry.

Insulation—The cellular tile structure promotes insulation comfort and economy.



Western Header Backer

Note that the backer tile is similar to Natco Double Shell Load Bearing Tile except in height which is 10½″ instead of 12″. (See Natco Page 28.) Header tile matches the backer tile in web construction

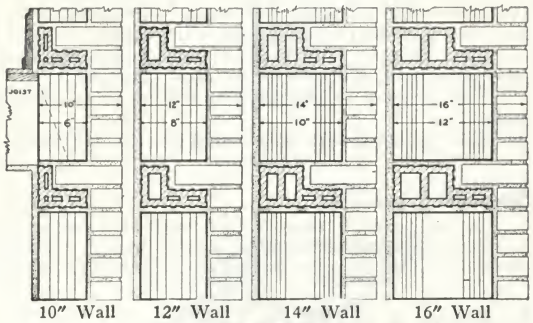


Eastern Header Backer

Note that the backer tile is similar to Natco Triple X Load Bearing Tile except in height which is 10½″ instead of 12″. (See Natco Page 32.) Header tile matches the backer tile in web construction

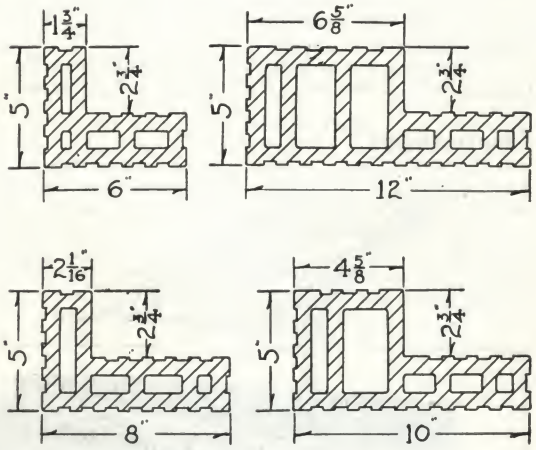
Adaptability

The strong, light Natco Header Backer construction is particularly adapted to use in all brick faced buildings, whether of load bearing or curtain closure wall construction, where the maximum in good construction and economy in labor costs are appreciated.



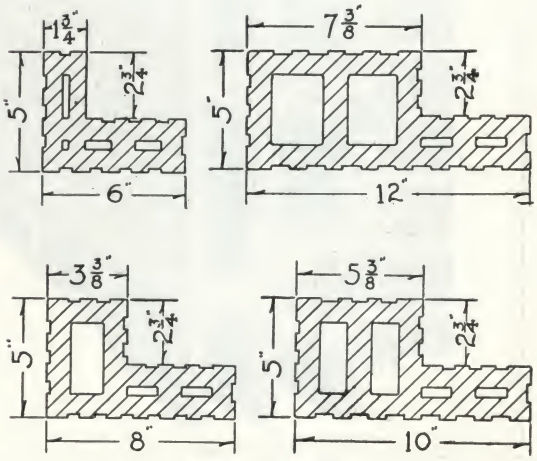
Typical Wall Sections

The standard backer is 10½″ high. While these sections show walls, including brick facing, 10, 12, 14 and 16″ only, thicker walls may easily be obtained by using additional tile



Western Header

The web design matches that of the double shell Western backer tile



Eastern Header

The web design matches that of the Eastern backer tile with 1″ web thickness

NATCO HEADER BACKER

Continued on next page

NATCO UNIBACKER

General

Natco Unibacker is a load bearing unit used in brick faced load bearing or curtain closure walls. It provides a mechanical bond every sixth brick course of such strength that full bearing value is allowed on the full masonry wall thickness.

Natco Unibacker can be bonded satisfactorily with Column Covering as three courses of the Unibacker will bond into two courses of the Column Covering.

The Eastern Unibacker is designed with 1" thick shell and webs particularly for the New York market.

Full bearing is provided for floor joists in load bearing walls.

The standard tile is dovetail scored for interior plaster.

Smooth Face Tile

If unplastered smooth tile walls are desired, unscored tile can be manufactured on special order. Adequate notice must obviously be given through our nearest branch office.

Economy of the Single Unit

Unibacker is made in a single tile shape and size which permits great speed of erection and consequent labor economies. This is particularly apparent in long curtain walls without openings.

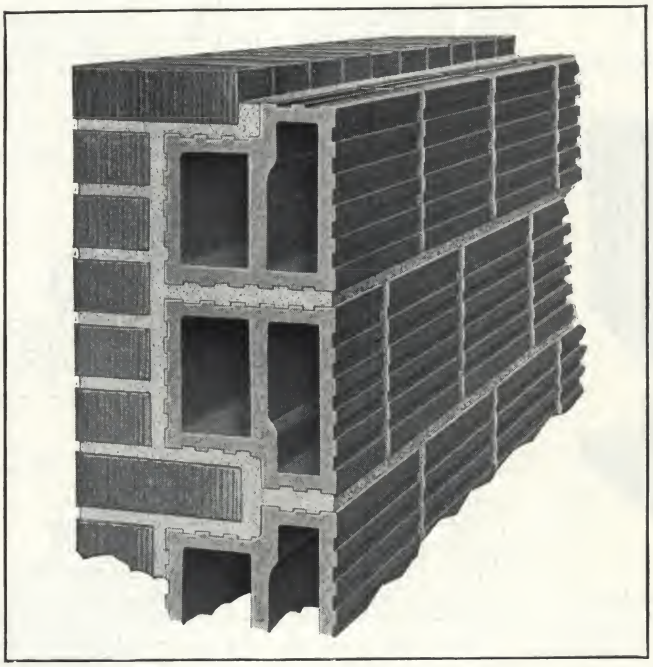
Its weight, compared with solid brick masonry, materially reduces foundation and steel costs without sacrifice of strength and permanence.

Unibacker is particularly economical of mortar. It saves approximately one-third over ordinary tile construction.

Displacement

Each Unibacker unit replaces (according to thickness) from 8 to 12 brick, which accounts for the pronounced savings in erection costs and the greater erection speed.

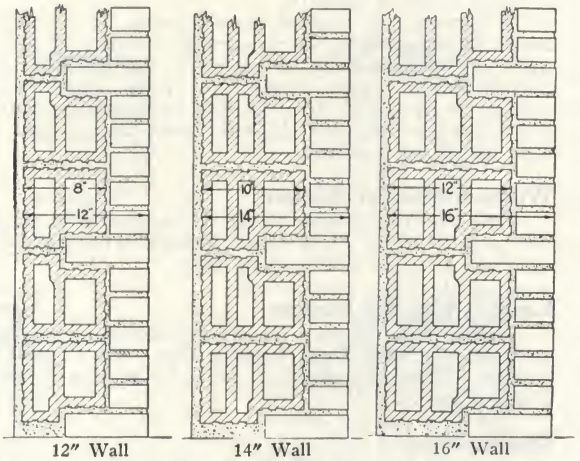
The inner face is 12" x 7¾". Standard thicknesses are 8, 10 and 12" for 12, 14 and 16" walls. Each tile lays up .715 sq. ft. of wall surface when ½" mortar joints are used. 140 units lay up 100 sq. ft. of wall.



Natco Unibacker Construction (Eastern Type)
Note the strong, effective masonry bond between the Unibacker tile and brick facing

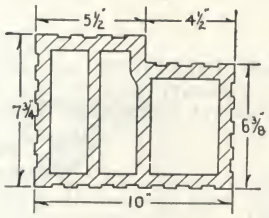
Adaptability

A strong, light construction with speed and labor economies adapting it admirably to use in all types of brick faced buildings of either load bearing or skeleton curtain wall construction.

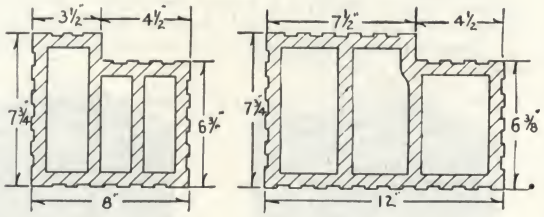


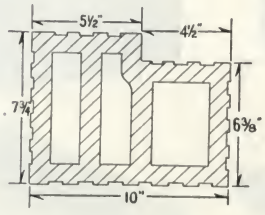
12" Wall 14" Wall 16" Wall

Typical Wall Sections
While these sections show walls including brick facing, 12, 14 and 16" only, thicker walls may easily be obtained by using additional tile

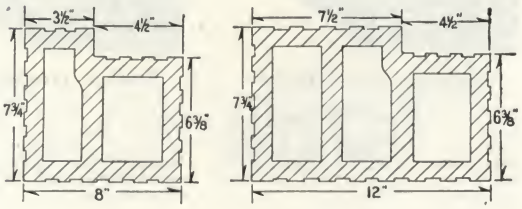


Western Unibacker
Due to the type of clay used the thinner shell and web construction adequately fulfills all load bearing requirements





Eastern Unibacker
This tile is particularly designed for the New York market where 1" thick shell and webs are required



NATCO UNIBACKER

Continued on next page

NATCO DOUBLE SHELL FACE TILE

General

Natco Double Shell Face Tile (Load Bearing) provides a most economical form of masonry construction.

The double shell feature adds to the comfort and strength of the completed structure. A multiple blanket of isolated air cells is located on both the exterior and interior face of the tile forming a barrier to heat transmission. All mortar joints are non-continuous, thus moisture cannot be drawn through by capillary attraction. The voids in the double shell key with the mortar adding strength and stability to the wall. (See also Natco Page 28.)

Each tile laid forms a section of an insulated moisture resisting wall, with an attractively finished exterior face. Upkeep is negligible, as the tile does not discolor, disintegrate or weather—obviously painting or similar maintenance is eliminated.

Each unit is equivalent to six brick, easily and quickly laid, effecting considerable labor and mortar savings.

Made with a 5″ x 12″ face for 8″ walls, complete with all accessory shapes for sills, jambs, lintels, etc. Also in 10⅜″x12″ face for 8″ walls, for ashlar bond. (See Natco Page 41 for architectural detail.)

Unglazed Tex-Tile (Designated by T)

Natco Unglazed Tex-Tile has a texture face resembling a high quality tapestry brick. To meet individual preferences, it is furnished in three (3) color combinations. These are termed Shade Ranges E-1, E-2 and E-3. In Shade Range E-1, the browns predominate. In Shade Range E-3 the reds predominate. In Shade Range E-2 a combination (full range) of Shade Ranges E-1 and E-3 is obtained which is extremely beautiful. The inside face is scored for plaster. (A color chart showing these shade ranges will be sent on request.)

Glazed Tex-Tile (Designated by TG)

Natco Glazed Tex-Tile has the same texture finish as the unglazed and is furnished in dark brownish shades. The inside face is scored for plaster.

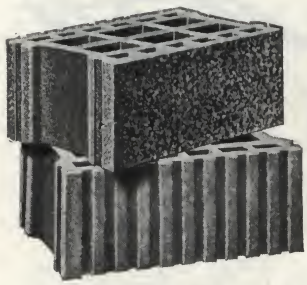
Glazed Combed Face Tile (Designated by B)

Natco Glazed Combed Face Tile has an exterior scratched or combed face and a glazed, smooth, sanitary, easily cleaned interior surface. It is furnished for walls 8″ thick.

Natco Unglazed Combed Face Tile is furnished with unglazed, combed exterior and smooth interior faces.

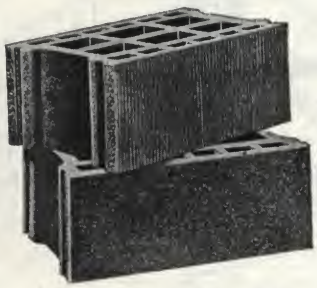
Adaptability

Natco Double Shell Face Tile is extensively and successfully used for residences, churches, schools, garages, factories, warehouses, gas stations, etc. It is the logical choice for any structure where attractiveness, permanence and comfort must be combined with economy.



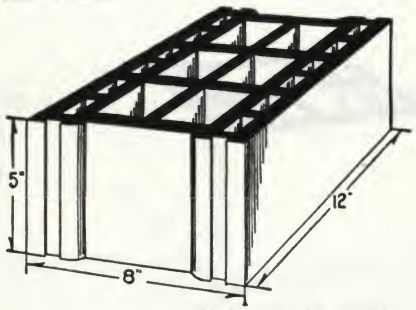
Natco Tex-Tile

Furnished with outside face either unglazed or glazed with the inside face scored for plaster

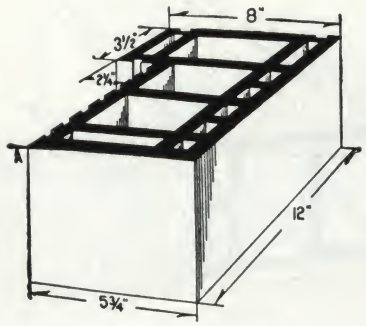


Natco Combed Face Tile

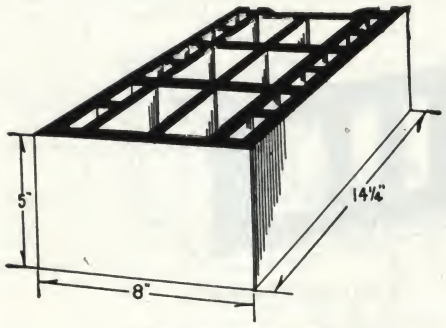
Furnished with outside face glazed and the inside face smooth glazed for exposed interior finish



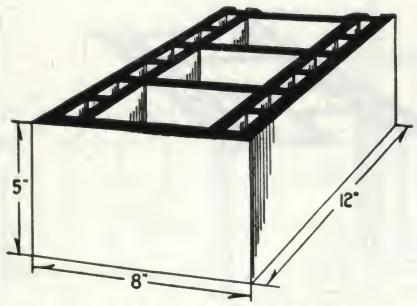
T-80; TG-80; B-80
8″ Wall Tile



T-82; TG-82; B-82
8″ Corner



T-88; TG-88; B-88
8″ Inside Corner

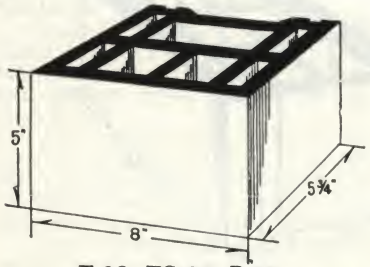


T-85; TG-85; B-85
8″ Closure

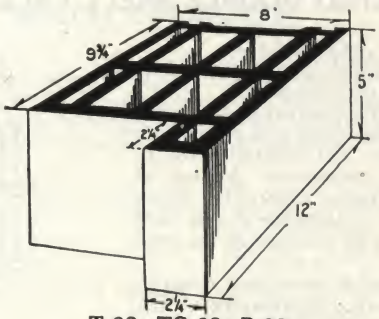
T-41; TG-41; B-41
1″ x 4″ x 12″ Joist Bearing Slab
See Fig. 5

NATCO DOUBLE SHELL FACE TILE

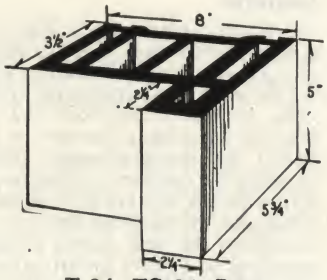
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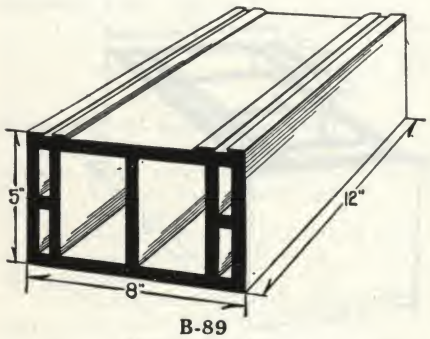
T-86; TG-86; B-86
8″ Half Closure



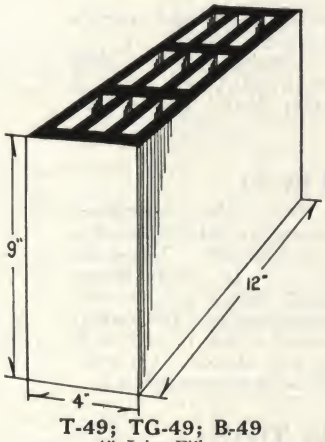
T-83; TG-83; B-83
8″ Full Jamb



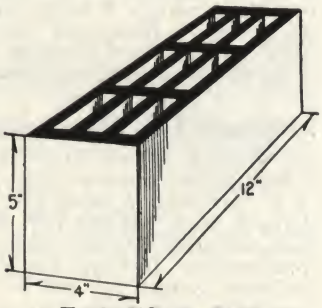
T-84; TG-84; B-84
8″ Half Jamb



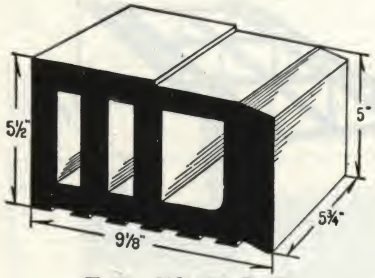
B-89
8″ Straight Lintel
Furnished in Combed Face only. (See T-89, TG-89, Page 33)



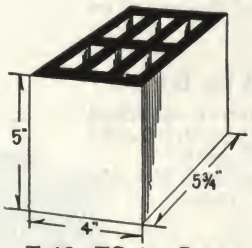
T-49; TG-49; B-49
4″ Joist Filler



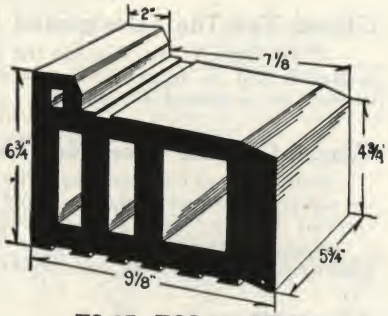
T-40; TG-40; B-40
4″ Joist Closure



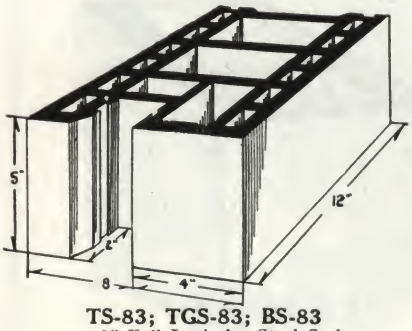
T-87; TG-87; B-87
8″ Sill Tile



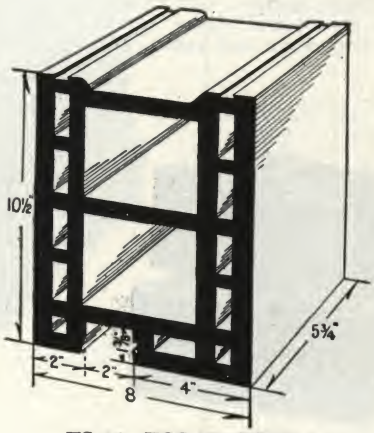
T-46; TG-46; B-46
Pilaster Tile



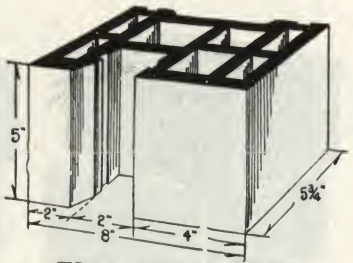
TS-87; TGS-87; BS-87
8″ Sill for Steel Sash



TS-83; TGS-83; BS-83
8″ Full Jamb for Steel Sash and for Plank Frame Windows and Doors



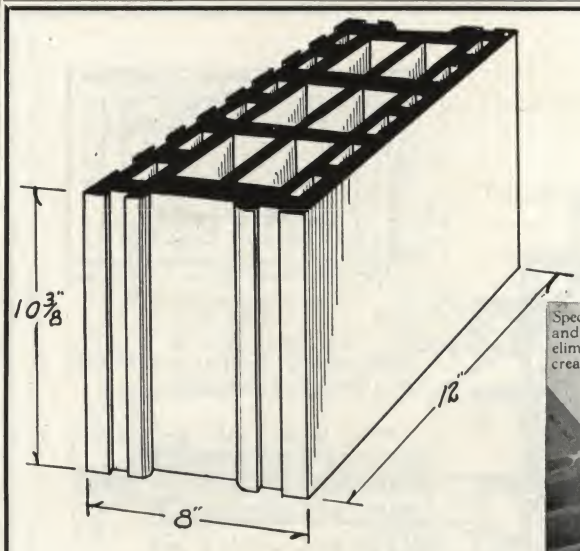
TS-89; TGS-89; BS-89;
8″ Soldier Lintel for Steel Sash. (Note: This lintel is also used extensively with wood frame windows and for soldier courses)



TS-84; TGS-84; BS-84
8″ Half Jamb for Steel Sash and for Plank Frame Windows and Doors

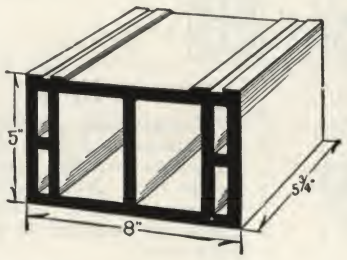
NATCO DOUBLE SHELL FACE TILE

Continued on next page



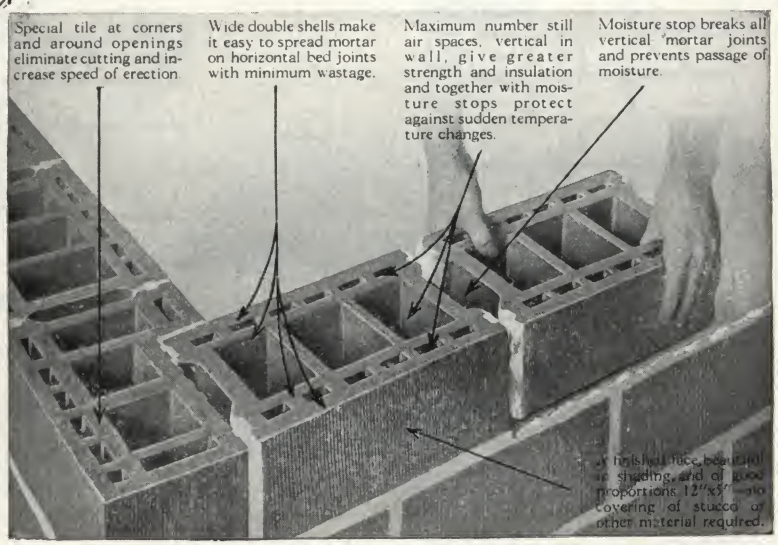
T-100

Random bond unit. Textile only; glazed or unglazed. See page 41 for architectural detail



T-89; TG-89

8" Straight Lintel. See B-89, Page 36. Furnished in Tex-Tile only



View of Corner Section of Natco Double Shell Tile Showing Advantages of Double Shell Construction

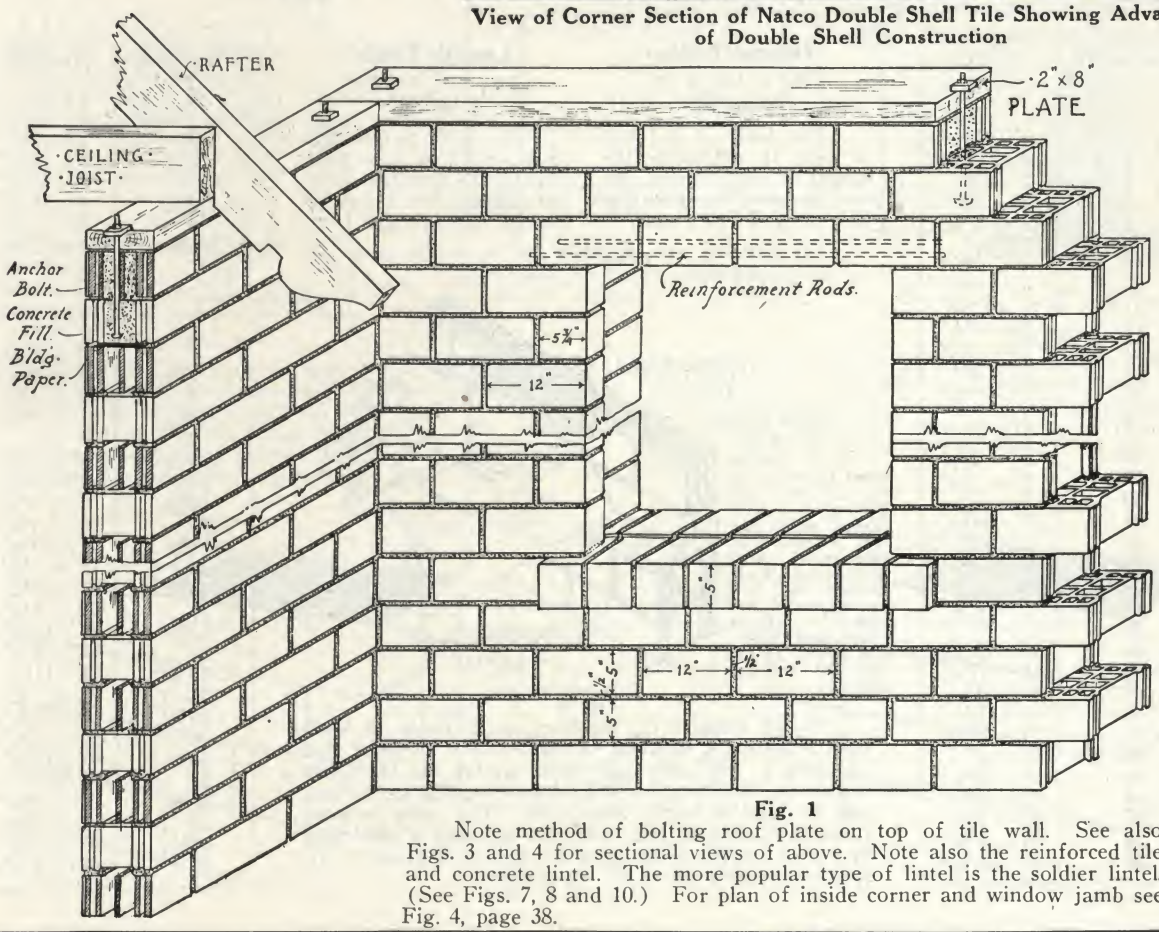


Fig. 1

Note method of bolting roof plate on top of tile wall. See also Figs. 3 and 4 for sectional views of above. Note also the reinforced tile and concrete lintel. The more popular type of lintel is the soldier lintel. (See Figs. 7, 8 and 10.) For plan of inside corner and window jamb see Fig. 4, page 38.

NATCO DOUBLE SHELL FACE TILE

Continued on next page

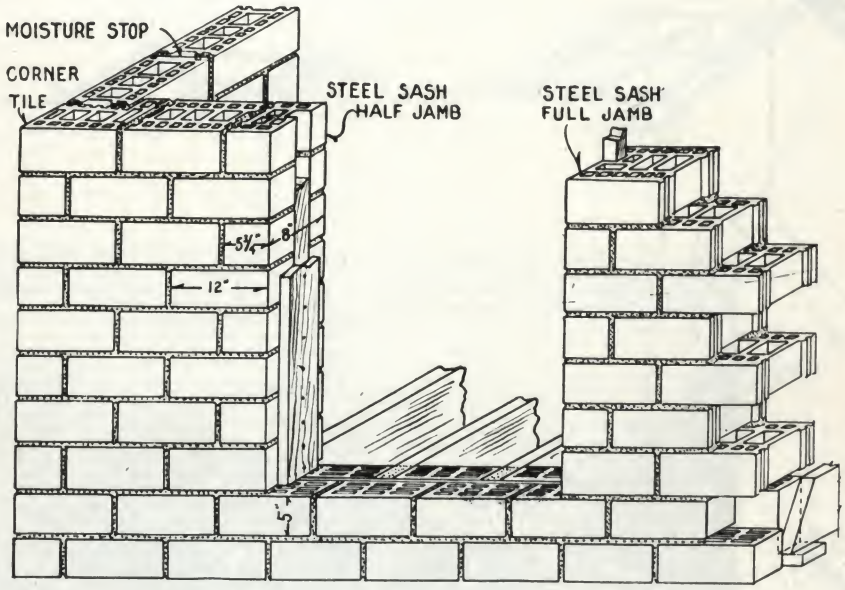


Fig. 2

Shows ordinary outside corner construction. Also shows method of making an absolutely weatherproof joint between tile and plank frame by using a strip of wood which has been nailed to the frame. This strip should fit into the recess in the tile. This method is recommended for all plank frames

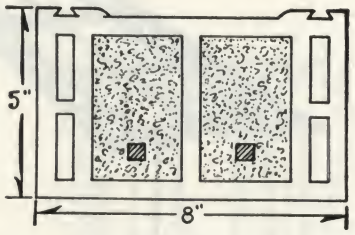


Fig. 3

Flat lintel showing reinforcing rods and concrete in both cells of tile. (See Fig. 1)

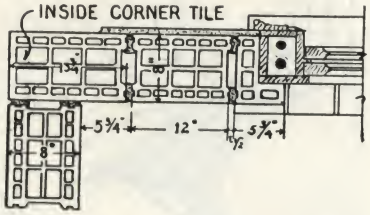


Fig. 4

Longitudinal cross section of wall shown in Fig. 1. Note jamb tile which provides space for sash weight box. Note the inside corner construction. This type of corner is required in ell shaped walls only

Course No.	Height
1	— 5⅜"
2	—10¾"
3	1'— 4⅛"
4	1'— 9½"
5	2'— 2⅞"
6	2'— 8¼"
7	3'— 1⅝"
8	3'— 7"
9	4'— 0⅜"
10	4'— 5¾"
11	4'—11⅛"
12	5'— 4½"
13	5'— 9⅞"
14	6'— 3¼"
15	6'— 8⅝"
16	7'— 2"
17	7'— 7⅜"
18	8'— 0¾"
19	8'— 6⅛"
20	8'—11½"
21	9'— 4⅞"
22	9'—10¼"
23	10'— 3⅝"
24	10'— 9"
25	11'— 2⅜"
26	11'— 7¾"
27	12'— 1⅛"
28	12'— 6½"
29	12'—11⅞"
30	13'— 5¼"
31	13'—10⅝"
32	14'— 4"
33	14'— 9⅜"
34	15'— 2¾"
35	15'— 8⅛"
36	16'— 1½"
37	16'— 6⅞"

Height Table

Tile 5" x 8" x 12"
Joint ⅜"

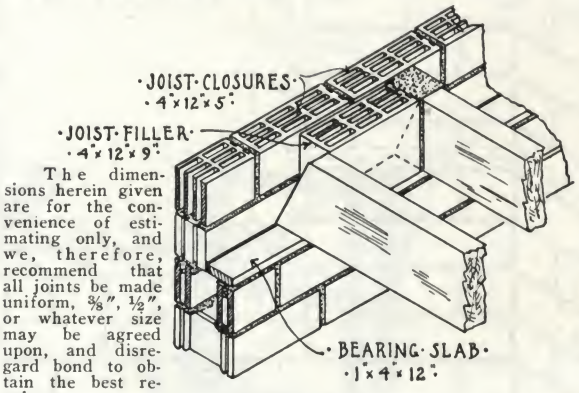
The table at the left is used to determine the height of walls which will best lay up without cutting tile, using ⅜" bed joint.

Length Table

Tile 5" x 8" x 12"
Joint ⅜"

The table at the right shows the length of walls that can be best laid without cutting tile, using ⅜" vertical mortar joint.

For window openings add ⅜" to height table and ¾" to length table.



The dimensions herein given are for the convenience of estimating only, and we, therefore, recommend that all joints be made uniform, ⅜", ½", or whatever size may be agreed upon, and disregard bond to obtain the best results.

Fig. 5

Shows method of building wood joists in wall. Joist closure tile are used for exterior 4" of wall and by using 1" tile slabs bedded in mortar for the joists to rest on, the joists get a solid and flat bearing surface and the load is evenly distributed. The space between joists is filled with joist filler tile to make a solid wall to top of joists. Joists may be spaced as desired. Illustration shows joists 14" on centers.

No. Tile	Length
1	1'— 0"
1½	1'— 6⅛"
2	2'— 0⅜"
2½	2'— 6½"
3	3'— 0¾"
3½	3'— 6⅞"
4	4'— 1⅛"
4½	4'— 7¼"
5	5'— 1½"
5½	5'— 7⅝"
6	6'— 1⅞"
6½	6'— 8"
7	7'— 2¼"
7½	7'— 8⅜"
8	8'— 2⅝"
8½	8'— 8¾"
9	9'— 3"
9½	9'— 9⅛"
10	10'— 3⅜"
10½	10'— 9½"
11	11'— 3¾"
11½	11'— 9⅞"
12	12'— 4⅛"
12½	12'—10¼"
13	13'— 4½"
13½	13'—10⅝"
14	14'— 4⅞"
14½	14'—11"
15	15'— 5¼"
15½	15'—11⅜"
16	16'— 5⅝"
16½	16'—11¾"
17	17'— 6"
17½	18'— 0⅛"
18	18'— 6⅜"
18½	19'— 0½"
19	19'— 6¾"

NATCO DOUBLE SHELL FACE TILE

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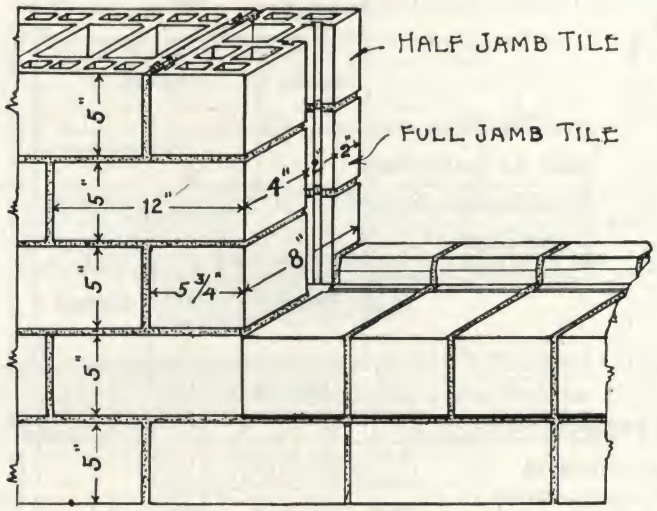


Fig. 6

Detail of opening for steel sash. Note recess in full and half steel sash jamb tile. (See Fig. 8 and 9 for method of bedding sash)

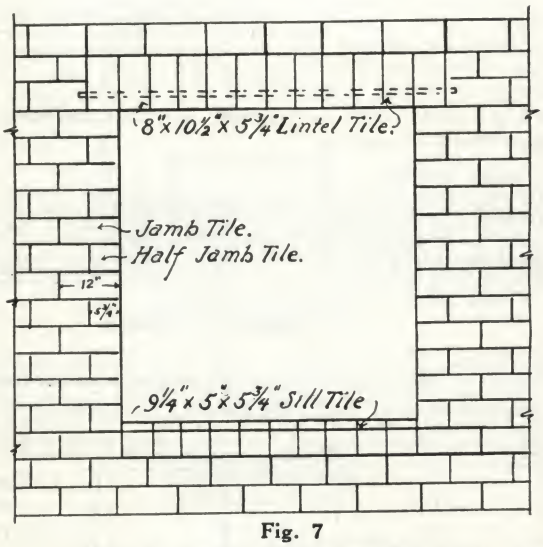


Fig. 7

Window opening showing soldier lintel. Can also be reinforced with angle iron as shown in Fig. 10

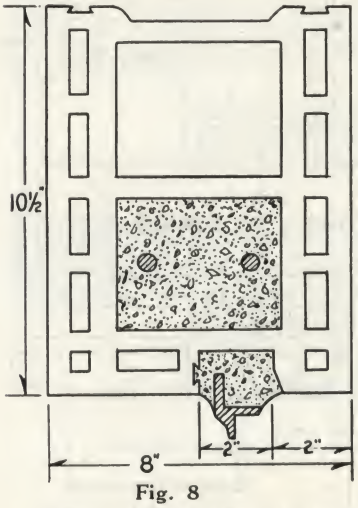


Fig. 8

Detail of lintel showing reinforced concrete beam in cell of tile and also method of bedding steel sash frame in the recess in steel sash lintel tile.

A method of reinforcing lintels over wide openings or where a heavy load bears above the openings. In order to allow the flanges of angles to go inside the tile, it is necessary to break out the small web of tile. This is very easily and safely done by tapping the web lightly with a hammer, breaking it out in small pieces until the web has been tapped out about half the length of the tile—then start at other end of tile and work to the middle

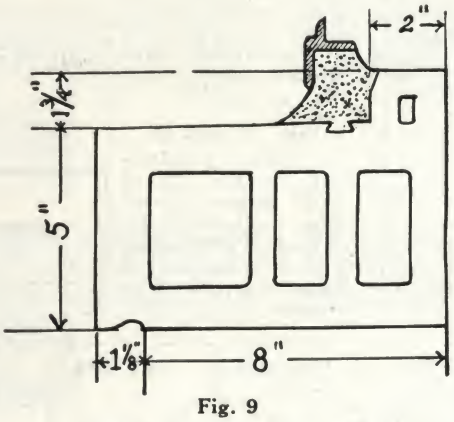


Fig. 9

Steel sash mortared to sill tile. Note dovetail scoring for holding mortar

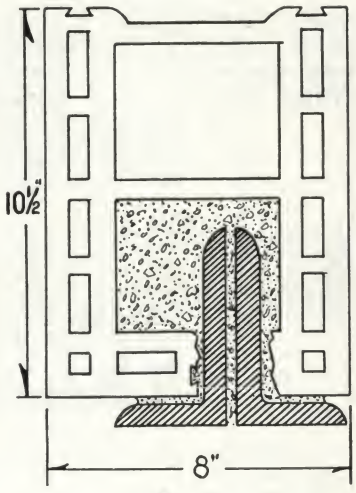


Fig. 10

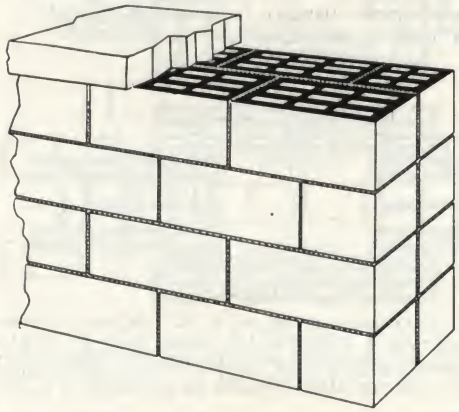
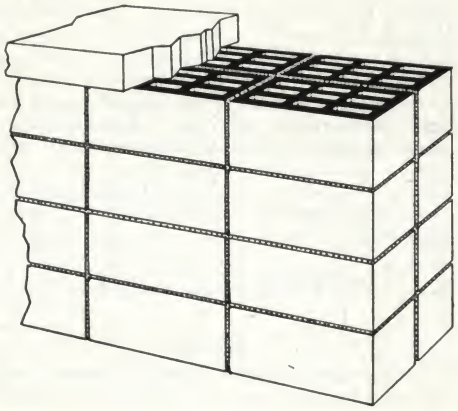


Fig. 11 (Left)

Detail of porch balustrade built of joist closures laid back to back with staggered mortar joints. This gives a finished face on each side and on the end

Fig. 12 (Right)

Detail of porch balustrade built of joist closures back to back with mortar joints in line. This gives a finished face on each side and on the end



NATCO DOUBLE SHELL FACE TILE

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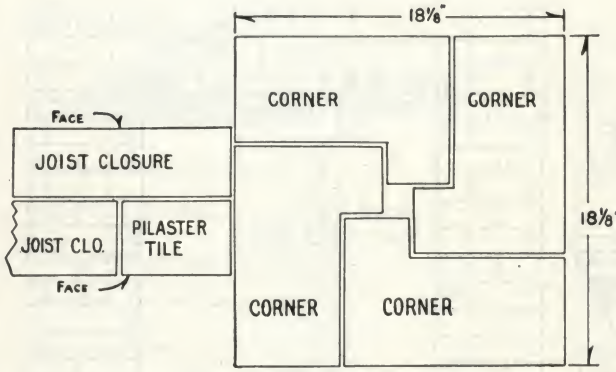


Fig. 13

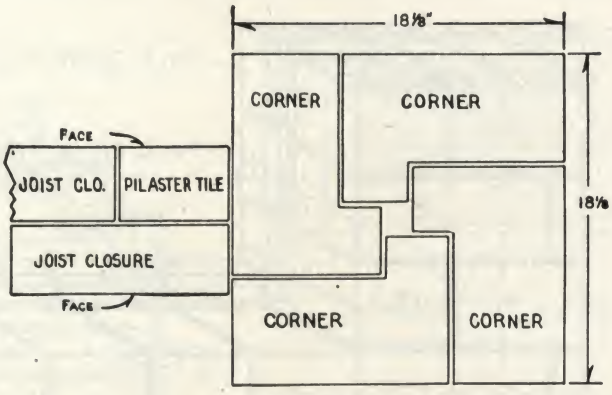


Fig. 14

PIERS

Figs. 13 and 14

Alternate courses of a porch column and balustrade. This is the smallest column that can be built with finished faces on all four sides and true bonding of tile. Both sides of balustrades have finished faces. (See Figs. 11 and 12)

Figs. 15 and 16

Details of alternate courses of a 24¼" square column. Our engineering department will gladly furnish layouts of larger size columns on request

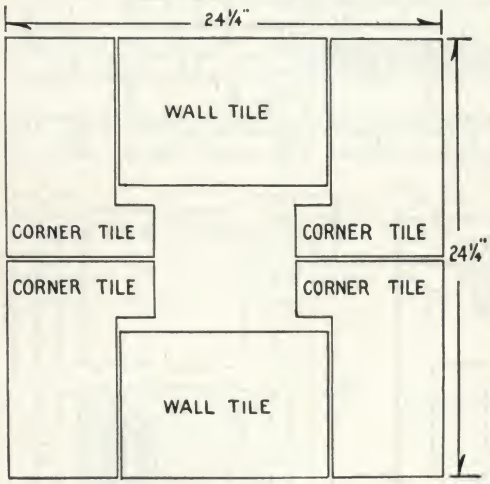


Fig. 15

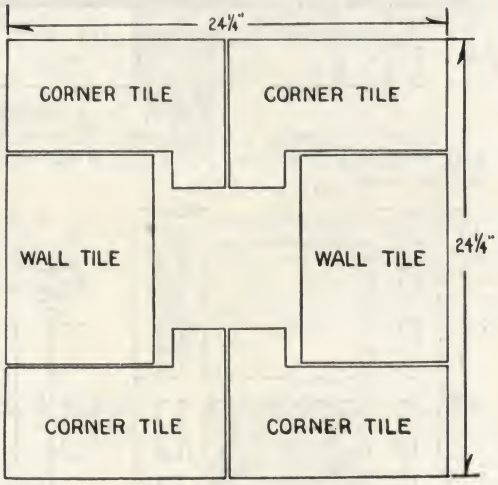


Fig. 16

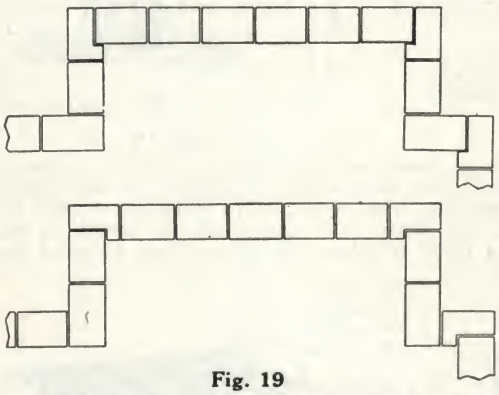
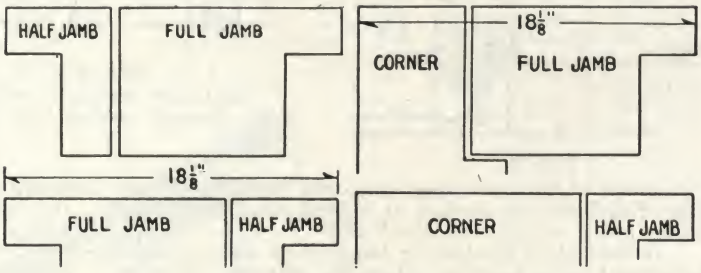


Fig. 19

Alternate courses of a typical bay window wall. Note that a true bond is preserved at all points in the wall without any cutting of tile



Figs. 17 and 18

Alternate courses showing the minimum distance between two windows, and the minimum distance from corner of building to nearest window without cutting of tile

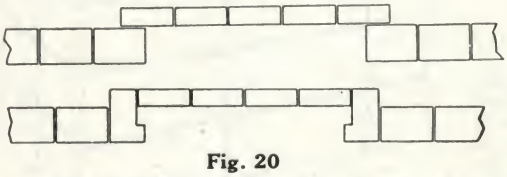


Fig. 20

Alternate courses of an 8" chimney recess. Chimney projects only 4" from face of wall

BAYS AND CHIMNEYS

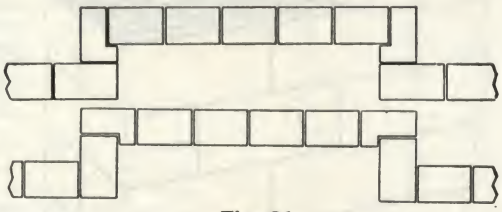


Fig. 21

Alternate courses of a 12" chimney recess. Preserves a true bond without cutting of tile. Chimney projects 12" from face of house wall. The chimney itself should be of brick

NATCO DOUBLE SHELL FACE TILE

Continued on next page

SUGGESTIONS FOR PILASTER CONSTRUCTION

The walls of industrial and commercial buildings are often designed to be built to considerable height without cross walls, and to bear heavy concentrated loads, such as floor beams and roof trusses. In these cases it is customary to build pilasters to stiffen the wall for wind pressure, and to carry these concentrated loads. Below are shown several pilaster layouts, and our engineering department will gladly furnish others if needed. Note that all pilasters are thoroughly bonded in the wall.

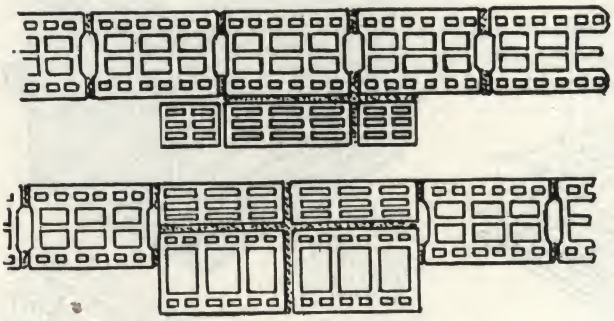


Fig. 22
Alternate courses of a pilaster 24½" wide with 4½" projection

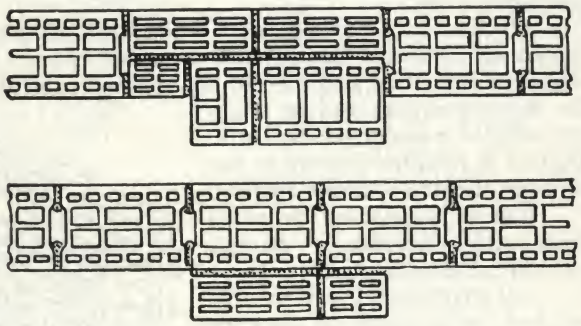


Fig. 25
Alternate courses of a pilaster 18½" wide with 4½" projection

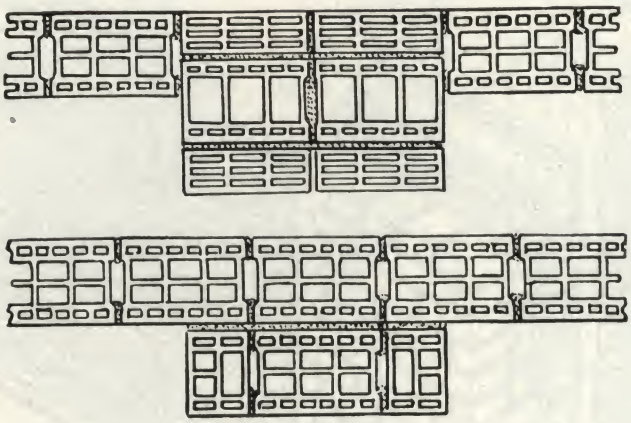


Fig. 23
Alternate courses of a pilaster 24½" wide with 8½" projection

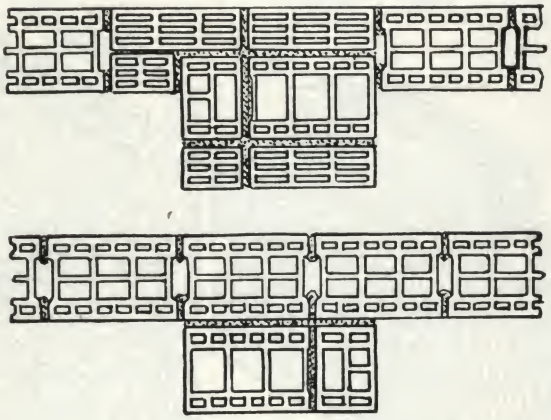


Fig. 26
Alternate courses of a pilaster 18½" wide with 8½" projection

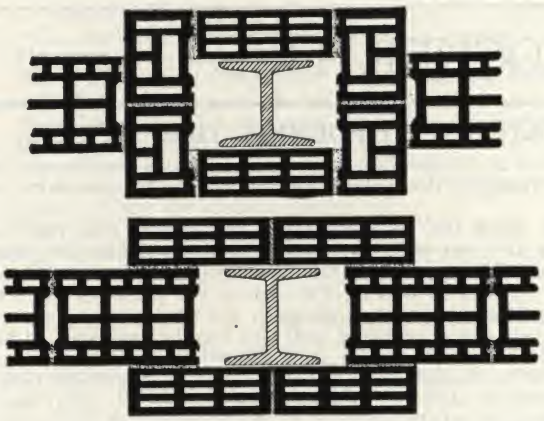


Fig. 24
Alternate courses showing method of enclosing H column. Gives a true bond. Our engineering department will gladly furnish layout for enclosing other sizes of columns

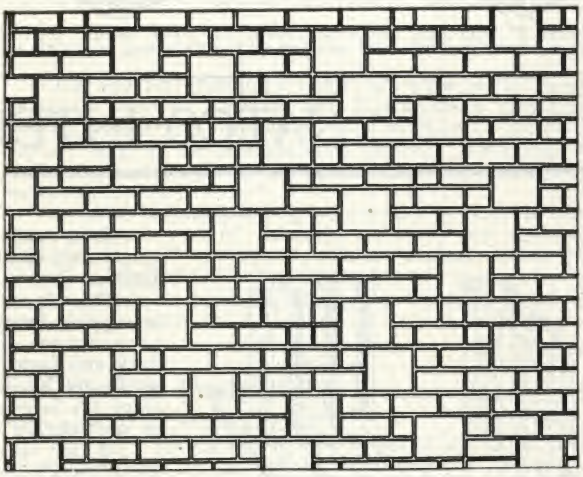


Fig. 27
Detail of a typical random bond wall obtained by the use of the T-100 Random Bond Tex Tile combined with standard Tex Tile units. This new unit permits many distinctive effects to be obtained.

NATCO DOUBLE SHELL FACE TILE

Continued on next page

NATCO INTERLOCKER TILE

General

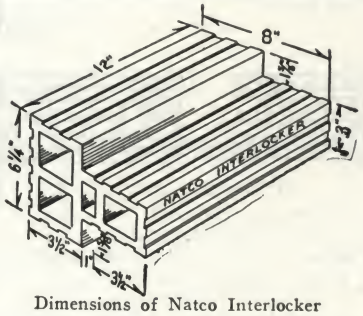
Natco Interlocker Tile is used for load bearing and closure walls, either in combination with brick or stucco, or without facing.

The units are light enough to be handled with one hand—are laid quickly and easily—effect a considerable saving in mortar and labor cost.

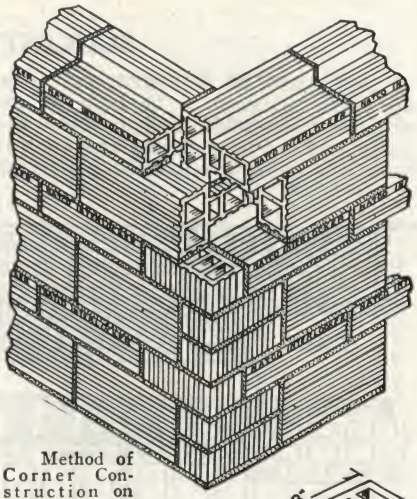
Mechanically bonded Interlocker walls may be built to any thickness desired. The vertical webs are always aligned, assuring maximum strength. Dead air spaces bar heat and cold, and the non-continuous mortar joints prevent the passage of moisture. Plaster is applied directly to the interior surface without furring.

Natco Interlocker provides economical, fire-proof, strong, permanent construction.

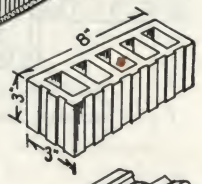
All structural details may be worked out as easily as the ones illustrated on this page. Information on specific construction problems will be gladly furnished.

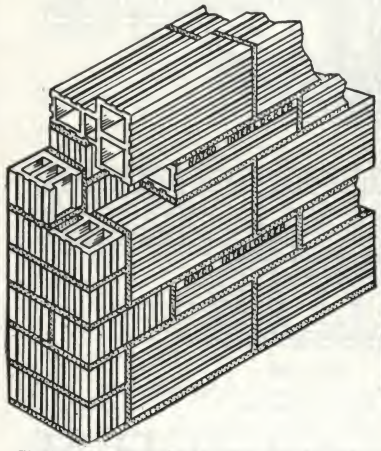


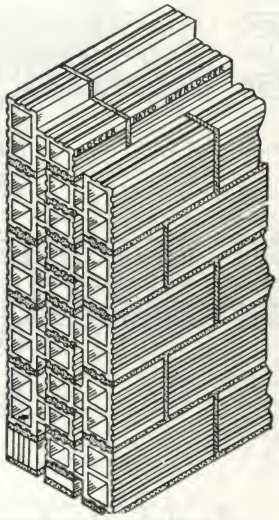
Dimensions of Natco Interlocker

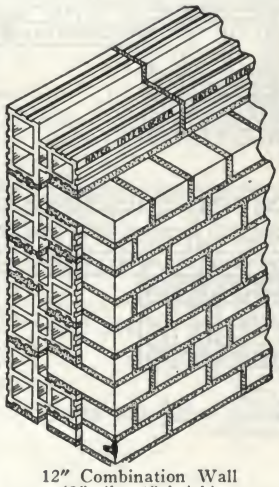

Method of Corner Construction on 8" Walls

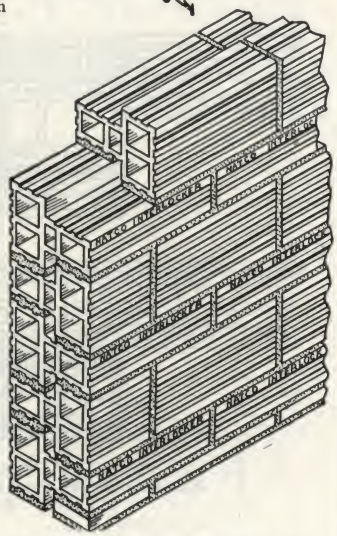
Right: Dimensions of Closure Block. One face and one end are scored—other face and end smooth




Closing 8" Wall End. Note mechanical bond of closure block with interlocker

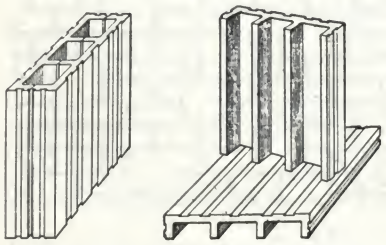

12" Tile Wall. Note block used in first course for starter


12" Combination Wall (8" tile, 4" brick)


8" Tile Wall. Note starting slab used in first course

NATCO INTERLOCKER TILE

NATCO SPLIT FURRING TILE



Brick walls exposed to the weather must be furred with hard burned tile, to prevent dampness reaching the interior and destroying the plastering and interior decorations.

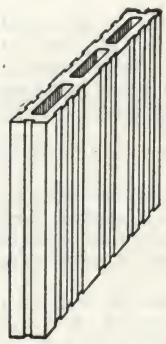
The tile are made either 1½" or 2" thick and 12" square. The ribs being set against the wall, an air space is formed which effectively checks the passage of moisture. They should be set with the ribs vertical without mortar at back and fastened to the wall by driving 10d nails in the joints of the brickwork, the head of the nail being bent down upon the tile, using a nail every third tile in every second course or metal wall ties may be embedded in wall, as provided by local building codes.

Where walls must be straightened or furred out to line with face of piers the 2" tile cannot be used. If ceiling height is not too great use 3" partition tile. If the space is greater than 3" the tile may be set out from the wall leaving a clear air space behind them. They should be braced at intervals by the use of drive anchors or 4" tile can be used without the anchors. This is known as free standing furring. The face of the tile is grooved for plastering.

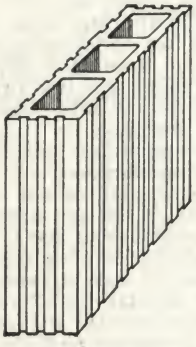
NATCO SPLIT FURRING TILE

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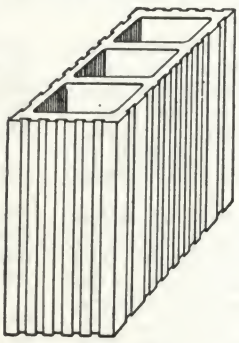
NATCO PARTITION TILE



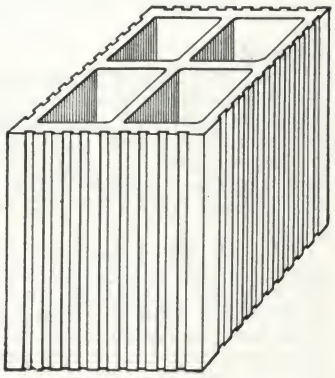
2 inch
Eastern Factories
2-cell—2x8x12—10 lb.
Ohio Factories
3-cell—2x12x12—15 lb.
Western Factories
3-cell—2x12x12—15 lb.



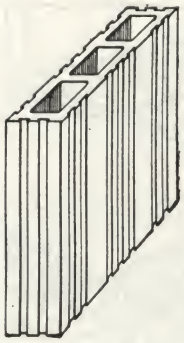
4x12x12
Eastern Factories
3-cell—16 lb.
Ohio Factories
3-cell—16 lb.
Western Factories
3-cell—16 lb.



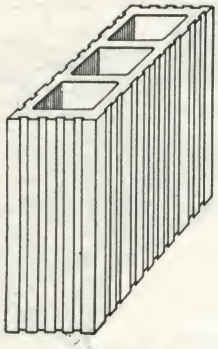
6x12x12
Eastern Factories
4 and 6 cell—22 and 24 lb.
Ohio Factories
3-cell—22 lb.
Western Factories
3-cell—22 lb.



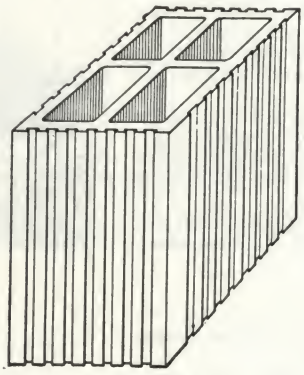
10x12x12
Eastern Factories
6-cell—36 lb.
Ohio Factories
4-cell—36 lb.
Western Factories
6-cell—36 lb.



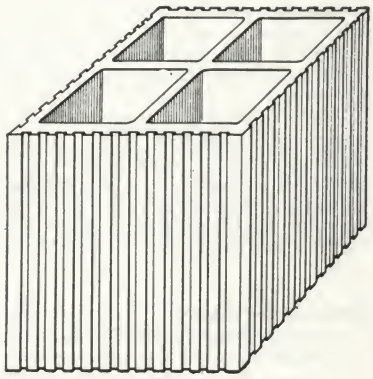
3x12x12
Eastern Factories
3-cell—15 lb.
Ohio Factories
3-cell—15 lb.
Western Factories
3-cell—15 lb.



5x12x12
Eastern Factories
6-cell—22 lb.
Ohio Factories
3-cell—19 lb.
Western Factories
3-cell—19 lb.



8x12x12
Eastern Factories
6-cell—30 lb.
Ohio Factories
4-cell—30 lb.
Western Factories
6-cell—30-lb.



12x12x12
Eastern Factories
6-cell—40 lb.
Ohio Factories
4-cell—40 lb.
Western Factories
6-cell—40 lb.

Note: Additional shapes available at Ohio factories: 5x12x12—6 cell—26 lb., 6x12x12—6 cell—28 lb., 7x12x12—3 cell—25 lb., 7x12x12—6 cell—30 lb., 8x12x12—6 cell—32 lb., 9x12x12—4 cell—32 lb.

In addition to their fire-resisting qualities, structural clay tile partitions are light, strong, easily handled by bricklayers, and do not transmit heat, cold or sound.

All partitions and furring tile, unless otherwise specified, are scored to receive plaster.

Wood or channel iron bucks are placed in all door openings, and should be 1½″ wider than thickness of the tile and act as grounds for the plastering.

It is not generally practicable to use 2″ tile for partitions, except for closets, shafts, etc.

Partitions of 3″ can be safely used up to 12′ in height, 4″ to 16′ and 6″ to 20′.

The tile are commonly made 12″ wide by 12″ long, except 2″ tile at Eastern and Northeastern factories, which is made 12″ long but 8″ wide at Eastern factories and 6″ wide at the Northeastern factory. They can be made any size required, but special sizes are necessarily more expensive.

In office buildings it is good practice to have all elevator enclosures of 6″, all main corridors and stairway enclosures of 4″ and the partitions between rooms 3″. Partitions should be bonded where meeting and anchored to wood bucks or brick walls by using 10d nails, or metal wall ties, in each second joint.

Natco Smooth Partition Tile (Glazed or Unglazed)

At a slightly increased cost, Natco Partition Tile, either glazed or unglazed, is made smooth on either one or two faces, as desired. The smooth, sanitary, easily cleaned interior surfaces of the tile walls, make it very desirable for warehouses, industrial plants, elevator shafts and similar applications.

Glazed or unglazed backing up tile, with smooth face, can also be furnished to be used in combination with smooth partition tile.

Standard thicknesses of this material are 4″, 6″ and 8″. Other sizes of smooth partition tile will be manufactured if sufficient quantities are ordered.

Standard glazed or unglazed partition tile, with one or two faces smooth, are always furnished with one end smooth so that tile can be used as a closure or lintel in addition to its use as wall tile.

NATCO PARTITION TILE

Continued on next page

NATCOFLOR

Description

Natcoflor System is a combination of special shaped Natco tile with 2″ wide cement grout joists or ribs spaced 13″ center to center between the tile. Each rib is reinforced with two steel bars, one straight and one bent.

No concrete is required on top of the tile for structural purposes. Wooden sleepers are placed directly on the tile, and are held in place with cinder fill or sleeper clips.

The design of the tile is such as to place the maximum sectional area of the tile unit where it will be of the most use in resisting the compressive stresses. The dead weight of the tile thus has been kept down to the minimum. In other forms of "Combination" systems, these stresses are taken care of by the concrete top. The tile are made from special clay which gives them high compression strength. Tests have repeatedly and clearly demonstrated that tile may be safely figured to take compressive stresses of 1000 pounds per sq. in. of net sectional area, allowing an ample factor of safety.

Cement grout or mortar mixed one part cement to two and one-half parts sand is used for the 2″ joists. This thoroughly covers the steel reinforcing and completely fills the joints between the tile. (At girders, etc. where the open ends of the tile are exposed, the tile are first placed on end and the cells stopped with about 1″ of mortar.) The flanges of the tile meet at the bottom to form an all tile ceiling thus assuring an excellent base for plastering.

With Natcoflor, greater speed of erection at a much lower cost is secured. This is due to the perfect alignment of the tile, small amount of material required for reinforcing joists and the extremely light dead load as compared with other strictly fireproof floors.

Our engineers will be glad to give architects and designers any assistance required in using this construction.

Special Features

Saves Dead Load—In either steel or concrete frame and foundation.

Saves Floor Depth—2″ to 4″ less than other construction.

Saves Plastering—No metal lath or suspended ceiling. A continuous tile surface.

Saves Labor Cost—Permits speedy erection the year around.

Saves Insurance—Strictly fireproof construction.

Typical Specification for Natcoflor

Fireproofing—The floor construction shall be what is known as "Natcoflor" system which consists of special structural clay with flanges at the bottom forming a tile ceiling, and 2″ wide mortar joists 13″ on center between the tile. Each joist shall be reinforced with 2 steel bars at the bottom, one to be bent and one straight. The bent bars shall extend up and continue over the point of support, where possible to the ¼ point of the adjacent span. No concrete or mortar is required on top of the tile for structural purposes.

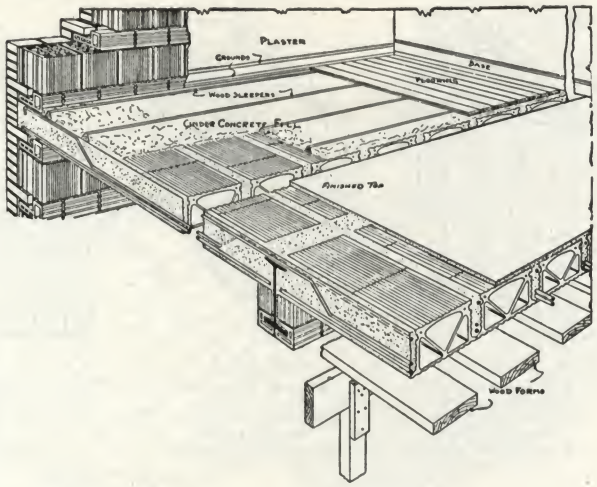
Tile—The size of the tile shall be as called for on the plans. The sizes given are the depth of the tile. All tile shall be of hard burned fire clay, free from damaging impurities and large defects and properly scored on all exterior surfaces. Actual weight of the tile shall not vary more than 5% over or under weight for different sizes published by the National Fireproofing Corporation. Tile shall be placed end to end in straight rows with bottom flanges and ends as tight as possible together. Break joints in alternate rows of tile by the use of half tile. Tile used at ends of rows shall be placed on ends and stopped with a small quantity of mortar. Rows of tile should line up from span to span. All tile must be wet before pouring mortar to insure a good bond.

Steel Reinforcing—Bars shall be of a deformed type meeting the specification of the A.S.T.M., and of sizes shown on drawings. Before placing into position, bars must be clean and free from rust or scale, adhering material, oil or any other substance tending to destroy the bonding qualities.

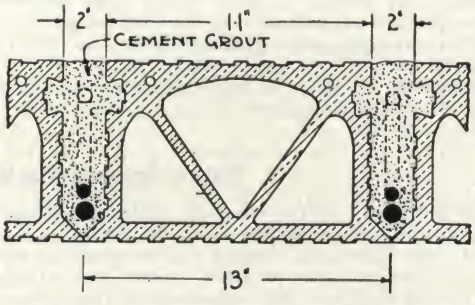
Cement—American portland cement to conform to the A.S.T.M. specifications.

Sand—Sand shall consist of quartz grains or other hard material, clean and free from any surface film coating and graded from fine to coarse. Shall not contain injurious vegetable or other organic matter or more than 5% by volume of clay or loam.

Mortar—Mortar for 2″ joist between the tile shall be mushy grout, not too wet, and shall consist of 1 part by volume of cement and 2½ parts sand and shall be mixed in a batch mixer. Mortar shall be dumped on top of tile and swept into place in joists between tile, so that all joists and joints are properly filled. Mortar shall be puddled so that steel reinforcement is completely encased in mortar.



Perspective view of Natcoflor System. Part of the finished floor is wood, the other part cement, to show the method of laying. The wall is Natco Header Backer.



Notice in the detail view, how the tile meet at the bottom, to form an all-tile ceiling.

NATCOFLOR SYSTEM OF FIREPROOF FLOORS

Continued on next page

TILE DEPTH AND STEEL AREA "NATCOFLOR" COMBINATION LONG SPAN FLOORS NO CEMENT TOP, 2" MORTAR RIBS 13" ON CENTERS

f_m and f_t = 1000 lb. per sq. in.
f_s = 16,000 lb. per sq. in.

$\frac{E_t}{E_s} = \frac{1}{10}$

¾" mortar below reinforcement.
S = Area of steel per joist, sq. in.
T = Depth of tile, in. = depth of floor.

Total safe load (dead plus live), pounds per square foot		150		165		180		195		210		225		240		260		300		335	
	Continuous span $M = \frac{WL}{12}$																				
	Semi-continuous span $M = \frac{WL}{10}$	125		135		150		160		175		185		200		220		250		280	
	Simple span $M = \frac{WL}{8}$	100		110		120		130		140		150		160		175		200		225	
Span in feet		T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S
6		4	.16	4	.17	4	.19	4	.20	4	.22	4	.23	4	.25	4	.28	4	.31	4	.35
7		4	.21	4	.23	4	.26	4	.27	4	.30	4	.32	4	.34	4	.38	5	.32	5	.36
8		4	.28	4	.30	4	.33	4	.36	4	.39	5	.31	5	.33	5	.37	5	.42	5	.47
9		4	.35	4	.38	5	.32	5	.34	5	.37	5	.39	5	.42	5	.46	5	.53	6	.46
10		5	.33	5	.35	5	.39	5	.42	5	.46	5	.48	5	.52	6	.45	6	.51	6	.57
11		5	.39	5	.43	5	.47	5	.50	6	.43	6	.46	6	.49	6	.54	6	.62	7	.57
12		5	.47	5	.51	6	.44	6	.47	6	.51	6	.54	6	.59	6	.65	7	.61	7	.68
13		6	.43	6	.47	6	.52	6	.55	6	.60	6	.64	7	.57	7	.63	7	.71	8	.67
14		6	.50	6	.54	6	.60	6	.64	7	.58	7	.61	7	.66	7	.73	8	.70	8	.78
15		6	.57	6	.62	7	.57	7	.61	7	.67	7	.70	7	.76	8	.70	8	.80	9	.78
16		6	.65	7	.58	7	.65	7	.69	7	.76	8	.67	8	.73	8	.80	9	.79	9	.89
17		7	.61	7	.66	7	.73	8	.66	8	.72	8	.76	8	.82	9	.79	9	.90	10	.89
18		7	.68	7	.74	8	.69	8	.74	8	.81	9	.74	9	.80	9	.88	10	.89	10	1.00
19		7	.76	8	.69	8	.77	8	.82	9	.78	9	.83	9	.89	10	.88	10	.99	12	.90
20		8	.71	8	.77	8	.85	9	.79	9	.87	9	.92	10	.88	10	.97	12	.89	12	1.00
21		8	.78	8	.85	9	.82	9	.88	10	.85	10	.90	10	.97	12	.87	12	.98	12	1.10
22		9	.75	9	.81	9	.90	10	.85	10	.93	10	.99	12	.86	12	.95	12	1.08	.....	.....
23		9	.82	9	.89	10	.87	10	.93	12	.83	12	.87	12	.94	12	1.04	12	1.18	.....	.....
24		9	.89	10	.86	10	.95	12	.82	12	.90	12	.95								
25		10	.86	10	.93	12	.84	12	.89	12	.97	12	1.03								
26		10	.93	12	.81	12	.90	12	.96	12	1.05	12	1.12								
27		12	.81	12	.88	12	.97	12	1.04	12	1.13										
28		12	.87	12	.94	12	1.05	12	1.12												
29		12	.94	12	1.01	12	1.12	12	1.20												
30		12	1.00	12	1.08	12	1.20	.....	.....												

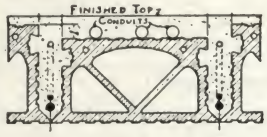
Design Data

Size, in.	4	5	6	7	8	9	10	11	12
Mortar per sq. ft....cu. ft.	.051	.064	.077	.090	.102	.115	.128	.141	.154
Wt. of tile .....lb.	26	28	30	32	34	37	40	44	47
Wt. of floor..lb. per sq. ft.	30	34	39	42	45	48	52	56	59

Note: Unit shear not to exceed 60 lb. per sq. in. Width of joist may be figured 3½" in computing shear (2" for joist and ¾" for each adjoining shell of tile).

Conduits

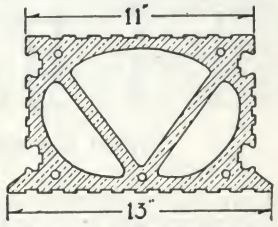
When cement or terrazzo floors are used, a run for conduit may be easily made by putting in a series of tile less in depth than the rest of the floor. In the case of wood floors, the conduit may be run between the sleepers.



Negative Moment and Shear Tile

Our corporation is able to furnish a special Natcoflor tile for use adjacent to the supporting members to take care of any excessive negative moment or shear at these points. This tile is so designed that the compressive area at lower portion of the tile is the same as the area in the upper portion besides having the additional key for the grout at the bottom. Generally two or three pieces of this special tile are required adjacent to the supporting member, depending on the designer's requirements. In some cases they would not be needed.

The advantages of this tile are that in some cases a saving in depth and cost of floor may be obtained. For example, a floor must sometimes be increased in depth because of excessive shear or negative moment although it meets the other design requirements. The tile weighs little more than the ordinary Natcoflor and the dead weight of the floor as a whole is not affected.



Negative Moment and Shear Tile

NATCOFLOR SYSTEM OF FIREPROOF FLOORS

This form of arch combines great strength with economy and lightness. It is particularly adaptable to warehouses, lofts, factories, sidewalks, or wherever a flat ceiling is not necessary.



The 6" arch is most commonly used and weighs approximately 35 lb. per sq. ft.

End construction tile may be used, but they are unsatisfactory unless the arches are of uniform span and rise throughout. Where a very light, strong arch is required in deep beams, and a flat ceiling is also demanded, use a suspended ceiling below the beam.

The most effective location for the tie rods to counteract the thrust is near the bottom of the beams. They may be placed there and painted, or set higher and protected by the arch. If this is done the rods in the end spans should be made forked or double rods set crossing each other.

Complete engineering data on application.

NATCO SEGMENTAL ARCH FLOOR

Continued on next page

NATCO FLAT ARCH FLOORS

General

Flat arches as adapted to floors and roofs are made up of various shaped tile as shown on Natco Page 48. The tile resting against the beams are called "skews" and the protection for the beam known as the "soffit" tile is held in place by the bevel on the "skews." The intermediate tile are called "inters" and the center one the "key."

Natco Flat Arch in general comes under two divisions, namely, the "End Construction Flat Arch" and the "Combination Side and End Construction Flat Arch" each described and illustrated below.

The depth of the arch must be proportioned to the span between the beams and to a certain extent to the load carried. A safe general rule for finding the depth of the arch in inches is to multiply the span in feet by 1½" and add the thickness of the protection below the beams. This is the code requirement of the larger cities in general.

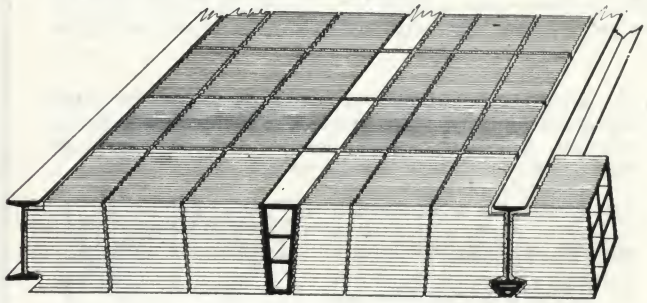
The outstanding advantage of the flat arch is its adaptability to speed in construction independent of temperature. Centers need remain in place but one-tenth to one-fourth as long as required under concrete construction. Moisture due to cement hydration is minimized.

Flat arch is most economical. Although the arch itself is placed by bricklayers, this labor cost is more than offset by the low centering cost. Centering is hung. (See Natco Page 47.) There is little or no lumber loss—no nails are used. Floors beneath are accessible for work by other trades.

By the omission of tile units at the time of erection, pipe work of the mechanical trades is economically accommodated. Holes may be cut at any time, almost with impunity, and later easily patched.

The all-tile ceiling provides the most satisfactory surface for plastering.

Natco End Construction Flat Arch

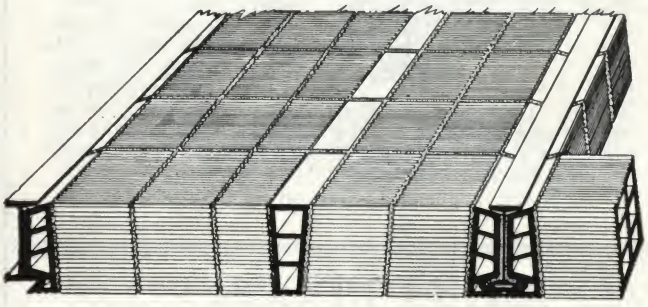


Typical End Construction Arch

Natco End Construction Flat Arch consists of end construction skews and inters and side construction keys.

This arch is the most adaptable form of arch, since the end construction skew can be cut to fit different elevations and sizes of the beams. Of course, it is advisable to keep the bearing beams as near the same elevation as possible so that the same skew which is usually cut to allow a 1½" or 2" soffit of tile under the beams may be used throughout and make for uniformity and, therefore, economy of construction. Moreover, this gives a more uniform ceiling level.

Natco Combination Side and End Construction Flat Arch



Typical Combination Side and End Construction Arch

Natco Combination Side and End Construction Flat Arch consists of side construction skews and keys and end construction inters.

By reversing the direction of the cells in the skews, better protection is given to the sides of the beams by the mortar joints and by the shells of the skews. The inters must be set end to end in straight courses from skew to key. The typical section illustrates the method of assembling the various members of this arch.

Side construction skews, being made by die to fit the various size standard beams, cannot be changed, as can end construction skews. If it is desired to use side construction skews uniformly throughout a building, the bearing beams must be on the same level at the bottom and of sufficient depth to permit the top of the skew to go under the top flange of the beam. Of course, special conditions can be taken care of by using end construction skews at these points and cutting them to fit.

Designing Data

The following table is applicable to all shapes of tile. Generally speaking, hollow tile of various shapes but of the same depth and cross-sectional area, have equal strength, and therefore, the strengths of arches of equal depth are directly proportional to their net sectional areas. The depth of arch as given in the table includes the protection underneath the bottom of the beam or the thickness of the soffit tile.

The strength of any arch depends as largely upon the workmanship as upon the material. The spans given in the table are safe if the arches are properly set, but may not agree with the requirements of the Building Codes of various cities.

Safe Loads given in the table have been figured for the Natco Combination Arch of side construction skews and keys with end construction inters. The net sectional areas of tile indicated, are for the keys—the critical point of the arch—and are taken per foot of tile parallel to beams.

Weights of arches have *not* been deducted from safe loads in the table; this and other dead load must be deducted to obtain the net safe live load for any arch and span.

TABLE OF SAFE LOADS PER SQ. FT. (DEAD AND LIVE)

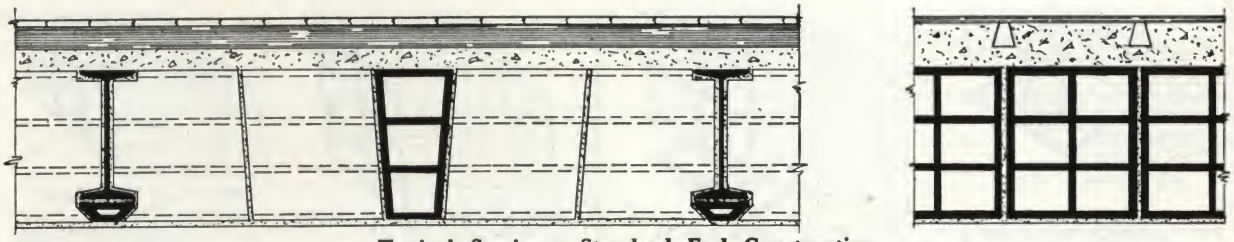
Factor of Safety of 7

Arches	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.	15 in.
Net sectional areas	27 sq. in.	27 sq. in.	27 sq. in.	27 sq. in.	36 sq. in.	36 sq. in.	36 sq. in.
Average wt. per sq. ft.	26 lb.	30 lb.	32 lb.	36 lb.	40 lb.	48 lb.	56 lb.
Span—ft. and in.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
3–0	420	490	560	630	933	1120	1400
3–3	357	417	477	537	795	954	1193
3–6	308	360	411	462	685	823	1028
3–9	268	313	358	403	597	716	895
4–0	236	276	315	354	525	630	786
4–3	.....	244	279	314	465	558	697
4–6	.....	218	249	279	415	497	622
4–9	.....	.....	223	251	372	447	558
5–0	.....	.....	201	227	336	402	504
5–3	.....	.....	182	205	305	365	457
5–6	.....	.....	.....	187	277	333	417
5–9	.....	.....	.....	171	254	305	381
6–0	.....	.....	.....	157	233	280	350
6–3	.....	.....	.....	.....	214	258	322
6–6	.....	.....	.....	.....	198	238	298
6–9	.....	.....	.....	.....	.....	221	276
7–0	.....	.....	.....	.....	.....	206	257
7–6	.....	.....	.....	.....	.....	178	223
8–0	.....	.....	.....	.....	.....	157	197
8–6	.....	.....	.....	.....	.....	.....	174
9–0	.....	.....	.....	.....	.....	.....	155
9–6	.....	.....	.....	.....	.....	.....	140
10–0	.....	.....	.....	.....	.....	.....	126

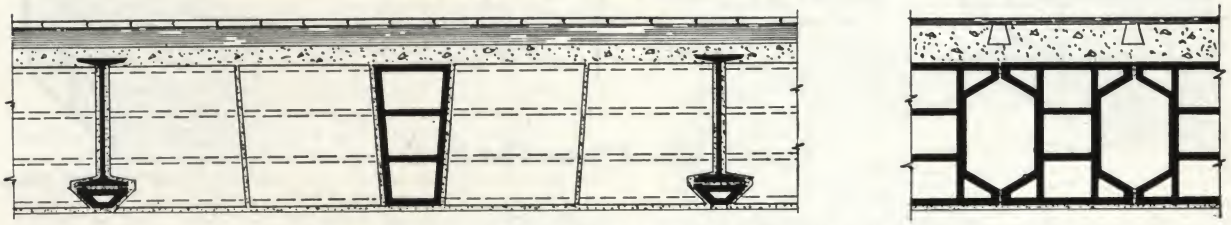
Engineering Service

It is part of NATIONAL FIREPROOFING CORPORATION'S service to design the arches for each individual span and furnish schedules and sketches showing the pieces which should be used in each size of span, and to make skews which will fit the structural steel work.

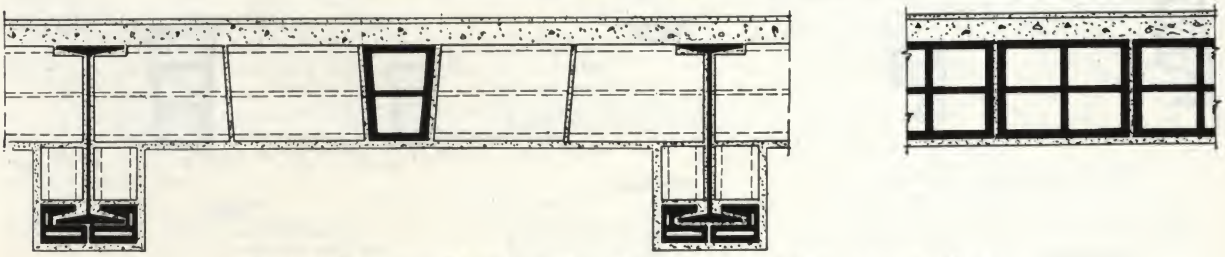
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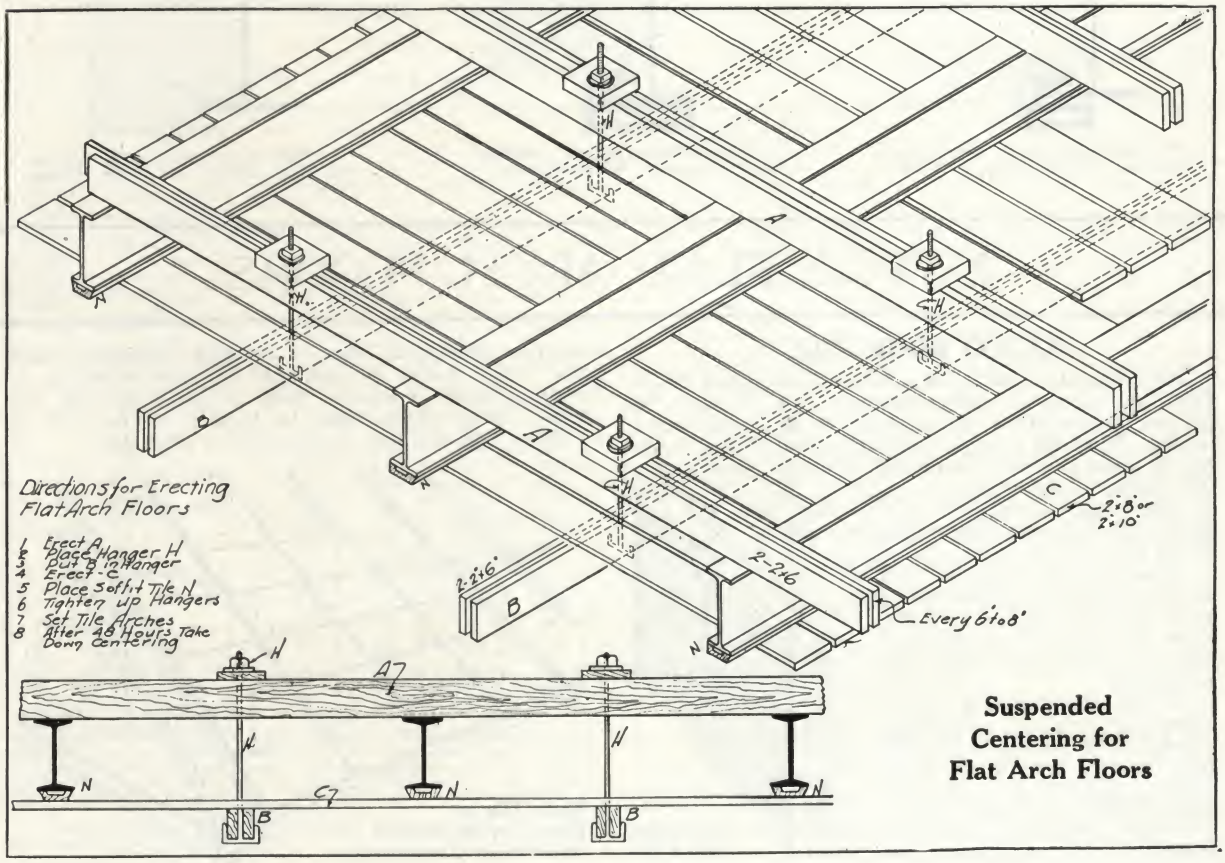
Typical Sections—Standard End Construction



Typical Sections, X-Tile Type—Western Factories Only



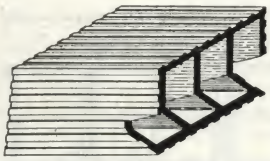
Typical Sections—Raised on Floor Beams for a Paneled Ceiling Effect



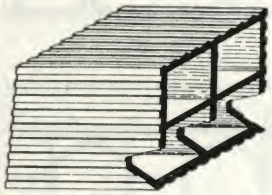
Suspended Centering for Flat Arch Floors

NATCO FLAT ARCH FLOORS

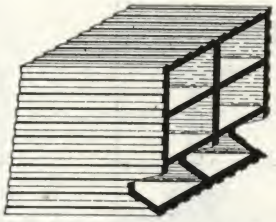
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For 6″ and 7″ Floors



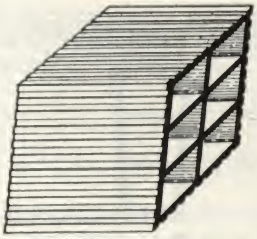
For 8″, 9″, 10″ and 12″ Floors



For 13″, 14″ and 15″ Floors

Bottom Cut End Construction Skews

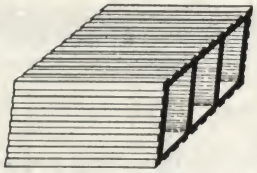
(*Note:* The 12″ length measured at center of arch is standard)



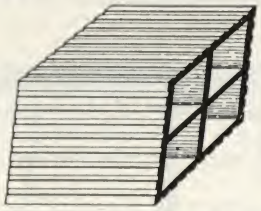
For 13″, 14″ and 15″ Floors

Inters

(*Note:* Furnished in 8″ and 12″ lengths)

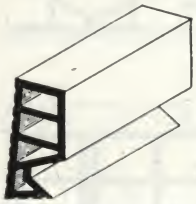


For 6″ and 7″ Floors

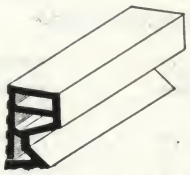


For 8″, 9″, 10″ and 12″ Floors

Typical Units of Natco Flat Arch



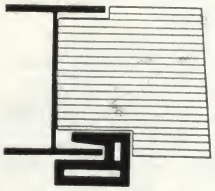
For 9″, 10″, 12″, 13″, 14″ and 15″ Floors



For 6″, 7″ and 8″ Floors

Side Construction Skews

(*Note:* 4½″ in thickness at center-line of arch. These skews can be furnished only for standard flange beams)

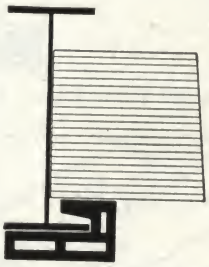


End construction skew, cut to suit clip tile and flange of beam

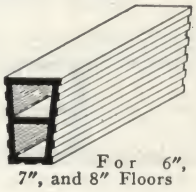


Soffit

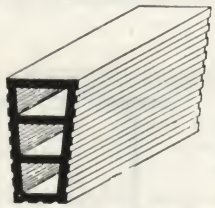
(Furnished in 1½″ 2″ thicknesses in widths to suit flange of beam)



Shows bearing of end construction butt skew on spandrel beam



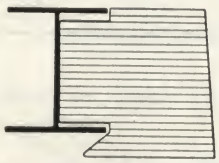
For 6″, 7″, and 8″ Floors



For 9″, 10″, 12″, 13″, 14″ and 15″ Floors

Keys

(Furnished in 3″, 4″, 5″ and 6″ thicknesses measured at the center line of arch)



End construction skew cut at top and bottom for wide flange beam

NATCO FLAT ARCH FLOORS

NATCO BOOK TILE

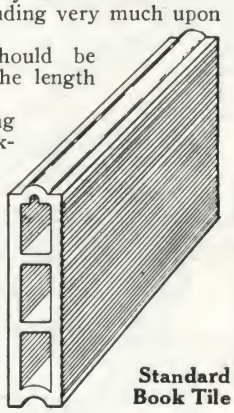
On account of their shape these tile are called "Book Tile," and they are made especially for roofs to be covered with concrete, tar and felt or any composition roofing. They are made of uniformly hard-burned material 3″ thick, and of a length depending very much upon the weight to be carried.

The steel framework T's should be spaced 1″ wider on centers than the length of the tile.

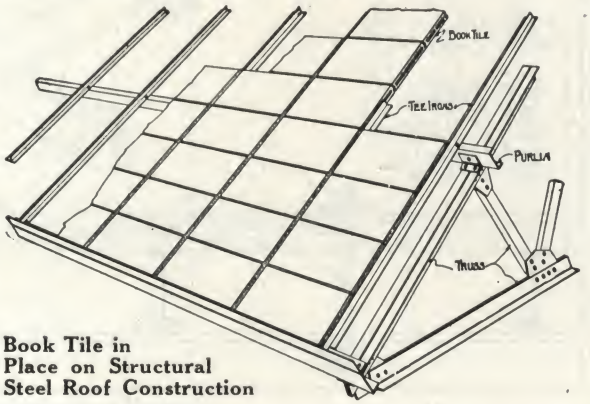
Book tile are used for covering the flat roofs of penthouses, bulkheads, etc., and may be used for main flat roof of a building when only light live loads are anticipated.

When providing for future increase in height of a building, a floor of flat arches is set and roof grading placed on temporary supports of T's (or dwarf-walls), and book tile.

Natco Book Tile permits a minimum of condensation of moisture underneath due to its high insulating qualities. This makes it invaluable for the protection of manufacturing processes, such as glass making, etc., where the product might be injured by the drip of water, or the spalling of underside of roof slab.



Standard Book Tile



Book Tile in Place on Structural Steel Roof Construction

NATCO BOOK TILE

Continued on next page

NATCO COMBINATION LONG SPAN FLOORS

Natco One Way System

The Natco Combination One Way System is particularly adapted to all classes of buildings where long span fireproof floors are required without the beams showing in the ceilings. The Natco Structural Tile in combination with the load bearing concrete reduces the dead load and provides a good plastering surface. The tile make permanent forms in which are cast the series of connected concrete "T's."

The tile in a line of units are all in contact, and hold each other securely in the proper positions. They are not displaced in pouring the concrete, and no realignment is necessary.

The naturally strong adhesive bond between tile and concrete, aided by the mechanical bond of the dovetail scorings on the tile, produce a monolithic effect.

In these floors, the Natco Structural Tile fireproofs the load carrying concrete of the beams against the flames of a fire below. Without this protection, a fire is likely to cause spalling, rapid weakening of the floor, and ultimate failure.

Special Two Way System Tile

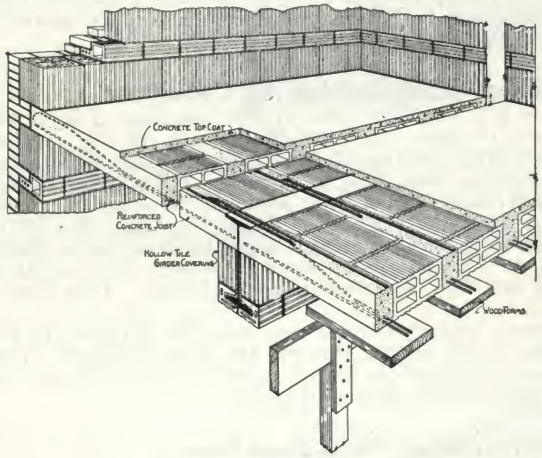
Besides our regular one way system of combination floor we are able to furnish a special tile adaptable for a two way system of combination floor.

This special Natco tile is a hollow tile block *with no exterior openings,* which prevents the concrete from entering the cells as would be the case if ordinary floor tile were used.

The design of the two way system is similar to the one way, the joists running in two directions at right angles instead of one which distributes the load in two directions. This floor has the advantages of decreasing the depth of slab, eliminating deep spandrel beams, and giving a very rigid floor laterally. No additional cross-bracing is required, which is a very important consideration in tall buildings subjected to high wind stresses.

Perspective View of Typical One Way Combination Floor

Note economical wood centering used; 2x8″ or 2x10″ under each joist is sufficient



TILE DEPTH AND STEEL AREA REQUIRED, ONE WAY COMBINATION FLOOR SLABS, 2″ CONCRETE TOP, JOISTS 4″ WIDE, 16″ ON CENTERS

fc.=650 lb. per sq. in.
fs.=16,000 lb. per sq. in. $\frac{Ec}{Es}=\frac{1}{15}$
Shear, 60 lb. per sq. in.

¾″ of concrete below reinforcement.

T=Tile; S=Steel.

*If moment $\frac{WL}{12}$ is used, investigate design for shear.

Total safe load (dead plus live), pounds per square foot																								
	Continuous Span $M=\frac{WL^*}{12}$	150		165		180		195		210		225		240		260		300		335		375		450	
	Semi-continuous span $M=\frac{WL}{10}$	125		135		150		160		175		185		200		220		250		280		310		375	
	Simple span $M=\frac{WL}{8}$	100		110		120		130		140		150		160		175		200		225		250		300	
Span in feet		T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S	T	S
6												3	.20	3	.22	3	.24	3	.28	4	.24	4	.27	5	.27
7		3	.19	3	.20	3	.22	3	.24	3	.26	3	.28	3	.30	4	.26	4	.30	5	.27	5	.30	6	.31
8		3	.24	3	.26	3	.29	3	.31	3	.34	3	.36	4	.31	4	.34	5	.32	5	.36	6	.34	7	.35
9		3	.31	3	.33	3	.37	3	.40	4	.34	4	.36	4	.39	5	.35	5	.40	6	.38	7	.37	8	.40
10		3	.38	3	.41	3	.46	4	.39	4	.42	4	.45	5	.40	5	.44	6	.42	7	.41	8	.41	9	.44
11		3	.46	4	.39	4	.44	4	.47	5	.42	5	.45	5	.48	6	.45	7	.45	7	.50	8	.49	10	.48
12		4	.43	4	.47	4	.52	5	.46	5	.50	5	.53	6	.49	6	.54	7	.53	8	.53	10	.47	12	.48
13		4	.51	4	.55	5	.50	5	.54	5	.59	6	.53	6	.57	7	.55	8	.55	9	.55	10	.56	12	.57
14		4	.59	5	.53	5	.58	5	.63	6	.58	6	.61	7	.58	7	.64	8	.64	10	.58	12	.54	15	.53
15		5	.56	5	.61	5	.67	6	.61	6	.67	7	.61	7	.66	8	.65	9	.66	10	.67	12	.63	15	.61
16		5	.64	5	.69	6	.65	6	.70	7	.66	7	.70	8	.67	9	.66	10	.68	12	.64	12	.71	15	.70
17		6	.61	6	.67	6	.74	7	.68	7	.75	8	.70	8	.76	9	.75	10	.77	12	.73	15	.65		
18		6	.69	6	.75	6	.82	7	.77	8	.74	8	.78	9	.76	10	.76	12	.73	12	.81	15	.73		
19		6	.76	6	.83	7	.80	7	.86	8	.83	9	.78	9	.85	10	.85	12	.81	15	.73	15	.81		
20		7	.74	7	.80	7	.89	8	.84	8	.91	9	.87	10	.85	12	.79	12	.90	15	.81	15	.90		
21		7	.81	7	.89	8	.87	8	.93	9	.91	9	.96	10	.94	12	.87	15	.80	15	.90				
22		7	.89	8	.86	8	.95	9	.91	9	.99	10	.95	12	.87	12	.95	15	.88	15	.98				
23		8	.86	8	.93	8	1.03	9	.98	10	.98	10	1.03	12	.94	12	1.03	15	.95						
24		8	.94	8	1.02	9	1.01	9	1.08	10	1.07	12	.96	12	1.03	15	.92	15	1.05						
25		8	1.02	9	1.00	9	1.10	10	1.07	12	.98	12	1.03	12	1.12	15	1.00	15	1.13						

Note: Based on safe loads indicated, the thickness (inches) and the areas of reinforcement (square inches per joist) are the figures for average conditions, and are for general information only. Each particular operation should be designed in accordance with actual conditions.

The Natco Engineering Department is at the disposal of any one desiring further information.

Weight of Combination Slabs Per Square Foot

Tile, in.	3	4	5	6	7	8	9	10	12	15
Weight, lb.	45	50	55	60	65	70	75	80	90	105

Note: Load tables for general information only, as each particular operation should be designed in accordance with actual conditions.

NATCO COMBINATION LONG SPAN FLOORS

Continued on next page

NATCO GIRDER AND COLUMN COVERING

The purpose of beam, girder and column covering is to place a retardent to fire over the structural steel frame of buildings, and to provide a surface on which to plaster. This goes under the general name of "Fireproofing of Steel."

Natco Fireproofing Is Reliable

It is necessary that the steel columns and the girders and beams projecting below the floor slab, be protected by at least 2" of fireproofing material. Experience has proven that well-burned hollow tile (burned at temperature of about 2000° F.) has no equal as a covering for structural steel or iron. In case of a serious fire, the integrity of the whole structure depends upon the thorough protection of the columns and girders and floor beams, and no reasonable expense should be spared to accomplish this.

Natco Fireproofing Satisfies All Conditions

There is a shape of Natco Girder Covering to fit in with almost any condition of fireproofing which may be required. The lower flanges of rolled beams and girders of any size have a Natco Clip or Shoe Tile to fit them. Plate girders, double beams and riveted sections are protected by means of a hung soffit and angle tile (see Figs. 4 and 8). The sides of the beams are protected by proper thickness filler tile at heights designed to fit neatly the opening between top of clip or angle tile and floor slab or top flange of beam. (See illustrations.)

If heavy plaster cornices are used, the girders are protected first by the hollow tile, and the shape required for the plastering is obtained by iron brackets and metal lath. This latter, alone, is not sufficient protection.

Natco Fireproofing Saves Dead Load

Tile covering saves from 50 to 75% in weight over concrete or brick covering. Even on a small 12" I-beam the saving is 50% in weight; in the large girders it is much greater. (See Fig. 9.)

Natco Fireproofing Saves in Cost

Tile fireproofing can, in general, be put in place complete for close to the same price as it costs to erect box forms about the beams for the concrete. In addition, you have the cost of steel beam wrapper and of the concrete itself to add to form cost; therefore, a saving of approximately 25 to 50% in cost, over concrete covering, can be made by use of tile.

Natco Fireproofing Promotes Speed of Erection

No forms being needed to hold the tile in place, there is, of course, no period of waiting for concrete to set before shores and forms can be removed.

Natco Fireproofing Provides Best Plastering Surface

One of the greatest advantages of tile beam and girder and column covering is the excellent plastering surface which is given to receive this finish.

No other surface is more economical of plaster, nor has a better mechanical key or more capillary suction than has tile. The absorption of moisture is small and test shows that the tile and plaster become almost one body. Only two coats of plaster are needed on tile.

Where steel columns are to be stiffened with concrete or where concrete columns are to be finished with plaster, the forms for same may be built out of partition tile or column covering. The tile must be banded with steel wire or strap iron, and mortar must be allowed to set, however, before the concrete is poured so that there will be sufficient strength in the wall to take care of the side pressure of the wet concrete.

Natco Fireproofing Will Carry the Load Safely

Tile girder covering has always been used with flat arch construction of floors, but present day contractors are finding a great saving in its use with all forms of concrete and long span type of floors. Where the span is long and where there is a considerable load on the floor joists, it is customary to use tile filler with the cells vertical, so that concrete can run into them and give a continuous solid bearing of the concrete joints on the lower flange of the beam. (See Figs. 6 and 7.) Even horizontal fillers are amply strong enough to carry the total load of the ordinary floor safely and well within the allowance for tile walls under building codes.

Natco Fireproofing Lowers Insurance Rates

Due to the tendency of the time to lighten up in the construction of floors in order to effect saving in steel, there has come into recent use a great variety of floors of thin built-up sheet metal joists, of built-up joists of bars, and light weight structural beams with a thin slab of top concrete. These floors depend for fireproofing merely on a ceiling of plaster on metal lath.

It is self-evident that if the supporting steel beams are not protected by something other than these ceilings, fire breaking through a portion of the ceiling will get to the structural beams and the entire floor or structure will fail. Such supporting beams should be fireproofed entirely up to the underside of the concrete floor slab on top of the joists, in which case the floor slab might fail, but the structure will be intact. (See Fig. 10.)

Buildings constructed of heavy slow burning timbers and floors on a steel frame can be made much more secure and obtain a much better insurance rate if the beams and columns be encased in tile.

Natco Fireproofing a Barrier Against Corrosion

No better protection can be found for structural steel against corrosion than tile masonry with good cement mortar filling space between tile and steel. Exterior steel members should, therefore, be built in solidly with tile masonry.

Natco Fireproofing Service

The standard shapes entering into the construction of Natco Beam and Girder Covering are carried in stock at all times. Regardless of the size of the job, shipments can be started promptly and kept up as needed, provided, of course, that proper notice is given of the extent and nature of the requirements so that the factories can be scheduled to take care of them.

It is not necessary for the architect or contractor, when designing for or estimating on the use of Natco Hollow Tile Beam and Girder Covering, to worry about the sizes and shapes of the tile clips and filler which must be used on the various size beams.

It is part of the service provided by the NATIONAL FIREPROOFING CORPORATION to furnish with each order for this material, a set of schedules for the architect's approval and the contractor's use, designating just what will be furnished for each beam shown on the final steel erection plans. This material is all sold on a basis of the square footage of the actual outside surface of the tile surrounding the beam from bottom of floor on one side of beam to the bottom of floor on the other side.

Estimates can be made of the approximate amount of this tile by taking the linear distance in feet around (A + B + C) as shown in Fig. 1 or (A + B + C + D) as shown in Fig. 2, and multiplying this sum by the length of the beam in feet.

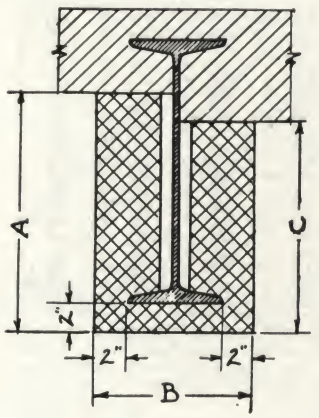


Fig. 1

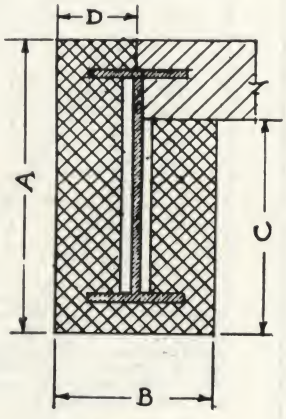
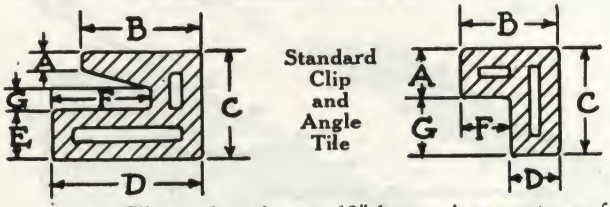


Fig. 2

After order is placed, a full set of the architectural drawings and a set of the final structural steel erection plans, as made up by the structural steel fabricator, should be forwarded to the NATIONAL FIREPROOFING CORPORATION as soon as possible, so that design can be made and submitted for approval at earliest date possible.

Continued on next page

NATCO GIRDER COVERING



Note: Clips and angles are 12″ long. A percentage of halves is shipped with each order.

Die No.	Approx. Sq. ft. outside measure	Approx. Weight per piece	A	B	C	D	E	F	G
G20	.65	13	¾	3⅜	3¾	3¾	2	2	¾
G25	.70	14	¾	3⅞	4	4½	2	2½	13/16
G30	.75	15	⅞	4¼	4¼	4¾	2	3	⅞
G35	.80	16	¾	4¾	4¼	5½	2	3½	1
G40	.85	17	¾	4¾	4¼	6	2	4	1
G45	.90	18	¾	4¾	4¼	6½	2	4½	1
G46	.95	19	¾	4¾	4¾	6⅝	2	4⅝	1½
G50	.95	19	¾	4¾	4¼	7	2	5	1
G55	1.00	20	¾	4¾	4½	7½	2	5½	1¼
G60	1.05	21	1	5½	4⅝	8	2	6	1⅜
G61	1.05	21	1	4½	4⅝	8	2	6	1⅜
G70	1.16	23	1	6	4⅞	9	2	7	1½
G71	1.16	23	1	4½	4⅞	9	2	7	1½
G75	1.33	29	2	7½	6⅜	9½	2	7½	2⅜
G80	1.40	32	2	8	6⅞	10	2	8	2⅞
L23	.60	12	2	4	5	2	.....	2	3
L26	.90	18	2	4	8½	2	.....	2	6½
L43	.65	13	2	6	5	2	.....	4	3
L46	.95	19	2	6	8½	2	.....	4	6½

How to Select and Order Proper Clip Tile for Beams

(1) Obtain the width of the beam flange, either by field measurement, or from manufacturer's handbook.

(2) Select in the above table the clip tile, having the "F" dimensions nearest to ½ the width of the flange.

(3) Order two pieces of clip tile for each linear foot of beams when the flange is covered on both sides.

Example—Beam having a flange width of 6¼″ will require a G-30, since ½ of 6¼″ is 3⅛″; and G-30 has "F" dimensions equal to 3″.

For some of the especially thick flanged beams, it is well to check the "G" dimension of the tile with the thickness of the nose of the flange of the beam.

Angle tile should be selected so that the "G" and "F" legs are long enough to cover the special condition for which it is needed.

Handling at the Job

In handling at the job, it is well to instruct your labor foreman that when a G-20 Clip is called for, the "F" or jaw dimension is two inches, a G-25 is 2½″, etc. on down the list. Similarly an L-23 is 2″ at the "F" and 3″ at the "G" dimension, etc. for all of the angles, except that the "G" dimension for the L-26 and L-46 angles is 6½″.

Caution: When material is received at the job, it is essential that all sizes of Clip, Angle and Filler Tile be piled in separate groups. If this be done, the handling of the shapes from pile to bricklayer will be greatly expedited.

Special Thickness of Fireproofing to Fulfill Ordinance Requirements

Where ordinances depart from the generally accepted standards nationally established, the NATIONAL FIREPROOFING CORPORATION in all cases provides Girder and Column covering of thickness and design that fulfill the ordinance requirements in that particular locality or district. In such cases special details, comparable to those illustrated under this heading, have been prepared and are accessible at the branch office serving the locality.

Our representatives are thoroughly familiar with all local building ordinance requirements pertaining to fire proofing within their respective territories—their advice and suggestions are always promptly available.

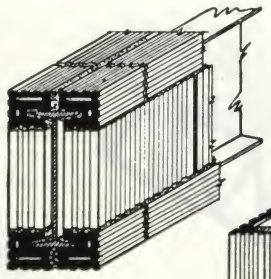


Fig. 3
Shows method of entirely enclosing a strut or beam which is in no way protected by the floor or other masonry

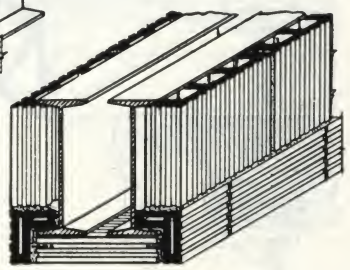


Fig. 4
Double beams, if not too far apart, may be protected on the bottom by long shoe or clip tile, however, if it be over 14″ from the outside of flange on one beam to the outside of flange on the other beam, a 3″ soffit tile is hung on metal hangers, which the contractor may make of No. 16 gauge or heavier strap iron. An angle tile is mortared over the end of this and after the mortar has set, the hanger serves as a reinforcement for the corner

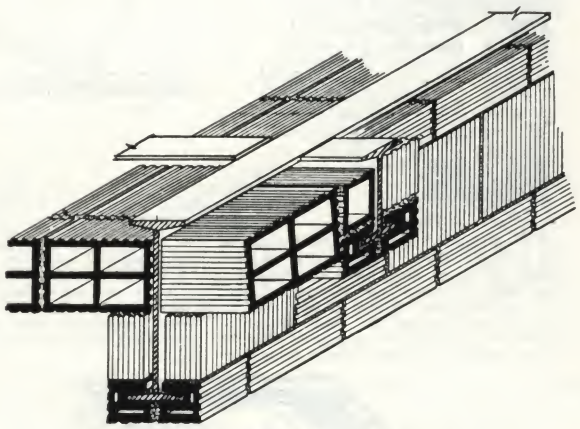


Fig. 5
Illustrates conditions of covering in flat arch work. Note especially covering where the arch is parallel to shoe on small beams and the full side covering at opening in floor

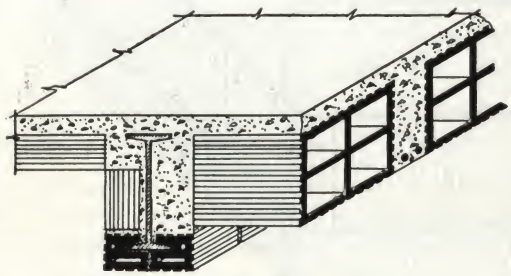


Fig. 6
Shows method of using tile fireproofing with long span concrete joist floor construction. It is economical either with structural tile or metal pan filler in the floor. You will note that the covering is put in place before the floor is poured and that the concrete of the joist fills the cells of the tile and bears directly on the flange of the beam

NATCO GIRDER AND COLUMN COVERING

Continued on next page

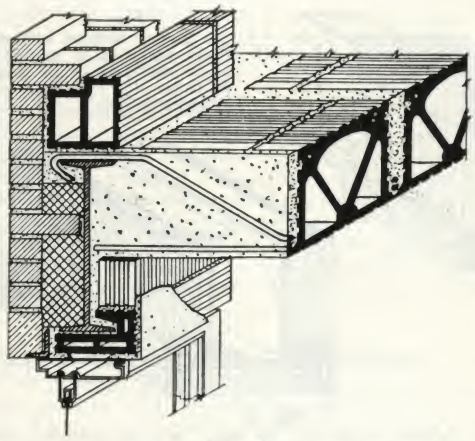


Fig. 7

At spandrel beams over window heads and in similar places, a long clip tile can be furnished to give a good return for plastering and at the same time thoroughly fireproof the underside of the beam. Note illustration of the "Natcoflor" system and of Natco Unibacker wall construction

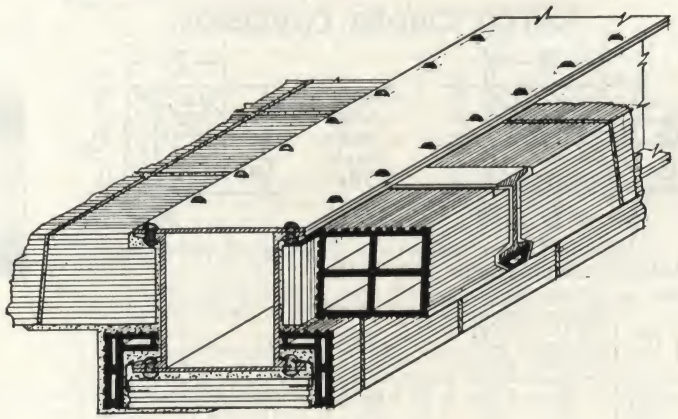


Fig. 8

Box Girders or any riveted sections are protected on soffit by hanging proper length of 3″ book tile on bottom by means of steel hangers (furnished by the contractor) and covering the ends of these with long lip angle tile. This fireproofing is done before the arches are set

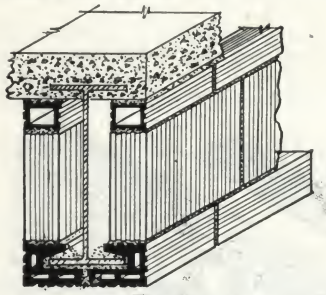


Fig. 9

Fireproofing with concrete slab floor construction. Note the extreme saving in dead load on these large girder beams due to the hollow construction. These beams are often covered after the floor is in place, thus permitting the use of the bottom flange to support floor forms

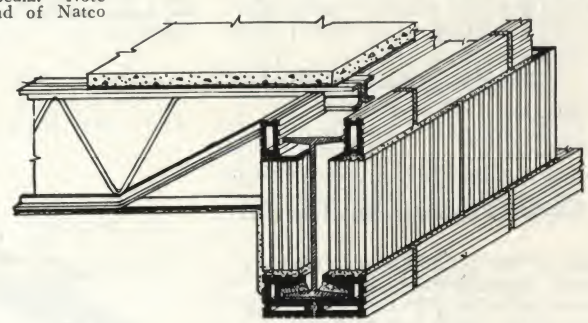


Fig. 10

The various types of light weight floors constructed of a thin slab of concrete on top of some form of light metal joist, which is protected only on under side by an ordinary coat of plaster on metal lath, are only rated as a semi-fireproof construction. We here show method of protecting the structural steel members used in connection with such construction by covering the tile entirely up to the under side of the concrete slab

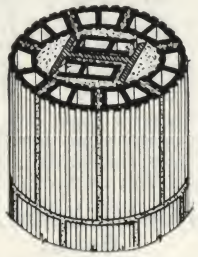


Fig. 11

Like the Bullnose Column Covering, not much of the 3″ Circular Covering is carried in stock, but any normally sized order can be manufactured in a reasonable time. The radius of the tile is 10″ on the outside and it is suitable for columns 16″ to 28″ in greatest dimension. This material is sold at a price based on the square foot of exterior surface.

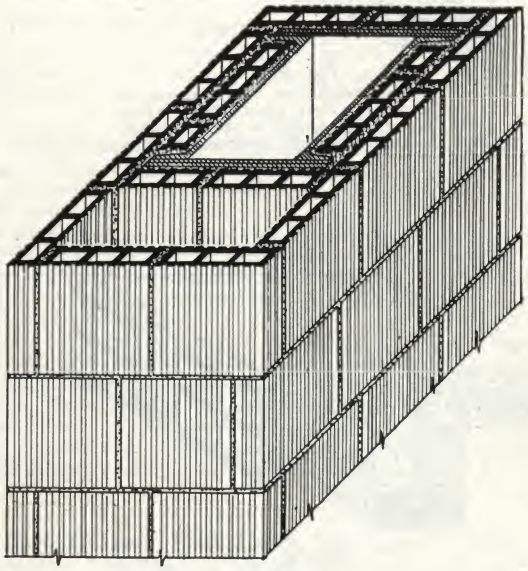


Fig. 12

Shows method of providing pipe space and vent ducts by building same in conjunction with the protection of the steel columns

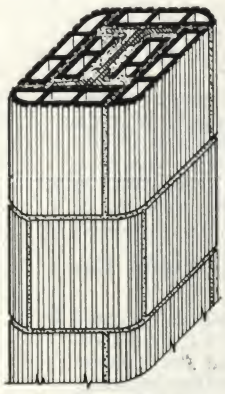


Fig. 13

Shows use of 3″ Natco Bullnose Tile in encasement of columns. No great quantity of this tile is carried in stock, but same can be manufactured on short notice, where requirements justify same

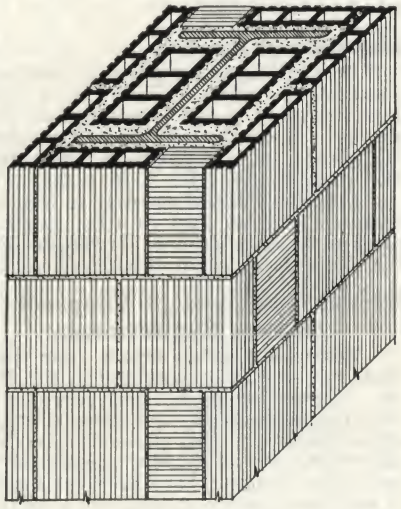


Fig. 14

Structural steel columns are most economically protected by encasing them with at least 3″ of hollow tile

NATCO GIRDER AND COLUMN COVERING

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NATCO FACE TILE

Natco Face Tile, with either smooth or tex finish, as ordered, is manufactured at our factory at Natco, New Jersey.

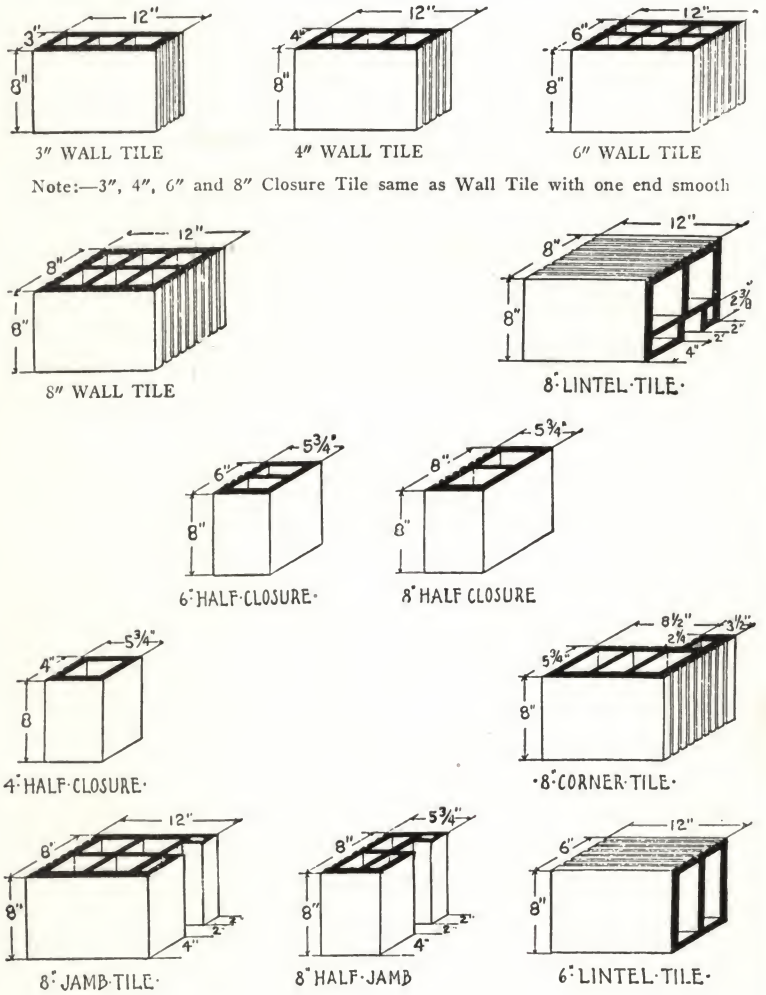
For general use, the kiln run of colors will be found the most satisfactory and pleasing combination. This tile can be furnished also in a one color range (not one shade) of very pleasing effect with one face tex finish and the other face smooth or scored.

Natco Face Tile is used principally in territory tributary to our New Jersey plants. It was developed and has been used successfully to meet a large demand for a hollow tile unit with a smooth or texture face for factories, railroad warehouses, farm buildings, etc. It is adapted especially to panel or curtain walls between reinforced concrete piers or columns. In the 8″ size, jambs and lintels for standard steel sash can be furnished.

Red or black mortar joints add greatly to the appearance of the wall.

When ordered, a proper proportion of half blocks is shipped to break joints.

Special shapes to build complete walls are illustrated at the right.



NATCO FACE TILE

WITH SMOOTH OR "TEX" FINISH AS ORDERED
MANUFACTURED AT OUR NATCO, N. J. PLANT

NATCO FACE AND COMMON BRICK

(Produced at plant at Port Murray, N. J.)

General:

Natco brick are made from a shale clay, properly burned, resulting in a brick of excellent structural qualities. They rate highly in compression and rupture tests and have a moderately low absorption.

Grades and Types of Brick:

NATCO COLONIALS: .

Selected smooth red brick with flashed and dark brick for relief.

NATCO TEX BRICK—FULL RANGE:

A rough textured face brick in blended range of reds, browns, blues, etc.

NATCO CLINKERS:

Rough overburned brick of odd shapes, etc., in reds, browns, blues, blacks, etc., mixed indiscriminately.

NATCO K/R SMOOTH REDS (COMMON):

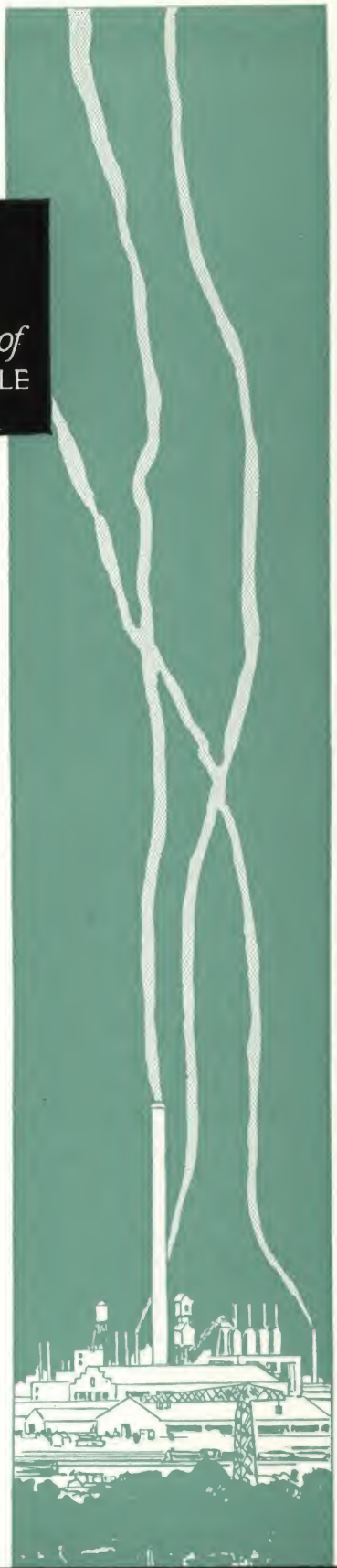
A smooth red brick not selected. An extra quality common brick of full size, well burned. Selection can be made in this class of brick for face brick purposes, at extra cost.

Samples of all brick will be submitted upon request.

NATCO FACE AND COMMON BRICK

NATCO

THE *COMPLETE* LINE *of*
STRUCTURAL CLAY TILE



NATIONAL · FIREPROOFING · CORPORATION

THE LARGEST CONCERN IN THE WORLD MAKING A COMPLETE LINE OF STRUCTURAL CLAY PRODUCTS

GENERAL OFFICES: FULTON BUILDING, PITTSBURGH, PA. BRANCHES: NEW YORK, CHANIN BUILDING; CHICAGO, BUILDERS BUILDING; PHILADELPHIA, ARCHITECTS BUILDING; BOSTON, TEXTILE BUILDING — — NATIONAL FIRE PROOFING COMPANY OF CANADA, LTD., TORONTO, ONTARIO

HENRY MAURER & SON

Manufacturers of Terra Cotta Hollow Tile Fireproofing

420 East Twenty-third Street
NEW YORK, N. Y.

PLANT, MAURER, NEW JERSEY

Products

"RARITILE" Enclosure Blocks for walls faced with brick. Standard sizes of INTERIOR PARTITION BLOCKS, WALL FURRING, and WALL BEARING BLOCKS.

For our page on Fire Brick, see Manufacturers' Index.

Quality

Deservedly reputed of best quality and workmanship, true to size and shape, with minimum tendency to breakage.

Facilities

Extensive clay mines adjacent to plant premises, owned, developed and operated by the company; plant located on tidewater in New York Harbor and two railroads (Central Railroad of New Jersey and Lehigh Valley R. R.) insures prompt shipment by boat or rail; motor truck deliveries direct to building give uninterrupted supply for work in progress. Modern and complete machinery and equipment afford ample provision for the largest contract requirements.

Backing Tile

The "Raritile" is a backing system of simple design, and yet possesses every desirable feature sought by architects, engineers and owners.

Only one size of block is used, making an ideal construction from a standpoint of permanence, simplicity and economy.

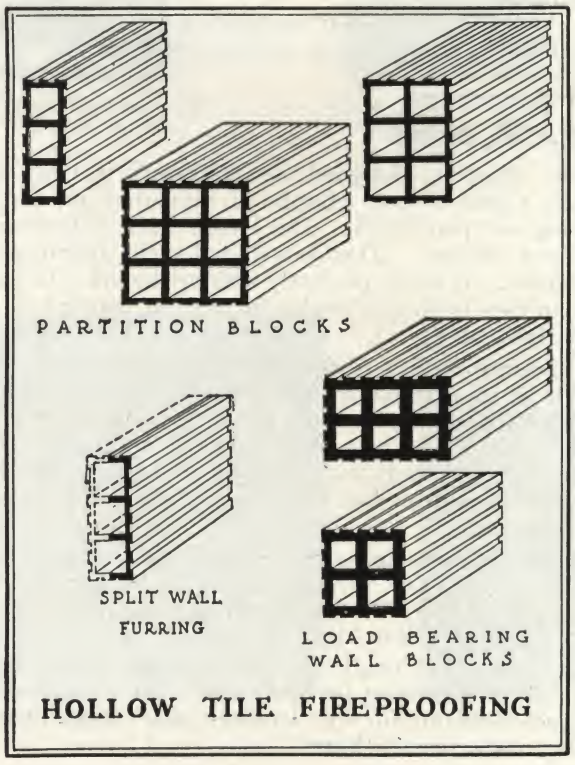
The webs and shells run vertically in perfect alignment, backing up both the stretcher and header face brick, with resultant maximum strength.

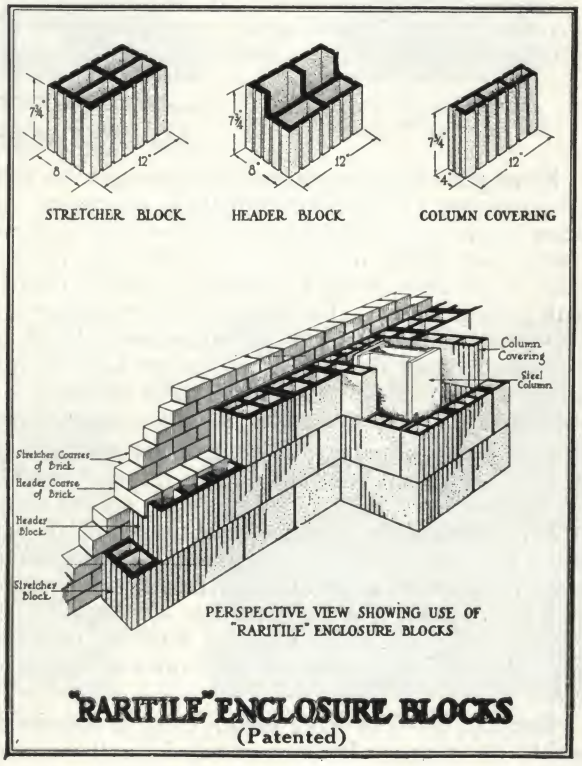
The air cells extend vertically the entire height from floor to floor with a continuous uninterrupted cubical air content, which creates absolute insulation as well as a true and complete furring into the wall; dampness can not penetrate as the cement joints are broken by the air cells.

Rigid unyielding support for the header face brick ties them in securely so they can not possibly sway or move out of place.

Catalogue

Descriptive catalogue on request.





HEATH CUBE SERVICE

609 Washington Building
TACOMA, WASH.

MANUFACTURERS AND SALES REPRESENTATIVES

AUSTIN, TEX., Elgin Butler Brick Co.
BEAUMONT, TEX., Beaumont Building Material Co.
CLEVELAND, OHIO, Valley View Brick Co.
Cleveland Builders Supply Co.
COLUMBUS, GA., Columbus Brick & Tile Co.
COLUMBUS, OHIO, Nelsonville Brick Co.
DALLAS, TEX., Fraser Brick Co.
DENVER, COLO., Heath Cube Sales
EL PASO, TEX., International Brick Co.
FORT WORTH, TEX., Harris Brick Co.
GALVESTON, TEX., The Haden Company
HARLINGEN, TEX., Brunson & Moore
HOUSTON, TEX., Vandaveer, Browne & Stoy
LINCOLN, NEB., Western Brick & Supply Co.
LOS ANGELES, CAL., Glading & McBean Co.
MINNEAPOLIS, MINN., Heath Cube Sales
OKLAHOMA CITY, OKLA., Reagan Brick & Tile Co.
PITTSBURGH, PA., Martin Brick Co.
ROCKFORD, IOWA, Rockford Brick & Tile Co.
SAN ANTONIO, TEX., Fraser Brick Co.
SAN FRANCISCO, CAL., N. Clark & Sons
SHEFFIELD, IOWA, Sheffield Brick & Tile Co.
TACOMA, WASH., Far West Clay Co.
WACO, TEX., Central Roofing & Supply Co.
WASHINGTON, D. C., United Clay Products Co.

The Company

The Heath Cube Service is an organization co-operating with the licensed manufacturers. The Heath Unit Tile Company is the owner of the Heath Patents. Rights to manufacture and sell Heath Cubes are licensed to those listed.

TRADE
HEATH CUBES
MARK

Product

The Heath Cube is a simplified form of structural clay tile. It is used for load-bearing masonry walls, and for backing up facing materials, such as brick, stone and terra cotta, in both load-bearing or non-load-bearing walls.

Branding

The product is marked by imprinting the words Heath Cube, and with the words Load Bearing when used in localities that require such marking.

Quality

Heath Cubes are made only by manufacturers who can comply with the specifications of the American Society for Testing Materials. Cubes possess high strength, good resistance to weather and to fire, and insure dependable masonry walls. Heath Cubes produce an excellence of workmanship in the finished job heretofore, we believe, unattainable in hollow tile masonry.

Source of Supply and Distribution

Licensed manufacturers and sales representatives are widely distributed throughout the United States, and include thirty-five manufacturing plants.

Our manufacturing plants are selected near the principal markets. As the Heath Cube is made uniformly under the same specifications at all plants it is possible to supply large orders from several plants. This insures prompt delivery.

Engineering Service

The various representatives will provide engineering data required, and will assist Architects and Engineers in the study of special masonry problems.

Catalogues, etc.

Apply to the nearest representative for catalogues, specifications, construction cost data and prices.

ADVANTAGES OF HEATH CUBES

Strength—Two properties give strength to Heath Cube masonry, double-web-and-shell alignment, and Roman bond, or two-way bond. The vertical alignment of webs and shells in tiers of load-bearing members within the wall is a fixed property in every detail of Heath Cube masonry. The Roman bond, peculiar to the cube, equalizes the stresses and distributes loads uniformly throughout the masonry structure as in no other assembly. Tests show that Heath Cube masonry is an exceptionally strong structural clay tile construction.

Economy—The basic Cube, with its designed division into halves and quarters, builds masonry with the least number of shapes. There are no special shapes. The halves and quarters are even divisions of the basic Cube. The mason has only the simple Roman bond to learn, and it is the same in every detail, either side-set or end-set. It is these properties of simplicity and flexibility that reduce the labor of building to a minimum. There is no patchwork with brick or special tile shapes.

Simplicity—The basic Heath Cube is the simplest possible tile shape. Its size is based on the common brick. Masonry designed for brickwork is built with Heath Cubes without change of measurement, and no cutting nor patchwork. The Heath Cube is both side-set and end-set. Double-web-and-shell alignment is automatic. It bonds perfectly with brickwork. In backing up face brick it provides for perfect bonding of the brick headers.

Soundproofing and Insulation—The Heath Cube builds an ideal insulated wall. Circulation of air in the cellular spaces is prevented by end-setting every third Cube. No special tile shapes and no additional labor. This is possible only with Heath Cubes. Also the large number of cells prevent the passage of sound more successfully.

Fire Protection—The process of making Heath Cubes under 2000° of heat results in a pre-tested fire resistant product. In the Heath Cube wall the rate of heat transfer is very low on account of the multiple cells. The short length and cubical shape resists cracking due to expansion by heat better than elongated tile shapes. The interior web structure and compact design resists distortion by heat.

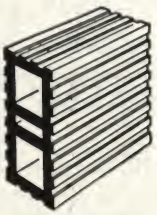
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A FORWARD STEP IN STRUCTURAL TILE MASONRY

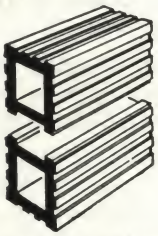
The Basic Units



Cube



Half Cube



Quarter Cube

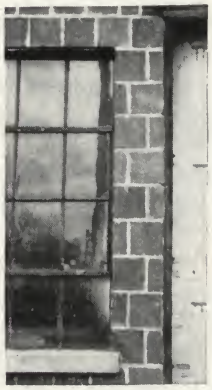


Header Cube

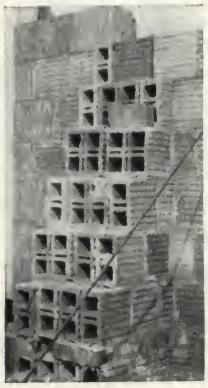
With these basic units, walls are built in the same dimensions as with brick, as the Cube is one brick long, two bricks and one mortar joint wide, and three bricks and two mortar joints high, approximately 8 in. in its three dimensions.

The *illustrations* below show some common details built with Heath Cubes. A Cube weighs 17 lbs., and a cubic foot of Heath Cube masonry weighs 60 lbs.

With the Heath Cube the architect is assured of a very durable and consistent masonry owing to the two-way bond and double-web-and-shell alignment being constantly carried out in every detail.



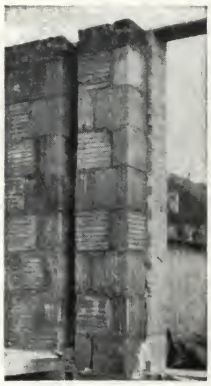
12-in. Mullion with End-set Cubes



16-in. Wall Bonding into a 12-in. Wall



12-in. Wall Showing Bond



4-in. Chase 12 In. from Window Jamb



8-in. Wall Construction



Heath Header Cube for 8-in. Back-up



Building Around Steel Columns

KRAFTILE COMPANY

Structural Tile with Wall Tile Finish in Plain Colors and Decorative Effects

MAIN OFFICE AND PLANT
NILES, ALAMEDA COUNTY, CALIF.

BRANCH OFFICES
SAN FRANCISCO, CALIF., 55 New Montgomery Street
CHICAGO, ILL., 567 E. Illinois Street
LOS ANGELES, CALIF., 4963 Sunset Boulevard
EXPORT OFFICE, W. W. MITCHELL, Manager, Robert Dollar Building, SAN FRANCISCO, CALIF.

Personnel of Company

KRAFTILE COMPANY is headed by A. Clay Myers. Participating in the company are J. L. Kraft, J. F. Whitney, C. H. Kraft and E. Ridgway, chairman of the board, president, vice-president and treasurer, respectively, of the Kraft-Phenix Cheese Corporation, and H. E. Leash, president of the International Wood Products Co., a subsidiary of the Kraft-Phenix Cheese Corporation.

Kraftile Products

KRAFT-ENAMEL HOLLOW TILE, structural tile with a face tile finish, in plain and decorative effects for Partitions and Exterior Walls.

For Kraftile High Fired Decorative Faience Tile, and Scum Gutters for swimming pools, and for Special Opaque Kraftile for use in public washrooms, etc., see Manufacturers' Index.

Kraft-Enamel Hollow Tile

Hollow building tile has for years enjoyed wide architectural acceptance for interior partitions and exterior curtain and load bearing walls.

Kraftile High Fired Faience Tile has established beyond question its distinctive advantages for interior and exterior walls, since it combines colorful beauty with unsurpassed qualities of endurance. Now, in Kraft-Enamel, one material has been created that combines hollow tile construction and face tile finish.

How Kraft-Enamel Is Made

Kraft-Enamel structurally is a hollow tile of exceptional quality. It is true to size and shape and entirely free from warps, cracks and checks. It is made by the exclusive Kraftile one-fire monolithic method.

By this method the body and enamel face are fired in *one* continuous burning at an extremely high temperature. Thus a hard burned body is produced to which the enamel is *fused*. The enamel can never lift or spall from the face as in the case of a tile produced by the *two-fire method* which makes the enamel a mere veneer.

The body of the tile is a cream colored fire clay, the same as that used in manufacturing Kraftile Faience Wall Tile. This body, plus the high temperature burning, produces a tile of very high structural strength.

The enamel finish is the same as used for Kraftile Faience Wall Tile which has shown such remarkable resistance to wear and temperature changes.

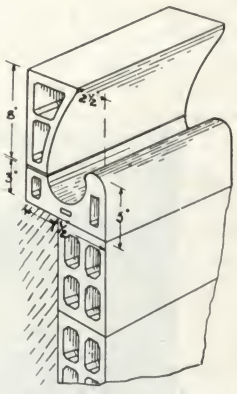
In Plain Colors and Decorative Effects—Kraft-Enamel is made in the same wide selection of colors as Kraftile Faience, ranging from oyster white and cream through sepia, tans, blues, greens, orchids, pinks to black. It also is available in distinctive mottled effects.

The delicate gradation of the colors and the semi-dull handcraft finish are the same as have brought Kraftile its artistic acceptance.

Borders and inserts are available in a variety of pleasing designs. Special shades and designs are made to order.

Kraft-Enamel Uses

For Partitions, Lobbies and Vestibules—This unique combination of structural and wall tile not only makes possible great economies but gives the sound-deadening and fire-resistant qualities inherent in hollow tile construction. The unusual size of the tile is arresting, and its colorful finish in a variety of plain colors, mottled and decorative effects, offers a stimulating field for artistic ingenuity. Various bonds can be employed and their effect is heightened by the infinite color gradations comparable with the finest of faience tile.



Scum Gutter for Swimming Pools

For Finishing Both Sides of a Partition—When it is desired to have a wall tile finish on both sides of a partition, Kraft-Enamel split tile is used as a furring and veneer.

As a Veneer—Kraft-Enamel split tile is also used as an exterior and interior furring and veneer, in place of enamel and face brick and architectural terra cotta.

Continued on next page

Interbonds Perfectly—Kraft-Enamel Hollow Tile interbonds perfectly with hollow tile and common brick, and its fire clay body has a high affinity for mortar.

For Curtain and Load Bearing Walls—To all the advantages that hollow building tile offers for curtain wall and load bearing wall construction, Kraft-Enamel adds its distinctive finish—as permanent and free from upkeep costs as it is beautiful.

For Swimming Tanks—Kraft-Enamel is an ideal material for plunge work. Its lovely colorings and striking border effects will make a tank of fascinating beauty—at a cost far less than that of its equal in artistry—Kraftile Faience Wall Tile. It members with the Kraftile Improved Scum Gutter shown here, which is furnished in matched colors. Kraftile Scum Gutter can be cleaned from the rim of the pool and yet it is so designed that a swimmer's foot cannot be caught in it.

KRAFT-ENAMEL HOLLOW TILE is recommended for *partitions, lobbies, vestibules, store fronts, curtain walls, load bearing walls, swimming tanks, elevator shafts, kitchens, bathrooms, engine rooms, industrial buildings, food plants, hospitals, schools, dormitories, subways, tunnels and railroad stations.*

Kraft-Enamel Advantages

One Material and One Craft for Wall and Finish—With Kraft-Enamel, one craft, the mason, does the entire job of erecting and finishing the partition or exterior wall.

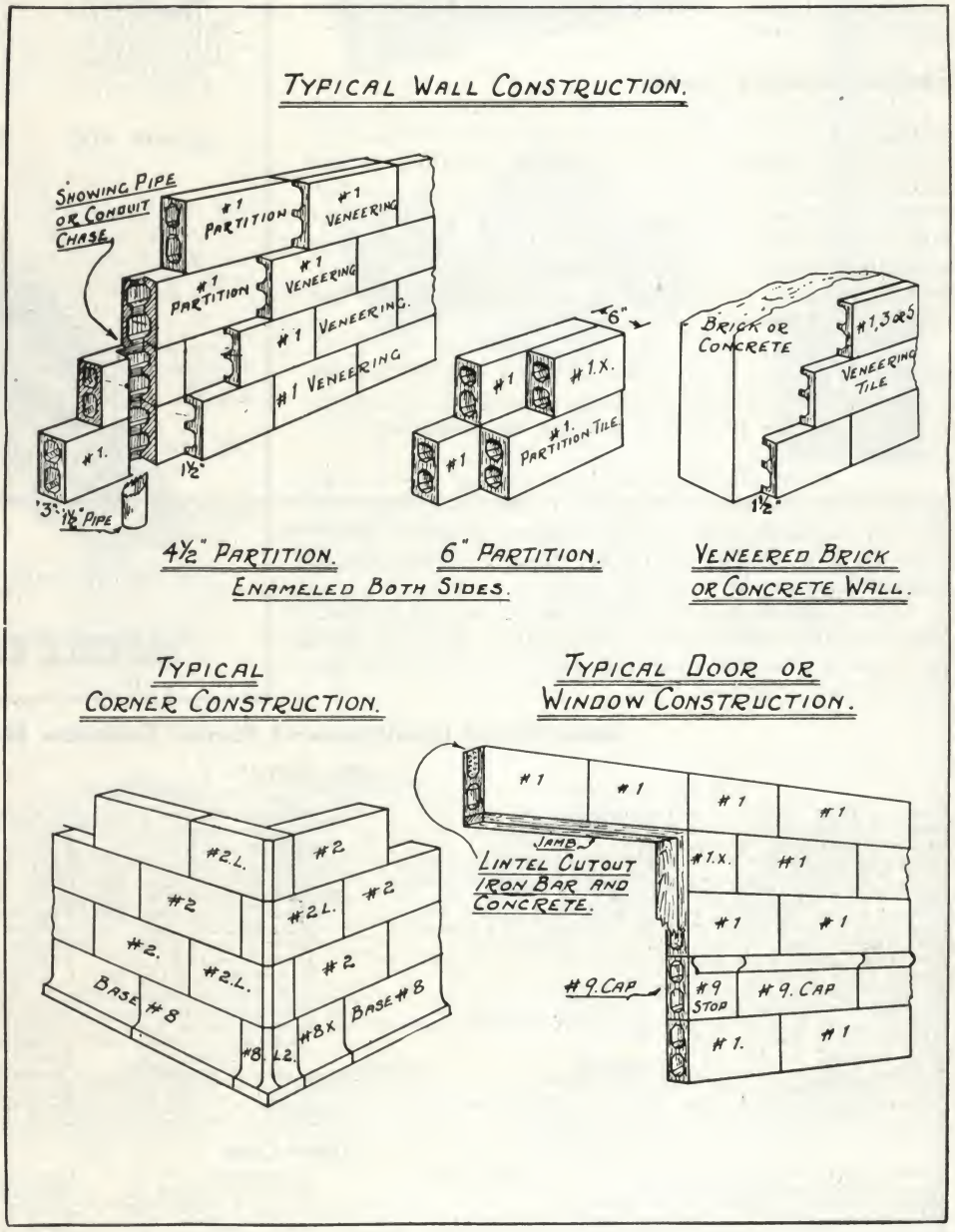
Kraft-Enamel is so true to size and shape that it will lay perfectly with a ⅛-in. joint and when pointed up compares favorably with the finest tile setting. The saving in labor cost and time is obvious. The cost is far less than that of erecting a wall or partition finished with even the cheapest of glazed wall tile. And it is obviously less than that of finishing an exterior wall, lobby or vestibule with architectural terra cotta or enameled or pressed brick.

A Wall Free from Upkeep Costs—In schools, hospitals, public buildings, etc., the cost of periodical plastering, painting and redecorating is an item of great consequence.

With walls of Kraft-Enamel these heavy recurrent expenses are entirely eliminated. The wall will never need any attention aside from an occasional washing as long as the building stands. It is sanitary and the mellow light reflection afforded by the soft colorings and semi-dull handcraft finish is pleasing and restful to the eyes.

The portable Kraftile cutter, a special cutter designed by the KRAFTILE COMPANY for true cutting of tile, marble, slate, etc., is especially recommended for this purpose. When a tile cutter is used, the full beauty of the finished wall is achieved.

The KRAFTILE COMPANY guarantees to furnish gratis for replacement any tile which shows manufacturing defects, such as glaze spalls, checks, stains, or fading within a period of two years.



RARITAN HOLLOW TILE CORPORATION

47 West 34th Street, NEW YORK, N. Y.

FACTORY: KEASBEY, N. J.

Products

HOLLOW TILE BLOCKS for partitions, furring, column and girder covering, etc.; LOAD BEARING EXTERIOR WALL BLOCKS and RARITILE ENCLOSURE BLOCKS for use with face brick.

Facilities

The location of the company plant on the Raritan River two miles west of Perth Amboy and a direct connection with the Lehigh Valley R. R. places the RARITAN HOLLOW TILE CORPORATION in a position to make prompt shipment either by rail or water. And as all shipments are made direct from the factory, the company is solely responsible for materials and deliveries.

The clays are mined on the company property adjoining the factory, which is equipped throughout with modern machinery.

Raritile Enclosure Blocks

In the past few years, there has been a remarkable increase in the use of hollow tile blocks in conjunction with either common or face brick for building curtain walls for skeleton steel structures. This type of construction not only shows a marked saving in labor costs, but it also decreases the weight of the walls so constructed by about 30%, and thereby effects a proportional saving in the amount of steel required for wall columns and spandrel beams.

The Raritile Enclosure Tile protected by W. G. Demarest patents Nos. 1,426,048 and 1,479,379, has the good features common to systems in which hollow tile is tied in to face brick and has also the following additional advantages:

(1) A continuous vertical air cell on the interior of the wall running from floor to floor eliminates the necessity of additional separate furring blocks.

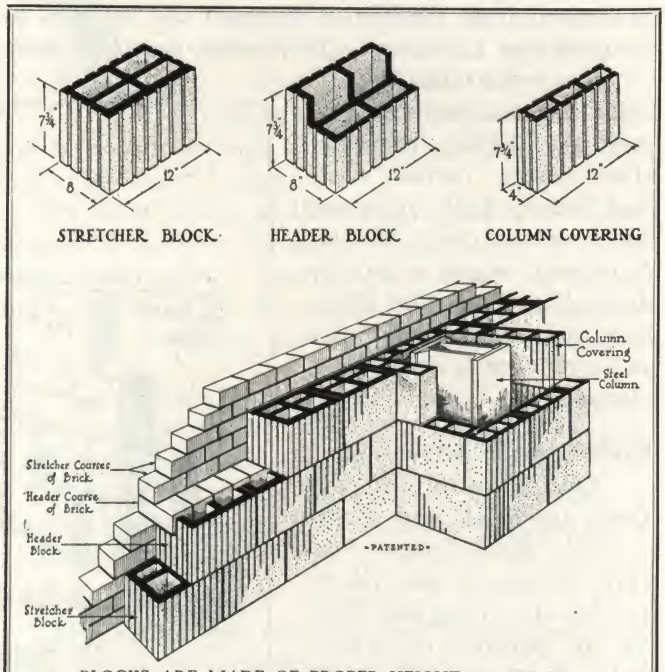
(2) The mortar joints are broken—there are no continuous joints through the wall.

(3) The blocks are of uniform height and approximately of uniform weight. This feature helps to speed up construction and makes it easy to tie in the face brick with any type of bond.

(4) The wall is so designed that webs and shells of the various blocks are in perfect alignment. In this way all material acts in compression and the full bearing strength of the tile is utilized.

Column Covering

For use with the Raritile standard wall block a 4-in. block of the same height is furnished for covering wall columns. This construction is simple and economical; the cost is approximately 30% less than a brick wall of the same thickness.



BLOCKS ARE MADE OF PROPER HEIGHT TO TIE IN WITH BRICK FACING

"RARITILE" ENCLOSURE BLOCKS

Some Recent Installations of Raritile Enclosure Blocks

New York, N. Y.

BUILDING AND LOCATION	CONTRACTOR	ARCHITECT
Equitable Trust Building, Broad St. and Exchange Pl.	Thompson-Starrett Co.	Trowbridge & Livingston, New York, N. Y.
Roosevelt Hotel, Madison Ave. and 45th St.	Thompson-Starrett Co.	Geo. B. Post & Sons, New York, N. Y.
Heckscher Apartment, 277 Park Ave.	Thompson-Starrett Co.	McKim, Mead & White, New York, N. Y.
Paramount Theater and Office Building, 43rd St. and Broadway	Thompson-Starrett Co.	C. W. & G. L. Rapp, Chicago, Ill.
R. H. Macy & Co. Department Store, 34th St. and Broadway	Marc Eidlitz & Son, Inc.	Robert D. Kohn, New York, N. Y.
American Woman's Club Building, 357 West 57th St.	Marc Eidlitz & Son, Inc.	B. W. Morris, New York, N. Y.
Western Union Telegraph Building, Worth and Hudson Sts.	Marc Eidlitz & Son, Inc.	Voorhees, Gmelin & Walker, New York, N. Y.
New York Hospital Buildings, 70th Street and York Avenue	Marc Eidlitz & Son, Inc.	Coolidge, Shepley & Bulfinch & Abbott, Boston, Mass.
New Madison Square Garden, 50th St. and Eighth Ave.	James Stewart & Co.	Thomas W. Lamb, New York, N. Y.
New York Central R. R. Office Building, 45th St. and Park Ave.	James Stewart & Co.	Warren & Wetmore, New York, N. Y.
Lincoln Office Building, 60 E. 42 St.	D. P. Robinson & Co., Inc.	J. E. R. Carpenter, New York, N. Y.
Apartment Houses, 1165 and 1175 Fifth Ave.	D. P. Robinson & Co., Inc.	J. E. R. Carpenter, New York, N. Y.
Mt. Sinai Nurses' Home, 5 to 17 E. 98th St.	Hegeman-Harris Co.	Robert D. Kohn & Chas. Butler, New York, N. Y.
Central Savings Bank and Office Building, 73rd to 74th St. and Broadway	Hegeman-Harris Co.	York & Sawyer, New York, N. Y.
Salvation Army Building, 120 W. 14th St.	Amsterdam Building Co.	Voorhees, Gmelin & Walker, New York, N. Y.
Office Building, 240 Madison Ave.	Edward Corning Co.	Cross & Cross, New York, N. Y.
McMillan Building, Fifth Ave. and 12th St.	Cauldwell Wingate Co.	Carrere & Hastings, Shreve & Lamb, New York, N. Y.
Park Lane Apartments, 299 Park Ave.	George A. Fuller Co.	Schultz & Weaver, New York, N. Y.
Railroad Co-operative Building, 44th St. and Lexington Ave.	George A. Fuller Co.	Sloan & Robertson, New York, N. Y.
Telephone Buildings, 206-214 West 18th Street	Tidewater Building Co.	Voorhees, Gmelin & Walker, New York, N. Y.

Other Cities

Jewish Hospital Buildings, St. Marks Ave., Brooklyn, N. Y.	Thompson-Starrett Co.	Crow, Lewis & Wick, New York, N. Y.
Penn Athletic Club, Philadelphia, Pa.	Thompson-Starrett Co.	Zantzinger & Borie & Medary, Philadelphia, Pa.
Shelbourne Hotel, Atlantic City, N. J.	George A. Fuller Co.	Warren & Wetmore, New York, N. Y.
Office Building, U. P. & Light Corp., Asbury Park, N. J.	D. P. Robinson Co.	Frank D. Chase, Inc., Chicago, Ill.
Brooklyn Telephone Building, Bridge and Willoughby Sts., Brooklyn	Cauldwell-Wingate Co.	Voorhees, Gmelin & Walker, New York, N. Y.
Five Apartment Houses, Standard Oil Co. of N. J., Bayonne, N. J.	Bayonne Housing Corp.	Andrew J. Thomas, New York, N. Y.
Van Tassell Apartment Houses, North Tarrytown, N. Y.	Tobir & McKenna	Andrew J. Thomas, New York, N. Y.
N. J. Bell Telephone Building, Broad and Lombardy Sts., Newark, N. J.	Turner Construction Co.	Voorhees, Gmelin & Walker, New York, N. Y.

THE WHITACRE-GREER FIREPROOFING COMPANY

Manufacturers of Hollow Building Tile

WAYNESBURG, OHIO

Products

HOLLOW FIRE CLAY BUILDING TILE.

GLAZED BUILDING BLOCKS; RADIAL CHIMNEY BRICK.

Facilities and Production

Our Ohio Plants at Waynesburg, Malvern and Magnolia have a monthly production of 20,000 tons.

Service

We manufacture a *complete line* of all standard sizes and are illustrating a few of the commonly used types. We maintain our own machine shop and can make up dies promptly for special shapes. No job is too large for us to handle. We give below some of our representative tile jobs:

The White House, Washington, D. C. (700 tons and 49 different sizes and shapes required)

New York Life Insurance Building, New York, N. Y. (15,000 tons), Cass Gilbert, Inc., Architect

Union Trust Building, Cleveland, Ohio (1200 cars, 42,000 tons tile), Graham, Anderson, Probst & White, Architects

and dozens of other similar jobs throughout the eastern portion of the United States.

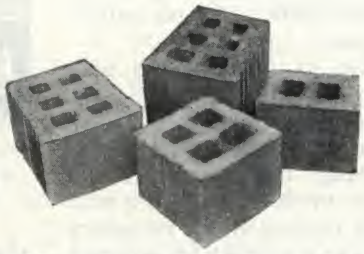
Catalogue

Complete catalogue mailed on request.



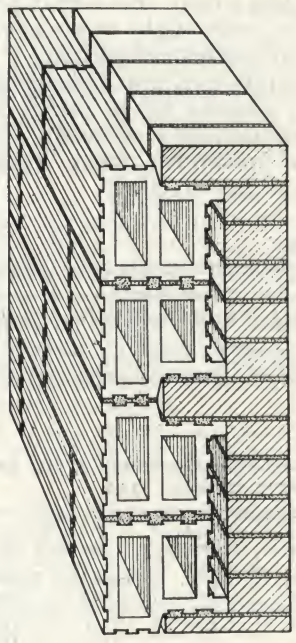
"Wedge Tile"





Buff Fire Clay Radial Chimney Brick

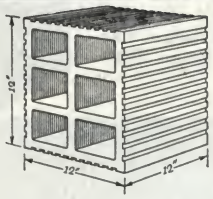
Dimensions of face—6⅜ in. wide x 4½ in. high. Thickness and weight—4 in., 6½ lb.; 6-in., 9½ lb.; 7-in., 11 lb.; 8-in., 12 lb.



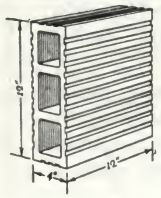
DRIBACKER TILE



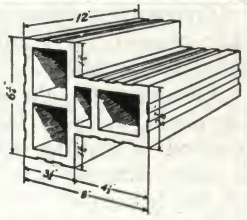
8"x12"x12"
4 cell



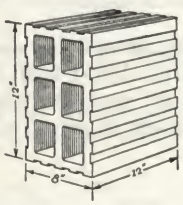
12"x12"x12"
6 cell



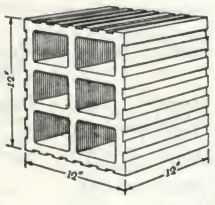
4"x12"x12"
3 cell



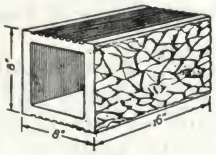
Standard Tee Tile



8"x12"x12"
6 cell



12"x12"x12"
6 cell



8"x8"x16" Hollow Block
1 cell

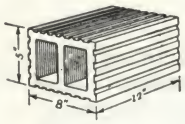


Standard Detail Block

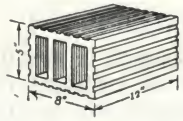
INTERLOCKING TEE TILE



5"x4"x12"
1 cell



5"x8"x12"
2 cell



5"x8"x12"
3 cell



Hollow Brick
2¼"x4"x8"
2 cell

CERTAIN-TEED PRODUCTS CORPORATION

GYPSUM DIVISION

Manufacturers of Gypsum Partition and Furring Tile

GENERAL OFFICES

100 East 42nd Street

NEW YORK, N. Y.

For Sales Offices, see Gypsum Plaster Pages

PLANTS

ACME, TEX. AKRON, N. Y. FORT DODGE, IOWA GRAND RAPIDS, MICH. GYPSUM, OHIO LARAMIE, WYO. NORTH HOLSTON, VA. BLUE RAPIDS, KAN.

For Our Other Products, see Manufacturers' Index

GYPSUM PARTITION AND FURRING TILE

Our gypsum partition and furring tile is now identified under the following brand names: *"Certain-teed"* or *"Acme."*

The following data is pertinent to both brands.

Gypsum Tiles are used for non-bearing construction in building interiors, such as partitions and wall furring, used as protection against fire on columns, in elevator shafts, stair wells, etc. These Tiles possess all the necessary physical requirements for a perfect fireproofing material and in addition are light in weight, permitting easier and faster handling and cutting away of openings in a standard wall if necessary.

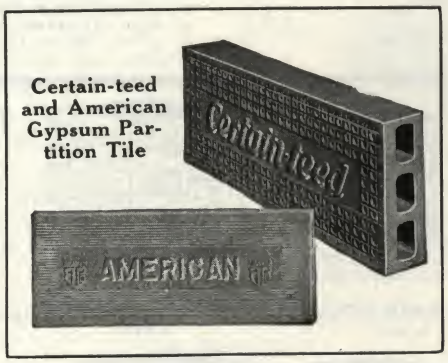
Gypsum partition tiles are also easily chased for conduits, switch boxes or pipe lines.

Grounds may be easily nailed to gypsum tile and bucks may be anchored by nailing with tenpenny cut nails directly into the end of each block course.

Another advantage of gypsum tile to be taken into consideration when designing the structural part of a building is the saving in dead load when using gypsum tile partitions.

Gypsum tile is not only considerably lighter than other tile, but because of the larger units, less mortar is required for setting and due to its uniform moulding in manufacture accurate weight of gypsum is assured and a saving of plaster effected. All these savings tend to lessen the dead load and naturally reduce the cost of construction.

TRADE-MARKS



Certain-teed and American Gypsum Partition Tile

Fire Protection

Gypsum tiles have passed unusually severe and exhaustive tests on their fire-resistant properties. They are especially recommended for non-bearing, fireproof partitions, stairways and elevator enclosures, and unplastered, non-bearing warehouse partitions, and for similar construction where a highly fire-resistant material is required.

Non-conductor of Sound

Gypsum partition tiles are excellent non-conductors of sound and for that reason are recommended and successfully used in hospitals, schools, office buildings, apartments, hotels and all buildings where a soundproof partition is desired. Authentic tests determine that less than 1/100 of 1% of incident sound is transmitted through gypsum tile partition plastered with gypsum plaster.

Other Advantages

Gypsum tiles by test have been proved to embody maximum density, great crushing strength, supreme fire, sound, and vermin proof qualities, with slight water absorption and negligible breakage.

Certain-teed and *Acme* gypsum tile are marked off by inches both longitudinally and vertically. This feature minimizes labor expense and expedites erection.

Laying

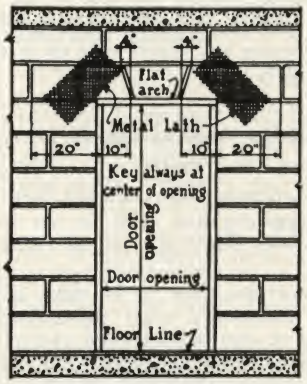
Gypsum unfibered plaster should always be used to lay these blocks. It makes a perfect bond and a stronger wall than either lime or Portland cement mortar. Approximateiy one-half ton of plaster is required to set a thousand square feet of block.

THICKNESS AND WEIGHTS OF CERTAIN-TEED, ACME AND AMERICAN GYPSUM 12x30-IN. TILE

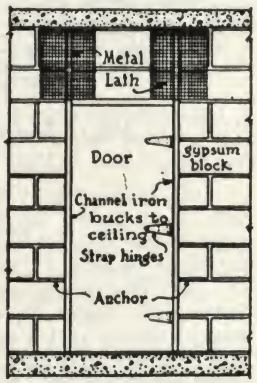
Thickness, in.	Ceiling heights up to —, ft.	Weight block per sq. ft., lb.	Weight mortar per sq. ft., lb.	Total Weight* per sq. ft., lb.	
				Plastered 1 side	Plastered 2 sides
2, solid	10	10.5	1.5	15.0	18.0
3, hollow	13	10.5	2.0	15.5	18.5
3, solid	15	14.5	2.0	19.5	22.5
4, hollow	17	14.5	2.5	20.0	23.0
5, hollow	25	17.0	2.7	22.7	25.7
6, hollow	28	19.0	3.0	25.0	28.0

*Allowing 3 lb. per sq. ft. for plaster, one side; 6 lb. per sq. ft. for plaster, two sides. (½-in. grounds.)

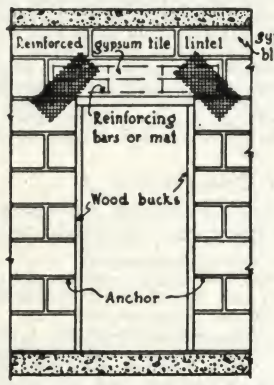
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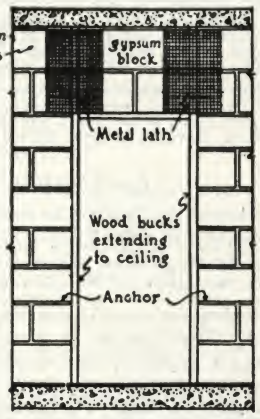
DETAIL SHOWING JACK ARCH CONSTRUCTION



DETAIL OF DOOR WITH CHANNEL IRON FRAME



DETAIL SHOWING REINFORCED GYPSUM LINTEL CONSTRUCTION



DETAIL SHOWING WOOD BUCKS

GYPSUM PARTITION TILE CONSTRUCTION DETAILS

BASIC SPECIFICATION FOR GYPSUM PARTITION AND FURRING TILE

Using Certain-teed or Acme Gypsum Tile in a Fireproof (Fire Resistive) Building

Notes: This specification is prepared for use in connection with the installation of non-bearing gypsum partitions and furring in a fire-resistive building. It may be used as written if the contractor for partitions and furring is a Sub-Contractor to the General Contractor. If, however, the gypsum partitions and furring are to be included under Mason Work, or Lathing and Plastering, according to locality and conditions the opening paragraphs (Section I (a), (b) and (c)) should be modified accordingly.

After various paragraphs will be found interpolated notes—which offer information and suggestions. Notes included in ( ) refer directly to preceeding paragraph.

Following this specification will be found "General Notes" in explanation of various provisions of the specification which are referred to in the interpolated notes.

Alternate specifications are suggested and will be found in small type in [ ] inserted after the proper clauses or section of the main specification paragraphs.

Note for Specification Writer: When writing a specification for a project at hand it is only necessary to use the paragraphs that cover the type of construction contemplated. It may be necessary to slightly revise certain paragraphs to fit the individual requirements.

I. General

(a) The General Conditions of this specification are hereby made to constitute a part of the specification for the furnishing and installation of Gypsum Partition and Furring Tile.

(If partition and furring tile are to be furnished and set as a part of Masonry Work, or of Plastering Work, omit paragraph (a) and place the heading "Gypsum Partitions and Furring" at head of paragraph (b) changing it to (a).)

(b) This Contractor shall report any floors, door bucks, etc., and any walls, windows, etc., which are not secure, plumb, true and level to the General Contractor for correction before proceeding with any gypsum block work.

(In some parts of the country, the architect may wish to eliminate this provision depending upon local conditions; *see also Par. (a) under General Notes.*)

(c) This Contractor shall accurately lay out all partitions and furring and set one course of tile one block high before door bucks, etc. are placed.

(If Gypsum Partition and Furring are under Mason Contractors work, they will probably be laid out by the General Contractors superintendent and this paragraph may be eliminated.)

II. Extent of Work and Exceptions

(a) Furnish all materials, labor, scaffolding, etc. necessary to install and complete the following, ready for plastering.

(If there are any special places where gypsum block is to be used and any exceptions as here mentioned, this paragraph should be modified and the drawings noted accordingly.)

(b) All partitions enclosing or separating lobbies, corridors, rooms and elsewhere throughout the building, unless otherwise shown, marked or specified.

(c) All furring on the interior of all exterior walls and all other places so indicated.

III. Materials

Partition and Furring Tile

(a) All of the foregoing shall be constructed of ("Certain-teed" or "Acme") gypsum tile as manufactured by the CERTAIN-TEED PRODUCTS CORPORATION, New York, N. Y. or other tile meeting the tests of the American Society for Testing Materials if approved in writing by the Architect. All blocks shall be thoroughly seasoned before shipment.

(If other than the types of Certain-teed tile on which this specification is based are to be used modify Par. (a) accordingly.)

(See Standard Specifications for Gypsum Tile adopted by the American Society for Testing Materials.)

(b) Unless otherwise indicated or specified all partitions shall be of (3, 4 or 6) in. hollow tile and all furring of (3 or 4) in. "split" tile. Where 2 in. tile is called for on the drawings, they shall be solid and where tile 3 in. or more in thickness is called for, same shall be hollow.

(If it is desired for certain enclosures to use solid tile where hollow are here called for or vice versa, Par. (b) should be changed to suit.)

(c) All blocks for partitions and furring shall be of standard 12x30 in. size. Not more than 8% of the tile used shall be less than a whole block except where required to fill out spaces. After delivery on the site, tile shall be stored in a dry location, well protected from dampness.

(d) This Contractor shall do all cutting, fitting or patching of tile required to accommodate any partitions or furring to electrical conduits, plumbing and heating pipes, etc. which may be installed ahead of his work.

Mortar

(a) All gypsum tile construction shall be laid up with gypsum mortar composed of unfibred cement plaster as manufactured by the CERTAIN-TEED PRODUCTS CORPORATION, thoroughly mixed in the proportions, by weight, of 1 part gypsum to not more than 3 parts of clean, sharp, dry sand. Gypsum mortar shall not be retempered and only as much mortar as can be used in 3 hours shall be mixed at one time.

IV. Partitions

(a) The first course of all gypsum tile used for permanently located partitions and for furring shall be laid in a bed of gypsum mortar spread on the rough floor slab. Tile courses must not be started upon frozen concrete nor upon cinder concrete when such is used for the purpose of fill only. Wherever a tile, cement or terrazzo base, etc. is to be installed and in any basement partitions or furring the starting course shall be of hollow clay tile equal in thickness to the gypsum tile specified.

Continued on next page

(When partitions may be of a temporary nature such as those sub-dividing office space they may preferably be started on top of the finished floor to facilitate possible changes. This applies except on wood floors where the blocks should be started on the underlying masonry construction. When such sub-dividing partitions are shown on plans and are to be started on the finished masonry floor they should be so indicated and Par. (a) amplified accordingly. *(See also Par. (b) under General Notes.)*

(Wherever wall tiles are to be set against gypsum block, the specification writer should provide under the Specification for Tile Work the paragraphs given below which are quoted from the Basic Specification for Tile Work, Revised Edition, 1924 of the Associated Tile Manufacturers.)

Specification for Tile Work

"Wherever tile work is to be set against gypsum tile this Contractor shall furnish and place a layer of building paper; this shall be overlaid with stiffened expanded metal lath or wire lath. Lath shall be secured in place by special anchorage or lacing as conditions require."

"At the option of the tile contractor, one heavy coat of asphaltum paint or other equal dampproofing coat may be substituted for building paper back of the metal lath specified for use on gypsum tile."

(b) The gypsum block of all partitions shall be laid in horizontal superimposed courses with vertical joints broken. All blocks shall be solidly bedded in mortar and all vertical joints shall be full. Partitions shall extend from the floor, as before specified, to the height indicated. All permanently located full height partitions shall extend to the underside of floor construction above and all other to the ceiling and shall there be wedged with wedges cut from the block and with the joints slushed from both sides with gypsum mortar.

(c) Partitions intersecting brick, or other masonry walls, shall be securely anchored to such walls by means of approved masonry bond or metal anchors, or by 10d nails driven into the masonry joints at each gypsum block course.

(d) Partitions shall be bonded at the corners by overlapping alternate courses back and forth (log cabin fashion). All intersecting partitions shall be bonded by overlapping not less than at every third course. Overlapping tile shall cover the courses below to the full thickness of the construction. The ends of overlapping tiles where exposed on the face shall have the cores plugged with mortar by this Contractor as the tiles are laid.

V. Furring

(a) The gypsum tile furring shall be laid as is herein required for partitions. Furring shall continue to frame wherever plastered or wood jambs are specified. All furring in contact with the construction shall be securely anchored to the masonry by means of 10d nails driven into the masonry joints at intervals not greater than every 2 ft. horizontally and vertically. Metal ties or other approved methods for securing furring to the masonry may be used.

Note: To avoid excessive breakage of furring tile in transit the Certain-teed Products Corporation will furnish a 3 or 4-in. furring tile which can be easily split on the job, making a 1½ or 2 in. tile as may be required by the specification.

(See *"General Notes" Par. (c)* for data regarding the use of split furring against stone walls.)

VI. Bucks

(See also "General Notes" Par. (d) and (e).)

(a) **Wood**—Wood bucks will be furnished and set as specified under "Carpenter Work."

(b) All wood bucks of openings 3 ft. or less in width shall be secured to the ends of the partition tile with 10d nails driven into every course. For openings wider than 3 ft. anchor strips of metal lath, wire mesh or sheet metal shall be nailed or stapled securely to the bucks and built into each course by this Contractor.

(c) **Metal**—Metal bucks will be furnished and set as specified under "Metal Work" with anchors built into the partition by this Contractor.

(Both wood and metal bucks are referred to in the above paragraph. Provisions for either or both, as required, should be inserted, by the specification writer, in specifications for trades effected, as follows:)

Specification for Carpenter Work

"Wood Bucks for Gypsum Partitions—*At all doors, interior sash and all other openings required, bucks shall be furnished and set by this Contractor. They shall be not less than 1⅝ in. thick and of a width equal to the thickness of the block and shall have not less than ½ in. grounds nailed to the sides and projecting beyond the bucks not less than ¾ in. forming a rabbet to receive the ends of the partition tile. All bucks shall be carefully braced plumb and true and left ready to receive gypsum tile, finished jambs, heads and trim."*

"Wood Bucks for Gypsum Furring—*Note: As these will vary according to kind of wall, location and reveal of windows and doors the architect should here describe to suit or refer to detail drawings."*

"Other Bucks—*Note: The Architect should here specify bucks for openings in any walls or partitions of other materials than gypsum."*

Specification for Metal Work

"Metal Bucks—*Note: The architect should here specify the metal bucks for openings in walls and partitions. It is not considered practical to include definite specification for same herein, as the type of metal buck to be used and the method of installation will depend upon the height of the partition, size of opening and other features of construction."*

VII. Nailing Strips and Grounds

See also "General Notes" Par. (f)

(a) Nailing strips for baseboards, chair rail and such trim will be furnished by the Carpenter and shall be set in the gypsum tile construction by this Contractor or as otherwise arranged by him.

(b) The nailing strips, not less than ⅞ in. thick and of such other dimensions as to completely cover the end of the block, shall be nailed directly to one end of each gypsum tile with not less than four 10d nails. Nailing strips for toilet and other heavy fixtures shall be 1½ in. thick and shall be spaced 15 in. o.c.

(c) Plaster grounds will be furnished and set as specified under Carpenter Work.

(Nailing strips are referred to in the above paragraphs. Provisions should be made in the specification for Carpenter Work for the furnishing of nailing strips and grounds, as follows:)

Specification for Carpenter Work

"Nailing Strips and Grounds—*Furnish the contractor for Gypsum Tile Work with nailing strips to be spaced 30 in. on center wherever baseboard, chair rail, etc., occur—these shall be ⅞ in. thick, 12 in. long and in width equal to the thickness of the block specified for partitions and furring."*

VIII. Lintels

Note: Several types of lintels are here specified, each of which has its suitable use according to the size of the opening, type of block, height of ceiling, etc. As any or all of these may occur in one building, the architect should select the type applicable, and cross out any of those not to be used.

For Openings Not Over 22 in. Wide

(a) **Built-up**—Openings in partitions of gypsum tile which are not more than 22 in. in width shall be spanned by a gypsum tile which shall have a bearing at each end upon the jamb of not less than 4 in.

For Openings Not Over 4 ft. Wide

(a) **Jack Arch**—When openings are more than 22 in. but not more than 4 ft. in width, the gypsum tile over the opening shall be laid in the form of a jack arch. Skewbacks shall be cut in the tile used over the jambs, intermediate tile shall be beveled to fit the skewbacks, and a key block to fit shall be set in the center of the jack arch. Bevel cuts shall not be less than 4 in. to the foot. The skewback tile shall have a bearing on the jambs of not less than 12 in. nor shall they be set so as to project beyond the face of the jambs to a distance greater than ⅓ of the bearing.

(b) When jack arch construction is employed, the jack arch shall be reinforced with strips of not less than No. 14 gauge woven wire mesh not less than 2 in. wide, or the reinforcement may consist of 2 strips of not less than No. 24 gauge perforated metal not less than 1 in. wide. The reinforcement herein prescribed shall be continuous and shall be bedded in the mortar joint between the jack arch and the course immediately above extending into the partition construction not less than 30 in. beyond the face of each jamb.

(Jack arches may often be omitted when substantial header bucks are used but this is a case for decision on each individual job. It has been suggested that mat reinforcement set in a bed of mortar on paper on top of the wood buck and the tile set immediately to secure a good bond would prove very efficient. With an additional strip of reinforcement in the next course, this method would probably prove satisfactory for openings up to 6 ft. wide when the ceiling height is not unusual. This method is merely suggested here as a possible alternate.)

For Openings More Than 4 ft. Wide

(a) **Metal**—Openings in partitions of gypsum tile which are more than 4 ft. in width shall be spanned by metal lintels as shown on the drawings or as specified under "Iron Work." All metal lintels shall be of such form as to provide a distributed and uniform bearing upon the supporting construction and shall provide a bearing upon each jamb of not less than 8 in. (Unless supported by the metal buck.)

Continued on next page

IX. Blank Heading

Note: This space is left blank in order that the architect may include specifications for arched openings or other special features not provided for under other headings.

X. Completion

(a) This Contractor shall leave his work complete and the premises clean of mortar, broken tile and rubbish resulting from his work. All partitions and furring shall be left rigid, plumb and true ready to receive plastering.

XI. Plastering

Note: If it is desired to include plastering as a part of this work the following specification paragraphs should be included, otherwise the specification writer should include them in his own Specification for Lathing and Plastering. *The use of gypsum plaster on gypsum tile is strongly recommended.*

(a) All base plaster shall be (Certain-teed, Acme, American or Southern) brand of (Neat Plaster, Fibred Cement Plaster or Unfibred Cement Plaster) sanded according to specifications for all base coat work, and all finishing plaster shall be (Certain-teed, Acme, American or Southern) brand of Gypsum (Finishing or Gauging) Plaster, as manufactured by the CERTAIN-TEED PRODUCTS CORPORATION, or other plaster if approved in writing by the architect.

(CERTAIN-TEED PRODUCTS CORPORATION also manufacture "Ohio Prepared Sanded Plasters" for base coat work, if desired, change Par. (a) accordingly.)

(If other than the types of Certain-teed, Acme, American or Southern plaster on which this specification is based are to be used modify Par. (a) accordingly.)

Sand

(b) All sand for base coats shall be clean and sharp, free from alkali, salt or quick-sand and from objectionable amounts of loam or clay and shall be graded from fine to coarse. All sand used shall meet the requirements of the A.S.T.M. specifications for plastering sand.

(If any sand float finish is to be included, the sand for same should be specified in Par. above.)

Mixing

(c) All plaster shall be mixed in clean, tight boxes and in accordance with best local practice, the intent of the specifications and the direction of the maker on file in the office of the architect.

(Mixing and the importance of clean water and direction of the maker are of vital importance to good work.)

XII. Proportions and Application

(a) The base coat shall consist of one part fibred plaster, to not more than three parts by weight of dry sand.

(b) Surfaces of the blocks shall be wet before plastering but not so wet that water remains standing on surface.

(c) The plaster shall be applied to a thickness of ½ in. beyond the block faces in two operations. A thin layer shall first be applied with strong pressure to secure a good bond and shall be followed immediately with a second layer which shall be straightened to a true, even plane keeping back sufficiently from the grounds, or inside the ½ in. thickness, to allow for finishing coat. The surface shall be broomed or otherwise roughened.

Finishing Coat

(a) *Smooth White Finish* shall be Prepared Gypsum Finishing Plaster mixed to the proper consistency with clean water only, and applied according to manufacturer's directions.

Note: If it is desired, a mixture of lime putty and finishing plaster may be used for the smooth white finishing coat in which case substitute the following paragraph:

[(a¹) *Smooth White Finish* shall be one part of gypsum finishing plaster to not more than three parts of perfectly slaked fresh burned plasterer's lump lime putty or standard hydrated finishing lime thoroughly and uniformly mixed.]

(b) Finishing coat shall be applied throughout the building except behind skirting and any place noted below and shall be smooth white finish trowelled to a dense, true surface.

(Here insert any exceptions)

Note: If *Sand Float Finish* is desired in some locations instead of *Smooth White,* add the following paragraph after, at end of, Par. (b), noting the exceptions and giving the locations.

[(b¹) *Sand Float Finish* shall be four parts Gypsum Cement Plaster unfibred, one measure of perfectly slaked fresh burned plasterer's lump lime putty or standard hydrated finishing lime and five measures of clean sharp sand.]

Note: This specification does not contemplate that colored, textural or special effects will be required as a finish in any portion of this job. If so, insert the location and description under *Finishing Coat* in appropriate paragraphs.

(c) Finishing coat shall be applied when the base plaster is set firm and hard and not until thoroughly dry. The surface of the base coat shall be sprinkled with water before the finish coat is applied.

(It is important that the base coat of any plastering job shall be thoroughly dry before the finish coat is applied. There are some who recommend that the finish coat shall be applied while the brown coat is damp. This, however, will permit *drying cracks,* if they occur, to show in the finish coat which will be obviated if the brown coat is permitted to dry first and then moistened to receive the finishing coat.)

(d) All surfaces throughout shall be applied and finished in the most workmanlike manner and shall be left plumb or level and true and even planed, free from trowel marks, blotches and without joinings showing.

(e) All finished plastering shall be protected from wind and in hot dry weather shall be sprinkled with water until set. In freezing weather, this Contractor shall arrange with the General Contractor that the plastering shall be protected from frost until set hard.

(In windy, hot, dry weather openings should be screened but not closed. In all clear weather after plastering has set, doors and windows should be kept open as fully as possible.)

GENERAL NOTES

Regarding the Provisions of the Preceding Basic Specifications

Note: The above Basic Specification, if used as herein given, will provide for all gypsum tile partition and furring required to make a complete job, also includes suggested specifications for plastering on gypsum tile, and useful data pertaining to the work of other trades that contact with gypsum tile work.

(a) The contractor for the gypsum tile work should be impressed with the importance of reporting any unsatisfactory conditions of parts to receive the partitions and furring as he will naturally be held responsible for the satisfactory installation of the tile ready for the plastering. *See Basic Specification I (a).*

(b) Gypsum Tile partitions may be started on finished floors except wood. This will allow the partitions to be moved at any time without requiring repairs to the floor. Where wood sleepers and floors are used, the partitions should, as specified, be started on the masonry construction. *See Basic Specification IV (a).*

(c) Due to the rough interior surface of rubble stone walls, split furring is not recommended for such locations. The use of a 2 in. solid tile built like a free standing partition inside the stone wall will be found very satisfactory. *See Basic Specification V (a).*

(d) Before specifying the type of bucks to be used, due consideration should be given to the height of the ceilings, the size, height and frequency of openings and character and weight of doors, if any, to be hung at such openings. Where the openings are numerous or large, or the doors heavy especially as in the case of fire doors, the bucks should extend from the floor to the ceiling. Metal lath, placed as specified in Section VIII will lessen the possibility of plaster cracks if any strain occurs at the junction of bucks in any partition. *See Basic Specification Section VI.*

(e) In specifying metal bucks, the architect should bear in mind those parts of the completed construction which come under the work of other trades and specify accordingly. Steel channel bucks under "Iron Work"; wood bucks, trim, etc. under "Carpenter Work"; the setting of the gypsum tile under "Lathing and Plastering." *See Basic Specifications Section VI.*

(f) All nailing strips and plaster grounds should be specified under "Carpenter Work." If patented grounds or nailing blocks are desired, so specify. Heavy fixtures such as toilets, tanks, blackboards, etc., should be bolted through the block or nailed to nailing bucks not less than 1½ in. thick of the character specified for other trim, spaced not to exceed 15 in. *See Basic Specifications Section VII.*

STRUCTURAL GYPSUM CORPORATION

Gypsteel Partition Tile, Beam and Column Covering

EXECUTIVE OFFICES
LINDEN, N. J.

NEW YORK OFFICE, 535 Fifth Avenue

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Products

GYPSTEEL GYPSUM PARTITION TILE.

Also Gypsteel Gypsum Soffit Slabs and Column Covering.

For Gypsteel Gypsum Plasters and Gypsteel Pre-cast Gypsum Roofs and Floors, see Manufacturers' Index.



Where Gypsteel Gypsum Partition Tile May Be Advantageously Used

(1) Non-bearing partitions, walls of corridors, and column covering.

(2) Fire division walls.

(3) Covering for steel members such as girders, beams, and columns.

(4) Heat ducts and light wells.

(5) Elevator, dumbwaiter, corridor and stairway enclosures.

(6) Wall furring (when split).

Special Advantages of Gypsteel Gypsum Partition Tile

The high quality of Gypsteel Gypsum Partition Tile is due to the combination of purity of the gypsum with a distinctive process of chemical control that insures uniformity in the finished product.

The great purity of gypsum manufactured by the Gypsteel Process at our Linden plant insures a stronger and tougher block, with a minimum waste from chipping and breakage.

Another factor tending to maintain breakage and waste at a minimum is our express trucking service within and adjacent to the New York Metropolitan area, whereby block is delivered from our mill direct to the job within a few hours by truck. This truckload delivery assures clean, strong block free from breakage and waste.

The machinery by which Gypsteel block is made at our Linden plant insures absolute accuracy and produces blocks true to size, accurately proportioned, and of uniform weight, strength and density.

General Advantages of Gypsum Partition Tile

(1) Fireproof—Gypsum partition tile is approved by the National Board of Fire Underwriters as a result of tests conducted by Underwriters' Laboratories, Inc., and is manufactured under the Laboratories' Inspection Service.

(2) Savings in Labor—Gypsteel Partition Tile are so strong the breakage in shipping and handling is reduced to an absolute minimum. This means considerable savings in time and labor in setting up. Similar savings are achieved because the tile are accurate in size and true in shape and uniform in composition, strength and weight.

(3) Heat Insulation—The great superiority of gypsum partition tile in preventing the transmission of heat has been frequently demonstrated by numerous tests under many conditions. Distinctly high qualities of thermal protection for embedded steel are an outstanding characteristic of gypsum partition tile. Reports of actual tests are available on request.

(4) Sound Insulation—Tests made many times, especially at the New England Conservatory of Music, have demonstrated the superior value of gypsum partition tile in retarding conduction of sound from one room to another.

(5) Light Weight—Gypsum partition tile are so light in weight that their use effects a large reduction in the total dead-load, and this permits of corresponding savings in the steel framework and foundations.

(6) Savings in Plaster—Gypsteel Gypsum Partition Tile are strong, they chip and break very little, meaning there is less mortar used, and pointing-up to be done. Their uniformity of size and proportions assure true plaster base and effect a substantial saving in the plastering.

(7) Perfect Plaster Base—Gypsteel Partition Tile are made of gypsum, with a very small percentage of wood planer chips, and laid up in gypsum mortar. The chemical bond established between the gypsum tile, and the gypsum in both the mortar and plastering, produces a wall of great strength and rigidity.

(8) Easily Altered—Gypsum partition tile cuts with a saw, permitting of alterations being made in partitions with a minimum of expense and annoyance.

Composition and Sizes

Gypsteel Partition Tile is furnished in standard sizes—2 and 3-in. solid, 3, 4, 5 and 6-in. hollow.

Continued on next page

WEIGHT PER SQUARE FOOT OF GYPSTEEL PARTITION TILE

Description of Gypsteel Furring and Partition Tile	Weight tile per sq. ft., lb.	Weight mortar per sq. ft., lb.	Weight plaster one side per sq. ft., lb.	Total weight plastered one side per sq. ft., lb.	Weight plaster two sides per sq. ft., lb.	Total weight plastered two sides per sq. ft., lb.
2x12x30" Solid...	10.5	1.5	3	13.5	6	16.5
3x12x30" Hollow.	11.0	2.0	3	14.0	6	15.0
3x12x30" Solid...	13.0	2.0	3	16.0	6	19.0
4x12x30" Hollow.	13.0	2.5	3	16.0	6	19.0
6x12x30" Hollow.	20.0	3.0	3	23.0	6	26.0

Directions for Installation

Complete details for installation of Gypsteel Gypsum Partition Tile are contained in literature which will be gladly sent by the STRUCTURAL GYPSUM CORPORATION on request.

Daily Deliveries

Orders for Gypsteel Gypsum Partition Tile for delivery in the New York Metropolitan market will be filled in 24 hours. If received early in the morning they can be delivered in reasonable amounts the same afternoon. Our trucks deliver direct to the job or to the dealer's yard.

Since deliveries are not dependent on rail shipments from distant points you can depend absolutely on delivery dates as promised by us.

Facilities of Structural Gypsum Corporation

The central location of our plant at Linden, New Jersey, in the New York Metropolitan Area makes rapid and prompt deliveries to all parts of that area possible.

The STRUCTURAL GYPSUM CORPORATION is one of the two largest producers of structural gypsum products in the United States.

Literature

Our Architectural Service Sheet No. 4 contains complete construction and installation details for Gypsteel Gypsum Partition Tile with specifications. A copy of this Service Sheet will be sent on application to our Linden, N. J., office.

References

A few of the better known buildings in New York City on which Gypsteel Gypsum Partition Tile have been installed recently are included in the following list, together with the names of the architects and mason contractors:

Typical Installations of Gypsteel Gypsum Partition Tile

JOB AND LOCATION	ARCHITECT	MASON CONTRACTOR
General Motors Building	De Young & Moscowitz	Paul Bendisch
Hotel New Yorker	A. MacKanner	John Meehan
Chrysler Building	William Van Alen	F. T. Ley Co.
Apartment 83rd to 84th Street on Riverside Drive	Gronenberg & Leuchtag	N. H. Brandt Bldg. Corp.
90th Street and Park Avenue	Geo. F. Pelham	J. H. McNally
120 Wall Street	Buchman & Kahn	J. H. McNally
245 East 72nd Street	Gronenberg & Leuchtag	J. H. McNally
London Terrace Apartments, 23rd and 24th Streets to 9th and 10th Avenues	Farrar & Watmough	Wm. M. Moore
90th St. and Central Park West	Margon & Holder, Emory Roth (Assoc.)	Wm. M. Moore
147 East 83rd Street	Schwartz & Gross	John A. Mulligan
New Barbizon Hotel, 58th Street and Sixth Avenue	Murgatroyd & Ogden	LaSalla Mason Corp.
261 Fifth Avenue	Buchman & Kahn	Wildman & Newman
111 John Street	Buchman & Kahn	Wildman & Newman
110 West 40th Street	Buchman & Kahn	Wildman & Newman
215 East 73rd Street	Emory Roth	Jacques Polstein
77th Street and Riverside Drive	Gronenberg & Leuchtag	Jacques Polstein
612 East 84th Street	Van Wart & Wein	T. E. Rhoades
21 East 79th Street	Van Wart & Wein	T. E. Rhoades
Tudor City Units Nos. 9, 10, 11, 12 and 13	Private Plans	Fred F. French Co.
895 Park Avenue	Sloan & Robertson	Thos. O'Reiley & Son
205 East 78th Street	Sugarman & Berger	Fred T. Ley Co.
Hotel Pierre	Schultze & Weaver	Geo. A. Fuller
Farmers Loan & Trust Building	Cross & Cross	Geo. A. Fuller
Salmon Tower	Shreve, Lamb & Harmon	C. T. Wills, Inc.
1 Cedar Street	Clinton & Russell	Micweil Co.
2 East 88th Street	Pennington & Lewis	Micweil Co.
76th Street and Broadway	Tillion & Tillion	Micweil Co.
322 East 53rd Street	Kenneth M. Murchison	Micweil Co.
425 East 86th Street	Sugarman & Berger	Micweil Co.
784 Park Avenue	Emory Roth	Geo. Colon
320 East 72nd Street	Lafayette A. Goldstone, Herbert Law & Hugh Clinton Porter (Assoc.)	James Stewart & Co.
73rd Street and Park Avenue	Rosario Candela	David Paton
242-48 East 72nd Street	J. M. Felson	Michaelson Construction Co.
Hotel Lexington	Schultze & Weaver	Turner Construction Co.
Governor Clinton Hotel	Murgatroyd & Ogden	Thompson-Starrett Co.

THE NAILCRETE CORPORATION

Manufacturer of the Original Nailing Concrete

105 West 40th Street, NEW YORK, N. Y.

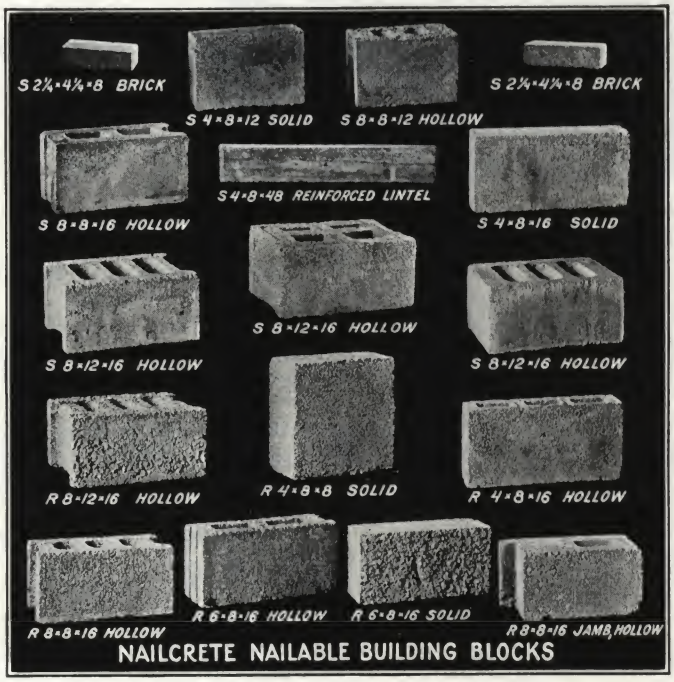
For Nailcrete, see Manufacturers' Index

NAILABLE CINDER CONCRETE BUILDING BLOCKS

Origin—Nailcrete Nailable Cinder Concrete Building Blocks were developed after extensive laboratory research and tests in the "Studies in Economic Construction" conducted by Grosvenor Atterbury, F.A.I.A., for the Russell Sage Foundation.

Nailcrete (Nailing Concrete)—A cementitious, fibrous, all-mineral compound containing no animal or vegetable matter.

Uses—Nailcrete Blocks are used in load-bearing walls, partition walls, and as an efficient and economical backup of cut stone, cast stone, and brick veneered walls.



NAILCRETE NAILABLE BUILDING BLOCKS

Sizes — Nailcrete Blocks are furnished in all sizes and fractions of sizes useful in constructing 3, 4, 6, 8, 12 and 16-in. masonry walls.

Economy—Cost of Nailcrete Block walls average 10% to 20% less than clay tile or gypsum, and 20% to 40% less than brick.

Nailability and Nail-holding—In addition to accepting nails better than yellow pine, Nailcrete Blocks *hold nails* better than commonly used cinder concrete. Nailability is not obtained by extreme porosity, but rather by the gripping and highly abrasive action of the Nailcrete contained in the composition. The lightest trim or moulding can easily be attached to interior walls, and shingles, siding or weatherboards to exterior and exposed walls.

Lightness—Because of the inherent lightness of the aggregates used—Nailcrete (2½ cu. ft. to 100 lb.) and cinders (2 cu. ft. to 100 lb.)—Nailcrete Blocks are among the lightest load bearing masonry units made. This reduces the dead load and often permits the use of lighter steel with subsequent savings.

Weight—Composed of Nailcrete, sized cinders and cement, Nailcrete Blocks of the most widely used size—8x8x16 in.—vary in weight from 30 to 40 lb. in exact proportion to their compressive strengths, ranging from 600 to 1200 lb. per sq. in.

Strength—Ample to meet uses to which material is put and requirements of local building rules. Can be furnished in any required strength, but nailability is a diminishing quality in the higher strengths, except with special masonry nails. Strength increases with age.

Elasticity and Toughness—The great elasticity of cinder concrete was conclusively proven by the U. S. Government Watertown Arsenal Tests of 1898. This quality of Nailcrete Blocks permits rough handling without the breakage incident to the use of ordinary tile and block.

Fireproof—Cinder concrete has long been accepted as one of the best fireproofing materials. Nailcrete Blocks, made of cinders, Nailcrete and cement, are incombustible and extremely fire resistive.

Lack of Capillarity, Thermal Conductivity, and Sound Conductivity—The multiplicity of tiny non-connecting pores or cells of Nailcrete Blocks render this material particularly resistive to capillarity, or wicking of moisture, transmission of heat, cold, and sound.

Textures—Two distinctive textures are furnished. One (R) rough, coarse, and full of crevices, for best mechanical bond for mortars, plasters and stuccos; the other (S) smooth, fine grained and dense for walls to be painted or for exposed interior or exterior walls.

Co-efficient of Expansion—Co-efficient of expansion of Nailcrete Block walls is approximately the same as that of steel.

Tests

Nailcrete Blocks are periodically tested for strength, nailability, weight, and absorption, at the Haller Testing Laboratories, Plainfield, N. J., and Philadelphia, Pa.; Camden Forge Structural Materials Laboratories, Camden, N. J., and other outstanding laboratories.

Reports of tests furnished on application.

Specification for Nailcrete Nailable Building Blocks

For plastered, stuccoed or exposed exterior or interior walls:

All load-bearing exterior and interior walls, and all partition walls will be of Nailcrete Nailable Building Blocks.

For backup of cut stone, cast stone and brick walls:

All backing of outside walls will be of Nailcrete Nailable Building Blocks.

CINDER CONCRETE BUILDING UNITS

MANUFACTURED UNDER STRAUB AND BO PATENTS—OWNED BY
NATIONAL BUILDING UNITS CORPORATION

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PHILADELPHIA, PA.

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ALBANY, N. Y., Finch & Ostrander, Inc.
ALLENTOWN, PA., Hollywood Building Block Co.
ALTOONA, PA., East Side Coal & Supply Co.
ASBURY PARK, N. J., Fire-Safe Products Co.
ATLANTA, GA., Atlanta Cinder Block & Tile Co.
BALTIMORE, MD., Cinder Block Corp.
BECTON, W. VA., Newton Pittman & Son
BINGHAMTON, N. Y., Straub Building Units, Inc.
BOSTON, MASS., Cinder Concrete Units Corporation
BRACKENRIDGE, PA., Frank H. Thompson
BLAIRSVILLE, PA., Blairsville Concrete Products Co.
CAMDEN, N. J., Concrete Specialties Co.
CEDAR RAPIDS, IOWA, Cinder Block & Material Co.
CHARLESTON, W. VA., Kanawha Cement Block Co.
CINCINNATI, OHIO, Cinder Products, Inc.
CLARION, PA., Clarion Blox Co.
CLARKSBURG, W. VA., Builders Supply & Equipment Co.
COATESVILLE, PA., Richard Scully
DENVER, COLO., Cinder Block Co.
DES MOINES, IOWA, Iowa Concrete Crib & Silo Co.
DES PLAINES, ILL., Des Plaines Concrete Products Co.
DETROIT, MICH., Detroit Cinder Block & Tile Co.
R. E. Hamilton's Sons
ELKINS, W. VA., Cooper Building Block Company
ELKTON, MD., Elkton Concrete Products Co.
ELMIRA, N. Y., Elmira Building Units, Inc.
ERIE, PA., Erie Patent Block Co., Inc.
ESCANABA, MICH., Universal Cinder Products Company
FAIRMONT, W. VA., Fairmont Wall Plaster Co.
FLINT, MICH., General Cement Products Corp.
GENEVA, N. Y., Geneva Brick Products Co.
GRAFTON, W. VA., Crystal Ice Company
HAMILTON, ONT., CAN., E. J. Shepard, Ltd.
HARRISBURG, PA., Harrisburg Building Block Co.
INDIANAPOLIS, IND., Cinder Block & Material Co.
JAMESTOWN, N. Y., Jamestown Block & Tile Co. Inc.
JERSEY CITY, N. J., Hud-Cin Building Products, Inc.
JOHNSTOWN, PA., Johnstown Cinder Block Co.
JOLIET, ILL., Welsch Waterproof Block Co.
KANSAS CITY, MO., Cinder Block Co.
LANCASTER, PA., Lancaster Concrete Tile Co.
MARTINSBURG, W. VA., Grove & Fitz
MEDFORD, MASS., Massachusetts Cement Block Co.
MIDLAND, MICH., John A. Whitman
MINNEAPOLIS, MINN., Concrete Building Units Corp.
MORGANTOWN, W. VA., Crawford & Shively
NASHVILLE, TENN., Nashville Breeko Block & Tile Company
NEW CASTLE, PA., Straub Block Co.
NEW KENSINGTON, PA., Straub Block Co.
NEWARK, N. J., Hud-Cin Building Products, Inc.
NORTH BERGEN, N. J., Hud-Cin Building Products, Inc.
OMAHA, NEB., Ideal Cement Stone Co.
PHILADELPHIA, PA., Penn Building Block Company
Philadelphia Partition & Building Block Co.
PITTSBURGH, PA., General Cement Products Corp.
POTTSVILLE, PA., Pottsville Building Block Co.
PUEBLO, COLO., Pueblo Cinder Block Co.
READING, PA., Berks Building Block Co.
REGINA, SASK., CAN., Adam Tell
RIDGEFIELD PARK, N. J., Bergen Building Block Co.
ROCHESTER, N. Y., Genesee Brick & Supply Corp.
Schaefer Bros. Builders Supply Co.
ST. JOSEPH, MO., Cinder Block Co.
ST. LOUIS, MO., Cinder Block Co., Clayton, Mo.
ST. MICHAELS, MD., Geo. R. Caulk & Sons
SCRANTON, PA., Scranton Building Block Co.
SPRINGFIELD, MASS., Springfield Sand & Tile Co.
SYDNEY, N. S., CAN., Fireproof Building Block Co.
SYRACUSE, N. Y., Syracuse Cinder Products Corp.
TORONTO, ONT., CAN., Toronto Brick Co., Ltd.
Canadian Cincrete, Ltd.
TRENTON, N. J., Concrete Specialties Co.
TUNNELTON, W. VA., Preston Co. Building Block Company
VANCOUVER, B. C., CAN., B. C. Concrete Co.
WARREN, OHIO, Straub Patented Block Co.
WARREN, PA., Wilson-Wetmore Lumber Co.
WASHINGTON, D. C., Washington Concrete Products Corp., So. Washington, Va.
WESTFIELD, N. J., Hud-Cin Building Products, Inc.
WHEELING, W. VA., Wheeling Patent Block Company
WILKES-BARRE, PA., Nepenna Building Materials Co., Kingston, Pa.
WILLIAMSPORT, PA., Delvan Block Co.
WILMINGTON, DEL., Cinder Block Corp.
YORK, PA., York Patented Building Block Co.

Products

Foundation and Wall Bearing Units; Partition Tile; Brick; Reinforced Lintels; Sills, Chimney Blocks; Floor Arch Blocks; Units for Fireproofing.

Patents and License

The manufacture and sale of cinder concrete building units is protected by United States Patent No. 1,212,840 to Francis J. Straub, and United States Patent No. 1,466,083, to Sigurd Bo. Other patents pending. The Straub patent has been broadly sustained by unanimous decision of the United States Court of Appeals. All plants work under license agreement with National Building Units Corporation.

Advantages

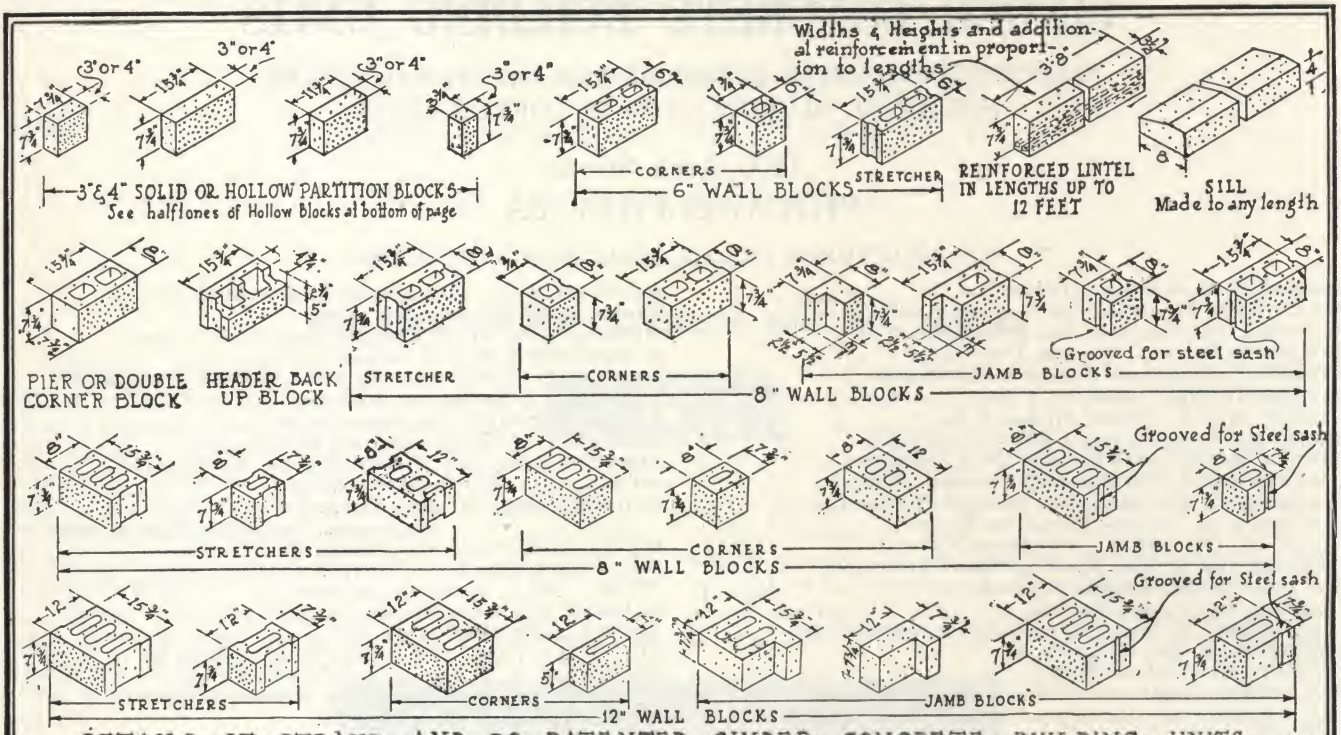
Economy—The lightness of the product effects a substantial saving. One 8x8x16-in. block displaces 12 brick and requires about one-quarter the mortar. Plaster is applied direct to cinder units and the trueness of the wall, together with the texture, facilitates the application. No nailing strips or plugs are necessary. Other economies will be found under other subheadings.

Tests—Tests made by Underwriters' Laboratories, Inc., Watertown Arsenal, Columbia University, University of Toronto, University of Illinois, Ohio State University, Rutgers College, Johns Hopkins University, Lewis Institute, Pittsburgh Testing Laboratory, Detroit Testing Laboratory, Kansas City Testing Laboratory, E. L. Conwell & Company of Philadelphia, Pa., and other recognized laboratories.

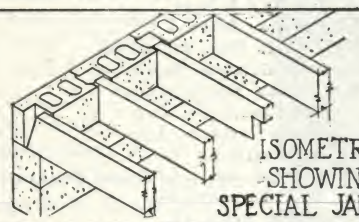
The National Building Units Corporation, or any of the plants listed, will send copies of these tests and other pertinent data on request.

Strength—All plants are required to manufacture cinder units having an average compressive strength of more than 700 lb. per sq. in. of gross area, and never less than specified by the local building code. Tests on cinder block walls by Columbia University show a ratio of wall strength to unit strength for cinder blocks of from 57% to 76%. The mortar bond develops its full strength. The limited suction of the unit prevents drying out of the mortar and the wide bed has a rough textured surface which gives a perfect key.

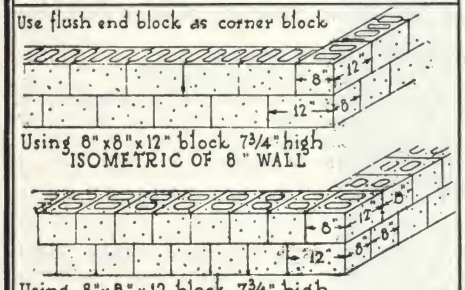
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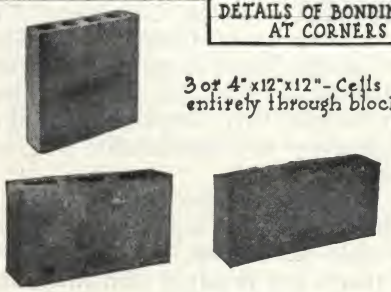
DETAILS OF STRAUB AND BO PATENTED CINDER CONCRETE BUILDING UNITS



ISOMETRIC SHOWING SPECIAL JAMB BLOCKS IN RELATION TO WOOD JOIST



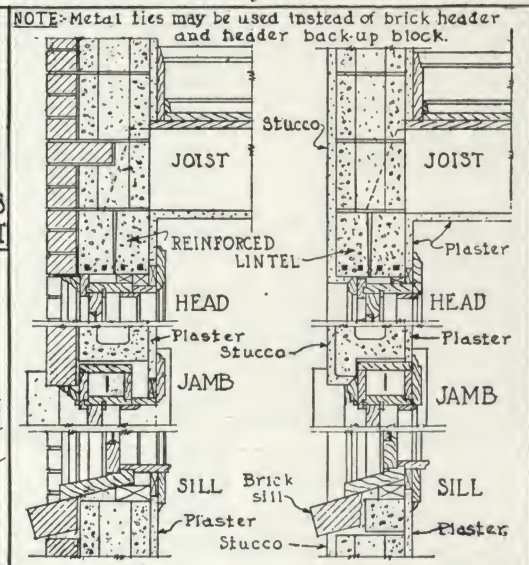
DETAILS OF BONDING AT CORNERS



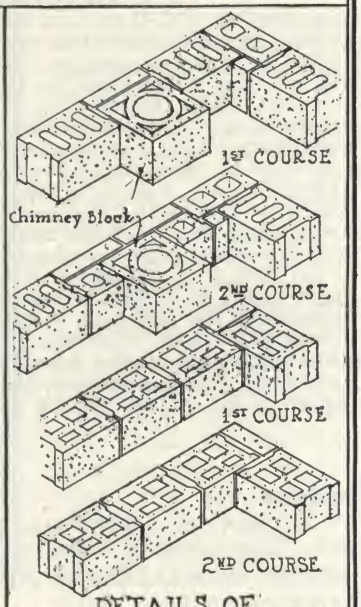
3 or 4"x12"x12" - Cells entirely through block

3" or 4" wide - 8" or 9" high - 16" or 18" long. Cells entirely through tile or top closed for solid mortar bed as ordered

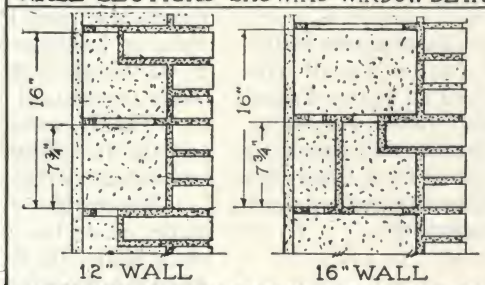
HOLLOW PARTITION TILE



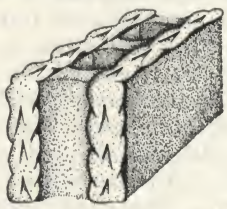
WALL SECTIONS SHOWING WINDOW DETAILS



DETAILS OF BONDING AT CORNERS.



METHOD OF BACKING FACE BRICK



Block is buttered on outside and inside edges - ribs are left free of mortar

MORTAR JOINTS

DRAWING	SIZES AND USES OF CINDER CONCRETE BUILDING UNITS	1

Continued on next page

No Breakage — Practically no breakage because of the toughness of the cinder concrete.

Light Weight—Easy to handle, being 40% to 50% lighter than brick or sand.concrete blocks. This speeds up the laying and reduces the dead weight of the wall. An ideal material for curtain walls and partitions in tall buildings where lightness is a necessity.

Fire Resistance — The official tests made at the Underwriters' Laboratories, Inc., in Chicago and tests by Columbia University and other laboratories, confirm the many demonstrations and results of actual fires. Prolonged exposure to fire and application of water to the wall causes no cracking or spalling, and the loss in strength is negligible. Used extensively for fireproofing of structural steel



Herman Kiefer Hospital, Detroit, Mich.
ALBERT KAHN, Detroit, Mich., Architect
Cinder units used for partitions



Strawbridge & Clothier Department Store, Philadelphia, Pa.
SIMON & SIMON, Philadelphia, Pa., Architects
TURNER CONSTRUCTION CO., Contractors
Cinder units used for backing limestone and for exterior column fireproofing

Timeproof—Age increases the strength of cinder concrete building units. They are not affected by freezing or temperature changes. This is due to the cellular structure of the material.

Insulating Against Heat and Cold—The corklike structure of the material builds insulation into the wall. It insures an even temperature within the house all year round and effects a substantial saving in fuel. Material is ideal for icehouses, refrigeration plants, fruit storage, dry kilns, etc.

Dampproof—The low capillary attraction of cinder units accounts for the fact that no water is drawn through the wall, when the wall is properly constructed. The insulative quality of the cellular cinder concrete prevents condensation. It is therefore possible to safely plaster direct without any furring or lathing.

Sound Insulating—Cinder units are used extensively in schools, hospitals, churches, and the like where the acoustic design is of particular importance. A wall of this material, exposed or plastered, reduces the reverberation and absorbs the sound. Cinder tile partitions insure privacy by practically eliminating transmission of sound.

Stucco and Plaster—Trueness of wall, rough surface and even suction facilitate plastering and reduce waste to a minimum. The adhesion is permanent and there is no danger of staining or cracking.

Nailing and Cutting—Nails can be easily driven into the wall, will grip firmly and will never rust. Nailing strips and plugs are eliminated and all grounds or trim may be fastened direct.

The units can be cut or channeled without breakage or waste.

Sizes and Construction Details—Typical sizes and shapes for the entire range of masonry construction are shown on the preceding page. Lintels of any length and special units for fireproofing and the like are manufactured to order. On large jobs, such special units eliminate cutting and patching, saving cost and time of construction.

Details, Catalogues and Data

Each plant is in position to submit details and give required information to architects, engineers and builders.

Address nearest plant or the head office of the NATIONAL BUILDING UNITS CORPORATION.



Frank B. Trissler Residence, Lancaster, Pa.
M. R. EVANS, Lancaster, Pa., Architect
HERMAN WOHLSEN, Lancaster, Pa., Contractor
6-in. cinder units used for backing brick

NATIONAL STONE-TILE CORPORATION

Patentees, Licensors and Manufacturers of Stone-Tile

564 Market Street
SAN FRANCISCO, CALIF.

370 Lexington Avenue
NEW YORK, N. Y.

For Local Licensees, see Telephone Book under "Stone-Tile," or Inquire of Nearest Office

Products

Standard dimensioned BUILDING UNITS of CAST CONCRETE.

Stone-Tile Holobrik

A highly satisfactory hollow brick designed for heavy loads and adaptable to all types of construction as an economical replacement for solid brick. It carries the load of brick yet materially decreases the dead load of the wall or pier. It is used as a form for reinforced concrete work with entire success, as no additional finish is required. It bonds readily with ordinary brick and finds a large use as a load bearing backup.

Dimensions—Stone-Tile Holobrik is made with 3⅝x12-in. face by 4, 6 or 8 in. thick, jamb and steel sash units as well as fractional sizes. At this time provision is being made to produce this desirable material in all standard shapes from the small solid brick size up to 8x8x16 in., as well as larger size partition blocks and an economical flat slab unit.

Send for brochure.

Stone-Tile Process

A new and logical method of producing cast concrete objects. Placing in operation the latest technique of modern concrete engineering, the Stone-Tile process creates highest quality cast units moulded into shapes adaptable to the many uses of building construction. In operation, the practical application of the water-cement ratio is employed with a wet-mix, wet-strip method of manufacture to produce, in unit form, a material second to none in its conformity to the requirements of the modern designer. In the Stone-Tile mix the aggregates are properly graded and the moisture content so controlled as to secure a plastic or *quaking* consistency.

Accredited plants are established throughout the country and are operated under, and by virtue of, an exclusive license which guarantees that only competent talent will be employed and satisfactory materials used. The well-known high grade standard of excellence of Stone-Tile products is maintained by the automatic control of the Stone-Tile process, and the required adherence to the rigid specifications which form a part of every manufacturer's contract.

Stone-Tile Texture

Stone-Tile methods produce a most interesting and superior texture. Possessing possibilities of form, color and character, it provides a new medium of architectural expression. The dimpled surface texture developed by this wet-mix, wet-strip process expresses the true individuality which is most closely approached by travertine stone. Normally, Stone-Tile units possess quite a range of color tone which imparts unusual life and brilliancy. A distinctly new type of architectural treatment has developed from the use of Stone-Tile made purposely irregular as to form and color. This has been used most successfully by the foremost exponents of this class of work.

As a base for paint, various cement washes or stucco, it is unexcelled in its field.

Patents and Underwriters' Approval

Patents—The entire Stone-Tile system of processes, equipment, and trade names protected by United States Patents.

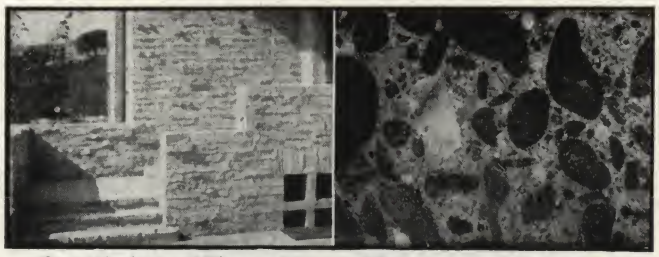
Underwriters' Listing—Stone-Tile has received the very high rating of "R-6 hours" for 12-in. walls.

As a result it has the lowest fire insurance rate allowed on hollow masonry units.

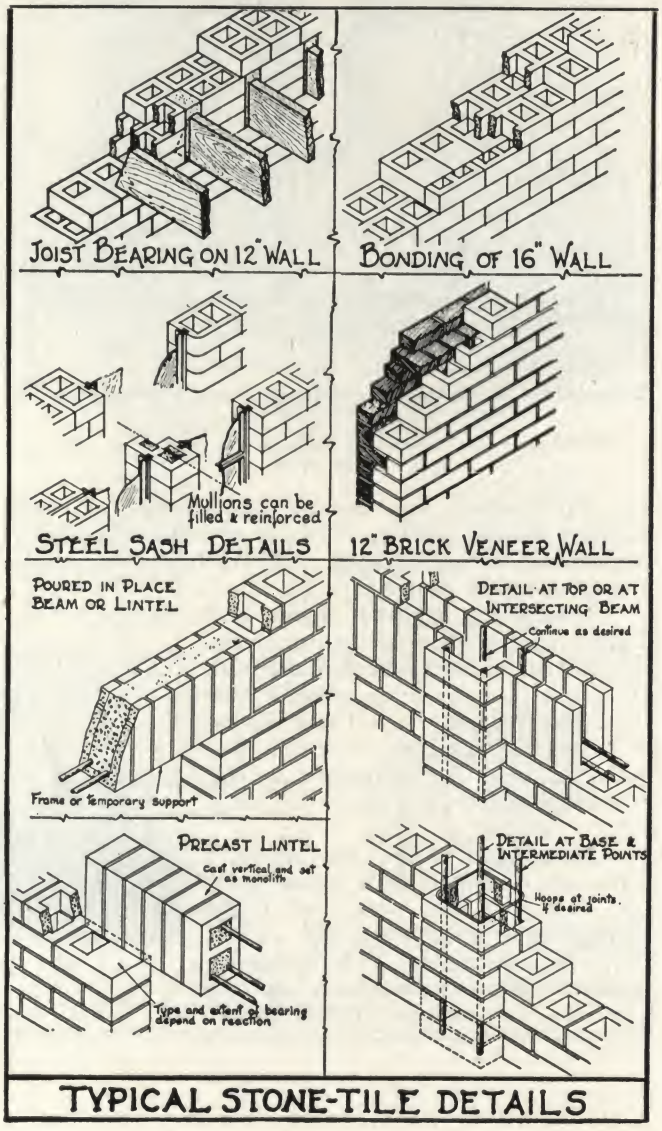
Tests—Stone-Tile units have stood the tests of both time and the laboratory with most gratifying results. Architects, engineers and building department officials endorse its use for all types of building construction.

Service

Plants located throughout the country insure prompt delivery of any quantity to almost any point. A technical service department is maintained to assist architects and engineers in designs and estimates without obligations. Consult with us on problems of design and use. A loose-leaf folder of construction details and estimating data is available to those who desire it.



One Variety of Texture — Made of Real Concrete



TYPICAL STONE-TILE DETAILS

ESTABLISHED 1885

W. S. DICKEY CLAY MFG. CO.

KANSAS CITY, MO.

BRANCH OFFICES: MACOMB, ILL., SAN ANTONIO and TEXARKANA, TEX.

Dickey Chimney Tops in New Colors and Styles

Now Dickey Chimney Tops are available in three stock colors—Buff, Blue and Green. New styles and sizes are offered. These enable architects and builders to choose, fancy-free, from a wide range of authentic stock designs and appropriate kiln-fired colors.

Moderate Cost

Moderate expenditure suffices where previously made-to-order, high priced tops were necessary to meet the demand for beauty and utility.

All colors cost the same.

Hard-Burned Fire Clay

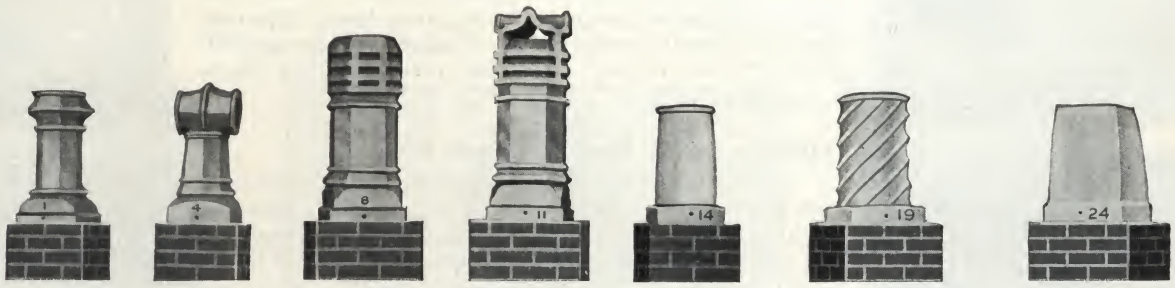
Dickey Chimney Tops are most durable. Gases, moisture or changes in temperature do not cause them to deteriorate.

Draft Efficiency

Sizes are adapted to fit over standard flue linings. Full efficiency of draft is assured.

Available Out of Stock

All colors and the entire line of styles and sizes listed below are carried in stock. No additional charge for colors listed.



Buff Nos.....	1, 2, 3	4, 5, 6	7, 8, 9, 13	10, 11, 12	14, 15, 16	17, 18, 19, 20, 21	22, 23, 24, 25, 26
Blue Nos.....	101, 102, 103	104, 105, 106	107, 108, 109, 113	110, 111, 112	114, 115, 116	117, 118, 119, 120, 121	122, 123, 124, 125, 126
Green Nos....	201, 202, 203	204, 205, 206	207, 208, 209, 213	210, 211, 212	214, 215, 216	217, 218, 219, 220, 221	222, 223, 224, 225, 226

Three Kiln-fired Colors

Seven styles illustrated above represent the Dickey Chimney Tops now made in three kiln-fired colors. Several sizes are made in each style, corresponding to standard flue linings. Numbers printed under each style apply to the three colors—first line for Buff, second for Blue and third for Green—and to different sizes in each style. Consult schedule below for numbers, colors and sizes.

BE CAREFUL to make certain that the number of chimney top you specify, or order, is correct for the style, color and size required. Use only one number for each top. Add name "Dickey" to identify maker and to assist contractor. A single number indicates three things—a certain style, a particular color and a distinct size.

Folder illustrating relative proportions mailed on request.

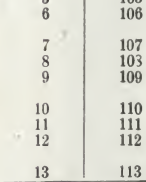
DICKEY CHIMNEY TOPS—NUMBERS, COLORS AND SPECIFICATIONS

Numbers and colors			Price, each	Height, over all, in.	Fits on brick chimney, size	Fits over flue lining, size,		Approx. inside dimension top of shaft	Base dimensions, in.			Approx. weight, each, crated, lb.
Buff	Blue	Green				Outside	Inside		Base dimen., outside	Base dimen., inside	Thickness of wall base	
1	101	201	$ 7.00	30	6 brick	8½x 8½	7 x 7	7-in. diam.	13½x13½	11½x11½	1	130
2	102	202	8.00	30	7 brick	8½x13	6¾x11¼	7x10	13½x16½	11½x14½	1	155
3	103	203	10.00	36	8 brick	13 x13	11 x11	10x10	16½x16½	14½x14½	1	160
4	104	204	7.00	30	6 brick	8½x 8½	7 x 7	7-in. diam.	13½x13½	11½x11½	1	115
5	105	205	8.00	30	7 brick	8½x13	6¾x11¼	7x10	13½x16½	11½x14½	1	160
6	106	206	10.00	36	8 brick	13 x13	11 x11	10x10	16½x16½	14½x14½	1	180
7	107	207	7.00	40	6 brick	8½x 8½	7 x 7	7-in. diam.	13½x13½	11½x11½	1	145
8	103	208	8.00	40	7 brick	8½x13	6¾x11¼	7x10	13½x16½	11½x14½	1	150
9	109	209	10.00	40	8 brick	13 x13	11 x11	10x10	16½x16½	14½x14½	1	180
10	110	210	7.00	40	6 brick	8½x 8½	7 x 7	7-in. diam.	13½x13½	11½x11½	1	135
11	111	211	8.00	40	7 brick	8½x13	6¾x11¼	7x10	13½x16½	11½x14½	1	155
12	112	212	10.00	40	8 brick	13 x13	11 x11	10x10	16½x16½	14½x14½	1	180
13	113	213	15.00	40	9 brick	13 x17½	10¾x15¼	10x14½	16½x21	14½x19	1	200





DICKEY CHIMNEY TOPS—NUMBERS, COLORS AND SPECIFICATIONS (Continued)





Numbers and colors			Price, each	Height, over all, in.	Fits on brick chimney, size	Fits over flue lining, size,		Approx. inside dimension top of shaft	Base dimensions, in.			Approx. weight, each, crated, lb.
Buff	Blue	Green				Outside	Inside		Base dimen., outside	Base dimen., inside	Thickness of wall base	
14	114	214	$ 7.00	24	6 brick	8½x 8½	7 x 7	7-in. diam.	13½x13½	11½x11½	1	90
15	115	215	8.00	24	7 brick	8½x13	6¾x11¼	7x10	13½x16½	11½x14½	1	110
16	116	216	10.00	24	8 brick	13 x13	11 x11	10x10	16½x16½	14½x14½	1	120
17	117	217	7.00	30	6 brick	8½x 8½	7 x 7	9-in. diam.	14 x14	11½x11½	1¼	115
18	118	218	8.00	30	7 brick	8½x13	6¾x11¼	10x13	14 x17	12 x15	1	135
19	119	219	10.00	30	8 brick	13 x13	11 x11	12-in. diam.	16½x16½	14½x14½	1	150
20	120	220	15.00	36	9 brick	13 x17½	10¾x15¼	14x17	16½x20½	14½x18½	1	190
21	121	221	18.00	36	10 brick	17½x17½	15¼x15¼	16-in. diam.	20½x20½	18½x18½	1	215
22	122	222	7.00	20	6 brick	8½x 8½	7 x 7	7½x7½	14 x14	12 x12	1	90
23	123	223	8.00	24	7 brick	8½x13	6¾x11¼	7x12	14 x17	12 x15	1	110
24	124	224	10.00	24	8 brick	13 x13	11 x11	12x12	17 x17	15 x15	1	125
25	125	225	15.00	30	9 brick	13 x17½	10¾x15¼	11x15	17 x21	15 x19	1	195
26	126	226	18.00	30	10 brick	17½x17½	15¼x15¼	15x15	21 x21	18½x18½	1¼	200

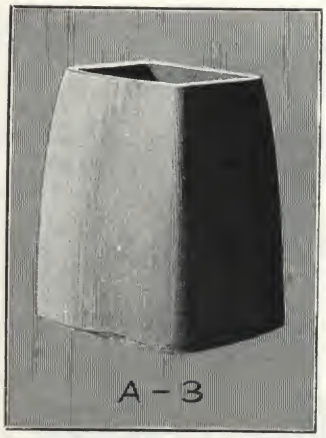
ESTABLISHED 1810

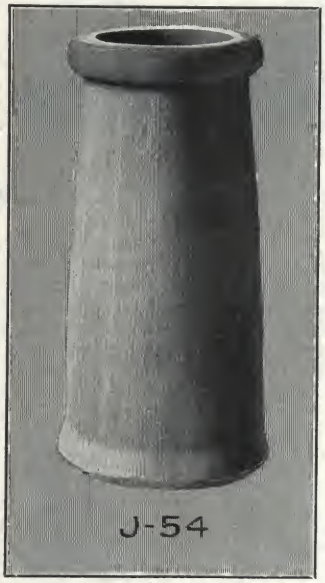
GALLOWAY TERRA COTTA COMPANY

Manufacturers of Galloway Pottery

3200 Walnut Street, PHILADELPHIA, PA.

For Galloway Garden and Decorative Pottery and Terra Cotta, see Manufacturers' Index







GALLOWAY *Hand Made* CHIMNEY POTS

Artistic and Practical Value of Chimney Pots

The roof attains additional interest in line and color when topped by Galloway Chimney Pots. Usually the most conspicuous feature of a country house, the roof deserves special consideration. Galloway Chimney Pots not only have practical value, but achieve striking effects at moderate cost.

Galloway Hand Made Chimney Pots

Galloway Hand Made Chimney Pots are made of high-fired, strong, durable terra cotta. They improve drafts, prevent rain water from washing down the flues and afford a simple method of increasing the chimney height without adding brick or stonework. Furnished in a wide range of types and sizes.

Color—The usual finish is a medium shade of red, but gray, buff and other colors will be made on order. Special designs, colors and sizes, other than those illustrated or described, can be furnished to order.

Estimates—In writing for quotations please give flue sizes, quantities and, if possible, a plan of the flues showing distances between them. If ordered a little in advance of the time when they will be needed, unnecessary delays will be avoided, particularly when special work must be executed.

GALLOWAY HAND MADE CHIMNEY POTS

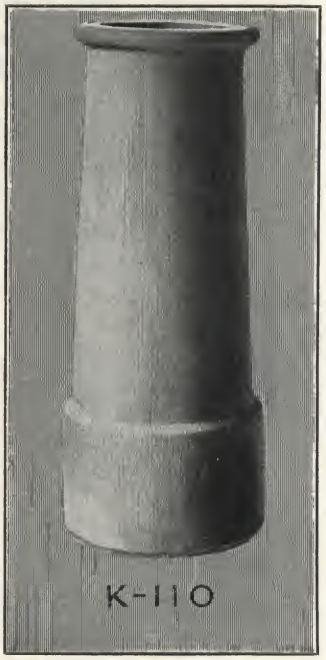
No.	Outside base size, in.	Shape of base	Inside top size, in.	Height, in.
		Type A-3		
68	12 x12	Square	7 x 7	18
3	12 x16	Rectangular	7 x11	18
4	16 x16	Square	11 x11	18
		Type A-210		
210	13 x13	Square	7½x 7½	24
211	13 x16½	Rectangular	7½x11½	24
212	16½x16½	Square	11½x11½	24
213	16 x21	Rectangular	11 x16	24
214	21 x21	Square	16 x16	24
		Type A-252		
250	14	Round	8	22
251	16	Round	10	22
252	19	Round	13	22
253	21	Round	15	22
		Types J-114 and J-54		
54	15	Round	11	30
475	15	Round	11	24
542	20	Round	14	30
5421	20	Round	14	36
114	14x18	Oval	8x11½	25

Note: Type J—Pot in other sizes 22, 24 and 30 in. diameter; 24 to 48 in. high.

		Type K-110		
26	12½	Round	6½	27
110	14	Round	9	36
		Miscellaneous		
41	12x12	Round with square base	6½	36
305	16½x16½	Round with square base	10	30
310	14	Round	8	30







LUDOWICI-CELADON COMPANY

Makers of Imperial Chimney Pots

104 South Michigan Avenue, CHICAGO, ILL.

NEW YORK, N. Y., 565 Fifth Avenue

WASHINGTON, D. C., 738 15th Street, N. W.

FACTORIES

NEW LEXINGTON, OHIO — COFFEYVILLE, KAN. — PERU, KAN.

For this page in color, see our cover page under Roofing Tiles

CHIMNEY POTS

Chimney pots are made in various textures and colors especially adapted to use with our weathered effect tiles. They are also available in glazed colors for the modern treatment.



C.P.200



C.P.500, 510 and 520



C.P.600, 610, 620, 630, 640, 650 and 660



SCHEDULE OF SIZES

NUMBER	FLUE	BASE	HEIGHT
C.P.200	7½"x7½"	13 "x13"	15"
C.P.300	8 " Dia.	14 "	18"
C.P.310	12 " Dia.	18 "	21"
C.P.320	15 " Dia.	21 "	25"
C.P.400	8 " Dia.	14½"	25"
C.P.410	12 " Dia.	18½"	29"
C.P.420	15 " Dia.	21 "	32"
C.P.500	8 " Dia.	14 "	15"
C.P.510	12 " Dia.	18 "	18"
C.P.520	15 " Dia.	21 "	22"
C.P.600	10 " Dia.	13 "	15"
C.P.610	12 " Dia.	15 "	18"
C.P.620	15 " Dia.	18 "	20"
C.P.630	18 " Dia.	21½"	23"
C.P.640	23 " Dia.	26 "	30"
*C.P.650	8 "x12"	11 "x15"	20"
*C.P.660	12 "x17"	15 "x20"	30"

*Elliptical



C.P.400, 410 and 420



C.P.300, 310 and 320

THE PURSELL CO.

128 East Sixth Street
CINCINNATI, OHIO

Products

CHIMNEY TOPS.

Description

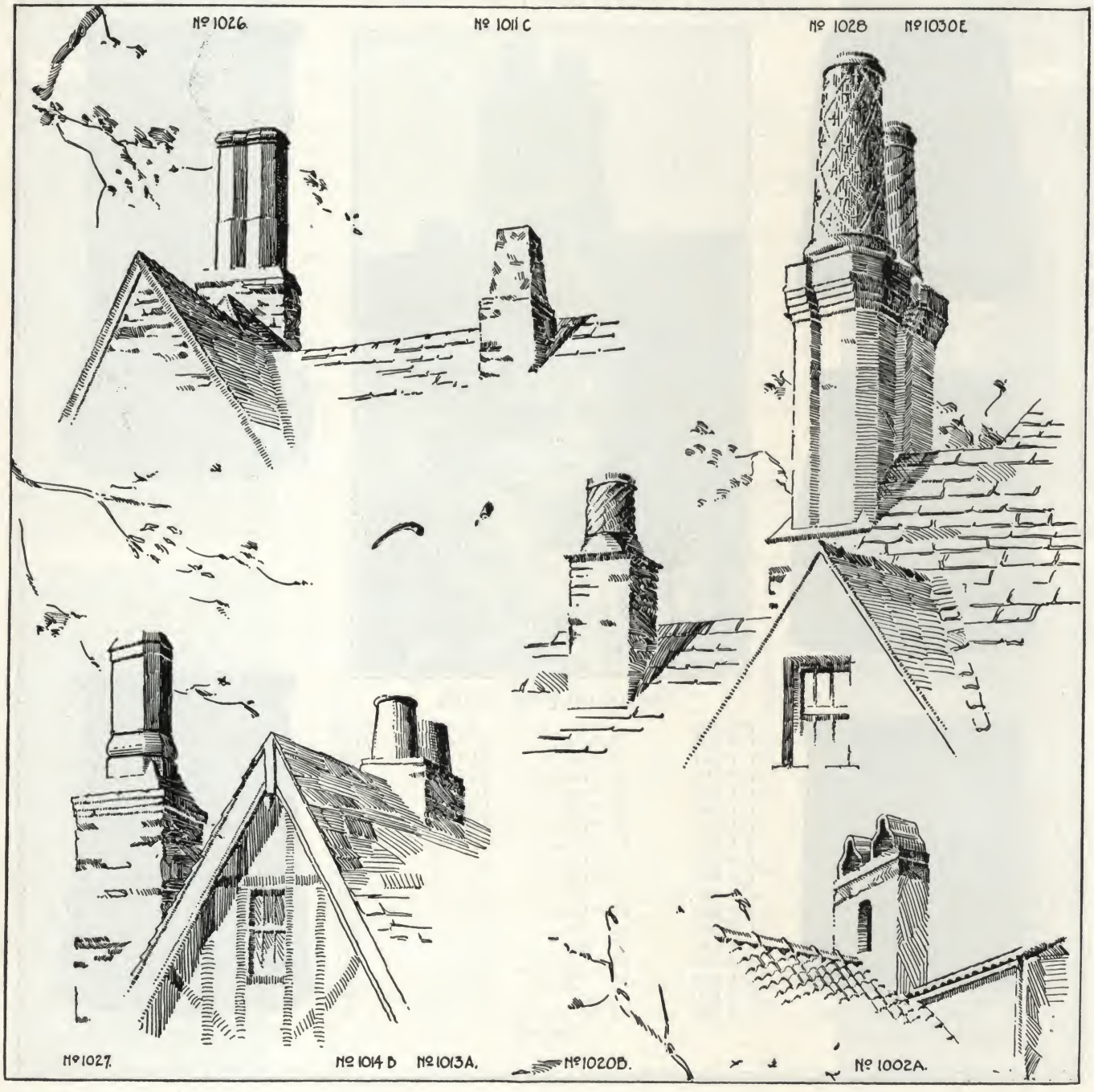
Wheatley Hand Fashioned Chimney Tops are designed to beautify the skyline—to give that final touch of character. In this limited space, we could only indicate a few of the designs from the catalogue, a copy of which will be sent on request.

A comprehensive stock of tops is carried in our standard color, Old Ivory; we can, however, if sufficient time is permitted, furnish tops in Plymouth Gray, Rhone Red, Eucalyptus Green, or a blend of colors may be developed on request.

Service

In case of structures where chimney tops of special design are desired, we offer the service of our designing and modeling departments, which together with our facilities, enables us to build to your order at prices that are reasonable.

Write us for suggestions or submit your sketches and we will cheerfully give you full information and prices.



METAL WINDOWS

Adams Co. A761
Bayley, William, Co. A762–773
Bliss Steel Products Corp. A776
Bogert & Carlough Co. A774–775
Campbell Casement Window Corp. A999–1001
Campbell Industrial Window Co., Inc. A1002–1003
Campbell Metal Window Corp. A1004–1005
Crittall Casement Window Co. A777–842
Dayton Greenhouse Mfg. Co. A1308
Detroit Steel Products Co. A843–946
Federal Steel Sash Co. A947–980
General Bronze Corp. A981–996
Hope, Henry, & Sons. A997–998
International Casement Co. Inc. A1006–1010
Jackson, Wm. H., Co. A1011
Kawneer Co. A1012–1013
Kewanee Mfg. Co. A1024
Lea, W. C. A1014–1023
Lord and Burnham Co. A1314
Lundell-Eckberg Mfg. Co., Inc. A1025–1044
Lupton's, David, Sons Co. A1045–1168
Mesker Bros. Iron Co. A1170–1179
Metallic Sash Operator Co. A1312–1313
Michaels Art Bronze Co., Inc. A1169
Michel & Pfeffer Iron Works. A1180–1207
Milcor Steel Co. A1208
Newman Mfg. Co. A1212–1223d
Payson Mfg. Co. A1309–1311
Philadelphia Supplies Co., Inc. A1209–1211
Pomeroy, S. H., Co., Inc. A1224–1225
Richey, Browne & Donald, Inc. A1226–1227
Solid Section Steel Window Industry A754–760
Soulé Steel Co. A1229–1276
Taylor Steel Products Co. A1280–1281
Thorn, J. S., Co.—
Casement Windows. A1277–1279
Steel Windows, etc. A1282–1283
Truscon Steel Co. A1284–1297
Vallas, Lionel A1228
Vento Steel Sash Co. A1298–1301
Voigtmann & Co. A1302–1303
Voigtmann Metal Window Corp. A1304–1305
Willis Mfg. Co. A1306–1307

SOLID SECTION STEEL WINDOW INDUSTRY

2212 Terminal Tower
CLEVELAND, OHIO

Membership

The SOLID SECTION STEEL WINDOW INDUSTRY includes in Division "A" manufacturers engaged in the manufacture, distribution and erection of all or a number of the following products manufactured principally from hot rolled steel sections:

Pivoted windows of the horizontally pivoted, vertically pivoted, or Underwriters' type; pivoted window operators; projected windows of the commercial projected or architectural projected type; continuous windows, continuous window operators; basement windows, utility windows; and industrial doors.

Purpose

The purposes of this trade association are: To broaden the market and stimulate trade in the products of the industry; to eliminate unfair methods of competition and uneconomic trade practices and to co-operate in bringing about general standardization and elimination of waste.

The last of these purposes has had consideration for years. As long ago as September 1927 the Department of Commerce published Simplified Practice Recommendations No. 72, which served to put the Industry on a uniform basis as regards nomenclature, sizes, styles and division of products.

This industry is now most concerned in the elimination of unfair methods of competition and uneconomic trade practices. A Code of Practice to regulate the action of members has been adopted with the approval of the Federal Trade Commission, before whom it was submitted in a Trade Practice Conference held in Washington, D. C.

It is the hope and expectation that the observance of this Code will establish a more fair and uniform market and place the industry upon a more ethical basis. Therefore, the co-operation of Architects, Engineers, Contractors, and all who may specify or purchase the products of this industry is asked, to the end that harmful practices and unfair discrimination will be eliminated for the good of the trade and the buying public.

Standards

Since the publication in 1927 of the Simplified Practice Recommendations No. 72 by the Department of Commerce, the continued development and extension of the use of Industry products made it advisable to introduce some changes in the Standards originally promulgated. These changes have been approved by the Department of Commerce and are now covered by the revised issue of the Simplified Practice Recommendations, Pamphlet No. R-72.

In order, therefore, for architects and engineers to gain the advantages of economy of cost and speed of delivery resulting from the use of standardized materials, all architectural designs should incorporate only windows with opening sizes and ventilator arrangement as shown in the tables and charts found in the following pages.

Use and Adaptability of Industry Products

There follows a list of the principal products of this Industry together with a brief indication of the particular usage of each.

Pivoted Windows—This window is practically universally used on industrial plants, powerhouses, garages and all similar construction where economy of first cost combined with a maximum degree of light and ventilation are the determining factors.

Projected Windows—Commercial—For high grade industrial construction, schools, institutional buildings and similar construction where the superior and convenient features of the projected type window make it desirable.

Projected Windows—Architectural—For use on schools, office buildings, hotels and institutional buildings where a high grade window is required. Standard hardware is solid bronze and glass is held in place with continuous solid steel glazing strips applied with screws.

Underwriters' Windows—The Underwriters' Laboratories will approve and provide labels for any type of horizontally pivoted, commercial projected or architectural projected windows with standard pivoted or outwardly projected ventilators, provided that the largest glass size does not exceed 350 sq. in. The glass in Underwriters' windows must be held in place with continuous glazing angles. Special Underwriters' hardware must also be furnished.

Continuous Windows—These windows are adapted to use in monitors or in sawtooth construction. They are often used in powerhouses and industrial plants where their heavy construction and hinged-at-the-top feature provide for maximum ventilation with full protection during inclement weather. This type of window is standardized for heights of opening in 3, 4, 5, and 6-ft. dimensions. The lengths are made up as required for each individual order. Consult manufacturers' catalogues for detailed information.

Basement Windows—Now almost universally used in residence construction where the non-sticking and non-swelling advantages of steel window construction have popularized their general adoption.

Mechanical Operators—Operators for steel windows may be had in the tension design for continuous and pivoted windows or in the torsion design (worm and gear or rack and pinion) for pivoted windows. Consult manufacturers' catalogues for detailed information. (See additional on first and fourth page following.)

Industrial Doors—Tubular steel doors are the logical type for use in all industrial construction where their rugged strength provides ample resistance to the severe usage encountered in manufacturing plants, railroad shops, garages and similar construction.

Service and Consultation

All members of the SOLID SECTION STEEL WINDOW INDUSTRY offer products made in standard sizes in

Continued on next page

accordance with the latest U.S. Department of Commerce Simplified Practice recommendations, Pamphlet R-72.

Individual details, and data concerning the various Industry products will be found more completely in the Catalogue insertions of the Member Manufacturers.

Information may also be had by application direct to their home offices or by consulting the "Where to buy it" section in the classified telephone directory, under the heading "Windows, Steel" for the address of the nearest local representatives. These local offices will co-operate with architects, engineers, contractors, and owners in all matters relating to the use and cost of Industry products.

Specifications

The following points are presented for the consideration of architects and engineers who desire to provide against matters of common error or omission when specifying products of this industry.

Mechanical Operators—All continuous windows not of the fixed type must be mechanically operated. All pivoted windows in monitors, along craneways, and all runs of ventilators not within reach of the floor should also be mechanically controlled. All mechanical operator specifications should provide for furnishing and erecting by window manufacturer. (See bottom of third page following for additional notes on operators.)

Painting—It is the standard practice of all industry manufacturers to furnish materials with a dip coat of the best grade of mineral paint before shipment. Steel products made up of small angular shaped sections require complete immersion in a paint tank in order to insure application of the protective coating over the entire surface. Lead and oil paint is not adaptable for use in tanks employed for a dipping process. Therefore, any shop coat other than the standard dip paint must be hand brushed at considerable extra cost and with probable less complete and thorough coverage. The standard mineral dip coat offers an excellent base for the application, after erection, of additional field coats of any kind of paint desired. All field painting should be specified under the general painting specifications.

Erection—Industry manufacturers, while fully guaranteeing their products against defects of design or manufacture, cannot assume full responsibility for the performance of these products unless the erection work is done with their own forces. Although small jobs including a few standard pivoted windows built in single openings may be satisfactorily installed by the general contractor, all other jobs should be so specified that the manufacturer is required to erect his products and thereby assume full responsibility for them.

Glass and Glazing—This item should be handled under a separate sub-contract and not included as part of the window sub-contract. Under "Glass and Glazing," care should be taken to specify a known high grade of steel window putty. Ordinary putty will not give proper results through lack of adhesion to steel sections. Inferior steel window putty often causes leakage through porosity of the putty body when set.

Grouting and Calking—Solid section steel windows are usually installed in openings previously prepared to receive them and require careful pointing and grouting in order to procure a watertight result. Windows built into walls with the progress of the masonry work do not require additional calking or grouting if the manufacturer's standards are followed and proper anchorage is provided for the fin section in the wall. Grouting and pointing (or calking when specified) should be made a part of masonry contractor's work.

Standard Pivoted and Commercial Projected Windows

COMBINATIONS OF STANDARD SIZES WIDTHS OF OPENINGS

Commercial Projected Windows are limited to 5 lights in width

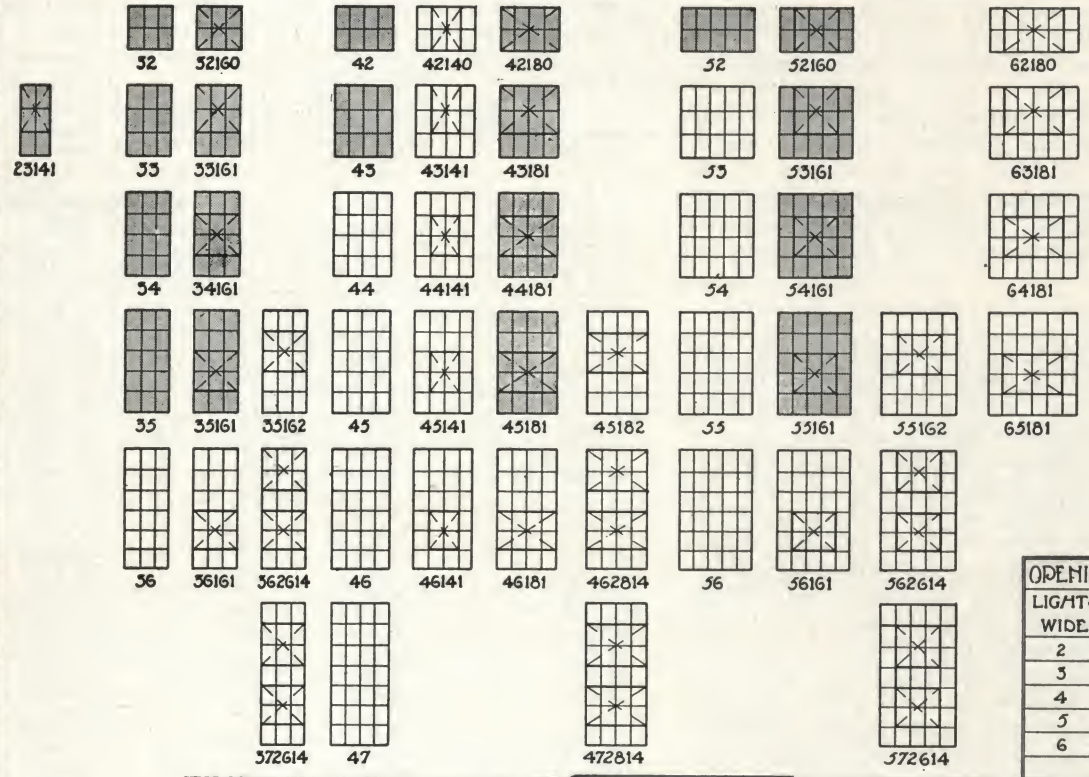
12" x 18" glass	Total number of units	Number of lights per unit Positions of each number indicates position of unit in opening	Total number of lights	Total number of mullions	14" x 20" glass
Widths of openings					Widths of openings
2′ 1⅝″	1	2	2	None	2′ 5⅝″
3′ 2″	1	3	3	None	3′ 8″
4′ 2⅜″	1	4	4	None	4′10⅜″
5′ 2¾″	1	5	5	None	6′ 0¾″
6′ 3⅛″	1	6	6	None	7′ 3⅛″
6′ 6″	2	3, 3	6	1	7′ 6″
8′ 6¾″	2	4, 4	8	1	9′10¾″
9′10″	3	3, 3, 3	9	2	11′ 4″
10′ 7½″	2	5, 5	10	1	12′ 3½″
10′10⅜″	3	3, 4, 3	10	2	12′ 6⅜″
11′10¾″	3	3, 5, 3	11	2	13′ 8¾″
11′10¾″	3	4, 3, 4	11	2	13′ 8¾″
12′ 8¼″	2	6, 6	12	1	14′ 8¼″
12′11⅛″	3	4, 4, 4	12	2	14′11⅛″
13′ 2″	4	3, 3, 3, 3	12	3	14′ 2″
13′11½″	3	4, 5, 4	13	2	16′ 1½″
13′11½″	3	5, 3, 5	13	2	16′ 1½″
14′11⅞″	3	4, 6, 4	14	2	17′ 3⅞″
14′11⅞″	3	5, 4, 5	14	2	17′ 3⅞″
15′ 2¾″	4	3, 4, 4, 3	14	3	17′ 6¾″
16′ 0¼″	3	5, 5, 5	15	2	18′ 6¼″
16′ 0¼″	3	6, 3, 6	15	2	18′ 6¼″
17′ 0⅝″	3	5, 6, 5	16	2	19′ 8⅝″
17′ 0⅝″	3	6, 4, 6	16	2	19′ 8⅝″
17′ 3½″	4	4, 4, 4, 4	16	3	19′11½″
18′ 1″	3	6, 5, 6	17	2	20′ 11″
18′ 6¾″	5	3, 3, 5, 3, 3	17	4	21′ 4¾″
19′ 1⅜″	3	6, 6, 6	18	2	22′ 1⅜″
19′ 4¼″	4	3, 6, 6, 3	18	3	22′ 4¼″
19′ 4¼″	4	4, 5, 5, 4	18	3	22′ 4¼″
20′ 7½″	5	5, 3, 3, 3, 5	19	4	23′ 9½″
21′ 5″	4	5, 5, 5, 5	20	3	24′ 9″
21′ 5″	4	4, 6, 6, 4	20	3	24′ 9″
21′ 7⅞″	5	4, 4, 4, 4, 4	20	4	24′11⅞″
22′ 8¼″	5	4, 4, 5, 4, 4	21	4	26′ 2¼″
22′ 8¼″	5	3, 5, 5, 5, 3	21	4	26′ 2¼″
23′ 5¾″	4	5, 6, 6, 5	22	3	27′ 1¾″
23′ 8⅝″	5	5, 4, 4, 4, 5	22	4	27′ 4⅝″
23′11½″	6	3, 4, 4, 4, 4, 3	22	5	27′ 7½″
24′ 9″	5	4, 5, 5, 5, 4	23	4	28′ 7″
25′ 6½″	4	6, 6, 6, 6	24	3	29′ 6½″
25′ 9⅜″	5	3, 6, 6, 6, 3	24	4	29′ 9⅜″
26′ 0¼″	6	4, 4, 4, 4, 4, 4	24	5	30′ 0¼″
26′ 9¾″	5	5, 5, 5, 5, 5	25	4	30′11¾″
27′10⅛″	5	5, 5, 6, 5, 5	26	4	32′ 2⅛″
28′ 1″	6	5, 4, 4, 4, 4, 5	26	5	32′ 5″
28′ 1″	6	3, 5, 5, 5, 5, 3	26	5	32′ 5″
28′10½″	5	6, 5, 5, 5, 6	27	4	33′ 4½″
29′ 4½″	7	3, 3, 5, 5, 5, 3, 3	27	6	33′10¼″
29′10⅞″	5	5, 6, 6, 6, 5	28	4	34′ 6⅞″
30′ 1¾″	6	4, 5, 5, 5, 5, 4	28	5	34′ 9¾″
30′11¼″	5	6, 6, 5, 6, 6	29	4	35′ 9¼″

HEIGHTS OF OPENINGS

12" x 18" glass		14" x 20" glass	
Lights high	Height of openings	Lights high	Height of openings
1	1′7¼″	1	1′ 9¼″
2	3′1⅝″	2	3′ 5⅝″
3	4′8″	3	5′ 2″
4	6′2⅜″	4	6′10⅜″
5	7′8¾″	5	8′ 6¾″
6	9′3⅛″	6	10′ 3⅛″
7	10′9½″	7	11′11½″

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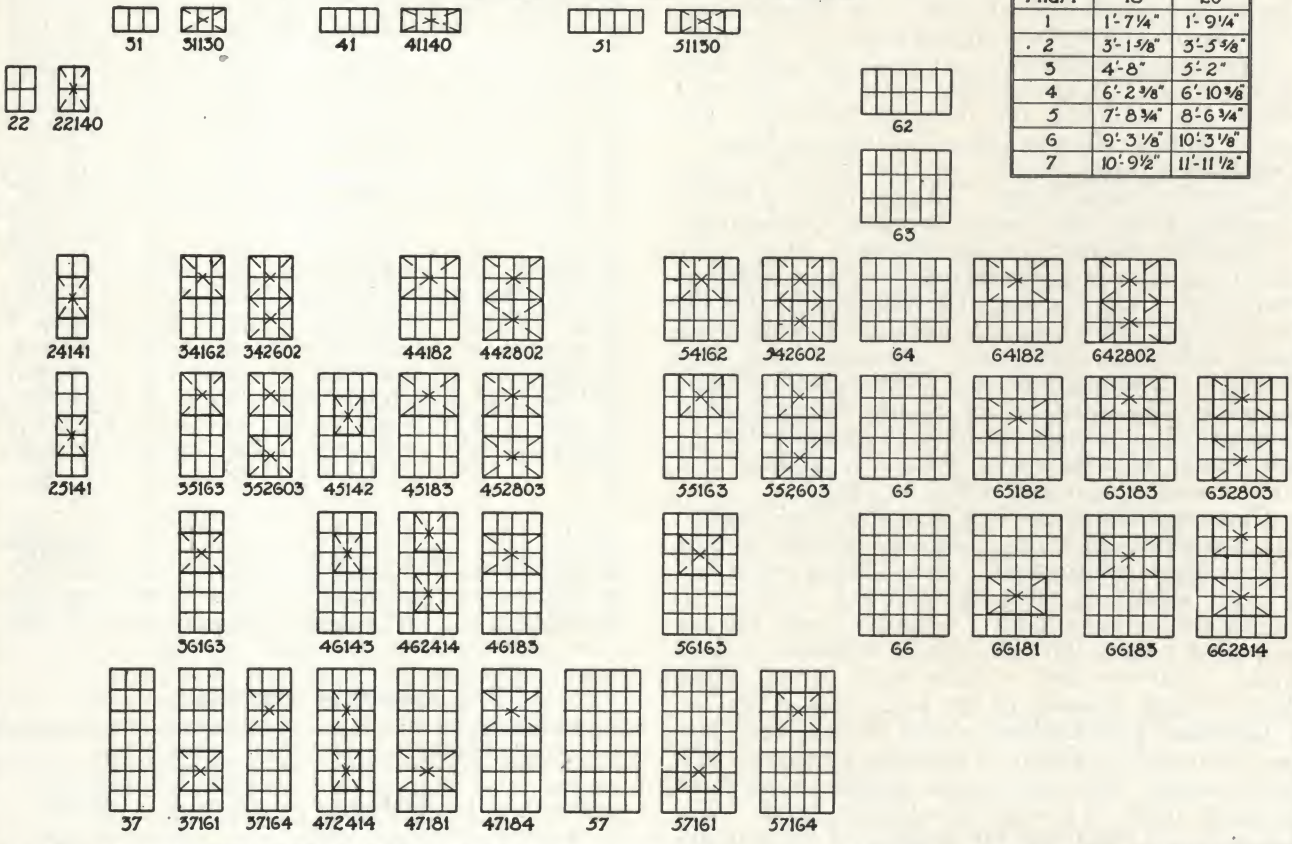
STOCK AND STANDARD TYPES



SHADED UNITS ARE DEALER STOCKS

OPENING DIMENSIONS		
LIGHTS WIDE	GLASS WIDTH 12"	14"
2	2'-1 5/8"	2'-5 5/8"
3	3'-2"	3'-8"
4	4'-2 3/8"	4'-10 3/8"
5	5'-2 3/4"	6'-0 3/4"
6	6'-3 1/8"	7'-3 1/8"
LIGHTS HIGH	GLASS HEIGHT 18"	20"
1	1'-7 1/4"	1'-9 1/4"
2	3'-1 5/8"	3'-5 5/8"
3	4'-8"	5'-2"
4	6'-2 3/8"	6'-10 3/8"
5	7'-8 3/4"	8'-6 3/4"
6	9'-3 1/8"	10'-3 1/8"
7	10'-9 1/2"	11'-11 1/2"

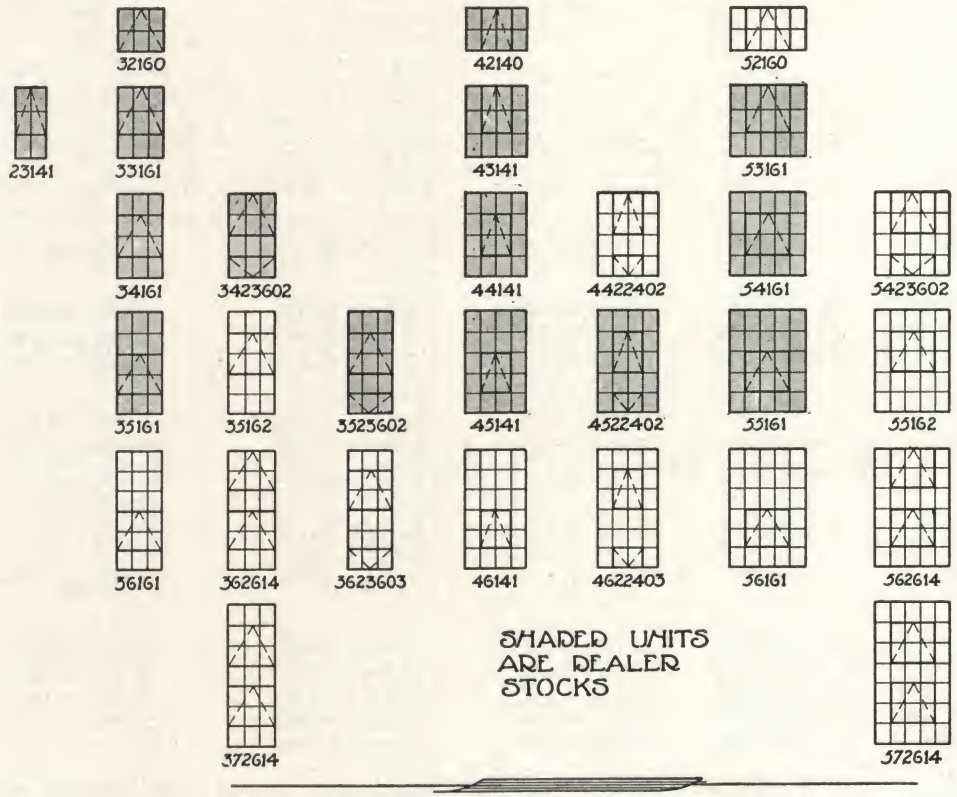
LISTED SPECIAL TYPES



HORIZONTAL · PIVOTED · WINDOWS

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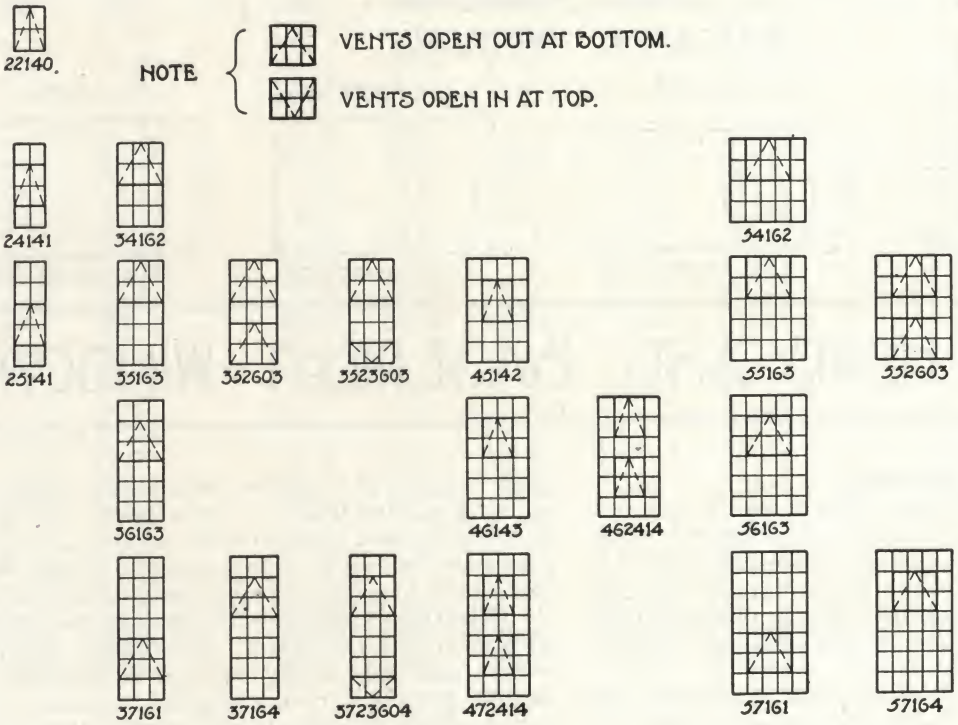
STOCK AND STANDARD TYPES



SHADED UNITS ARE DEALER STOCKS

OPENING DIMENSION		
LIGHTS WIDE	GLASS WIDTH 12"	14"
2	2'-1 5/8"	2'-5 5/8"
3	3'-2"	3'-8"
4	4'-2 3/8"	4'-10 3/8"
5	5'-2 3/4"	6'-0 3/4"
6	6'-3 1/8"	7'-3 1/8"
LIGHTS HIGH	GLASS HEIGHT 18"	20"
1	1'-7 1/4"	1'-9 1/4"
2	3'-1 5/8"	3'-5 5/8"
3	4'-8"	5'-2"
4	6'-2 3/8"	6'-10 3/8"
5	7'-8 3/4"	8'-6 3/4"
6	9'-3 1/8"	10'-3 1/8"
7	10'-9 1/2"	11'-11 1/2"

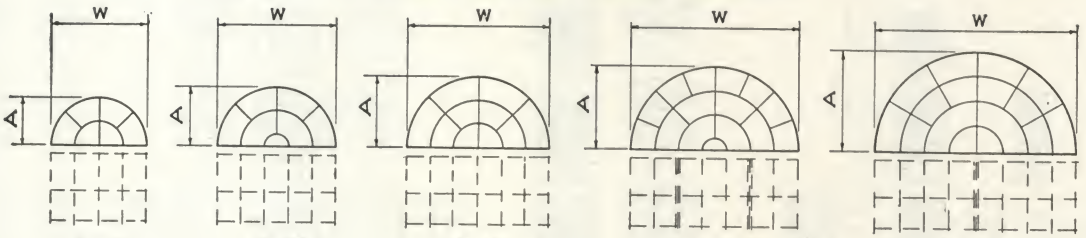
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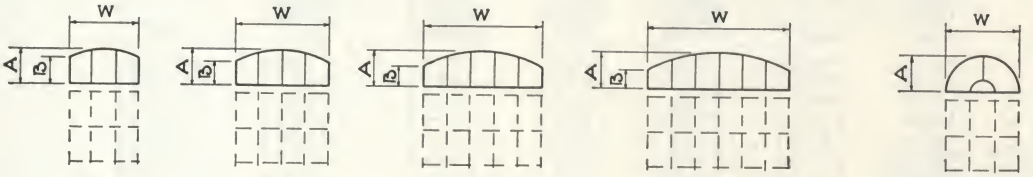
COMMERCIAL PROJECTED WINDOWS

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CAMBER AND CIRCLE HEAD UNITS



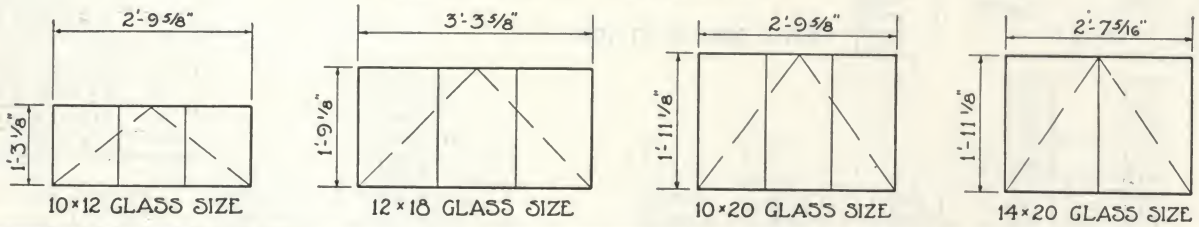
GLASS SIZES	12"×18"	14"×20"	12"×18"	14"×20"	12"×18"	14"×20"	12"×18"	14"×20"	12"×18"	14"×20"
W -	4'-2 3/8"	4'-10 3/8"	5'-2 3/4"	6'-0 3/4"	6'-3 1/8"	7'-3 1/8"	7'-9 1/4"	8'-11 1/4"	8'-6 3/4"	9'-10 3/4"
A -	2'-1 3/16"	2'-5 3/16"	2'-7 3/8"	3'-0 3/8"	3'-1 9/16"	3'-7 9/16"	3'-10 5/8"	4'-5 5/8"	4'-3 3/8"	4'-11 3/8"



GLASS SIZES	12"×18"	14"×20"	12"×18"	14"×18"	12"×18"	14"×20"	12"×18"	14"×20"	12"×18"	14"×20"
W -	3'-2"	3'-8"	4'-2 3/8"	4'-10 3/8"	5'-2 3/4"	6'-0 3/4"	6'-3 1/8"	7'-3 1/8"	3'-2"	3'-8"
A -	1'-6 1/8"	1'-8 1/8"	1'-6 1/8"	1'-8 1/8"	1'-6 1/8"	1'-8 1/8"	1'-6 1/8"	1'-8 1/8"	1'-7"	1'-10"
B -	1'-1"	1'-2 1/4"	0'-11 3/8"	1'-0 5/16"	0'-9 11/16"	0'-10 3/8"	0'-8 1/16"	0'-8 7/16"		
R -	3'-2"	3'-8"	4'-2 3/8"	4'-10 3/8"	5'-2 3/4"	6'-0 3/4"	6'-3 1/8"	7'-3 1/8"		

NOTE: HORIZONTAL MULLIONS ARE REQUIRED WHEN CURVED HEAD UNITS ARE ABOVE STEEL WINDOWS GREATER THAN SIX LIGHTS IN WIDTH. IN SMALLER WIDTHS THE UPPER AND LOWER SASH ARE BOLTED DIRECTLY TOGETHER

BASEMENT WINDOWS



CURVED HEAD AND BASEMENT WINDOWS

Notes on Mechanical Operators

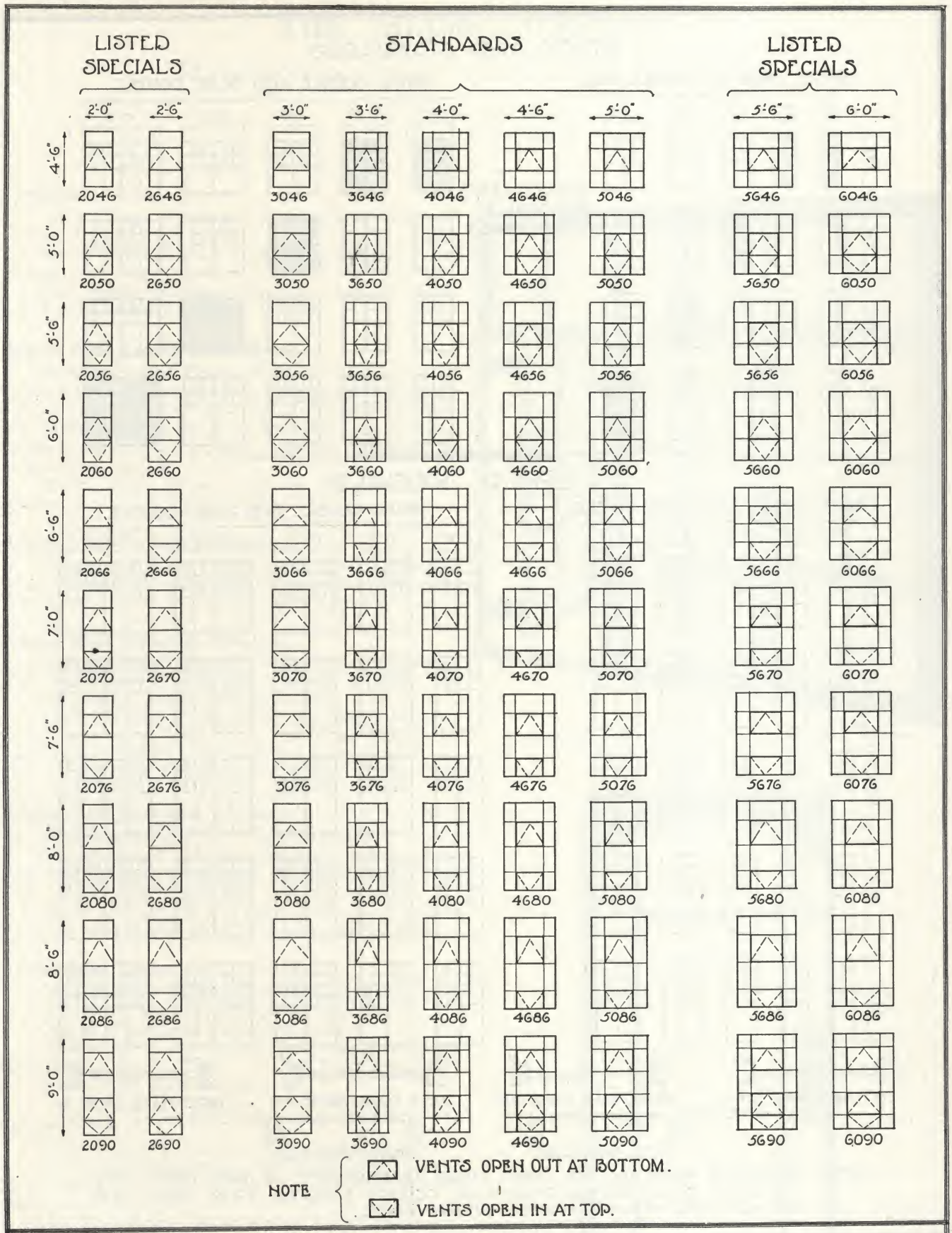
For Standard Pivoted Windows—Worm and gear type operators are limited to a length of 40 ft. either side of the power, giving a total maximum possible length of 80 ft. for any one power. In the rack and pinion type these quantities may be doubled giving 80 ft. as maximum length either side of the power and a total possible limit of 160 ft.

For Top Pivoted Windows—Only the rack and pinion type operator will give the necessary degree of opening required for these windows. The maximum length either side of power is 40 ft. or a total possible length of 80 ft.

For Continuous Top Hung Swing Windows—The tension type operator used for these windows may be furnished in any length which good practice would require to be controlled from one point. Factors, such as the angle of slope of the window, the degree of opening required, the height of the window and the weight of the glass used, determine the layout. It is therefore customary for each manufacturer to design the operator layout to meet the requirements of individual jobs.

Electrical Control—Any operator may be equipped with electric motor control. The window manufacturer will furnish only totally enclosed or metaline bearing motors, sprockets, chain, magnetic reversing switches, limit switches, individual push button control and wiring diagrams. All other electrical equipment, including wire, conduits and safety line switches must be furnished by the electrical contractor who shall also wire and install all control and switch equipment up to and connecting with the motor power. The window manufacturer will mount only motors, sprockets, chain and limit switches.

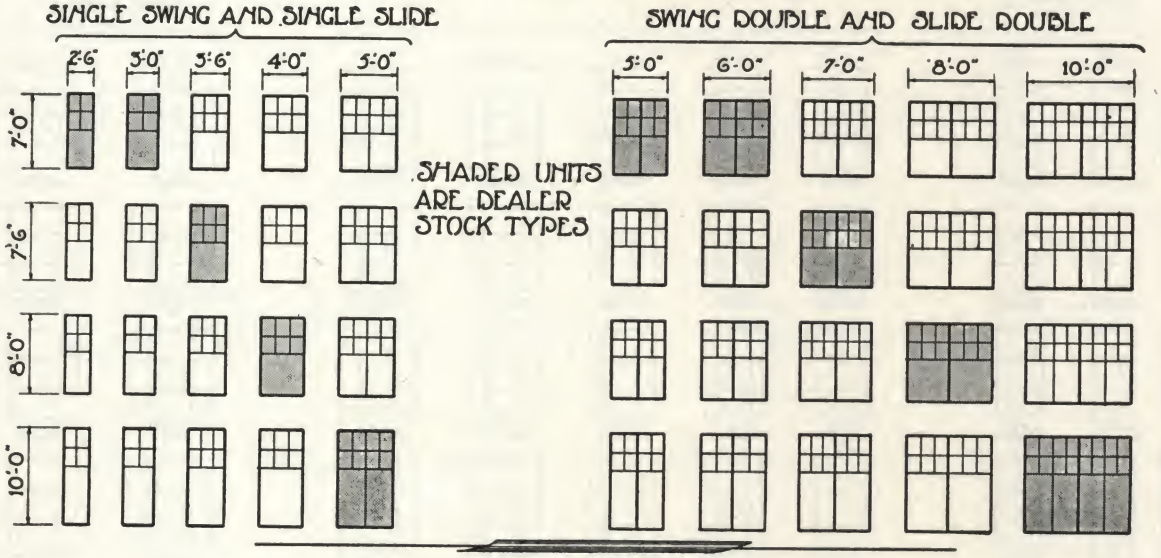
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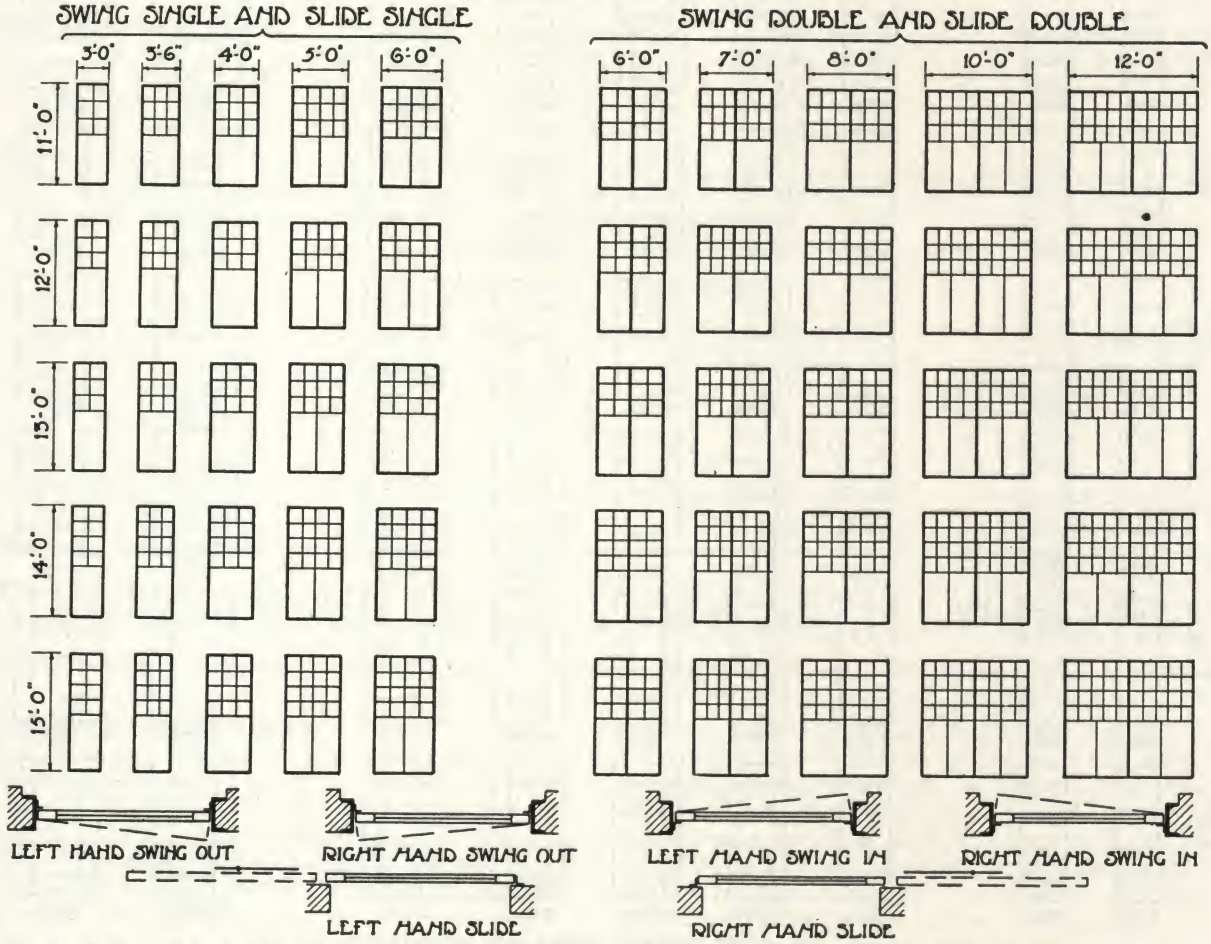
ARCHITECTURAL PROJECTED WINDOWS

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STOCK AND STANDARDS



LISTED SPECIALS



NOTES: DIMENSIONS GIVEN ARE FOR INSIDE FRAME MEASUREMENT OF SWING DOORS ONLY. FOR SLIDE DOOR OPENING DIMENSIONS DEDUCT 3 INCHES FROM WIDTH AND 1½ INCH FROM HEIGHT OF SIZES SHOWN ABOVE.

INDUSTRIAL DOORS

ESTABLISHED 1883

THE ADAMS COMPANY

Manufacturers of Steel Windows and Steel Doors

109 West 6th Street
DUBUQUE, IOWA

Products

ADAMS STEEL WINDOWS: Architectural, Industrial, Basement and Laundry.

ADAMS STEEL DOORS: Architectural, Industrial and Garage.

Also Adams Fireplace Dampers, Ash Pit Doors, Ash Dumps and Coal Chutes.

Adams Steel Casement Windows

Standard Steel Type—Windows made according to plans and specifications with inswinging or outswinging casements. All windows fully equipped with suitable anchors and all necessary hardware. Outswinging casements have cleaning hinge. Special hardware furnished upon request.

Heavy Steel Type—Windows made special according to plans and specifications.

Adams Steel Projected Windows

Commercial Type—Window designed to eliminate friction slide. Projects either inward or outward. Windows equipped with all necessary hardware.

Adams Steel Industrial Windows

Center-pivoted Type—Standard sizes; details on request.

Stationary Type—Standard sizes.

Utility Type—Designed for garages, filling stations, factories, packing plants and barns. Especially desirable for buildings which require economical screening.

Adams Steel Basement Windows

Durable and attractive. Easily installed.

On account of quantity production, Adams Steel Basement Windows compete in price with wood sash.

Detail information and price sheets for standard and stock sizes Adams Steel Windows upon request.

Adams Steel Doors

Architectural Type—Specially designed.

Industrial Type—Standard and special.

Garage Type—Standard stock sizes.

Details and prices for standard sizes steel doors upon request.

Special sizes made to order.

Special Work

Steel windows and doors made to specifications.

Let us submit elevations, details and prices on your special work such as: steel store fronts, special steel doors, etc.

Our Engineering Department will gladly work out construction details and furnish drawings for approval.

Catalogues

Catalogues, construction and installation details mailed upon request.



Adams Standard Outswinging Steel Casement Window



Adams Architectural Steel Door, Special Design

ESTABLISHED 1881

THE WILLIAM BAYLEY CO.

SPRINGFIELD, OHIO

DISTRICT OFFICES

NEW YORK, N. Y., 67 W. 44th Street
Telephone, Vanderbilt 2858

BOSTON, MASS., 5 Park Street
Telephone, Haymarket 3285

CLEVELAND, OHIO, Terminal Tower
Telephone, Main 3958

WASHINGTON, D. C., 1427 Eye Street, N. W.
Telephone, National 1229

SPRINGFIELD, OHIO, West North Street
Telephone, Center 269

CHICAGO, ILL., 75 East Wacker Drive
Telephone, Randolph 5997

ATLANTA, GA., 808 Norris Building
Telephone, Walnut 1879

SALES AGENTS IN 75 AMERICAN CITIES

Member Solid Section Steel Window Industry

BAYLEY
STEEL WINDOWS & DOORS

Separate Catalogues Covering These Products Are Available



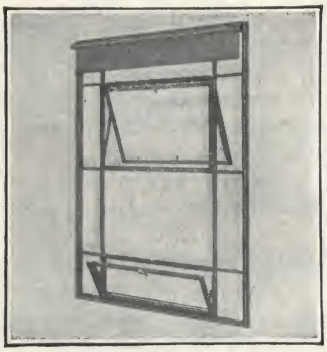
Pivoted Windows



Pivoted Windows Screened



Projected Windows Commercial



Projected Windows Architectural



Continuous Windows and Operating Devices



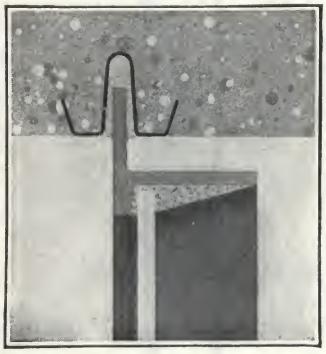
Steel Casements



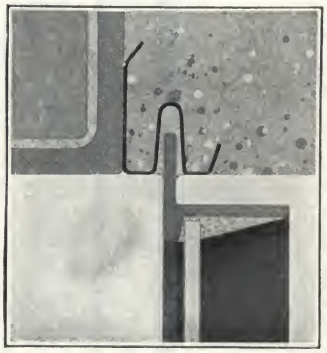
Prison Windows Screened 1½-in. T-bar



Guard Windows for Prisons Super Bar



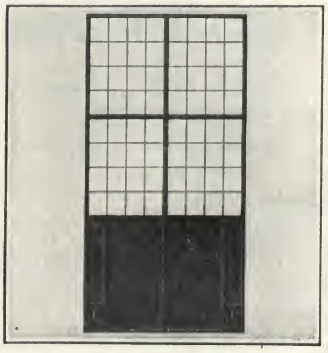
Steel Window Inserts, Concrete Construction



Steel Window Inserts, Concrete Frame—Brick Veneer



Tubular Steel Doors



Airplane Hangar Doors

BAYLEY STEEL WINDOW AND DOOR PRODUCTS

Continued on next page

Experience

Bayley Steel Windows and Doors are backed by 49 years of continuous manufacturing experience, including 21 years of active participation in the steel window and door industry, beginning with its inception.

Service

Bayley representatives co-operate with designers. They often suggest economical and satisfactory layouts and help to solve new and difficult problems.

Catalogues

The following material is taken from the Bayley Catalogues.

The complete catalogues covering individual products are ready, and are listed, together with abbreviated titles by which they may be ordered.

Pivoted Windows	P. W. 29
Pivoted Windows Screened	P. W. S. 29
Projected Windows Commercial	P. W. C. 29
Projected Windows Architectural	P. W. A. 29
Steel Casements	S. C. 29
Continuous Windows	C. W. 29
Tubular Steel Doors	T. S. D. 29
Steel Window Inserts	S. W. I. 29
Airplane Hangar Doors	A. H. D. 30

Bayley Pivoted Windows

Bayley Pivoted Windows are for sidewalls of factories, warehouses, garages, loft buildings, power houses and all types of industrial buildings. They are made of heavy, rolled steel sections, designed for steel window construction.

Experience—Extensive experience in architectural iron work since 1881, coupled with experience of manufacturing steel windows since 1909 and developing them to their present standard, identify The William Bayley Co. as manufacturers of a quality product. Exclusive features of Bayley windows and processes of manufacture are patented.

Design—Design of sections assures permanence and low cost of maintenance. There are neither sharp edges, which encourage corrosion, nor ledges where dirt and moisture may collect. Flat surfaces are neat, easily painted and require a minimum amount of paint.

Construction—Pivoted windows have a deep angle frame, of a size sufficient to provide a ½-in. engagement at head, jambs and sill in all wall constructions.

Interior bar is T-shaped and is a characteristic Bayley section, with a flange containing no greater amount of metal than its web and a depth of 1½ in. This dimension is found only in Bayley windows and is the basis of exclusive features such as screening and double glazing. It provides space for a tenon of extra size, which, when driven, makes a tight and permanent joint. It allows space for bed and face putty and either ⅛ or ¼-in. glass.

Intersection of interior bars is accomplished by threading vertical bar through horizontal bar. Horizontal bar is punched in web. Vertical bar is punched in flange. Loads are carried by horizontal bar. After assembly, a wedge is driven at intersection, making entire construction rigid. Bar is not bent or manipulated in assembly. This construction is patented.

Double glazing is an exclusive feature, essential in industries where constant temperature and humidity must be preserved and where fuel saving is considered. Double glazing in each glass space is accomplished with galvanized separators 2-in. long, which provide ⅜-in. clear space between two lights of glass. Bed putty is applied, outside light of glass inserted followed by double glazing separators, inside light of glass follows separators and is held in place by glazing springs. Face putty is applied for finish.

Hinge of steel is centered 3 in. above center of ventilator. It is contained within contact members and does not project beyond faces of window, a protection against damage in shipment. Hinge may be adjusted by regulating two substantial bolts.

Weathering at hinge is provided by lapping upper weathering on ventilator over lower weathering on fixed portion of window. Ventilator contacts are close fitting. Vertical contacts are of formed steel. Horizontal contacts are one-piece heavy rolled sections integral to ventilator and unit and are 1⅝ in. deep.

Hardware—Hardware is furnished in four standard designs. Lockbar F of steel, for vent within easy reach, opens, positions, and locks ventilator. Pushbar G of steel and cam H of malleable iron, for vent within easy reach, provides a bar for positioning and cam for locking ventilator. One cam is furnished for ventilator up to 3 lights wide and two cams for ventilator 4 lights or over. Spring catch C of steel in sherardized finish and chain return B of steel provide an efficient method of operating ventilator out of reach. Cam H15, of malleable iron, and chain return B are alternates for spring catch and chain. When ordering windows, specify kind of hardware required. When no choice is made, lockbar F will be furnished. If hardware is to be chain operated, indicate sill height, so that proper length of chain will be provided. Hardware is shipped unattached. Attachment is part of window erection.

Vertical mullions of two designs are used. M mullions are used for windows up to 5 lights high, and T mullions above 5 lights. T mullions have no holes where corrosion may start. T mullions for attachment of brackets are used when ventilators are mechanically operated. Mullion caps 98A of copper are furnished for flashing heads of mullions.

Horizontal mullions in several designs are suggested but not furnished by The William Bayley Co. unless specifically mentioned in the contract.

Layouts and Sizes—Standard layouts and sizes 12x18 and 14x20 are shown and should be followed to secure best prices and quick shipments.

Unit marking system—First numeral (number of lights wide), second (number of lights high), third (number of ventilators), fourth (number of lights per ventilator), fifth (number of lights from sill of unit to sill of lower ventilator), sixth (number of lights from sill of unit to sill of upper ventilator).

Accessories—Jamb plates may be used with standard units where necessary to accommodate openings of slightly greater size than standards.

Circular and camber head units are furnished in standard sizes which should be followed.

Pivoted window operators are offered in several designs, torsion, rack and pinion, tension and screw thread and may be either manually or electrically controlled. Parts are designed to eliminate friction and include such features as machine cut racks, pinions, worm and gears, and bronze or ball bearings where necessary.

Window cleaner holdfasts are furnished when specified.

Erection Instructions—Erection instructions are packed in Hardware Box No. 1.

Glass Sizes and Glazing—Layouts show glass sizes in fixed lights. Edges of lights in ventilators at sides, top or bottom of ventilators must be trimmed 1 in.

Glazing is from inside. Bed putty should be applied before glass is set. Each light of glass should be secured by four glazing springs 4K, and face putty.

Painting—One dip coat of standard red oxide paint is applied to all steel before shipment. Bayley steel windows can be galvanized when desired. The hot dip galvanizing process is used after units have been assembled and constitutes complete protection.

Underwriters' Label—Underwriters' label may be applied to this product. Sections and details duplicate those of standard pivoted windows except that glass is held in place by glazing angles and ventilators are equipped at heads and sills with expansion clips. Window units are limited to 7x12 ft. Width and height may be either dimension. Glass size is limited to 300 sq. in. Larger openings are made up of several units connected together by approved T mullions. Mullions have special anchors at heads and sills. Window openings are not limited to any width. Hardware may be either lockbar, spring catch and chain or cam H15 and chain. Local inspection authorities where job is situated have jurisdiction over type of hardware acceptable. Double glazing may be had in these windows and provides two lights in each glass space, held in place by two sets of glazing angles. It is essential that ample bed putty be used to insure a watertight job. Underwriters' label is placed on inside face of glazing angle located at lower edge of fixed light near center and sill of unit.

Erection—Erection by The William Bayley Co. is recommended and insures a satisfactory installation.

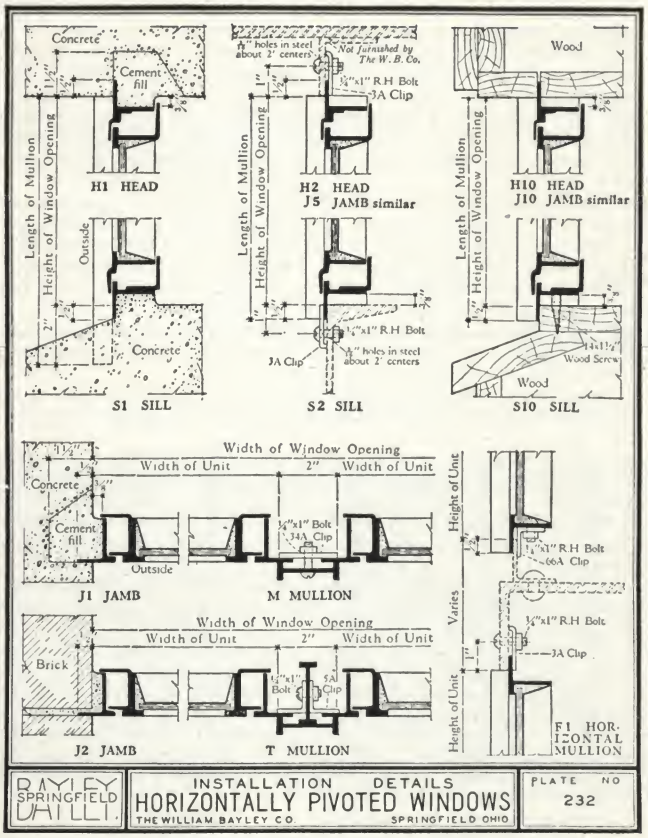
Prices—Prices include necessary hardware, attachment clips, four glazing springs 4K per light and vertical mullions complete.

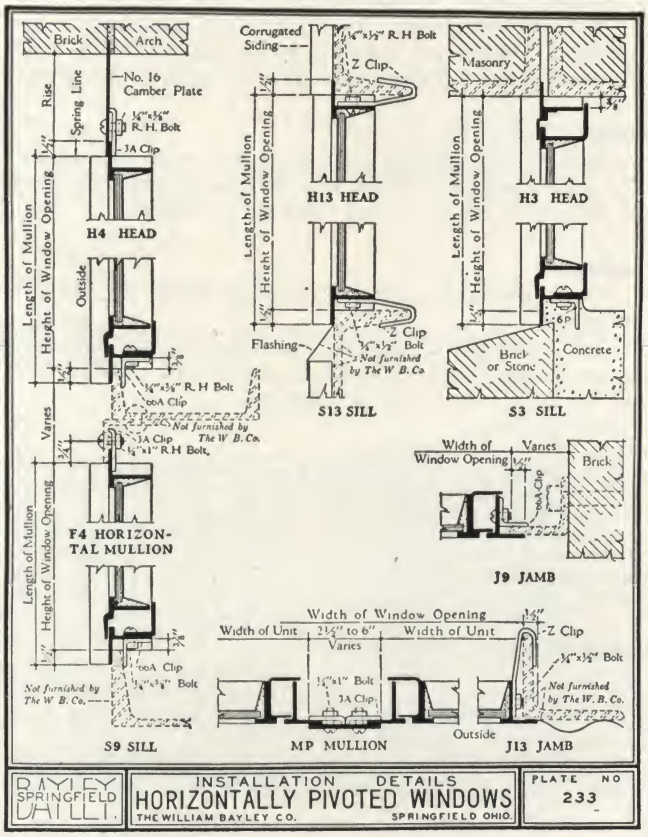
Items Not Furnished—Items not furnished by The William Bayley Co. are structural steel, window cleaner holdfasts, flashing, glass, putty, erection, pointing, caulking, field painting and glazing, unless specifically mentioned in contract.

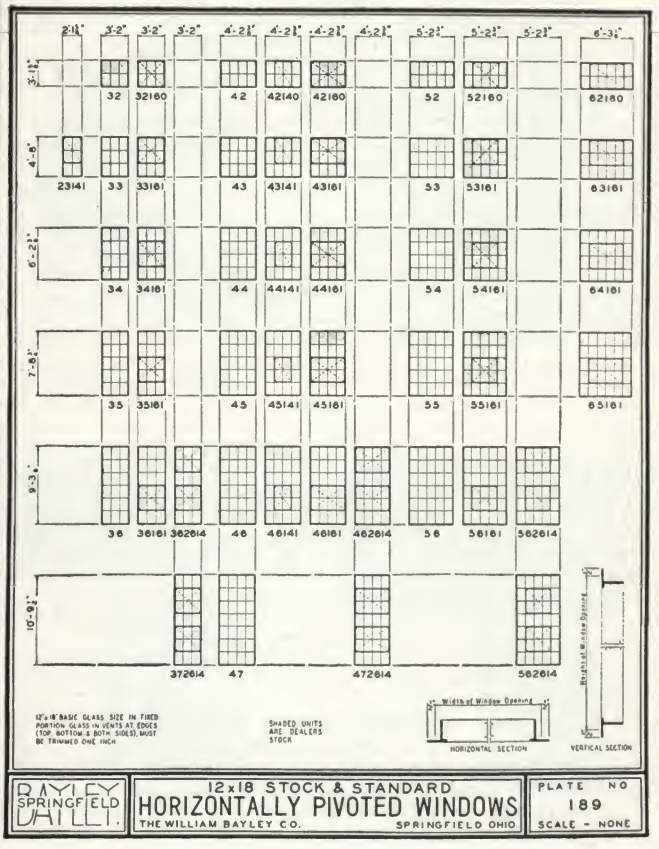
Vertically Pivoted Windows—Vertically pivoted windows may be furnished and are desirable in some industries.

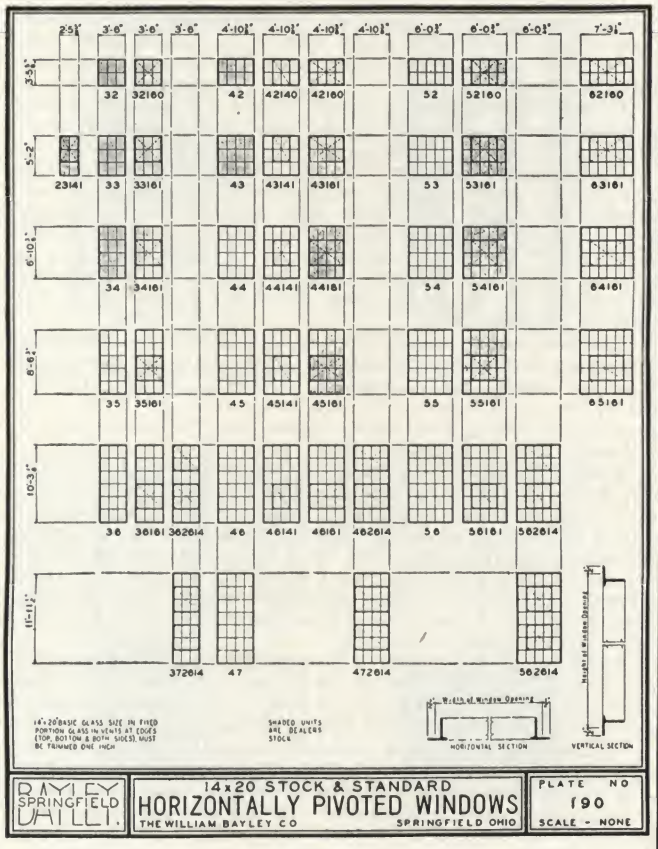
Co-operation—Co-operation is offered designers. Separate catalogue covering Pivoted Windows Screened, Projected Commercial, Projected Architectural, Casement and Continuous Windows; Steel Window Inserts and Tubular Steel Doors for Industrial and Airport Buildings are available.

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BAYLEY PIVOTED WINDOWS

Continued on next page

BAYLEY-SPRINGFIELD PIVOTED WINDOWS SCREENED ARE FOR BUILDINGS REQUIRING SCREEN PROTECTION ADDED TO THE ADvantages of pivoted windows. These improved screened windows completely protect the materials & machinery in all kinds of manufacturing & distributing plants. They should not be confused with pivoted windows to which screens have been attached in a make-shift manner.

VENTILATORS & SCREENS are built together but screens are removable.

STANDARD LAYOUTS & SIZES are 12x18 & 14x20 inches. Opening dimensions match those of pivoted windows.

SECTIONS DUPLICATE THOSE of Standard Pivoted Windows except those exclusive to this product. Horizontal muntin bar of ventilator is 1¾ inches deep & is shaped to provide continuous close fitting screen contacts with ventilator in any position.

PIVOTS EXCLUSIVE TO THIS product are located at center of ventilator.

FRICTION ADJUSTERS OF non-corrosive metal hold ventilator securely in any position. They are attached within the weathering at each side, properly adjusted in manufacture & protected during shipment & erection.

POLE CATCH IS OF MALLEable iron in parkerized finish.

SCREEN ATTACHMENTS ARE built into window & outside screen is protected at head by a continuous weathering member.

SCREENS MADE BY THE WILliam Bayley Co., are an integral part of window. They have solid steel frames in hot dip galvanized finish. Bronze screen cloth, 16 mesh, is standard. Screens are interchangeable & easily removed from inside for cleaning windows or for winter storage. Rewiring may be done by any mechanic without special tools.

GLAZING IS FROM INSIDE with putty. Double glazing is an exclusive feature which may be specified in this as in other Bayley-Springfield Products. It is specially desirable where uniform temperature & humidity is necessary & where fuel saving is considered.

ONE DIP COAT OF STANDARD red oxide paint is applied to all steel before shipment. Windows may be hot dip galvanized.

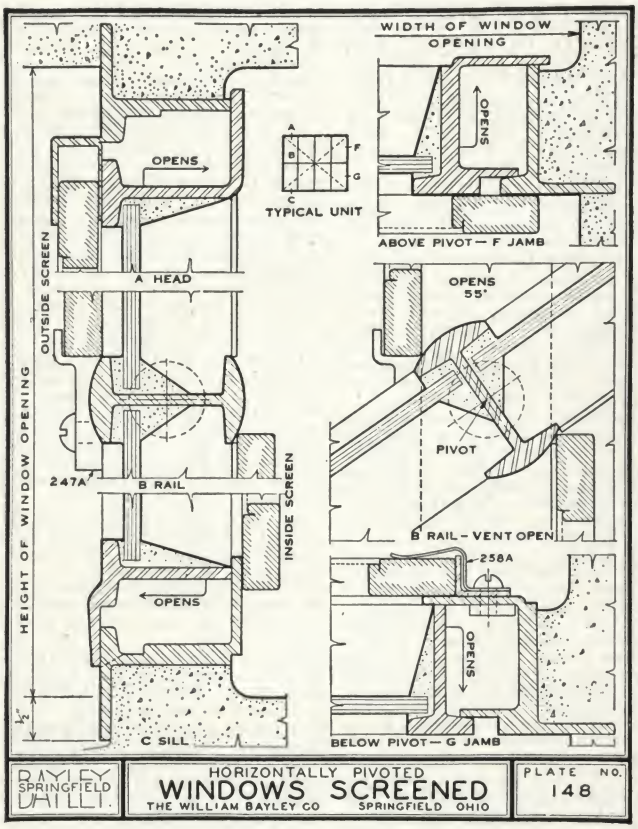
ERECTION BY THE WILLIAM Bayley Co., is recommended & insures a satisfactory installation.

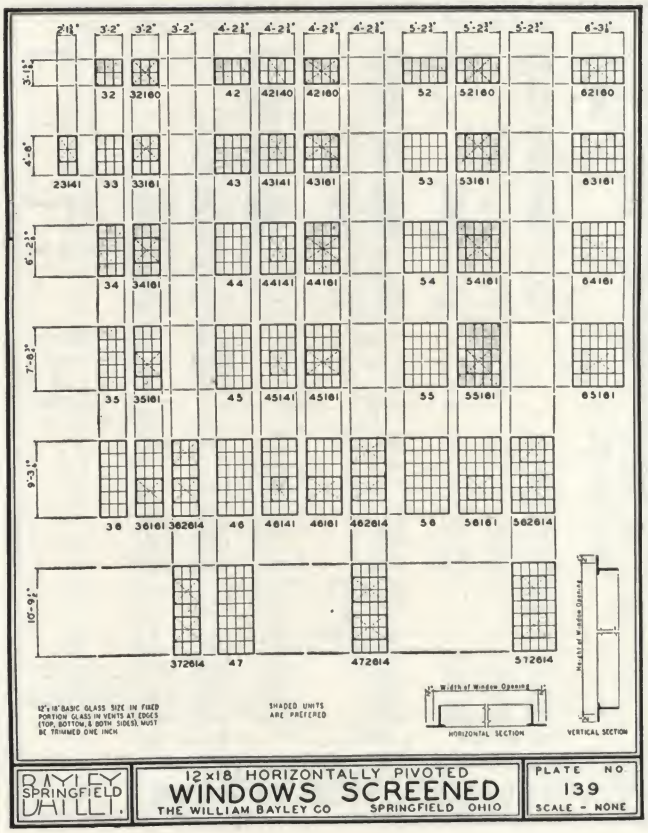
VENTILATORS IN LONG LINES & those out of reach may be equipped with mechanical operators of either manual or electric control.

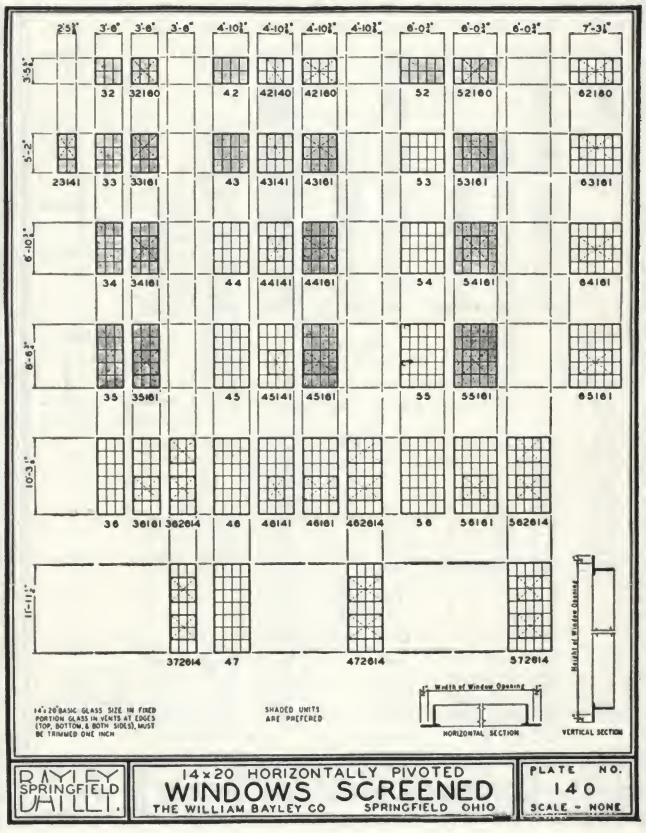
PRICES INCLUDE NECESSARY hardware, attachment clips, 4 glazing springs per light & vertical mullions complete.

ITEMS NOT FURNISHED BY The William Bayley Co., are structural steel, window cleaner anchors, flashing, glass, putty, erection, pointing, field painting & glazing, unless specifically mentioned in the contract.

COOPERATION IS OFFERED designers. Separate catalogs covering Pivoted, Projected, Casement & Continuous Windows; Steel Window Inserts & Tubular Steel Doors for Industrial & Airport Buildings are ready.







BAYLEY PIVOTED WINDOWS SCREENED

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BAYLEY-SPRINGFIELD PROJECTED WINDOWS COM-

MERCIAL ARE FOR INDUSTRIAL BUILDINGS, OFFICES, GARAGES, STORAGE AND Loft Buildings. They are used as single units or in bays.

STANDARD LAYOUTS & SIZES are 12x18 & 14x20 inches. Opening dimensions match those of pivoted windows.

SECTIONS 1⅛" DEEP ARE SIMILAR to those of pivoted windows. Projected ventilators permit use of shades & drapes. Screens, when attached, fit flat against weathering. This product need not be used solely for its screening advantages. The Pivoted Window Screened is equally efficient.

CORNERS OF VENTILATORS & ventilator openings are electrically welded & ground where necessary for strength. Ventilators have bronze sliding pivots at top for projected out & at bottom for projected in. They balance on pairs of heavy steel arms, connected to ventilator with friction plates. Friction increases as ventilator closes. Ventilators remain in any desired position. Ventilators project in & out to an extent which permits washing outside surfaces from inside. Ventilators may be opened a considerable degree without departing from horizontal weathering between pivots, thus providing protection during showers. Ventilators which project in provide draftless ventilation.

HARDWARE OF IRON IN Parkerized finish is standard. Handles have a positive cam action & draw ventilators tight against weathering. Projected out ventilator handles operate through sill & permit flat screening against weathering. One handle for each ventilator is standard. Ventilators beyond reach from floor, which project out, are equipped with pole eye. Those out of reach from floor which project in are equipped with automatic pole catch. Shade brackets are furnished when specified.

SCREENS MADE BY THE William Bayley Company have solid steel frames, hot dip galvanized. Bronze screen cloth 16 mesh is standard. Screens are easily placed or removed from inside. Clips are furnished with screens. Screens may be rewired by any mechanic without special tools.

VERTICAL MULLIONS ARE furnished & include neat adjustable mullion covers when specified.

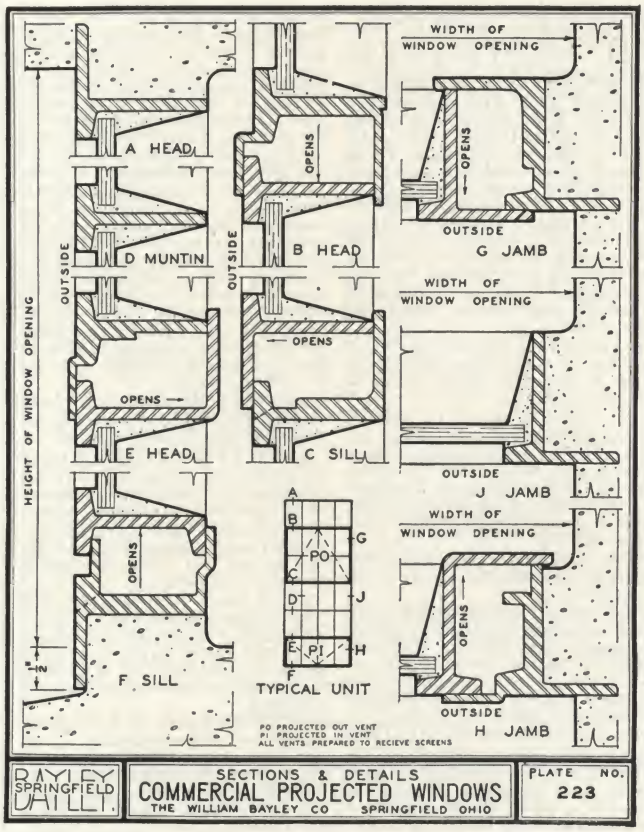
GLAZING IS FROM INSIDE with putty & glazing springs. Double glazing is an exclusive feature which may be specified in this as in other Bayley-Springfield Products.

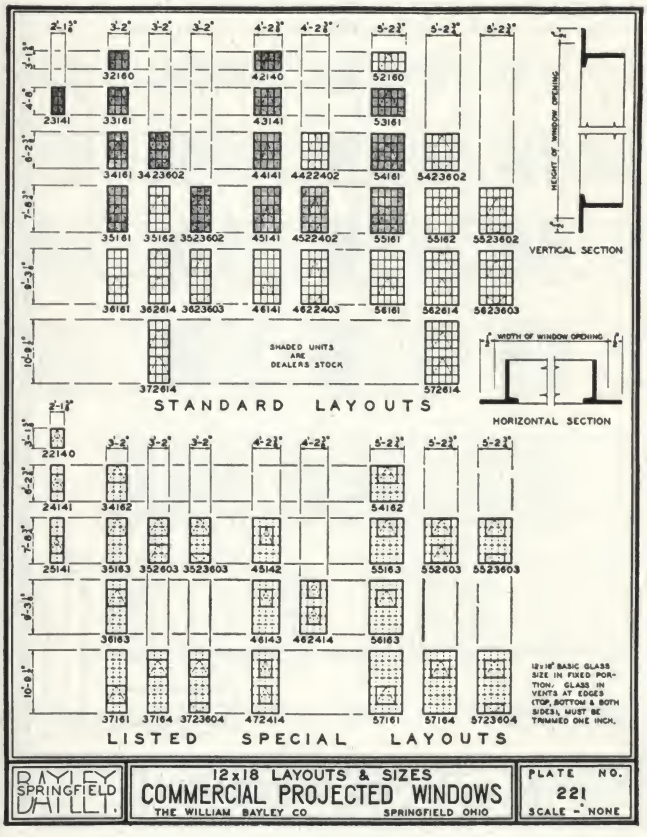
ONE DIP COAT OF STAND-ard red oxide paint is applied to all steel before shipment. Windows may be hot dip galvanized.

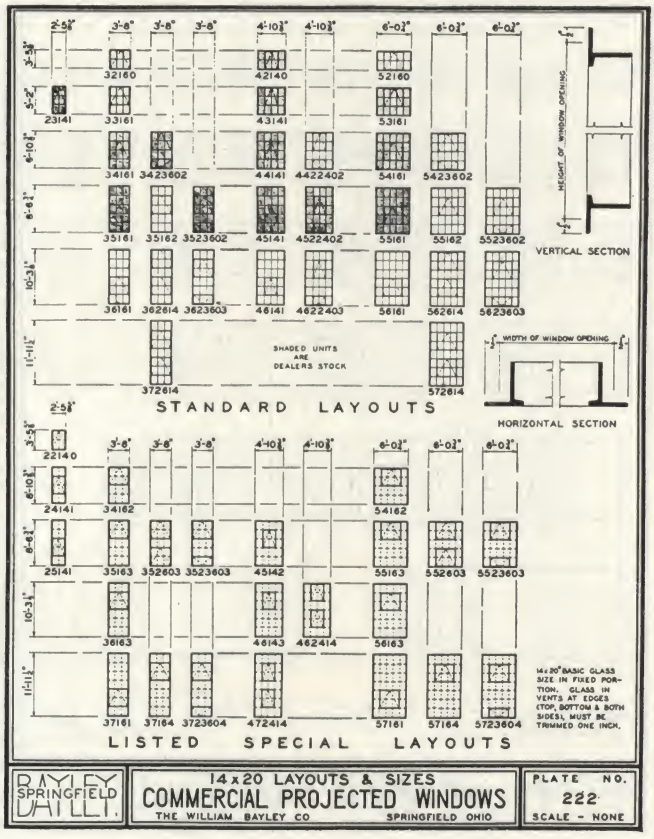
UNDERWRITERS' LABEL MAY be applied if desired when layouts are confined to projected out ventilators.

ERECTION BY THE WILLIAM Bayley Company insures a satisfactory installation. Glass, Putty & Glazing are not furnished.

COOPERATION IS OFFERED designers. Separate catalogs covering Pivoted, Projected Architectural, Casements & Continuous Windows; Steel Window Inserts & Tubular Steel Doors for Industrial & Airport buildings are ready.







BAYLEY PROJECTED WINDOWS COMMERCIAL

Continued on next page

BAYLEY-SPRINGFIELD PROJECTED WINDOWS ARCHITECTURAL

ARE FOR SCHOOLS, CLUBS, PUBLIC AND OFFICE BUILDINGS. THEY ARE USED as single units or in bays.

FRAMES ARE EXTRA HEAVY deep flanged channels which provide for wall anchorage, rigidity & pleasing appearance, because of greater exposure of metal both inside & outside. Masonry, stucco, plaster & interior finish are brought directly against flanges or frames.

CORNERS OF VENTILATORS & ventilator openings are electrically welded & ground. Ventilators have bronze sliding pivots at top for projected out & at bottom for projected in. They balance on pairs of heavy steel arms, connected to ventilator with friction plates. Friction increases as ventilator closes. An adjusting screw provides varying degrees of friction so that ventilators remain secure in any desired position. Ventilators project in & out to an extent which permits washing outside surfaces from inside. Standard layouts provide for outside of fixed lights to be washed from inside through ventilator opening. Ventilators may be opened a considerable degree without departing from horizontal weathering between pivots, thus providing protection during showers. Ventilators which project in provide draftless ventilation.

HARDWARE OF BRONZE IN matt bronze finish is standard. Handles have a positive cam action & draw ventilators tight against weathering. For projected out ventilators handles operate through sill & permit flat screening against inside weathering. This is an exclusive feature. One handle for each ventilator is standard. Ventilators beyond reach from floor, which project out, are equipped with a pole eye. Those out of reach from floor which project in are equipped with an automatic pole catch. Shade brackets are furnished when specified.

SCREENS ARE MADE BY THE William Bayley Company & have solid steel frames, hot dip galvanized & painted one coat of dark red lacquer primer. Bronze screen cloth 16 mesh is standard. Screens are easily placed or removed from inside. Attachment clips are furnished with screens. Screens may be rewired by any mechanic without special tools.

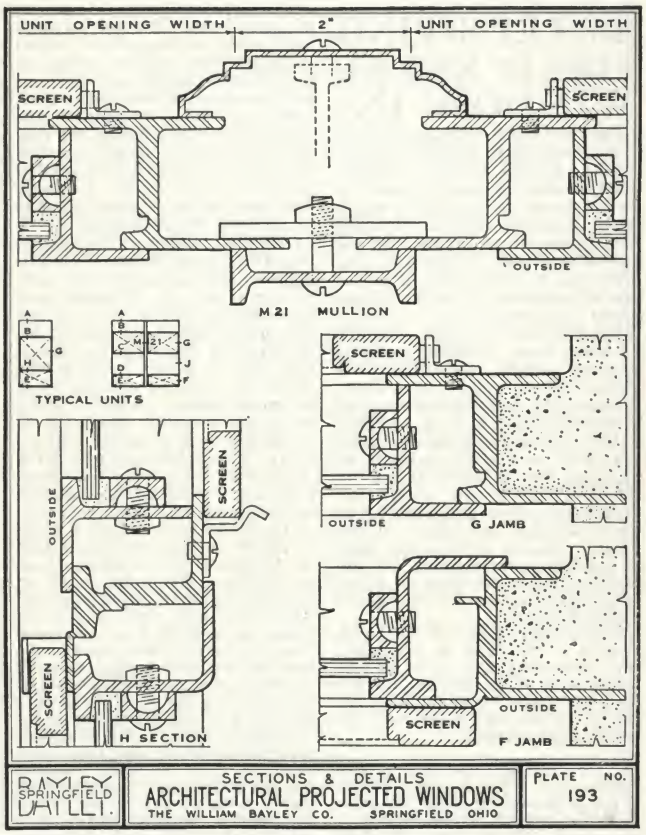
VERTICAL MULLIONS ARE furnished & include attractive adjustable inside mullion covers.

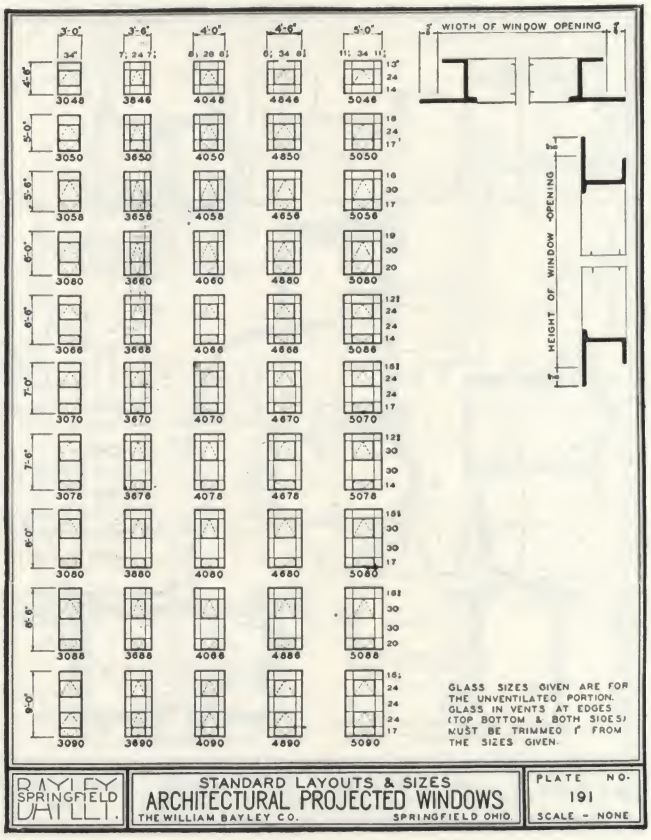
GLAZING IS FROM INSIDE with bed putty & glazing channel beads which are held in place by low head aluminum screws.

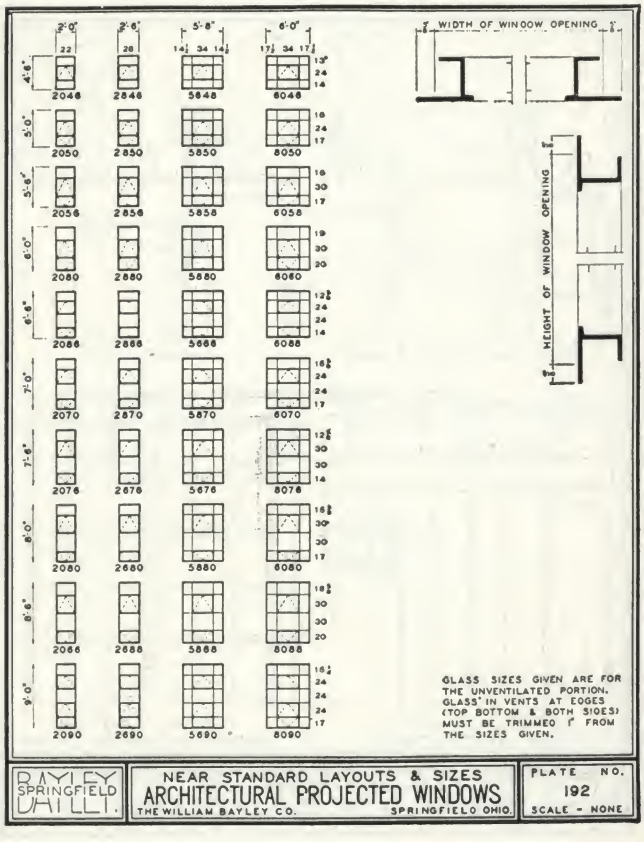
ONE DIP COAT OF STANDARD red oxide paint is applied to all steel before shipment.

ERECTION BY THE WILLIAM Bayley Company insures a satisfactory installation. It is a service offered & sold with all Projected Architectural Windows. Glass, Putty & Glazing are not furnished.

COOPERATION IS OFFERED designers. Separate catalogs covering Pivoted; Projected Commercial, Casements, & Continuous Windows; Steel Window Inserts & Tubular Steel Doors for Industrial & Airport buildings, are ready.







BAYLEY PROJECTED WINDOWS ARCHITECTURAL

Continued on next page

BAYLEY-SPRINGFIELD STEEL WINDOW INSERTS

SERTS ARE FORMED OF GALVANIZED, RUST-RESISTING ARMCO INGOT IRON. They provide recesses in jambs & across heads of openings in which steel windows are to be used. Inserts are of two types, one for use in buildings of concrete construction & finish, the other for use in buildings of concrete frame, faced with brick.

THE RECESS IN THE INSERT is filled with a natural colored, stainless, plastic fill. This fill is protected by a rope covering which is removed before window erection.

EACH INSERT IS MARKED with an identifying figure, corresponding to similar markings on shipping lists & layout sheets.

THIS SYSTEM OF MARKING should be followed by the builder as he attaches the inserts to the forms. Inserts are marked with a number corresponding to the opening for which they are made. The Inserts for each opening are wired together.

SINGLE UNIT OPENINGS HAVE Inserts at the head & one jamb. The remaining jamb must be prepared with an allowance of space to permit erection of the window.

ERECTION OF INSERTS IS easily accomplished,

After selecting proper Inserts for jamb & head forms, a gauge should be made to regulate the placing of all Inserts at an equal distance from the face of each form. The top of each jamb Insert is prepared to project into the overlapping recess of head Insert, thereby providing an even continuous recess in jambs & heads of finished openings. The window erector removes the rope which protects the plastic fill. The window is raised until inserted into the plastic fill at the head. The jamb of the window is then placed into the jamb Insert.

CONSTRUCTION IS SPEEDED up by the use of Inserts. Window erection may be performed at any temperature, & glazing may follow immediately after erection. The use of Inserts eliminates the necessity of recalling the cement finisher to point around the windows. Cement pointing often leaves excessive concrete which interferes with the operation of ventilators & must be chipped away. Plastic fill into which the window is inserted is a high grade caulking compound & therefore no additional caulking is necessary.

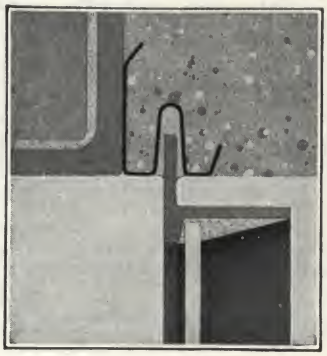
ADDITIONAL ADVANTAGES of Inserts include the elimination of corrosion. The window frame inserted into the pliable plastic fill is not subject to the rapid corrosion which may take place when the frame is imbedded in concrete. The continuous Insert around the opening serves as an expansion or contraction joint. Windows erected in openings in which Inserts have been used do not become loose.

STOCK LENGTHS OF INSERTS are maintained in order that quick shipment may be made. Inserts are shipped in sturdy crates which insure complete protection. Clips & complete erection instructions are included with each shipment.



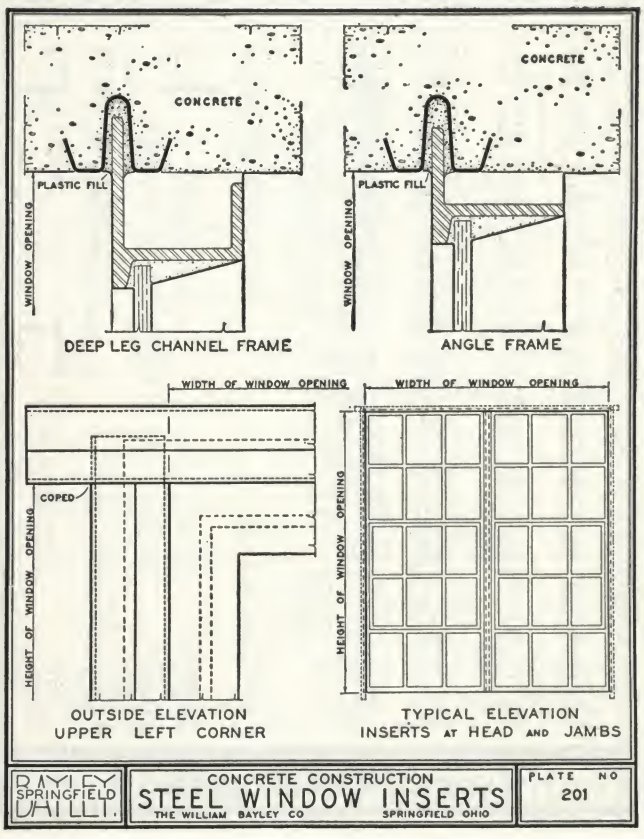
Steel Window Inserts, Concrete Construction

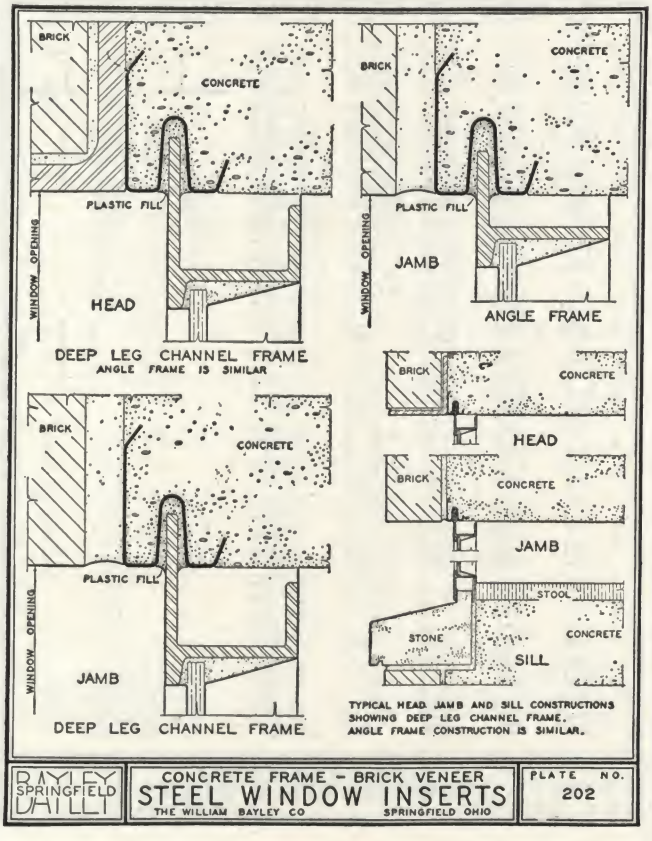
Save time and money by eliminating cement finishing and caulking. They permit installation of windows in all kinds of weather and glazing may follow immediately after erection. Cement pointing often leaves excessive concrete along jambs where it interferes with the operation of ventilator. Ventilators always work freely when inserts are used. The plastic fill in the insert is a high quality caulking compound



Steel Window Inserts, Concrete Frame, Brick Veneer

Safeguard against corrosion and serve as an expansion joint. They also eliminate leakage where frame of window enters wall. Windows erected in openings provided with Inserts never become loose. Inserts for Concrete Frame, Brick Veneer are a new development to extend the advantages of the Insert beyond buildings with only a finished concrete construction. Inserts are carried in stock





BAYLEY STEEL WINDOW INSERTS

Continued on next page

BAYLEY-SPRINGFIELD STEEL CASEMENTS

ARE SUITABLE FOR USE IN MANY KINDS OF BUILDINGS & IN VARIOUS TYPES OF WALL construction. They are made to open out, which removes all obstruction within the building & permits draperies to hang with no interference from the casement. Likewise, this places the screen within the room & protects it entirely from storms & dust when the casement is closed & partially protects it even tho the casement is open, thereby prolonging the life of the screen. Glazing is done from the outside to make a more waterproof installation & to provide a finished interior appearance.

SECTIONS OF ROLLED MILD steel, carefully straightened, are used exclusively. All cross joints are lock formed without excessive cutting away & corners are electrically welded & finished smooth. One dip coat of standard gray paint is applied before shipment.

HEAVY WIDE FRAMES ARE used around all units. They are one & five eighths inches deep & provide needed additional space inside for plaster or other interior finish & also sufficient engagement into walls for weather proofing, so that no additional or separate piece is needed for this purpose.

LEADED GLASS PANELS MAY be used by omitting the interior horizontal & vertical glazing bars. They appear lighter, are more easily cleaned, more colorful & irregular in line & altho the cost of the complete installation is increased, the result secured by their use can be had in no other way. Cames about three-eighths inch wide are preferable.

MULLION & TRANSOM BAR dimensions must be added to casement widths & heights

For vertical mullions add one and one eighth inches & for horizontal transom bars add five-eighths of an inch.

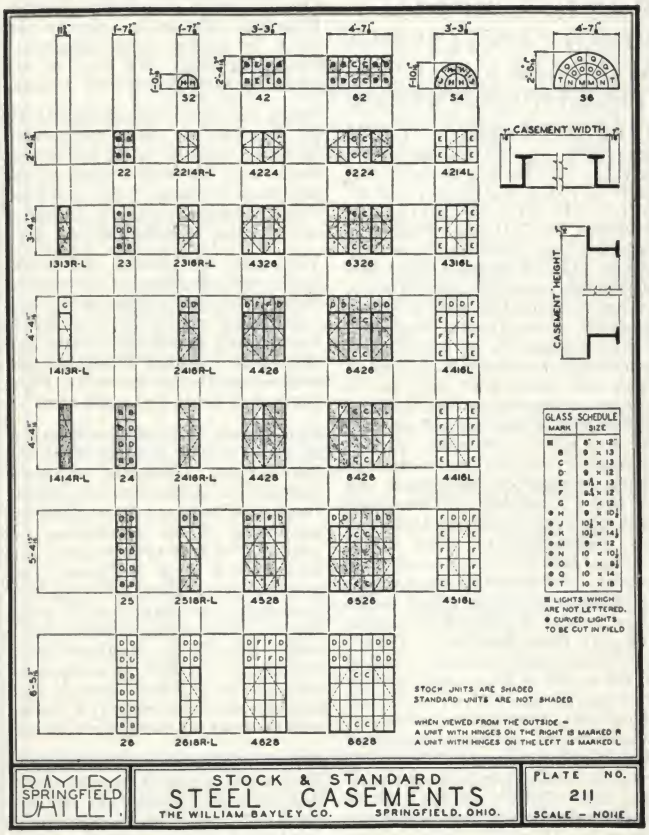
HINGES OF ROLLED STEEL with heavy bronze pins are furnished on all casements & they are of extension or cleaning type and provide a convenient means of washing the outside of all units from within the building.

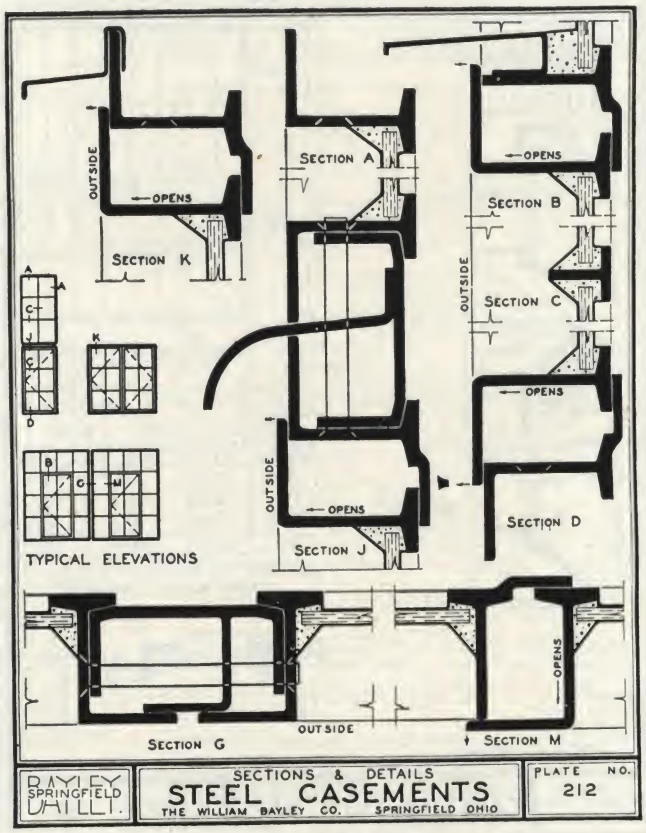
CASEMENT HANDLE PROvides one slightly open position & a tight contact when closed. Handle of Malleable Iron in Parkerized finish is Standard. Bronze handle in gun metal finish may be used at an additional cost.

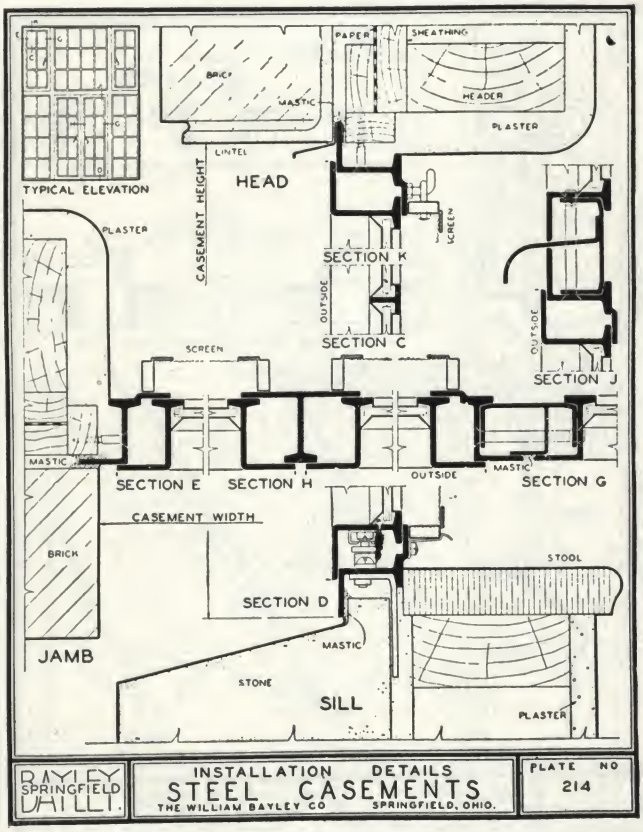
FRICTION ADJUSTER IS OF non corrosive metal. It is located at the sill of the casement and concealed within the weathering. This design makes possible proper adjustment in manufacture and gives protection during shipment & construction. The adjuster is also protected from the weather. It is self lubricating and has a smooth, positive action. A screw provides varying degrees of friction.

PRICES INCLUDE HARDWARE, necessary fixing anchors, horizontal & vertical mullions with bolts, if any are required, 2 glazing springs per light & mastic for weatherproofing.

COPPER DRIP IS FURNISHED over all casements. That shown in section K plate 212 is used where casement extends to head of opening & that shown in section B is used where casements have a fixed light above.







BAYLEY STEEL CASEMENTS

Continued on next page

BAYLEY-SPRINGFIELD CONTINUOUS WINDOWS & CONTINUOUS WINDOW OPERATORS FOR ROOFS & SIDEWALLS ARE CONSTRUCTED OF SPECIALLY DESIGNED SOLID ROLLED STEEL SECTIONS WELDED together for strength & permanency. The sill member is of a new design having no pockets for water or ice in either the open or closed position, at any useful angle. It has an integral flange for operator attachment & a flat-surface contact with the structural steel & its shape is such that a condensation gutter of effective size & form may be used where advisable. Hinges, at four feet centers, placed inside of steel framing for protection, are of heavy steel with three-eighths inch brass pins & have slotted holes for adjustment to steel work. Vertical bars are spaced at two feet centers. Putty-bed on all members is in the same plane which facilitates glazing, requires less putty & reduces glass breakage. Where panels are joined the splice is placed at the center of glass space, & fully develops the strength of horizontal members. Vertical weathering, where hinged portions meet fixed panels, is of formed galvanized steel. Hinged windows have fixed panels one foot wide at extreme ends of lines & two feet wide at intermediate ends. All steel is given one dip coat of standard red oxide paint.

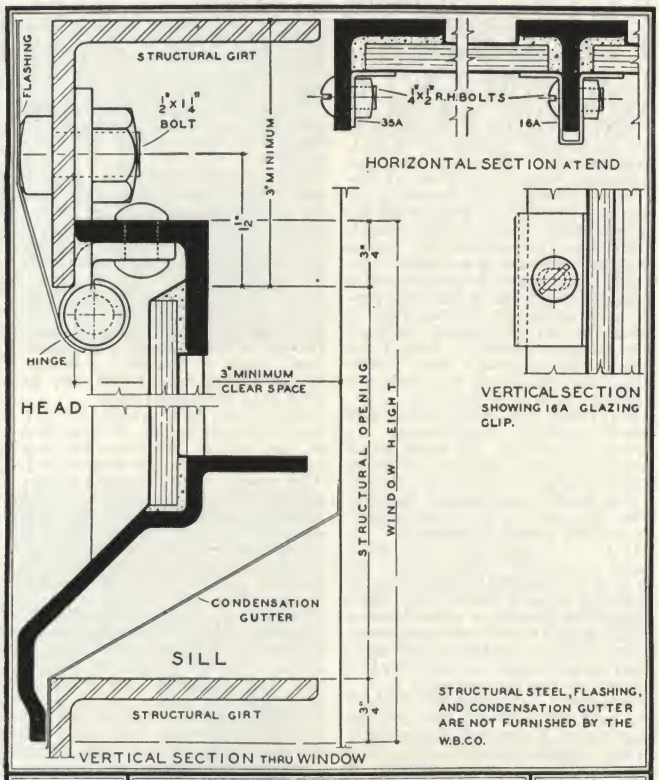
Overall length of windows should be held to full feet in order to use stock & insure quick shipment. Variations from full feet to be taken up with flashing by others.

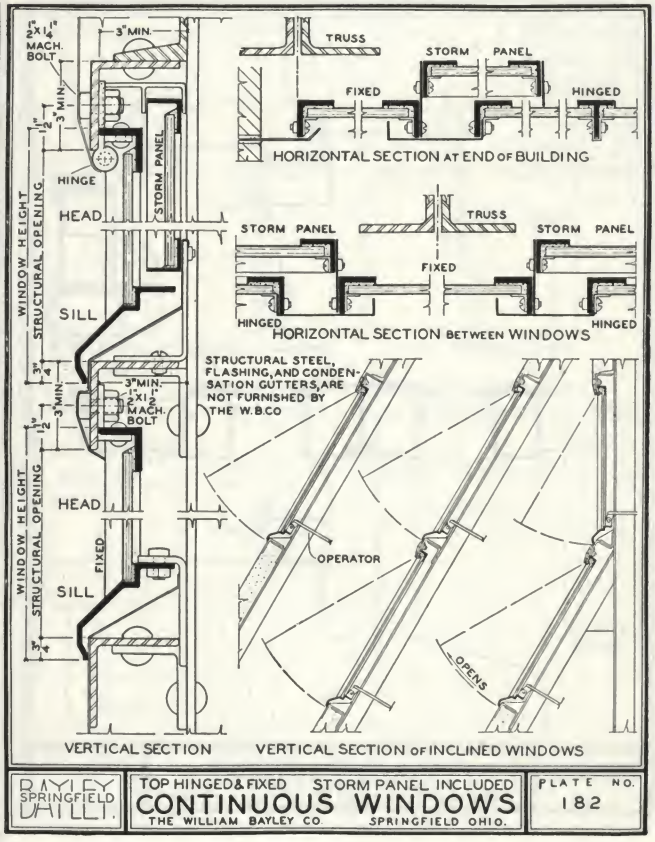
Storm Panels are not included but are furnished at extra cost when specially ordered & fit inside the three inch clearance space with provision to drain water outside. Glass in storm panels is of same size as glass in main part of line.

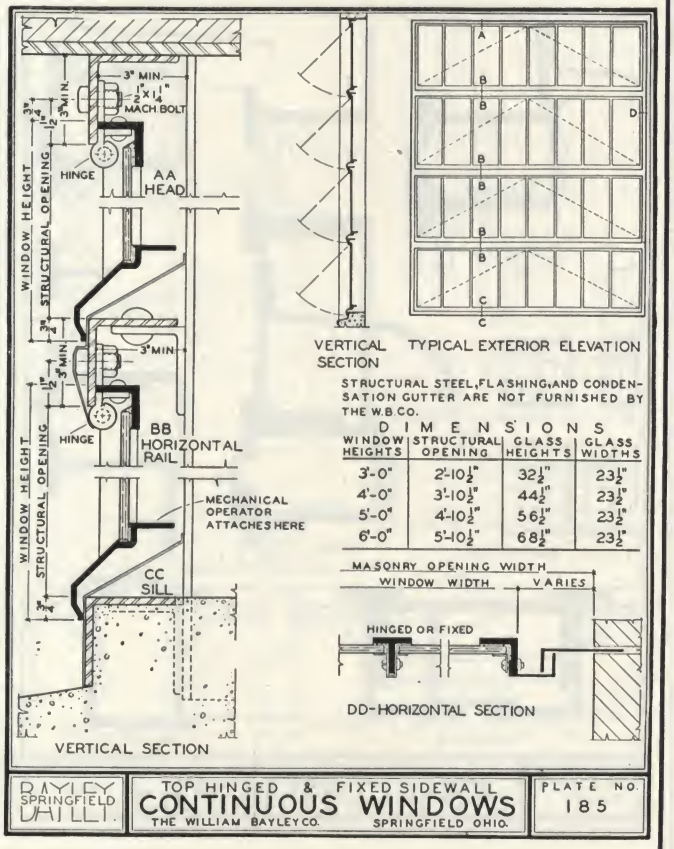
Wire glass one quarter inch thick is recommended & must be twenty-three & one-half inches wide, except in end panels, set in an even bed of putty struck flush with outside surface of glass & held by galvanized metal clips and bolts. Face putty may be used at extra cost.

Continuous Window Operators are of the Tension type or Rack & Pinion type. They may be either manually or electrically controlled. Lengths of lines are determined by conditions of the installation. In general, Tension type is used for long lines & Rack & Pinion type used for short lines. This product is of sturdy construction & good quality. Parts are designed to eliminate friction & include such features as machine-cut racks, pinions, worms & gears; bronze or ball bearings, where necessary; & provision for working parts to run in oil.

Items not furnished by The William Bayley Co. are structural steel, all flashing and condensation gutters, glass, putty, erection, pointing, field painting & glazing, unless specifically mentioned in the contract.

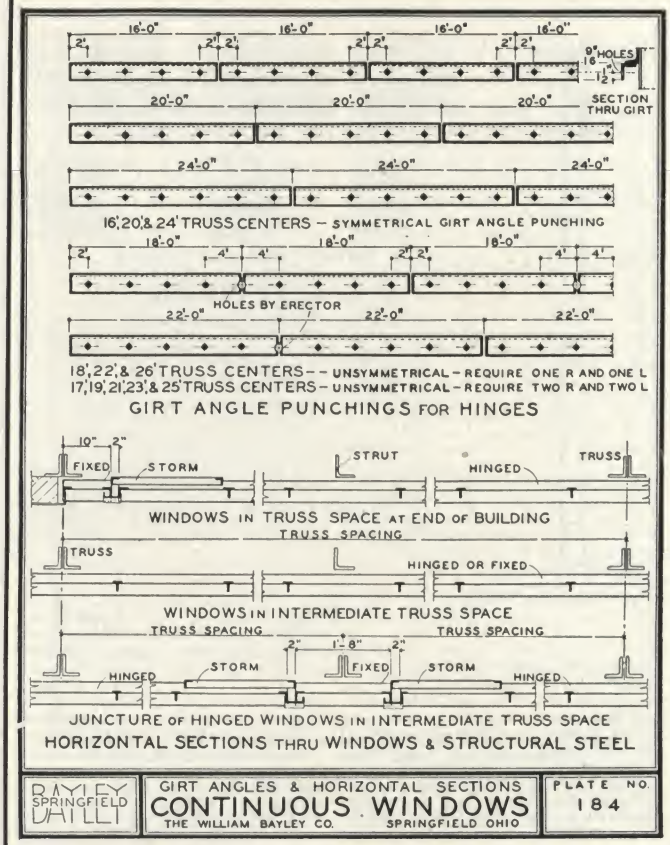






BAYLEY CONTINUOUS WINDOWS

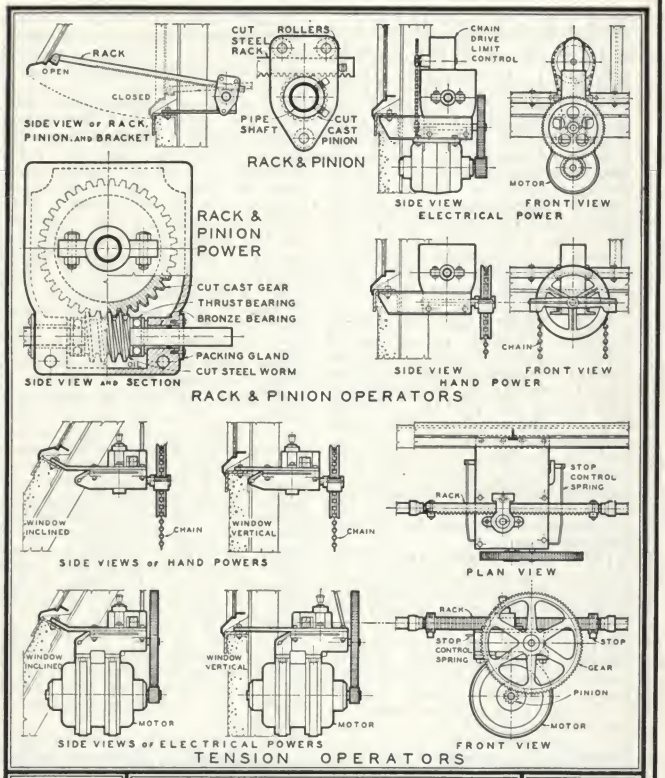
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BAYLEY SPRINGFIELD DAILEY

GIRT ANGLES & HORIZONTAL SECTIONS
CONTINUOUS WINDOWS
THE WILLIAM BAYLEY CO. SPRINGFIELD OHIO

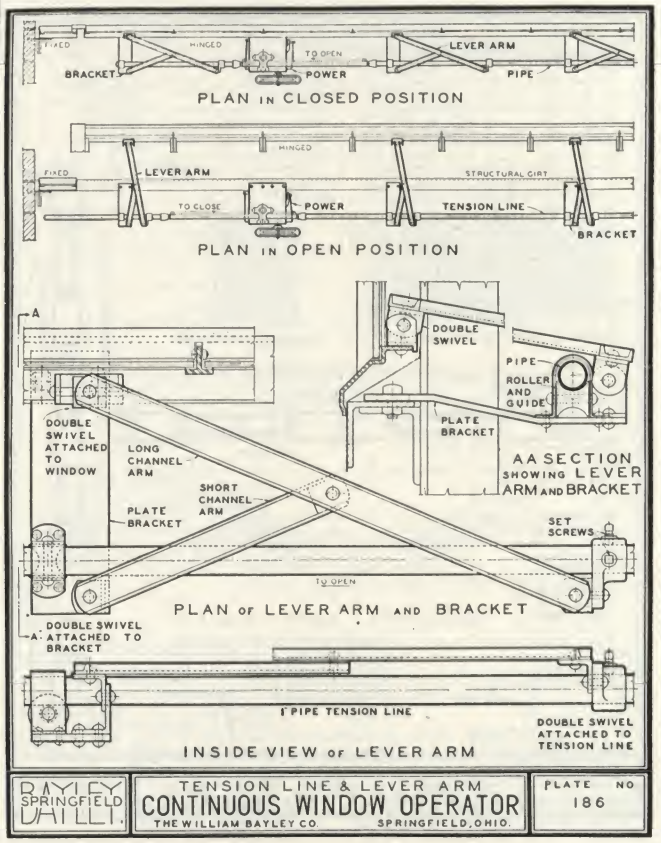
PLATE NO. 184



BAYLEY SPRINGFIELD DAILEY

HAND CONTROL & ELECTRICAL CONTROL
CONTINUOUS WINDOW OPERATORS
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

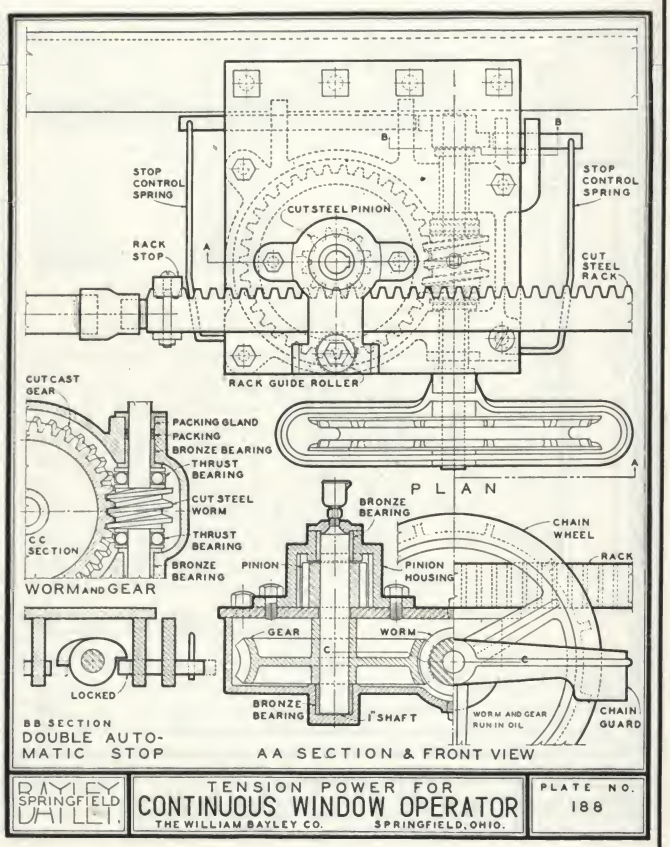
PLATE NO. 187



BAYLEY SPRINGFIELD DAILEY

TENSION LINE & LEVER ARM
CONTINUOUS WINDOW OPERATOR
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

PLATE NO. 186



BAYLEY SPRINGFIELD DAILEY

TENSION POWER FOR
CONTINUOUS WINDOW OPERATOR
THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO.

PLATE NO. 188

BAYLEY CONTINUOUS WINDOWS

Continued on next page

BAYLEY-SPRINGFIELD TUBULAR STEEL DOORS ARE

ADAPTABLE TO INDUSTRIAL, COMMERCIAL & AIRPORT BUILDINGS. THESE DOORS combine strength, performance & good appearance. They are made to swing, slide & fold. Doors are furnished complete with hardware. WELDED STEEL TUBING IN two sizes 2½"x1½"x$\frac{3}{16}$" & 3"x2"x$\frac{13}{64}$" is used for stiles & rails. Corners are mitered & reinforced with heavy castings driven inside tubes & then welded & ground.

DOOR PANELS ARE CHANNEL sections 1½" deep tightly fitted to rails & stiles. Upper panel is prepared for glass & has glazing channels. Lower panel is 16 gauge plate.

HARDWARE FOR SWING doors includes half surface offset steel hinges, a mortised lock or latch & mortised extension bolts when required. Working mechanisms of lock & latch are identical. Lock Y 2, furnished as standard, is equipped with handles & cylinders on each side.

LOCKS & LATCHES ARE MADE of bronze & copper nickel metals in the shops of The William Bayley Company. Lock is fitted with Yale & Towne four tumbler cylinders. Cylinders or handles may be omitted from either side. Master-keyed cylinders furnished at extra cost. Latch bolt 2 inches high & $\frac{7}{8}$ inches thick is dead locked by key only. Latch Y 11 is identical in construction to Lock Y 2 when cylinders are omitted. Latch Y 14 of steel may be used at lower cost. Panic devices with handle or bar release are furnished in several combinations.

HARDWARE FOR SLIDE DOORS includes enclosed steel track, roller bearing trolley trucks, stay rollers, steel handles, flush pulls, mortised extension bolts & door stops. Lock Y 17 is similar in materials & construction to lock Y 2 for swing doors. Latch Y 13 of steel may be used at lower cost. Hasp bolt Y 71 for single & Y 72 for double doors may be used in place of locks or latches at a further saving. Padlocks for hasps are not included.

FRAMES FOR SWING DOORS are of structural channels & have suitable masonry anchors. Each door is fitted to its frame before shipment. Frames for slide doors are not included.

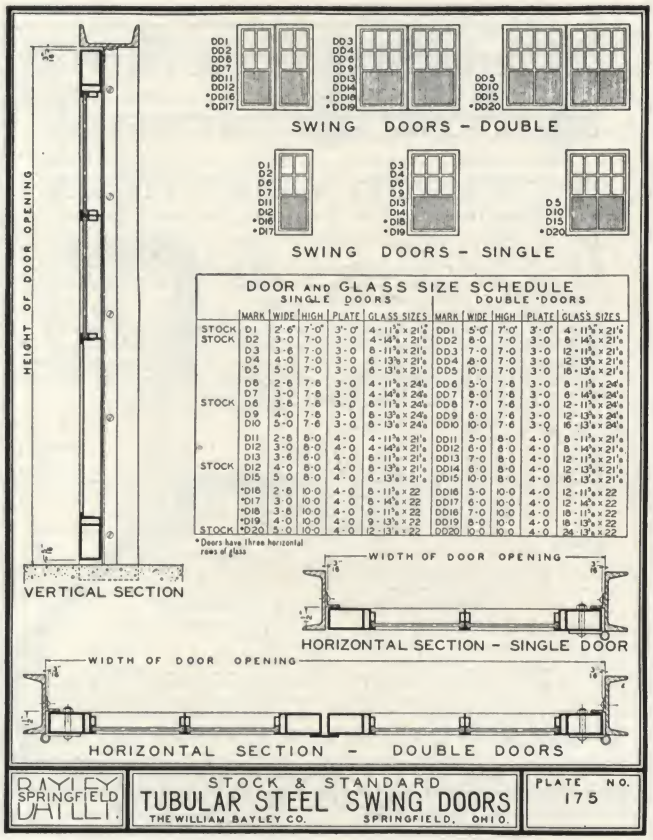
ONE COAT OF STANDARD RED oxide paint is applied to all steel before shipment.

AIRPORT DOORS OF SIMILAR tubular construction are furnished for straight & round-the-corner tracks. Stiles & rails are 2½" square welded tubing $\frac{13}{64}$" thick. Upper panels prepared for glass admit ample light. Lower panels of steel give protection. Hardware is malleable iron & steel. Rollers equipped with roller bearings & alemite lubrication assure easy operation. Door openings may be any width. Standard door leaf width is 10 feet & heights vary in even feet.

TRACKS SET IN FLOOR & overhead guides are parts of building & are not included.

ERECTION BY THE WILLIAM Bayley Co. insures a satisactory installation.

COOPERATION IS OFFERED airport designers. Separate catalogs covering Airport Doors, Pivoted Windows for sidewalls, Casements & Projected Windows for auxiliary buildings are ready.

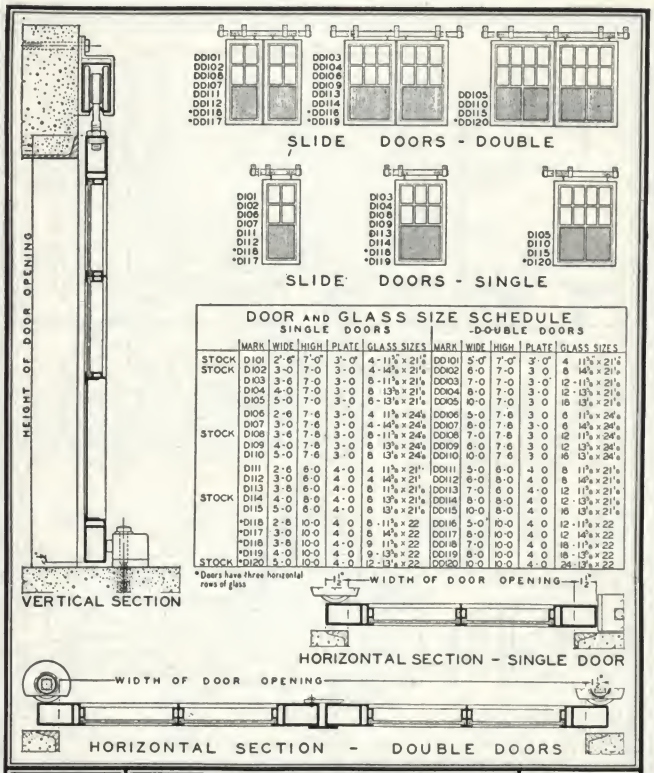


DOOR AND GLASS SIZE SCHEDULE

SINGLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES	DOUBLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES
STOCK D1	2'-6"	7'-0"	3'-0"	4 - 11⅝" x 21⅛"	DD1	5'-0"	7'-0"	3'-0"	4 - 11⅝" x 21⅛"
STOCK D2	3-0	7-0	3-0	4 - 14⅝" x 21⅛"	DD2	6-0	7-0	3-0	6 - 14⅝" x 21⅛"
D3	3-6	7-0	3-0	6 - 11⅝" x 21⅛"	DD3	7-0	7-0	3-0	12 - 11⅝" x 21⅛"
D4	4-0	7-0	3-0	6 - 13⅜" x 21⅛"	DD4	8-0	7-0	3-0	12 - 13⅜" x 21⅛"
D5	5-0	7-0	3-0	6 - 13⅛" x 21⅛"	DD5	10-0	7-0	3-0	18 - 13⅛" x 21⅛"
D6	2-6	7-6	3-0	4 - 11⅝" x 24⅛"	DD6	5-0	7-6	3-0	8 - 11⅝" x 24⅛"
D7	3-0	7-6	3-0	4 - 14⅝" x 24⅛"	DD7	6-0	7-6	3-0	6 - 14⅝" x 24⅛"
STOCK D8	3-6	7-6	3-0	6 - 11⅝" x 24⅛"	DD8	7-0	7-6	3-0	12 - 11⅝" x 24⅛"
D9	4-0	7-6	3-0	8 - 13⅜" x 24⅛"	DD9	8-0	7-6	3-0	12 - 13⅜" x 24⅛"
D10	5-0	7-6	3-0	8 - 13⅛" x 24⅛"	DD10	10-0	7-6	3-0	16 - 13⅛" x 24⅛"
D11	2-6	8-0	4-0	4 - 11⅝" x 21⅛"	DD11	5-0	8-0	4-0	8 - 11⅝" x 21⅛"
D12	3-0	8-0	4-0	4 - 14⅝" x 21⅛"	DD12	6-0	8-0	4-0	8 - 14⅝" x 21⅛"
D13	3-6	8-0	4-0	6 - 11⅝" x 21⅛"	DD13	7-0	8-0	4-0	12 - 11⅝" x 21⅛"
STOCK D12	4-0	8-0	4-0	8 - 13⅜" x 21⅛"	DD14	8-0	8-0	4-0	12 - 13⅜" x 21⅛"
D15	5-0	8-0	4-0	6 - 13⅛" x 21⅛"	DD15	10-0	8-0	4-0	16 - 13⅛" x 21⅛"
*D16	2-6	10-0	4-0	8 - 11⅝" x 22	DD16	5-0	10-0	4-0	12 - 11⅝" x 22
*D17	3-0	10-0	4-0	8 - 14⅝" x 22	DD17	6-0	10-0	4-0	12 - 14⅝" x 22
*D18	3-6	10-0	4-0	9 - 11⅝" x 22	DD18	7-0	10-0	4-0	18 - 11⅝" x 22
*D19	4-0	10-0	4-0	9 - 13⅜" x 22	DD19	8-0	10-0	4-0	18 - 13⅜" x 22
STOCK *D20	5-0	10-0	4-0	12 - 13⅛" x 22	DD20	10-0	10-0	4-0	24 - 13⅛" x 22

*Doors have three horizontal rows of glass

BAYLEY SPRINGFIELD DILLI. — STOCK & STANDARD TUBULAR STEEL SWING DOORS — THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO. — PLATE NO. 175

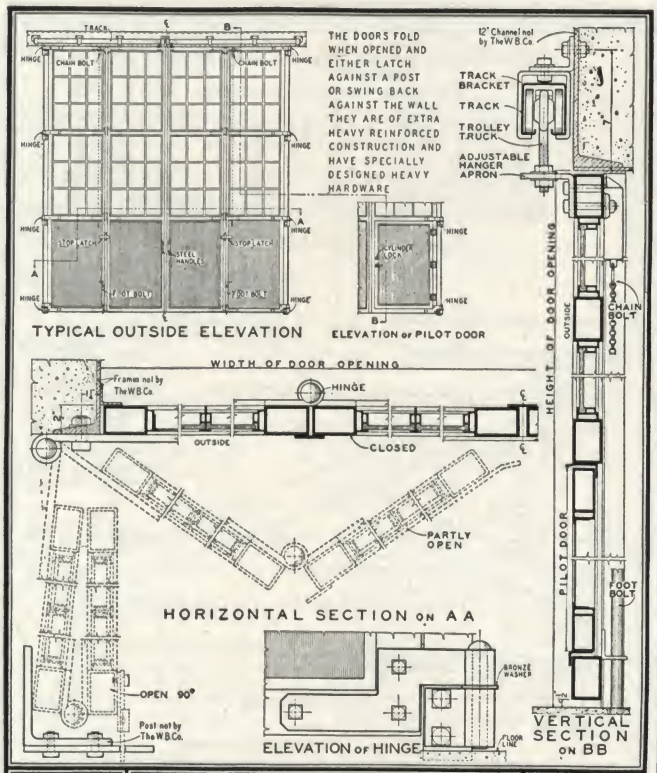


DOOR AND GLASS SIZE SCHEDULE

SINGLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES	DOUBLE DOORS MARK	WIDE	HIGH	PLATE	GLASS SIZES
STOCK D101	2'-6"	7'-0"	3'-0"	4 - 11⅝" x 21⅛"	DD101	5'-0"	7'-0"	3'-0"	4 - 11⅝" x 21⅛"
STOCK D102	3-0	7-0	3-0	4 - 14⅝" x 21⅛"	DD102	6-0	7-0	3 0	8 - 14⅝" x 21⅛"
D103	3-6	7-0	3-0	6 - 11⅝" x 21⅛"	DD103	7-0	7-0	3-0	12 - 11⅝" x 21⅛"
D104	4-0	7-0	3-0	6 - 13⅜" x 21⅛"	DD104	8-0	7-0	3-0	12 - 13⅜" x 21⅛"
D105	5-0	7-0	3-0	6 - 13⅛" x 21⅛"	DD105	10-0	7-0	3 0	18 - 13⅛" x 21⅛"
D106	2-6	7-6	3-0	4 - 11⅝" x 24⅛"	DD106	5-0	7-6	3 0	8 - 11⅝" x 24⅛"
D107	3-0	7-6	3-0	4 - 14⅝" x 24⅛"	DD107	6-0	7-6	3-0	6 - 14⅝" x 24⅛"
STOCK D108	3-6	7-6	3-0	8 - 11⅝" x 24⅛"	DD108	7-0	7-6	3 0	12 - 11⅝" x 24⅛"
D109	4-0	7-6	3-0	8 - 13⅜" x 24⅛"	DD109	8-0	7-6	3 0	12 - 13⅜" x 24⅛"
D110	5-0	7-6	3-0	8 - 13⅛" x 24⅛"	DD110	10-0	7 6	3 0	16 - 13⅛" x 24⅛"
D111	2-6	8-0	4-0	4 - 11⅝" x 21⅛"	DD111	5-0	8-0	4 0	8 - 11⅝" x 21⅛"
D112	3-0	8-0	4 0	4 - 14⅝" x 21⅛"	DD112	6-0	8-0	4 0	8 - 14⅝" x 21⅛"
D113	3-6	8-0	4-0	6 - 11⅝" x 21⅛"	DD113	7-0	8 0	4-0	12 - 11⅝" x 21⅛"
STOCK D114	4-0	8-0	4-0	8 - 13⅜" x 21⅛"	DD114	8-0	8-0	4 0	12 - 13⅜" x 21⅛"
D115	5-0	8-0	4-0	8 - 13⅛" x 21⅛"	DD115	10-0	8-0	4 0	16 - 13⅛" x 21⅛"
*D118	2-6	10-0	4 0	8 - 11⅝" x 22	DD116	5-0	10-0	4 0	12 - 11⅝" x 22
*D117	3-0	10-0	4 0	8 - 14⅝" x 22	DD117	6-0	10-0	4 0	12 - 14⅝" x 22
*D118	3-6	10-0	4-0	9 - 11⅝" x 22	DD118	7-0	10-0	4 0	18 - 11⅝" x 22
*D119	4-0	10-0	4-0	9 - 13⅜" x 22	DD119	8-0	10-0	4 0	18 - 13⅜" x 22
STOCK *D120	5-0	10-0	4-0	12 - 13⅛" x 22	DD120	10-0	10-0	4-0	24 - 13⅛" x 22

*Doors have three horizontal rows of glass

BAYLEY SPRINGFIELD DILLI. — STOCK & STANDARD TUBULAR STEEL SLIDE DOORS — THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO. — PLATE NO 176



BAYLEY SPRINGFIELD DILLI. — RAILROAD & LARGE INDUSTRIAL TUBULAR STEEL FOLDING DOORS — THE WILLIAM BAYLEY CO. SPRINGFIELD, OHIO. — PLATE NO. 177

BAYLEY TUBULAR STEEL DOORS

Continued on next page

BAYLEY AIRPLANE HANGAR DOORS ARE

ADAPTABLE TO STRAIGHT & CURVED TRACKS IN HANGARS, AIRPLANE FACtories, Garages & All Buildings Requiring Wide Clear Openings. These Doors Are Completely welded together, an exclusive feature, which gives extra strength, eliminates use of bolts & prevents corrosion. Perfect alignment gives ease of operation, & arrangement of parts is pleasing & finished in appearance. Doors are furnished complete with hardware.

USE OF HEAVY TUBES TO provide structural strength & neat finished appearance is an old & tried method of construction. Bayley Doors for years & years before the Airplane Hangar Door was offered, blazed the trail in this & all other important principles of design now used.

WELDED STEEL TUBING IN three sizes $2\frac{1}{2}$"x$2\frac{1}{2}$"x$\frac{12}{64}$", 3"x$2\frac{1}{2}$"x$\frac{12}{64}$" & 4"x$2\frac{1}{2}$"x$\frac{12}{64}$" is used for stiles & rails. Dimensions of interior members depend on size & layout of door. Corners are mitered & reinforced with heavy steel castings driven inside tubes & then welded & ground. Tubes are sealed against passage of air, preventing corrosion on inside.

DOOR PANELS ARE CHANNEL sections $1\frac{1}{4}$ inches deep, welded to rails & stiles. Upper panel is prepared for glass & glazing with glazing springs 4k, & putty. Lower panel is 12 gauge plate. Paneling effect is emphasized by setting both glazed & plate portions in ½ inch from outside face of tube.

HARDWARE FOR END SWING Doors includes full surface steel hinges Y23, chain bolt Y82, & hasp bolt Y81. Hinge Y23 is made of heavy steel plate. Hinge pin, $\frac{3}{4}$ inches in diameter, operates thru thrust bearings of bronze.

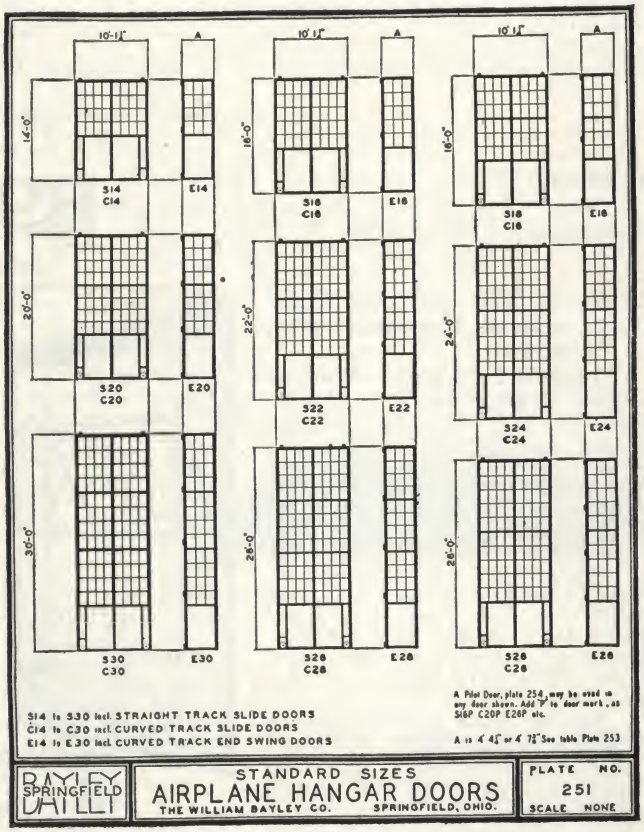
HARDWARE FOR ROLLING Doors includes top & bottom rollers of malleable iron, machined. Top roller is self-lubricated. Bottom roller is an assembly of certified malleable castings & steel. Wheel is machined to fit standard 16 lb. A.S.C.E. rail. Wheel turns on machined steel axle & double roller bearings, Alemite lubricated. Foot lever operates wheel lock on bottom roller & eliminates applied hardware. It is placed where necessary to lock line of doors.

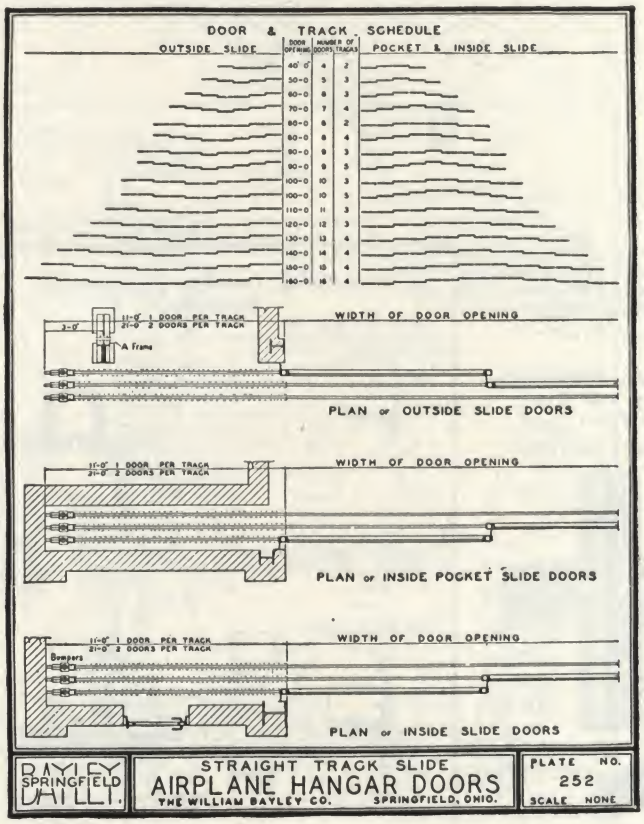
HARDWARE FOR PILOT Doors includes half surface offset steel hinges, mortised lock Y7, with handle flush outside to allow passage of doors.

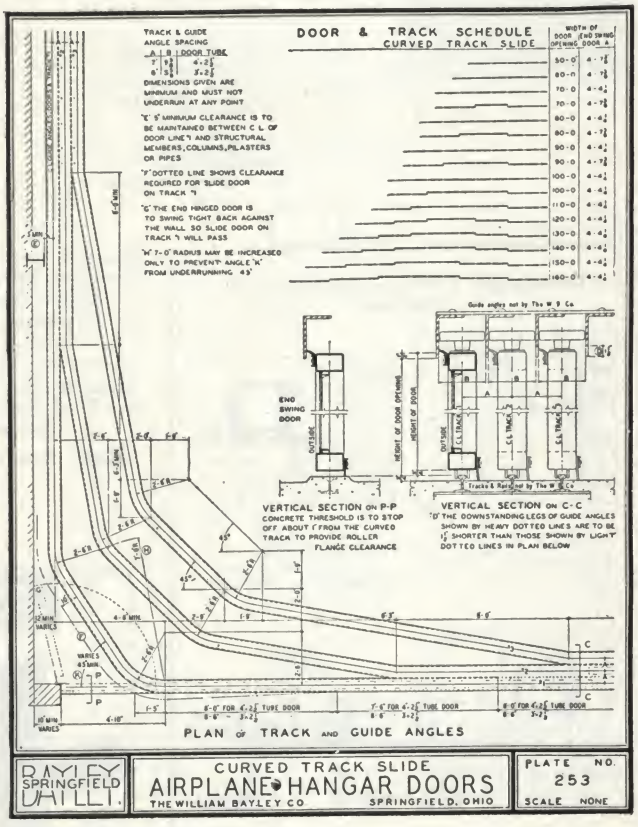
LOCKS ARE MADE OF BRONZE & copper nickel metals in the shops of The William Bayley Company. Lock is fitted with four tumbler cylinders. Cylinders may be omitted from either side. Masterkeyed cylinders are furnished at extra cost. Latch bolt 2 inches high & $\frac{3}{4}$ inches thick is deadlocked by key only.

WEATHERING OF DOORS AT Heads, Jambs & Sills is made with two ply rubberized canvas which is adjustable to provide close working of parts & to compensate for variations in building construction.

DOORS MAY BE FURNISHED with double plates in panels containing insulating material & with upper panels double glazed. Double glazed construction permits dead air insulating space of $\frac{3}{4}$ inches.







BAYLEY AIRPLANE HANGAR DOORS

TELEPHONE
SHERWOOD 2-7850

THE BOGERT & CARLOUGH CO.

PATERSON, N. J.

NEW YORK, N. Y., 441 Lexington Ave. PITTSBURGH, PA., Commonwealth Bldg. CHICAGO, ILL., 163 W. Washington St.
AGENCIES IN PRINCIPAL CITIES
Member Solid Section Steel Window Industry

Products

STEEL PROJECTED WINDOWS, Architectural and Commercial; STEEL PIVOTED WINDOWS; UNDERWRITERS' WINDOWS; CONTINUOUS WINDOWS; MECHANICAL OPERATORS; STEEL PARTITIONS; BASEMENT WINDOWS; STEEL CASEMENTS; INDUSTRIAL (TUBULAR STEEL) DOORS; "ECONOMY" STEEL DOORS; ALUMINUM WINDOWS.

BOCA SOLID STEEL SASH
TRADE-MARK

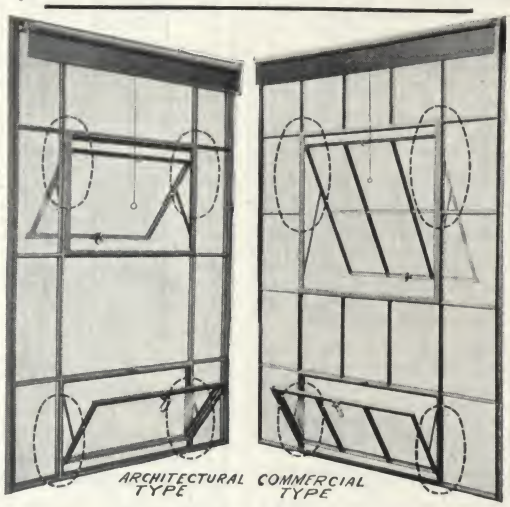
Boca Architectural and Commercial Projected Windows

Improved Projected Windows—BOCA Architectural and Commercial Projected Windows with ventilators of either the *open-out* or *open-in* type have the new BOCA bronze friction shoe with steel spring mounted on steel pivot at sides of all ventilators.

Sizes and Types—See catalogue of Solid Section Steel Window Industry elsewhere in this edition of SWEET'S for listed special sizes and dealer stock sizes of BOCA Architectural and Commercial Projected Windows. Widths and heights given are wall opening dimensions.

Special Boca Features — (1) ***Bronze Friction Shoe and Steel Spring***—Shoe consists of two small angles of bronze, shoulder riveted together, with one angle having slotted holes to permit spring action as indicated by dotted lines. The steel spring mounted over a pin causes the bronze shoe to exert sufficient friction against the weathering channel in which it slides vertically, to produce free operation of ventilator and hold it open at any desired angle.

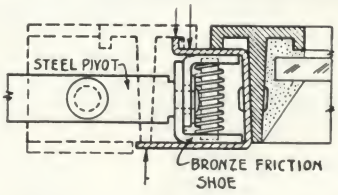
(2) ***Three-point Weathering***—This is obtained by use of the special steel weathering channel which acts as a guide for the bronze shoe and is continuous along sides of ventilator. This three-point contact gives assurance of the best possible weather protection.

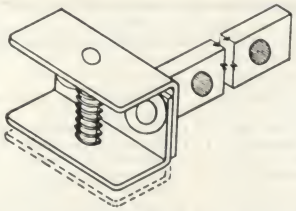


Boca Projected Windows
Dotted ellipses indicate location and vertical movement of Bronze Friction Shoe

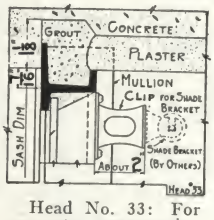
Boca Patented Lock Joint

Used exclusively in all BOCA Steel Windows. This joint is made by machine process and no welding is employed. The design and construction produce a lock joint of unexcelled merit and one that cannot get out of square. The smoothness of surface at the joint together with the flat exterior of the members, produce a pleasing architectural effect.

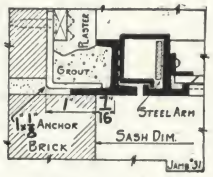




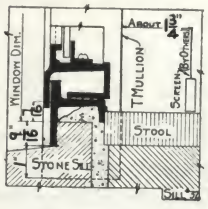
Installation Details—Architectural Windows



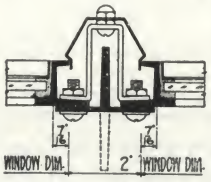
Head No. 33: For concrete construction with plaster ceiling. Shade bracket clip shown.



Jamb No. 31: For brick openings with interior plastered wall. Open-out ventilator indicated.



Sill No. 32: For stone sills. Sills must be cut where vertical mullions occur. Sills of concrete or brick similar.

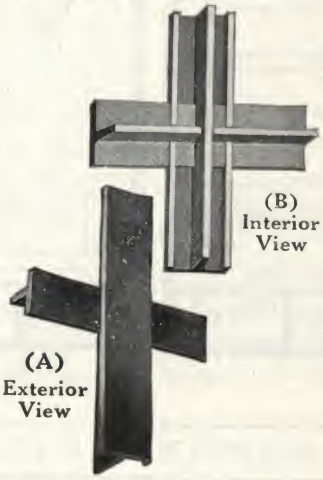


Vertical Mullion and Cover: Used to join Boca Architectural Projected Windows.

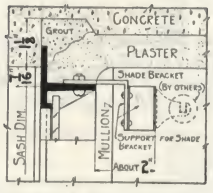
Above at left:
Section Through Ventilator Above Showing Bronze Friction Shoe, Steel Spring and Pivot

Above at right:
Bronze Friction Shoe with Steel Spring and Ventilator Pivot

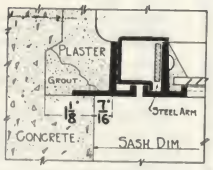
Boca Patented Lock Joint



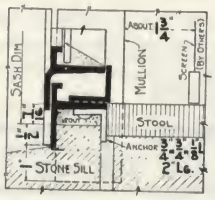
Installation Details—Commercial Windows



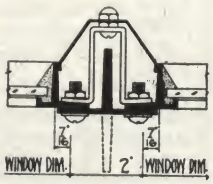
Head No. 24: For concrete construction. Shade bracket clip indicated.



Jamb No. 26. For concrete walls with interior plaster. Open-out ventilator indicated.



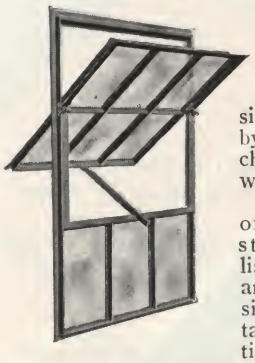
Sill No. 23. For stone sill. Sills of concrete or brick similar. Screen indicated.



Vertical Mullion and Cover: Used to join Boca Commercial Projected Windows.

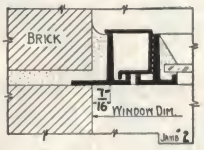
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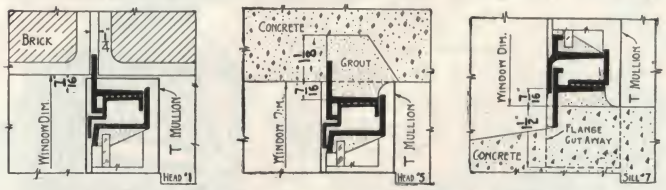
Boca Horizontally Pivoted Windows and Boca Camber and Circular Head Units



These windows are manufactured from the same solid steel sections as used for the Boca Commercial Projected Windows. They also take the same wall opening dimensions. Lower ventilators are operated by either stay bar or spring catch and chain. Upper ventilators are operated with spring catch and chain.

Types and Sizes—See catalogue of Solid Section Window Industry for standard sizes, listed specials and dealer stock sizes. Also for table of combination of standard sizes for opening widths and heights.





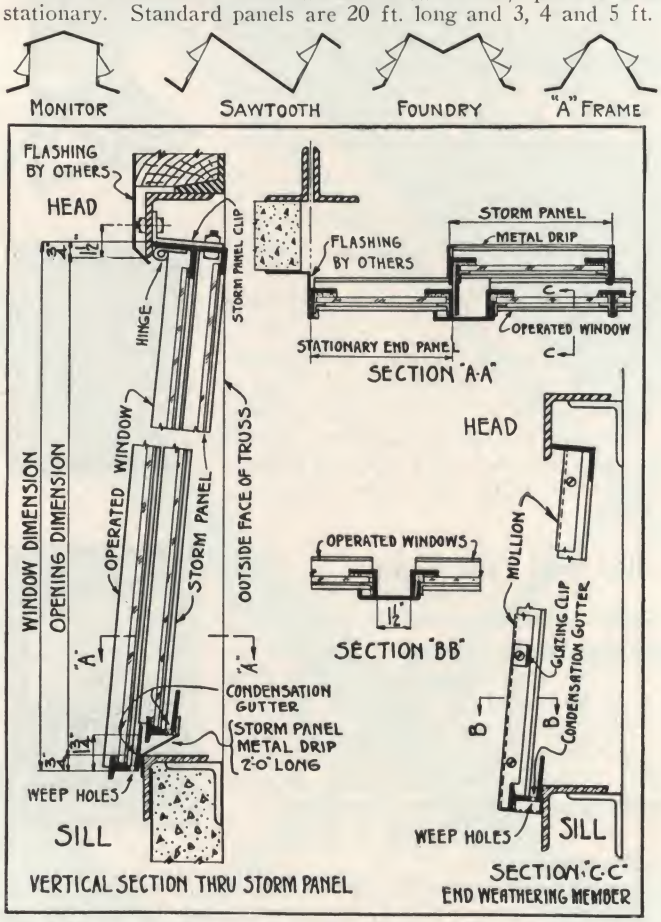
Installation Details—Horizontally Pivoted Windows

Boca Continuous Windows

This combined bottom rail and condensation gutter shown below is an exclusive Boca feature and eliminates the expense of a separate gutter or flashing of copper or other metal, extending the full length of the window opening.

It is designed to carry off condensation that forms on the inside surface of the glass. Weep holes provided in this member together with its flange directly back of the glass, forming a gutter, discharge this condensation outside of the building structure.

Boca Continuous Windows are of two kinds, operated and stationary. Standard panels are 20 ft. long and 3, 4 and 5 ft. high. Made of rolled steel bars with all joints tenoned and riveted. Operated windows have malleable hinges with bronze pins spaced 4 ft. on centers along top angle and are operated with mechanical operators by arms attached to bottom rail. Storm panels supplied when specified. Stationary windows are held at top by angle clips and at bottom by straps.



End View and Intermediate Weathering Where Stationary Panels Occur

Aluminum Windows

The Boca Patented Lock-joint shown on opposite page, lends itself extremely well to the manufacture of Boca Windows made of aluminum. Over 30,000 sq. ft. of Boca Aluminum Windows are installed in the 200 aluminum sliding hangar doors (10x22 ft.) at the Floyd Bennett Airport, Barren Island, N. Y.—all manufactured in accordance with specifications prepared by the City of New York.

Boca Hangar Doors

These doors are designed to operate on either straight or curved track. They are mounted on flanged wheels at the bottom and have guide rollers at the top. A steel plate is furnished in the lower portion and Boca Steel Window units in the upper portion. Our special design submitted on request.



Boca Industrial (Tubular) Steel Doors



Single Swing Door

These doors are either swing or slide type. The stiles consist of rectangular steel tubing $2\frac{1}{2}$x$1\frac{1}{2}$x$\frac{3}{16}$ in. accurately mitered and welded at the corners. Upper panel is a Boca Steel Window, the lower panel a No. 14 copper alloy steel sheet, both secured to tubing stiles.

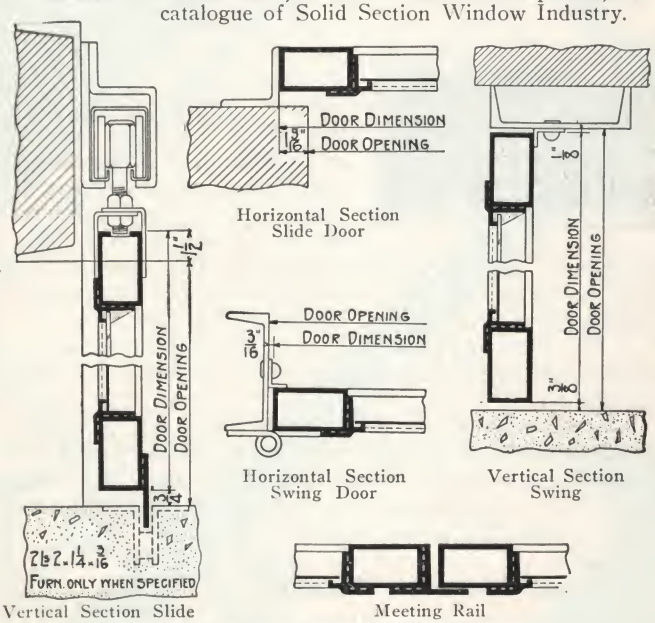
Door frame for swing doors is a 4-in steel channel. Heavier channels supplied when specified.

Hardware—Swing doors; bronze lock with knob and lever; also chain and foot bolt for double doors. Slide doors; overhead track, hasp and staple and foot bolts.



Double Slide Doors

Sizes—For stock sizes, standards and listed specials, see catalogue of Solid Section Window Industry.



Details of Boca Industrial Steel Doors

Other Boca Products

Boca Underwriters' Windows, Boca Steel Casements, Boca Basement Windows, Boca Steel Partitions, Boca Mechanical Operators, Boca "Economy" Steel Doors.

Types and Sizes—See catalogue of Solid Section Window Industry for these products.

BLISS STEEL PRODUCTS CORPORATION

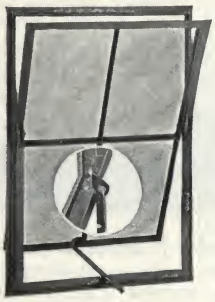
Manufacturers of Solid Steel Windows

EAST SYRACUSE, N. Y.

Member of the Solid Section Steel Window Industry (see List of Manufacturers)

Products

SIDEWALL PIVOTED WINDOWS; COMMERCIAL PROJECTED WINDOWS; TOP HUNG CONTINUOUS WINDOWS; "MOSTLITE" PUTTYLESS BASEMENT WINDOWS; MANIFOLD UTILITY WINDOWS; ARCHITECTURAL MANIFOLD WINDOWS; SPECIAL WINDOWS; STEEL TUBE DOORS.



Sidewall Pivoted Windows

This type is used mostly in factories, garages and other buildings where weathertightness, durability and economy are the main requisites.

To secure maximum durability all sections have a minimum thickness not less than ⅛ in. For maximum surface protection all windows receive a dip-coat of the best quality red oxide ground in linseed oil, and are slowly air-dried. For standard sizes and construction details, write for our complete catalogue.



Architectural Manifold Windows

The Bliss Architectural Manifold Window is designed for use in the finest hotels, office buildings and other structures where the architectural treatment will permit the use of a standard window, and in the manufacture of this window we make no concessions from our highest ideal of quality.

The window is made in nine standard sizes, and consists of two outward-projecting ventilator sections, one above the other; with a short stationary section at the top, for shade protection. All material is cut and fitted with the utmost care. Joints are either brazed, or welded and ground. Cams, slides, pins, and adjusting screws are of brass. Ventilators are fitted to within five thousandths of an inch, and we guarantee that they will be tight and that they will work perfectly. Our guaranty includes free service for a period of one year.



The outward-projecting ventilators prevent direct drafts and give the most satisfactory indirect or baffled ventilation.

Illustration shows the Bliss Architectural Manifold Windows with small lights in upper ventilator and large single light in lower ventilator. Illustration of building is of a Municipal Building equipped with Bliss windows and Bliss fire apparatus doors.

Top Hung Continuous Windows



This type of window is used principally for sawtooth roof buildings where the windows are set at an angle from the perpendicular. Upper edges of window project under the flange of the horizontal structural steel member at the top of the opening, and are held there with substantial hinges spaced on 4-ft. centers.

Note: To the architects interested in Bliss Steel windows, we wish to mention that a most complete catalogue with unusual features will be mailed on request.

"Mostlite" Puttyless Windows

The "Mostlite" Puttyless Window is a recent addition to the Bliss line, and has met with immediate acceptance. The puttyless glazing feature consists of a strip of cork cemented to the glass rest all around. This window is almost airtight. It is weathertight and windtight. These windows can be putty-glazed if desired.



The "Mostlite" Puttyless is particularly useful for basements, and due to its removable features, the opening of this window can be used for a coal chute.

Illustration shows the ease with which this window can be removed.

Bliss Manifold Window



This window, as its name indicates, is intended to meet the demand for a good low-priced ventilator window, and it is particularly adapted for use in private garages, penthouses, small stores and many other types of building.

The upper half of the window is stationary. The lower ventilator section projects outward when opened, and is thus out of the way.

This window has many desirable features.



Illustration shows a Bliss Manifold Window installed, and it gives a good idea of the pleasing appearance of this type of window. Made in only one size with over-all dimensions of 40¼ in. wide, 44½ in. high.

Bliss Steel Tube Doors



The Bliss Steel Tube Doors are made exceptionally heavy and strong, to stand the roughest kind of service.

We make the folding door type for large sized entrances, and we also make the single and double swing doors following your specifications.

View shows a Bliss Double Swinging Door of a powerhouse.

Literature

Our Catalogue No. 2 contains loose tracing sheets of all the types of windows manufactured by us. Write for your copy.


CRITTALL
METAL
WINDOWS
CRITTALL
CASEMENT WINDOW CO.
DETROIT, MICHIGAN.

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Custom built for the finest work

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Heavy standard windows for the best type of work

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of Solid Steel and Bronze

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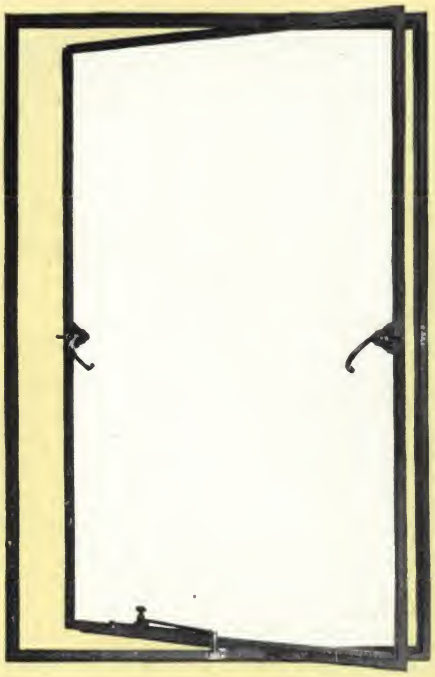
UNIVERSAL CASEMENTS

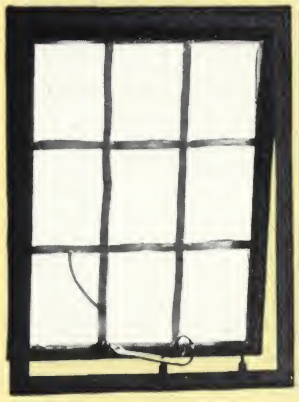


Stone, steel, lead and glass masterfully combined to make a beautiful opening.
Theological Seminary,
Chicago, Illinois
Herbert Hugh Riddle, Architect

Continued on next page

UNIVERSAL CASEMENTS







Vertically Pivoted Casements, when pivoted in the center, take hardware similar to side hinged out opening casements. This is also true when pivoted off center with the major portion to swing out. When the major portion swings in, pivoted casements take hardware similar to side hinged in opening casements.



Top Hinged Out Opening Casements are fitted with solid bronze peg stay No. 107 for hand operation.

Bottom Hinged In Opening Casements are fitted with spring catch 2AS for pole control. Spring catch 3AS is applied only to small units for cord control. Units under nine square feet in area are fitted with concealed side arms. Larger units take two friction stays.

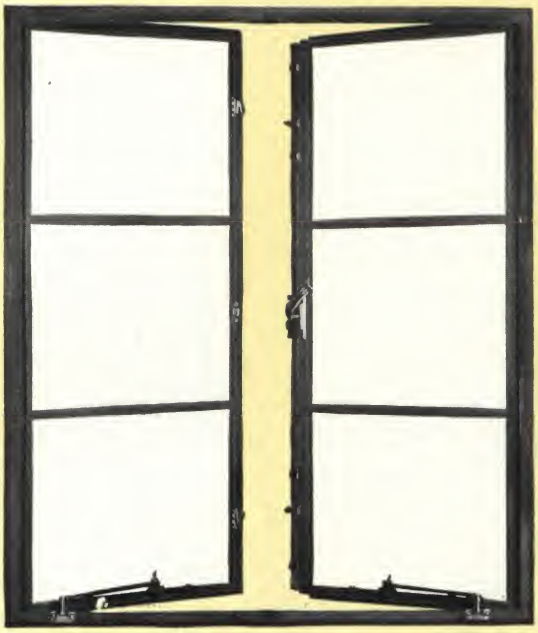
Side Hinged Out Opening Casement handles may be either No. 205 or No. 206 on choice of plates 225 or 229. Handle No. 211 is also optional but is usually reserved for very large casements. Stays may be sliding stay No. 108, friction stay or peg stay No. 107.

Side Hinged In Opening Casements have the same optional handles as above. The choice of stay is limited to friction stays or peg stay No. 107.



Continued on next page

UNIVERSAL CASEMENTS



Double Casements Out Opening are fitted with bronze cremorne bolts and No. 108 stays. Friction stays may be applied at the head or peg stays No. 107 at the sill without extra charge.

* * *

The standard handle for a bronze cremorne bolt is ordinarily handle No. 310 but handle No. 306 may be used without extra when desired. When double casements are used in the same room with side hinged casements, it is customary to use handle No. 206 on the side hinged casements and handle No. 306 on the double casements so that they all conform.

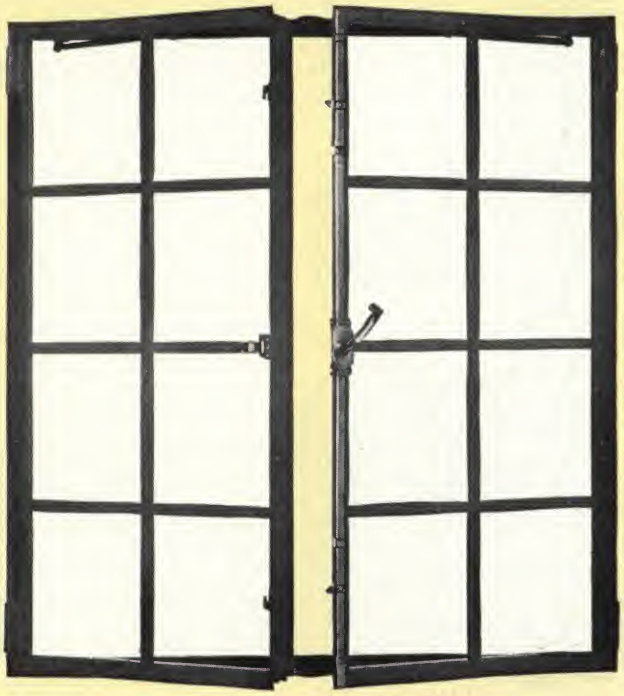
* * *

All hardware is solid cast bronze of government mixture, toned a dark coinage color without the use of chemicals or plating. Friction stays are Rixson stays of brass, toned to match the other hardware.



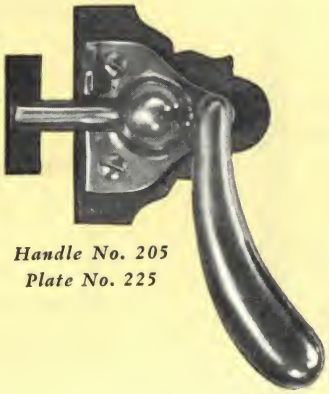
Horizontally pivoted transoms are fitted with spring catch 2 AS for cord control. When pole control is desired, two friction stays must be used to hold the casement in the desired position. There is a slight extra charge for these stays on casements under 9 square feet in area.

Double Casements In Opening are fitted with bronze cremorne bolts and friction stays. They may have bronze peg stays No. 107 applied at the sill on the outside without extra charge.



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UNIVERSAL CASEMENTS
STANDARD HARDWARE



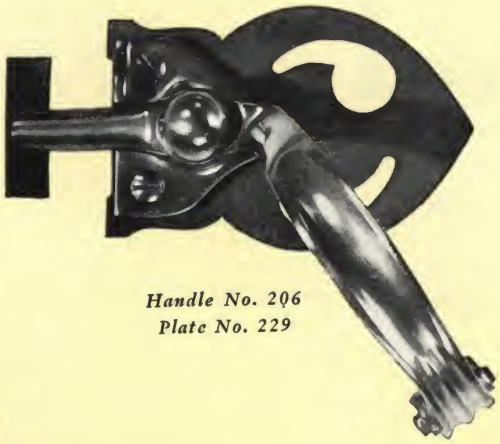
Handle No. 205
Plate No. 225



3-Point Strike Plate



Night Latch



Handle No. 206
Plate No. 229



Two Throw Latch
Handle No. 206
Plate No. 229



Three Throw Latch
Handle No. 211
Plate No. 225

Handles No. 205, 206 and 211 are standard and interchangeable without change in cost. In general, handle 211 is used only where three throw hardware is required as it is designed for exceptionally heavy duty. Back plates No. 225 and No. 229 are steel plates welded to the casement sections. There is no difference in cost. Side hinged out opening casements may be fitted with concealed night latch shown on the upper right at a very small extra charge. The projecting night latch shown at the upper left may be used on side hinged out opening casements at a slightly increased cost where a still greater degree of night ventilation is desired without rattles.

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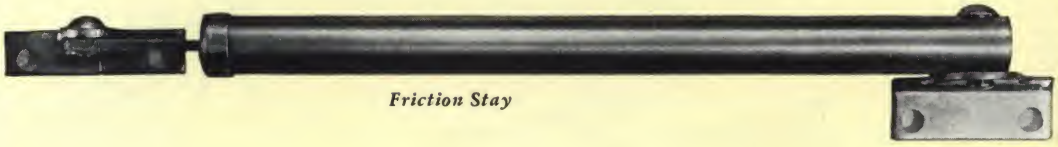
UNIVERSAL CASEMENTS

STANDARD HARDWARE

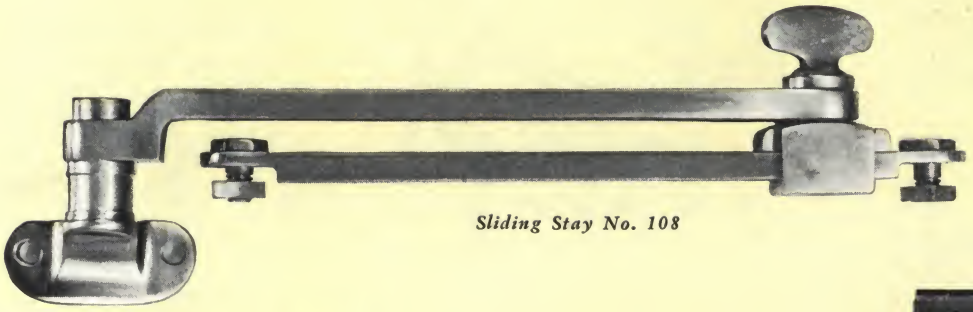


Handle No. 310 for Cremorne Bolt

Standard solid bronze cremorne bolt with handle No. 306 is illustrated at the right. Handle 310, at the left, is optional. Friction stays are brass, toned to match the other hardware. They are applied at the head of the casements where they are inconspicuous. Solid bronze sliding stay No. 108 is standard for side hinged out opening casements while the friction stay is standard for side hinged in opening casements. The friction stay is optional also on out opening casements in place of stay No. 108. Peg stay No. 107 is chiefly used in residential work where it may be applied on either side hinged out or side hinged in opening casements.



Friction Stay



Sliding Stay No. 108



Cremorne Bolt with Handle No. 306



Peg Stay No. 107

Continued on next page

UNIVERSAL CASEMENTS

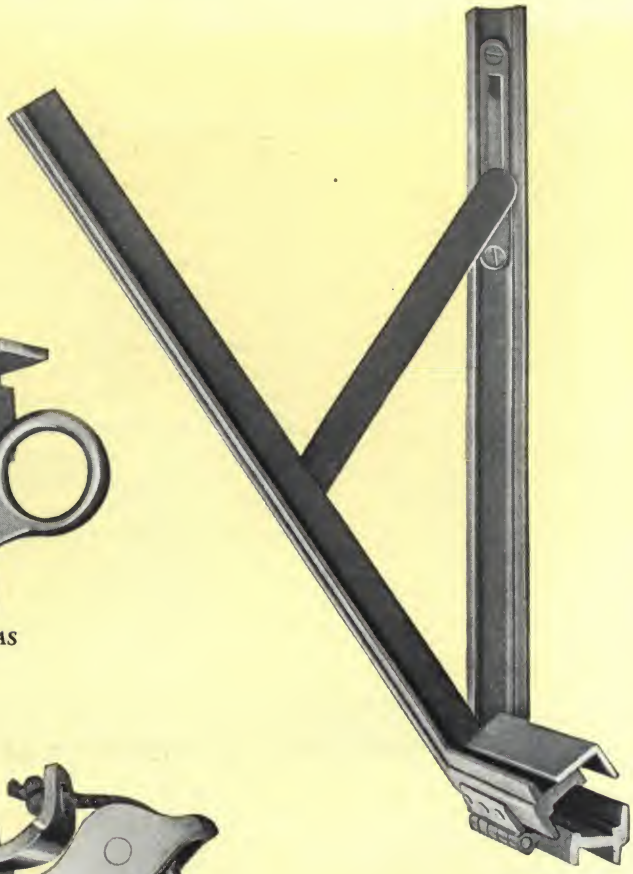
STANDARD HARDWARE



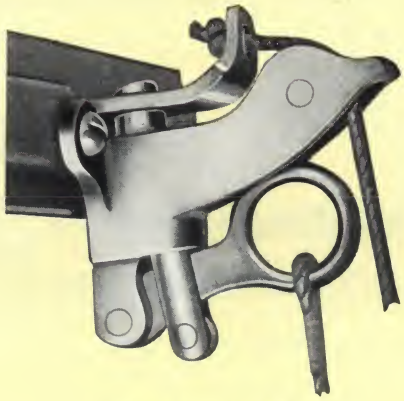
Friction Stay



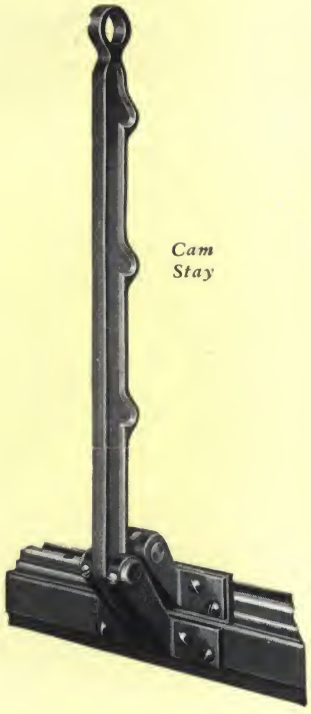
Spring Catch 2AS



Concealed Side Arm



Spring Catch 3AS



Cam Stay

Concealed side arms shown above, to the right, hold the casement in full open position. Friction stays permit varying degrees of opening. Concealed side arms are standard for bottom hinged casements under nine square feet; friction stays are extra on these small units but are standard on units over this size. Passable side arms to permit the transom to drop down for cleaning can be furnished at no extra cost.

For uses of spring catches see pages 4 and 5.

The solid bronze cam stay, illustrated at the right, is used for pole operation on top hinged transoms when no screens are used. It is applied only as an extra.

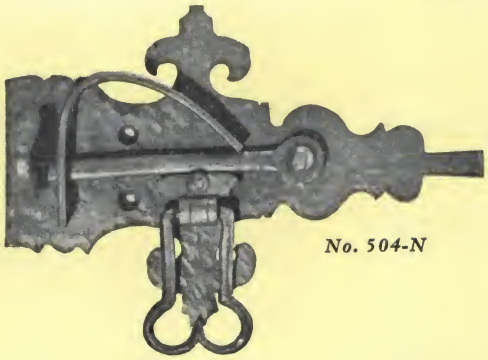
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UNIVERSAL CASEMENTS

SPECIAL HARDWARE



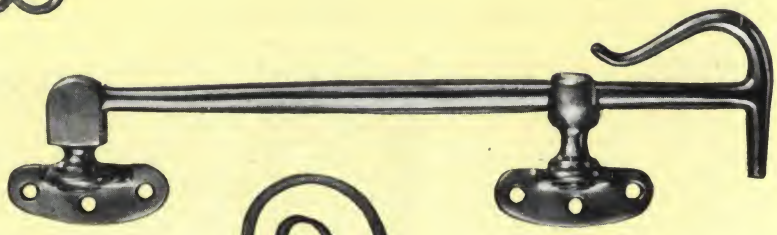
No. 302



No. 504-N



No. 219



No. 112



No. 107-G



No. 207



Handle No. 206
Plate No. 210

For particular effects, we can furnish special hardware to our own or to the architect's designs.

Handle No. 302, for cremorne bolts, handles Nos. 207 and 210, for casements, and peg stay No. 112 are bronze fittings the extra for which is not excessive.

Latch and plate No. 504-N, plates Nos. 219, 221 and peg stay No. 107-G are hand wrought iron. These, being the finest kind of hand work, are quite expensive.

Handle No. 506-A and plate No. 210 are further examples of hand work but plate No. 210 is more economical when made as a bronze casting, painted black, on which may be mounted any standard handle such as No. 206.



No. 210



Handle No. 506-A
Plate No. 210



No. 221

Continued on next page

NORMAN CASEMENTS



Residence of E. Z. Nutting, Esq.
Palm Beach, Florida
Julius Jacobs, Architect



Office Building
Montclair, New Jersey
Holmes & Von Schmid, Architects



Residence of E. W. Goebel, Esq.
Kansas City, Missouri
E. W. Tanner, Architect

Residence of Merwin Armstrong, Esq.
Hinsdale, Illinois
R. S. Walcott, Architect

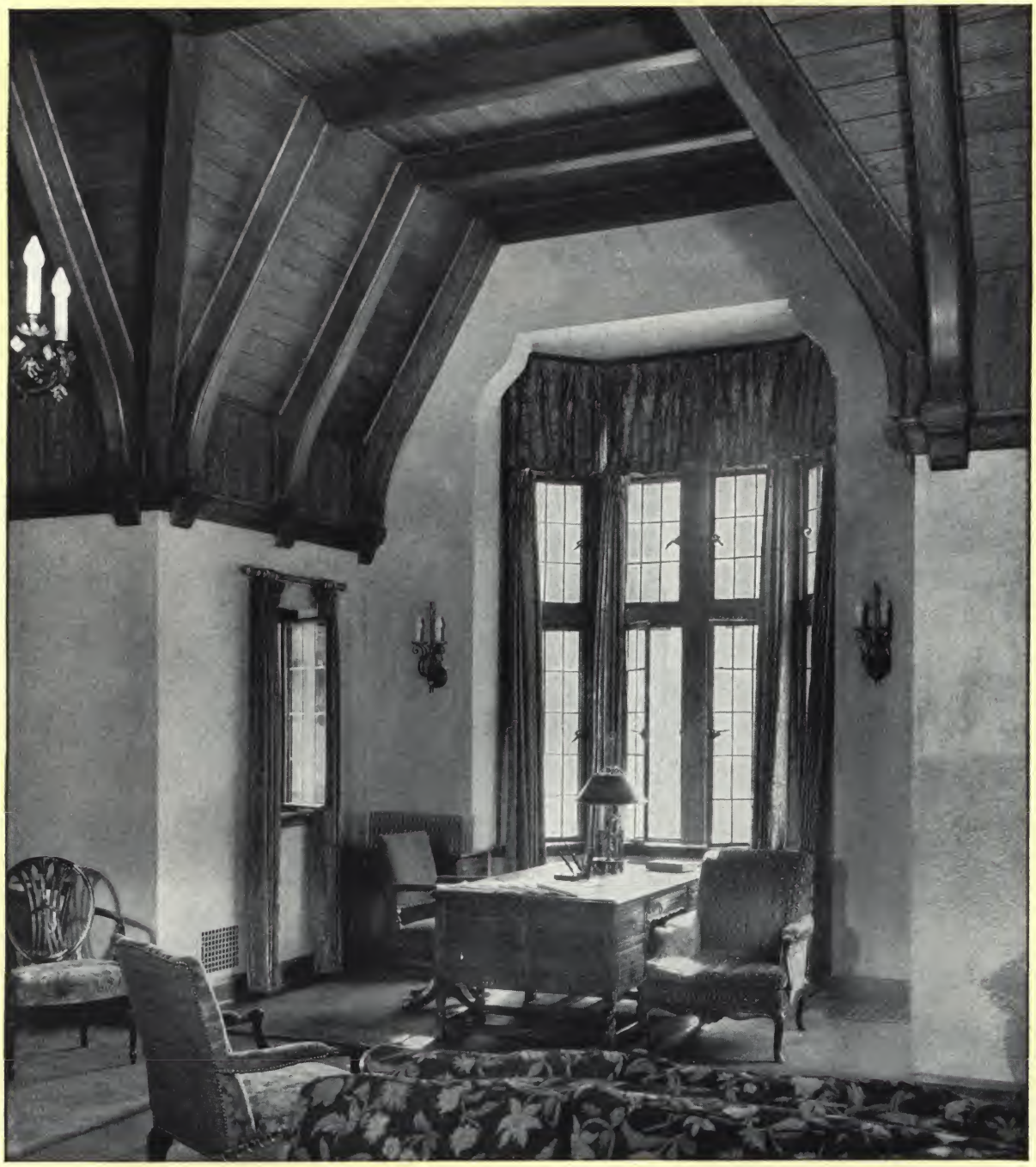




Residence of C. L. Ayres, Esq.
Grosse Pointe, Michigan
Beckett & Akitt, Architects

Continued on next page

NORMAN CASEMENTS



An effective illustration of the perfect utility and exquisite draping of inward opening casements.
Organ Building, Estate of J. K. Lilly, Esq., Indianapolis, Indiana
Robert Frost Daggett, Architect

Continued on next page

STANWIN CASEMENTS



House for V. Green Company
Greenhaven, New York
R. J. Miller, Architect



John Harris High School
Harrisburg, Pennsylvania
Lappley & Hornbostel, Architects



580 West End Avenue,
New York, New York
Emory Roth, Architect

Group Houses, Washington, D. C.
Baer & Scholz, Architects



Riverview Manor, Harrisburg, Pa.
C. J. Lappley, Architect



Continued on next page

STANWIN CASEMENTS



Residence of Edgar Bamburger, Esq.,
West Orange, New Jersey
Clifford C. Wendehack, Architect

Continued on next page

NORMAN CASEMENTS

STANDARD HARDWARE



Handle No. 1140
Plate No. 225



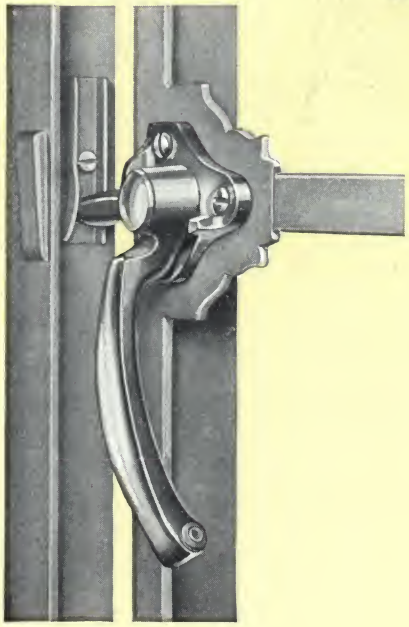
Cleaning Hinge



Concealed Coil Spring



Close Hinge



Night Latch

All casements are fitted with substantial bronze hinges with hardened steel pins. Standard hinges on outward opening and inward opening casements are close hinges. Where specified, outward opening casements may have projecting hinges for cleaning as illustrated at the upper right. Steel handle plate No. 225 with solid bronze handle No. 1140 illustrated above is standard. Typical of the care given to details is the concealed coiled spring illustrated at the left which takes up all wear and prevents rattles. All outward opening casements have the concealed night latch illustrated at the left for small amounts of ventilation. Friction stays are applied at the heads of all Norman Casements, see illustration on Page 7.

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STANWIN CASEMENTS

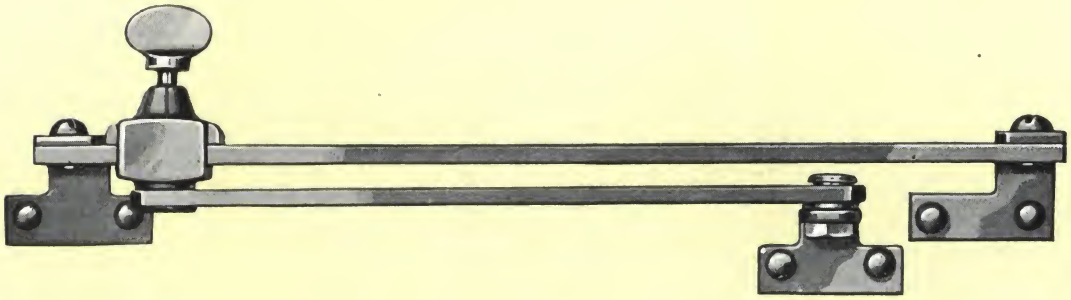
STANDARD HARDWARE

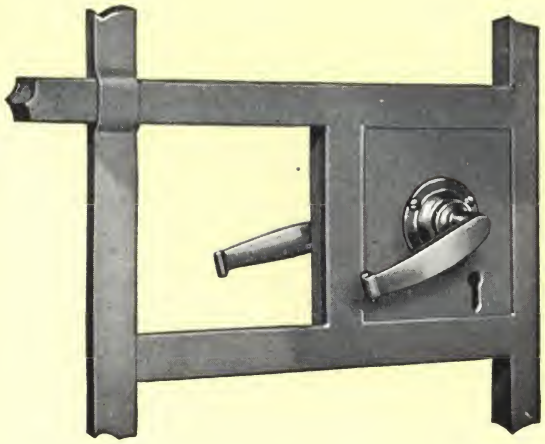
HANDLES: All handles are drop forged bronze, fitted with a slotted nose which permits a small amount of ventilation without draft.

TRANSOM STAYS: Top hung transoms are operated with drop forged bronze peg stays.









SILL ADJUSTERS: Sliding stays have solid bronze top and bottom bars, bronze friction box and bronze thumb screws. This stay is standard equipment on all Stanwin Casements.

LOCKS: Doors are fitted with bronze handles and mortise latch locks. They operate from both sides.

Continued on next page

UNIVERSAL CASEMENTS



The Riverside Church, New York City
Henry C. Pelton and Allen & Collens
Associated Architects

Continued on next page

UNIVERSAL CASEMENTS

GUARANTEE

The same guarantee as given on page 39 of this catalogue for Norman Casements applies equally to Crittall Universal Casements

STANDARDS OF MATERIALS AND WORKMANSHIP

STEEL: All steel used is copper bearing steel, containing not less than 0.15% nor more than 0.30% copper to resist rust. The copper content also gives a better surface, with greater affinity for paint. Medium casement sections shall weigh not less than 3.25 lbs. per lineal foot, this weight to include the swinging leaf and the outer frame, but does not include glass stop or any subframe. The heavy section shall weigh not less than 4.54 lbs. per lineal foot.

HARDWARE: Standard hardware is solid cast bronze of government standard mixture, including handles, cremorne bolts, sliding stays, and peg stays. Friction stays are Rixson stays of brass, toned to match other hardware. All bronze hardware is toned a beautiful dark coinage color without the use of plating or chemicals. Concealed in all handles is a coiled spring to take up wear and prevent rattles.

All side hinged casements under 5′ have a single handle; on casements 5′ high or over a two-throw latch is used, while on those over 7′ high a three-throw latch is used.

HINGES: All hinges are specially made bronze butts with hardened steel pins. They are 2″, 3¼″, and 4″ in height, depending on the weight of section and the size of the casement. Two hinges are applied to each casement under 6′, three hinges to all casements 6′ high and over, and four hinges to all casements 7′ 6″ high and over.

WINDOWS: All corners are electrically welded and cleaned free from flux. All handle plates are welded to the casement sections. All ventilating units have two points of contact all around. Sections are designed so that in composite openings glass will be in the same plane and sight lines will be uniform throughout.

PAINTING: All steel sections are cleaned free from rust and scale previous to painting. They receive one coat of red rust-resisting paint and one coat of dark gray shop paint, each coat baked on separately.

GLAZING: Where panes are small the sash may be prepared for putty glazing from the outside. Glazing clips are furnished by us. For large lights of glass or for better appearance, sash may be fitted with moulded steel glazing stops. These are applied on the inside to prevent corrosion and to facilitate glazing. These stops may be solid rolled steel or rolled hollow for economy. Both types of stops are carefully mitered at the corners, individually fitted to each pane, and are held in place by *countersunk* brass screws.

SPECIFICATIONS

WINDOWS: The printed general conditions and notice to bidders preceding the specifications must be referred to and shall control all portions of this work.

All windows shall be Crittall Universal Casements as manufactured by the Crittall Casement Window Company, Detroit, Michigan. They shall be custom built to the sizes and designs shown on the drawings. Shop drawings must be submitted for the architect's approval before starting fabrication.

All work shall conform in all respects to the "Standards of Materials and Workmanship" published on page 17 of Crittall's catalogue in Sweet's current edition.

FRAMES: The sash manufacturer shall furnish, delivered to the building site, frames (*mullions*) (*transoms*) of twelve-gauge pressed metal as shown on the drawings.

FINS: A continuous angle fin around the head and jambs shall be furnished and set by the sash manufacturer when erecting the casements.

Note: Fins are used in veneer construction when no frames are used. See pages 24, 25, 30.

GLAZING: (*Sash shall be fitted with spring clips for putty glazing from the outside*) (*sash shall be fitted with solid rolled steel glazing stops applied from inside*) (*sash shall be fitted with hollow rolled steel glazing stops applied from inside*).

HARDWARE: Shall be as follows:

Note: Indicate choice. See pages 6, 7, 8.

Side Hinged (*Out*) (*In*) Opening Casements; Vertically Pivoted Casements: Handle (*No. 205*) (*No. 206*) (*No. 211*) on plate (*No. 225*) (*No. 229*).

Double Casements (*Out*) (*In*) Opening: Cremorne bolt with handle (*No. 306*) (*No. 310*).

Out-Opening Casements: Stays (*Friction*) (*No. 108 Sliding*) (*No. 107 Peg*).

In-Opening Casements: Stays (*Friction*) (*No. 107 Peg*).

Bottom Hinged Transoms: Spring catch (*No. 2 AS*) (*No. 3 AS*) (*concealed side arms*) (*friction stays*).

Horizontally Pivoted Transoms: Spring catch No. 2 AS.

Note: Friction stays should be specified when pole control is desired.

DOORS: (*Bronze thresholds*) (*double-thick steel kick plates*) (*cylinder locks*) (*master keyed*) (*dummy lock to match*) (*double-operating cremorne bolts*) (*floor stops*) (*friction stays*) (*bronze top and bottom bolts*).

Note: For door hardware see page 37.

ERECTION: All windows shall be set in place by the manufacturer and all joints between the steel sash and the collateral construction shall be made tight with the use of Crittall Mastic Cement, neatly pointed on the exterior. All hardware shall be shipped to the job separately and shall be applied by the manufacturer after glazing and after the rough trades are out of the building.

Notes to be included in specifications of others

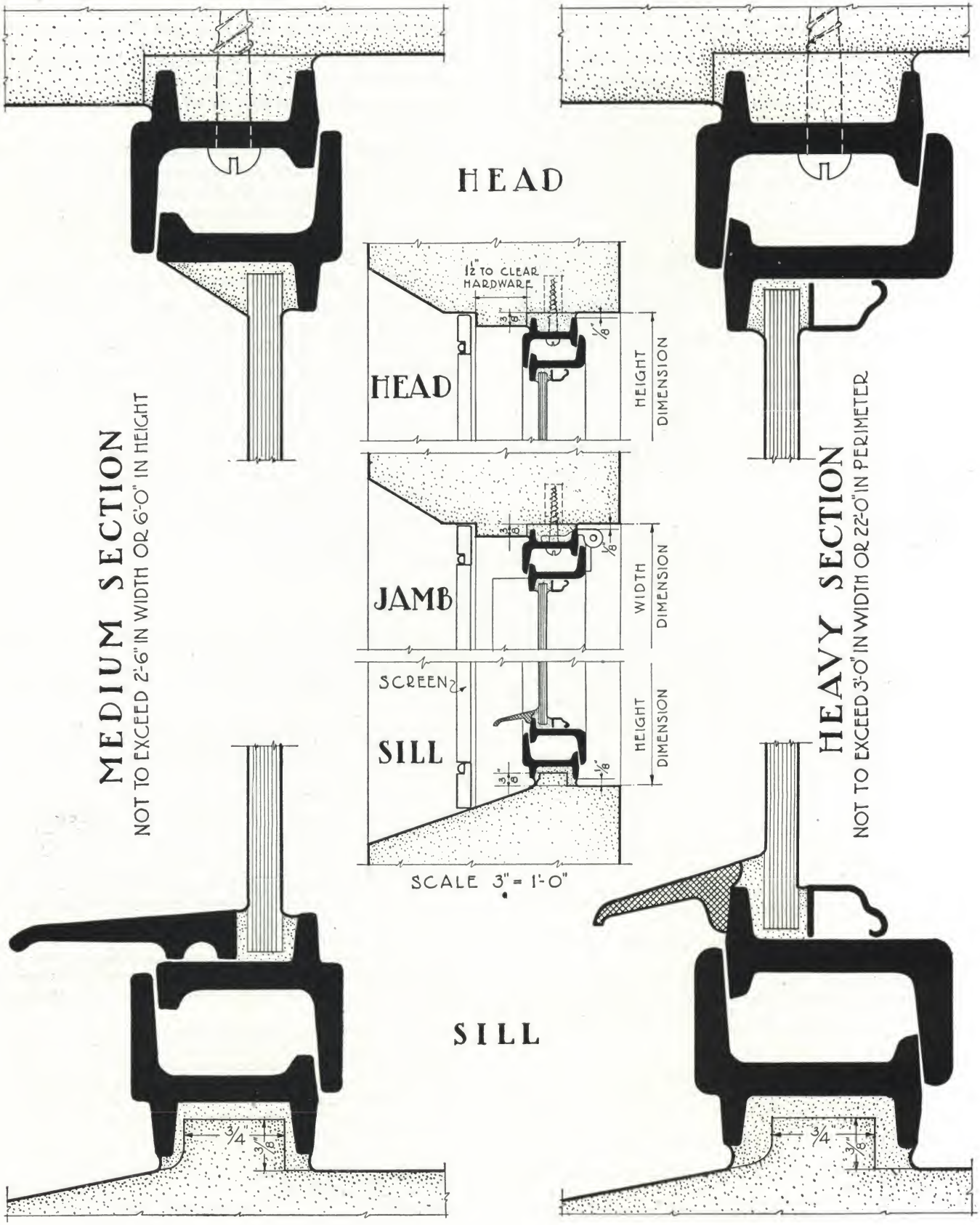
MASON: When twelve-gauge pressed metal frames are used, specify that the mason shall set them in place and build them in as the walls go up, including cementing in place, caulking, and pointing neatly.

GLAZIER: When steel glazing stops are used they are fitted to each pane. Insist that the glazier remove the stops for one light of glass at one time, apply face putty, insert glass, back putty, and then screw the stops back into place before going on to the next pane. For large lights of glass specify that the glazier use wood wedges as directed by the casement manufacturer. A good grade of steel sash putty should be used.

PAINTER: The casements arrive on the job with two coats of shop paint baked on. The last coat is designed to take any finished paint desired. Specify that the painter shall apply in the field two coats of paint of the desired color and quality.

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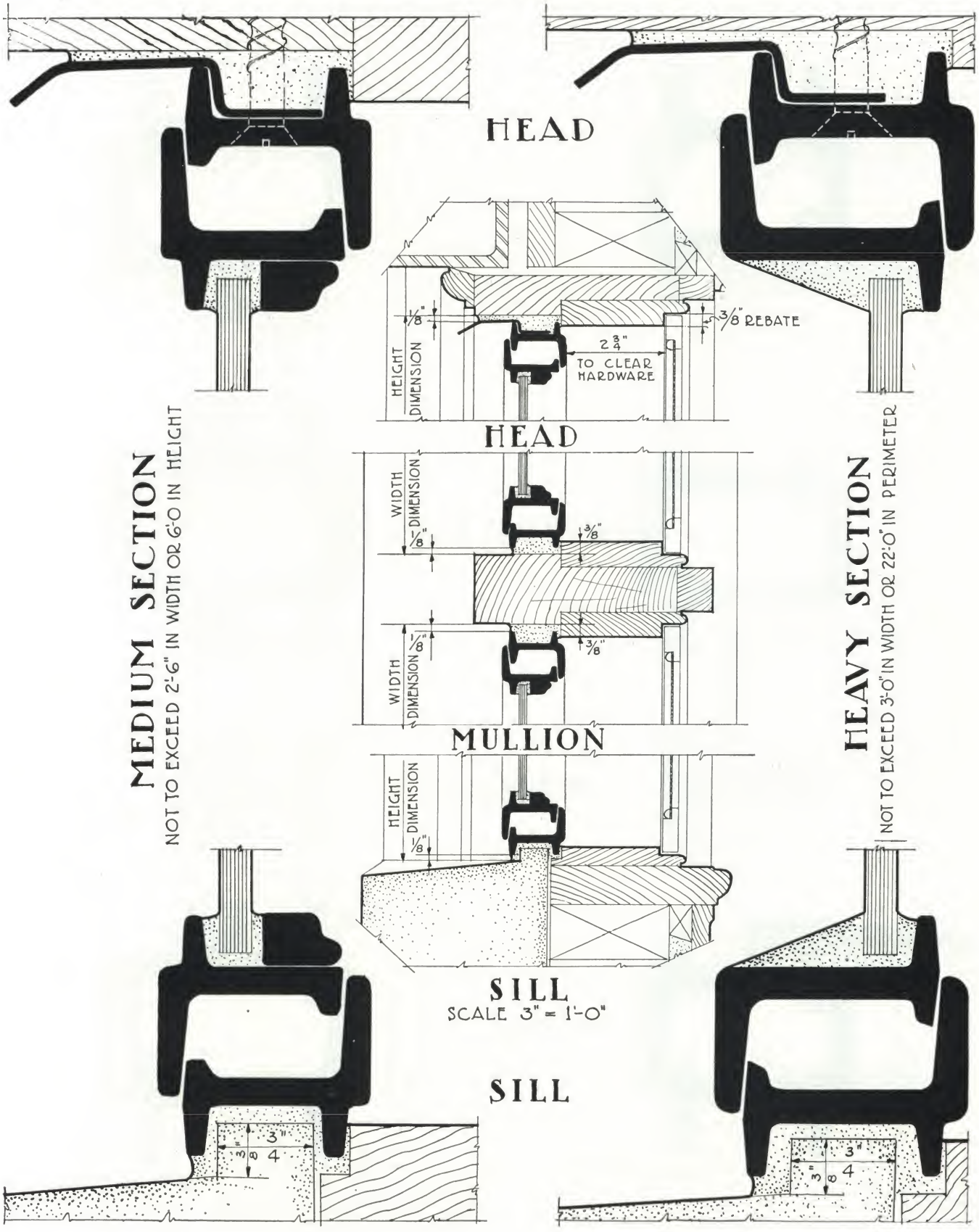
UNIVERSAL CASEMENTS
SIDE HINGED IN-OPENING CASEMENT DETAILS



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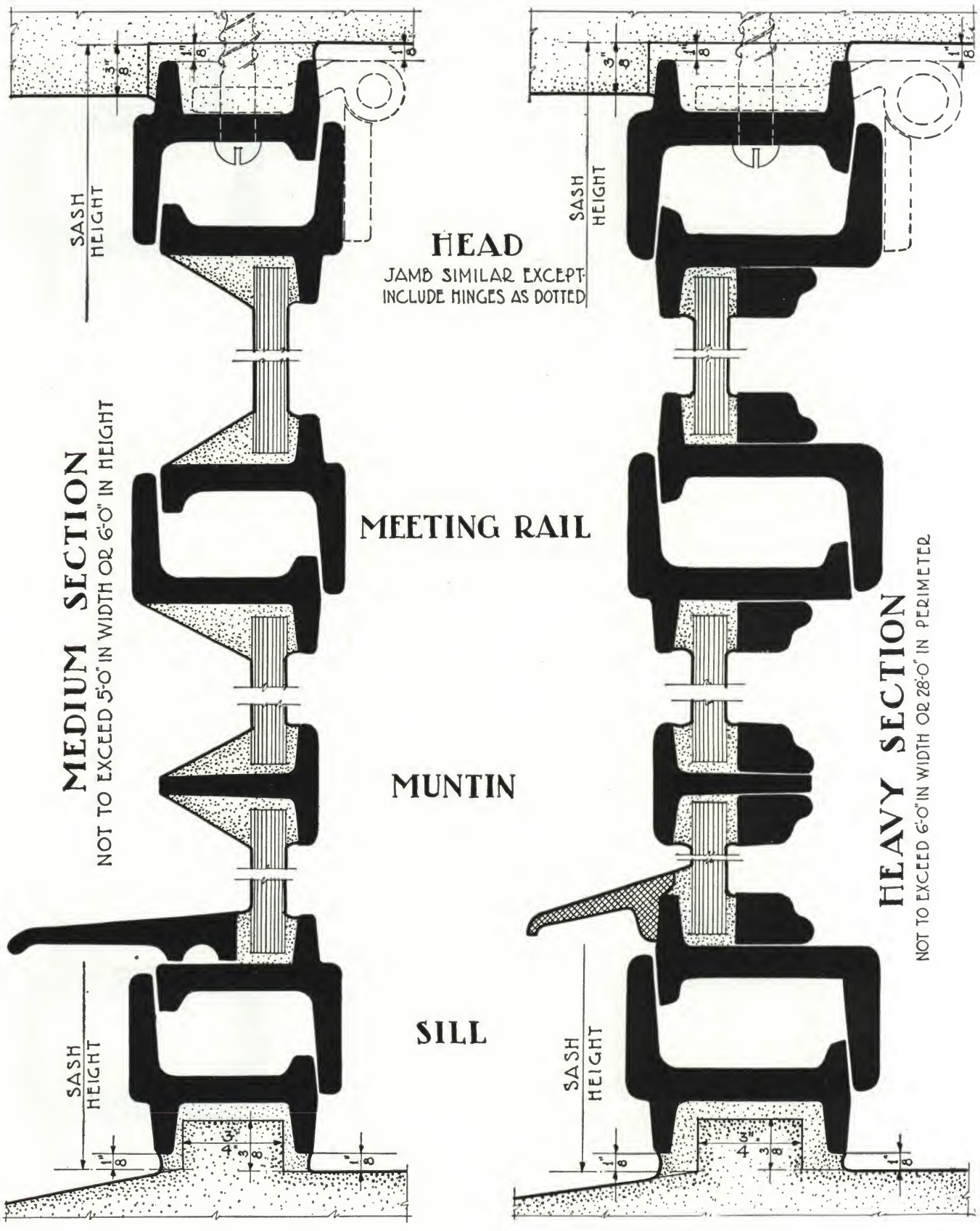
UNIVERSAL CASEMENTS

SIDE HINGED OUT-OPENING CASEMENT DETAILS



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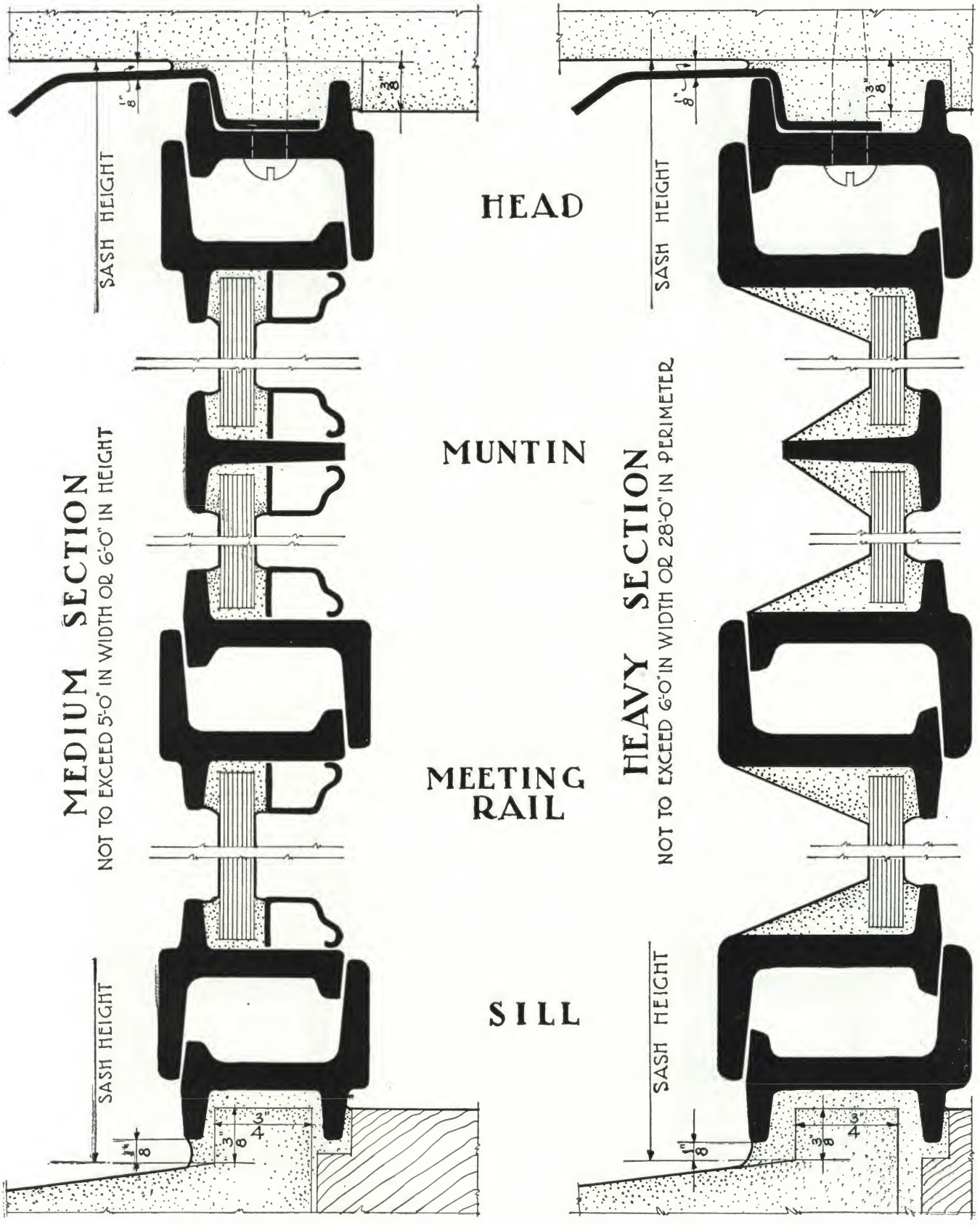
UNIVERSAL CASEMENTS
DOUBLE CASEMENT (FOLDER) IN-OPENING DETAILS



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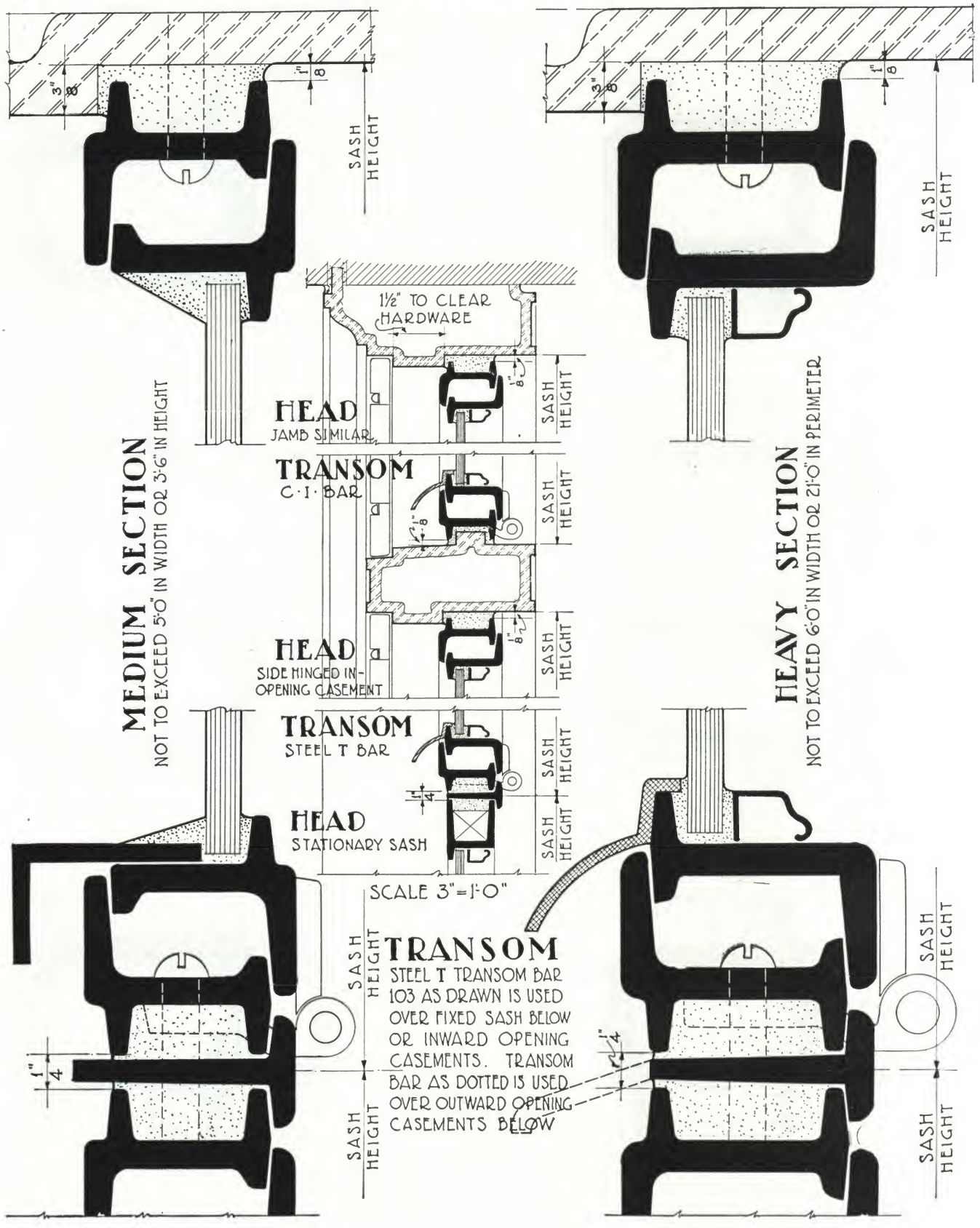
UNIVERSAL CASEMENTS

DOUBLE CASEMENT (FOLDER) OUT-OPENING DETAILS



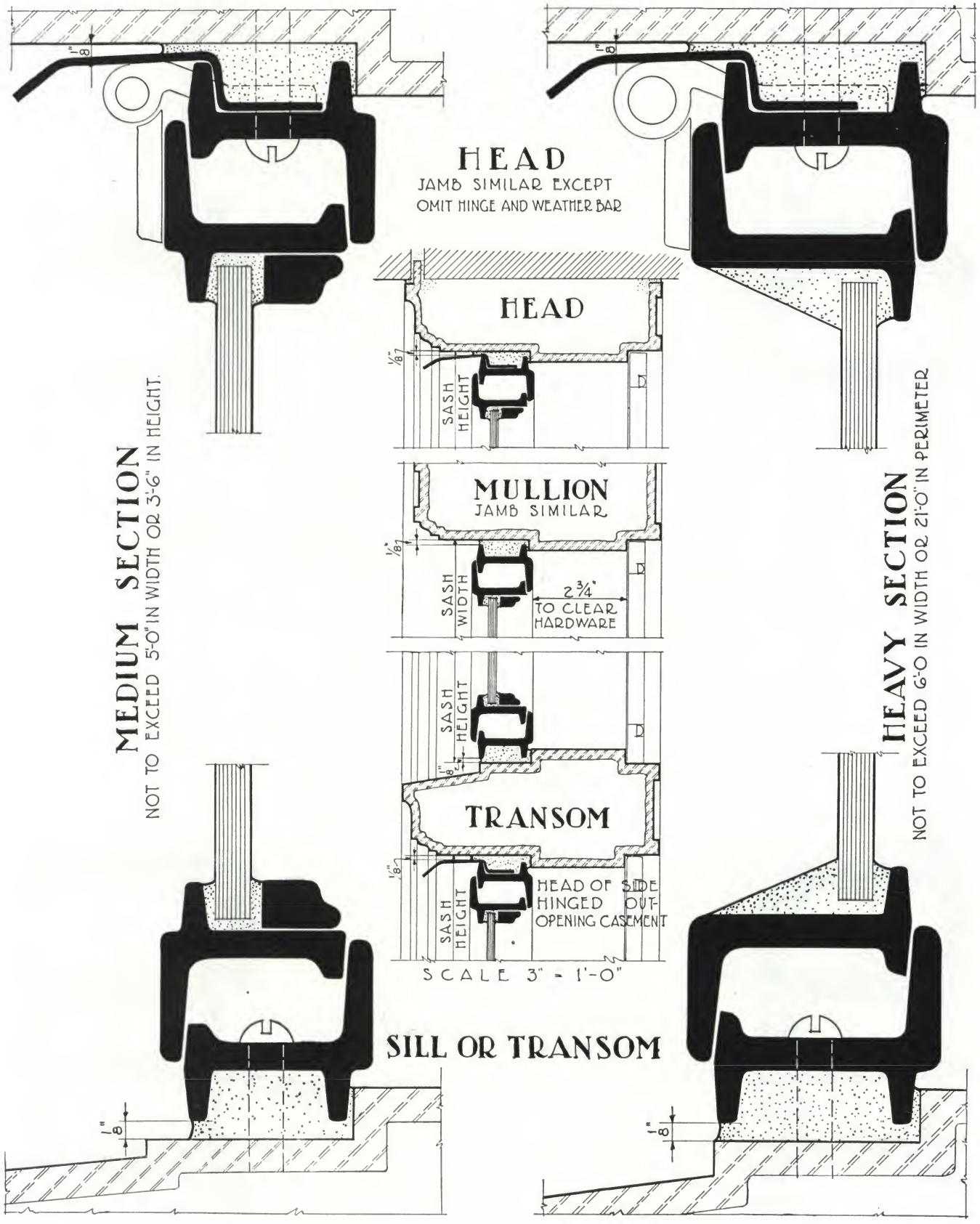
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UNIVERSAL CASEMENTS
BOTTOM HINGED IN-OPENING CASEMENT DETAILS



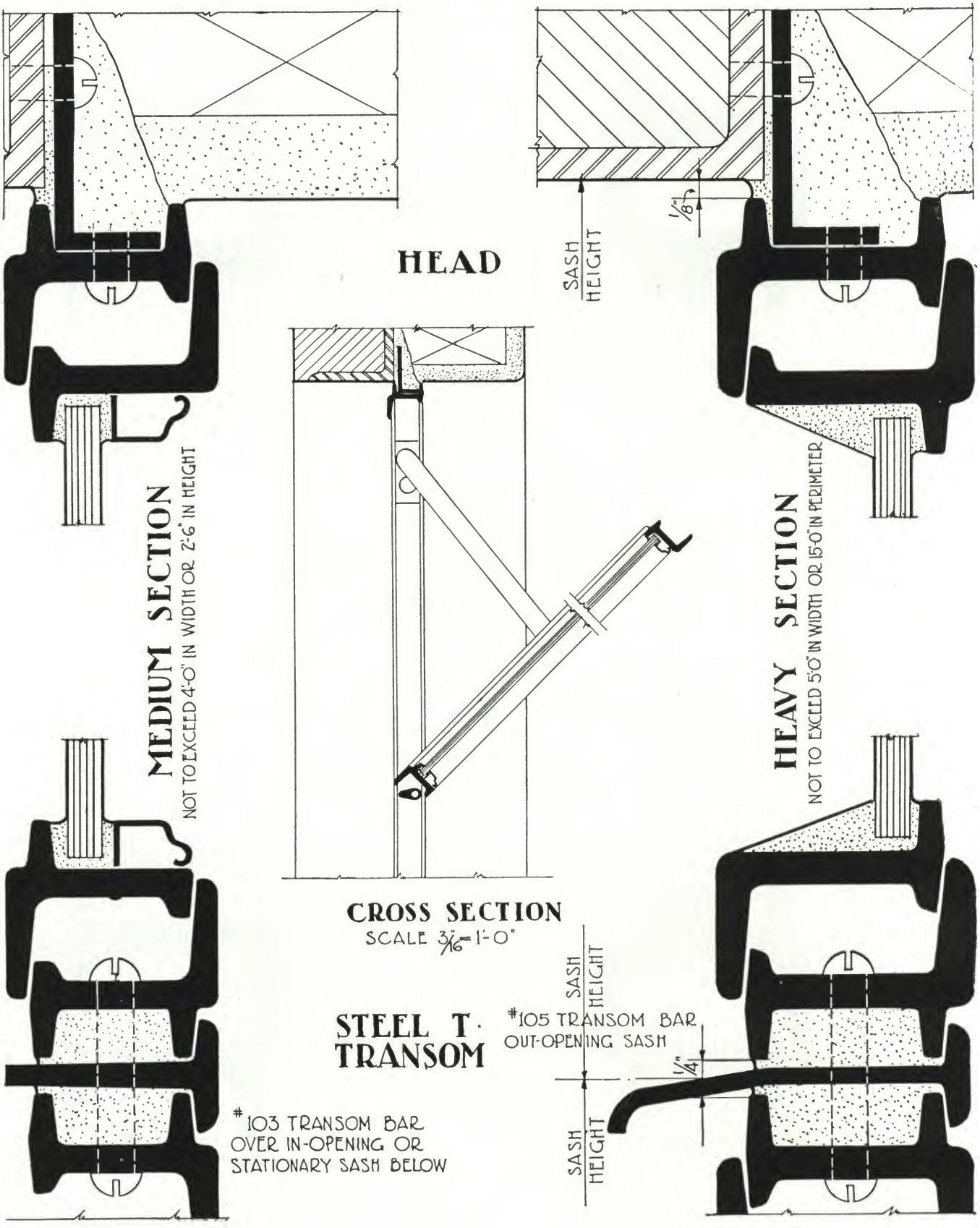
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UNIVERSAL CASEMENTS
TOP HINGED OUT-OPENING CASEMENT DETAILS



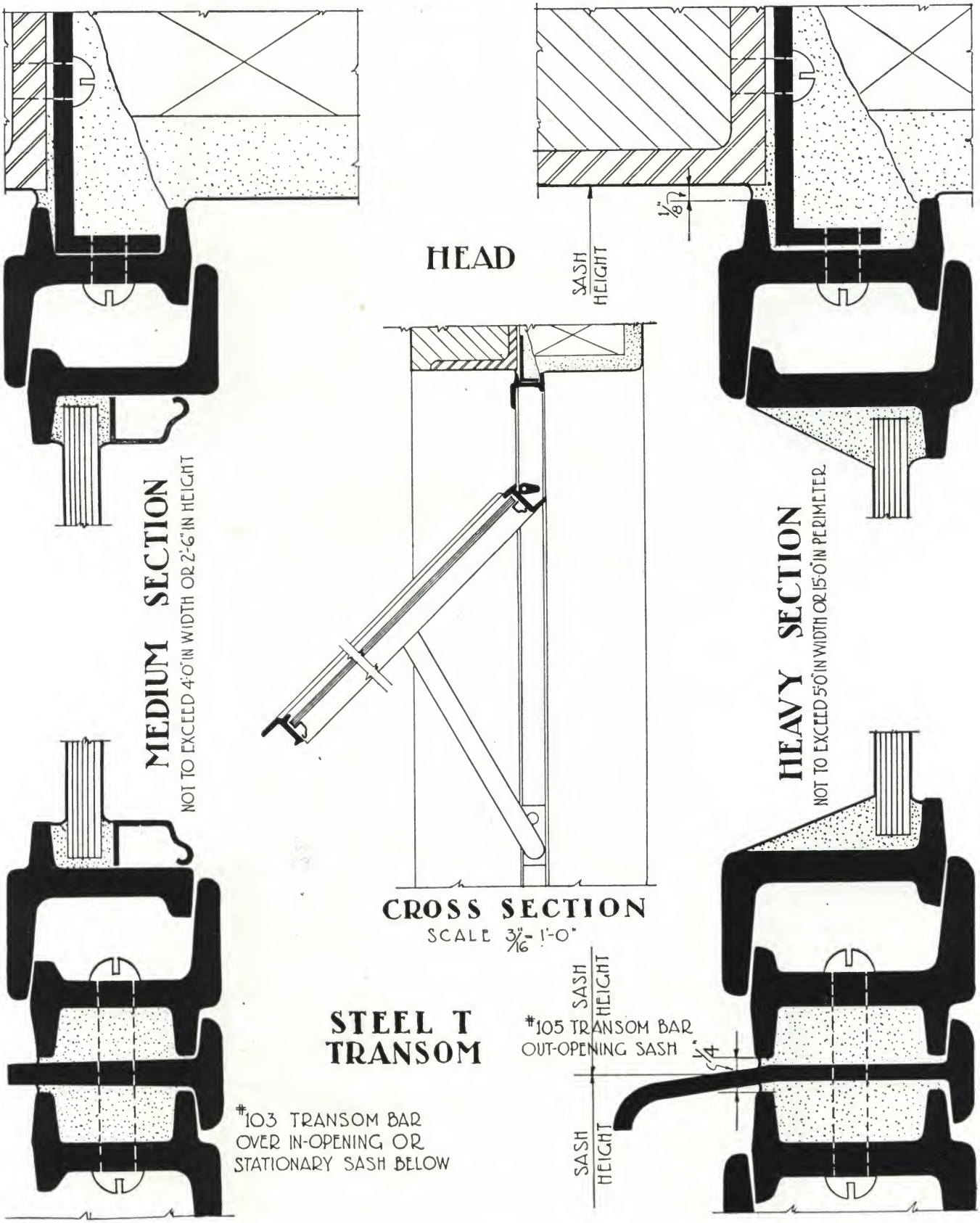
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UNIVERSAL CASEMENTS
PROJECTED IN AT TOP CASEMENT DETAILS



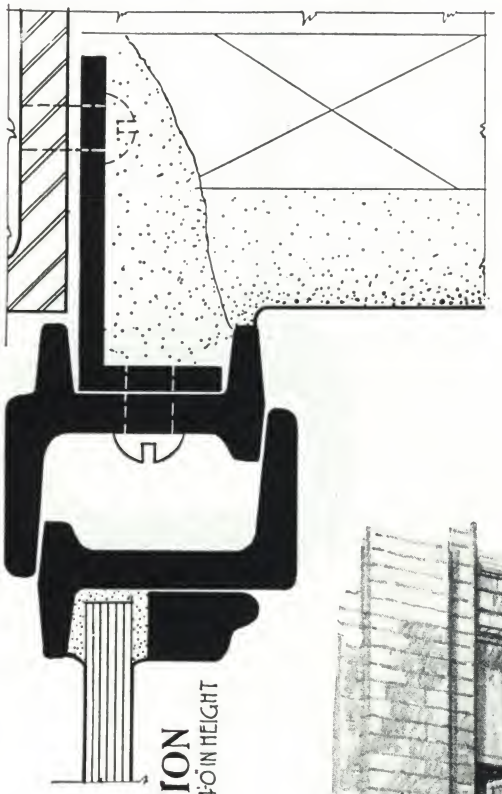
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UNIVERSAL CASEMENTS
PROJECTED OUT AT BOTTOM CASEMENT DETAILS

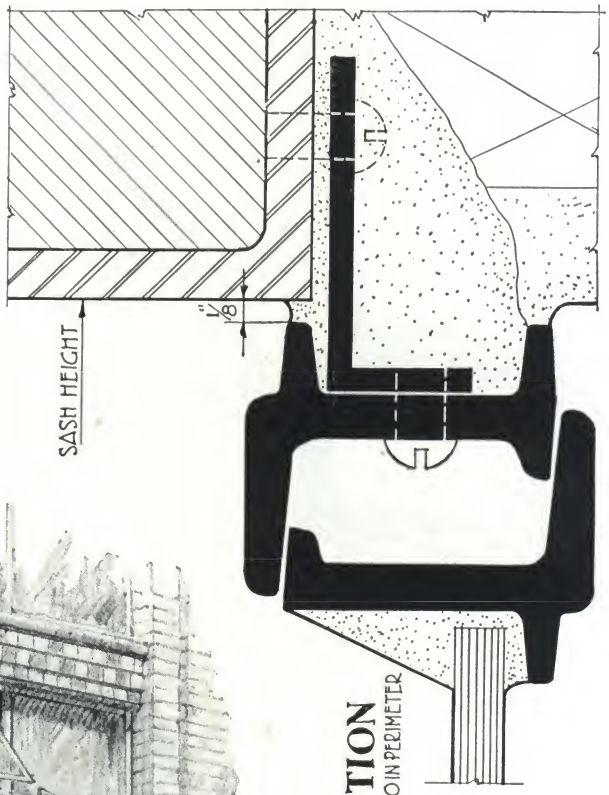


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UNIVERSAL CASEMENTS
HORIZONTALLY PIVOTED (AT JAMBS) CASEMENT DETAILS



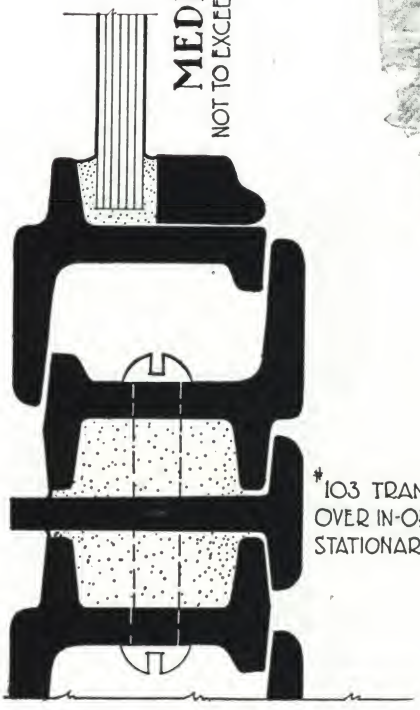
HEAD





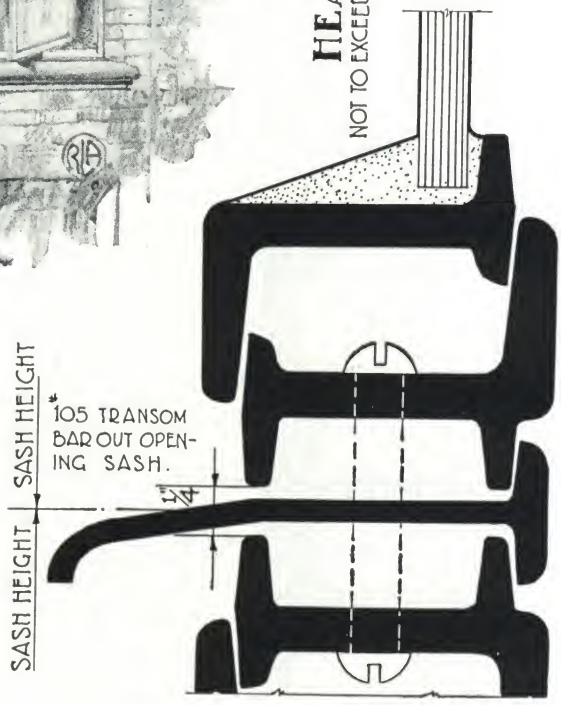
MEDIUM SECTION
NOT TO EXCEED 3'-6" IN WIDTH OR 4'-0" IN HEIGHT

HEAVY SECTION
NOT TO EXCEED 5'-0" IN WIDTH OR 18'-0 IN PERIMETER



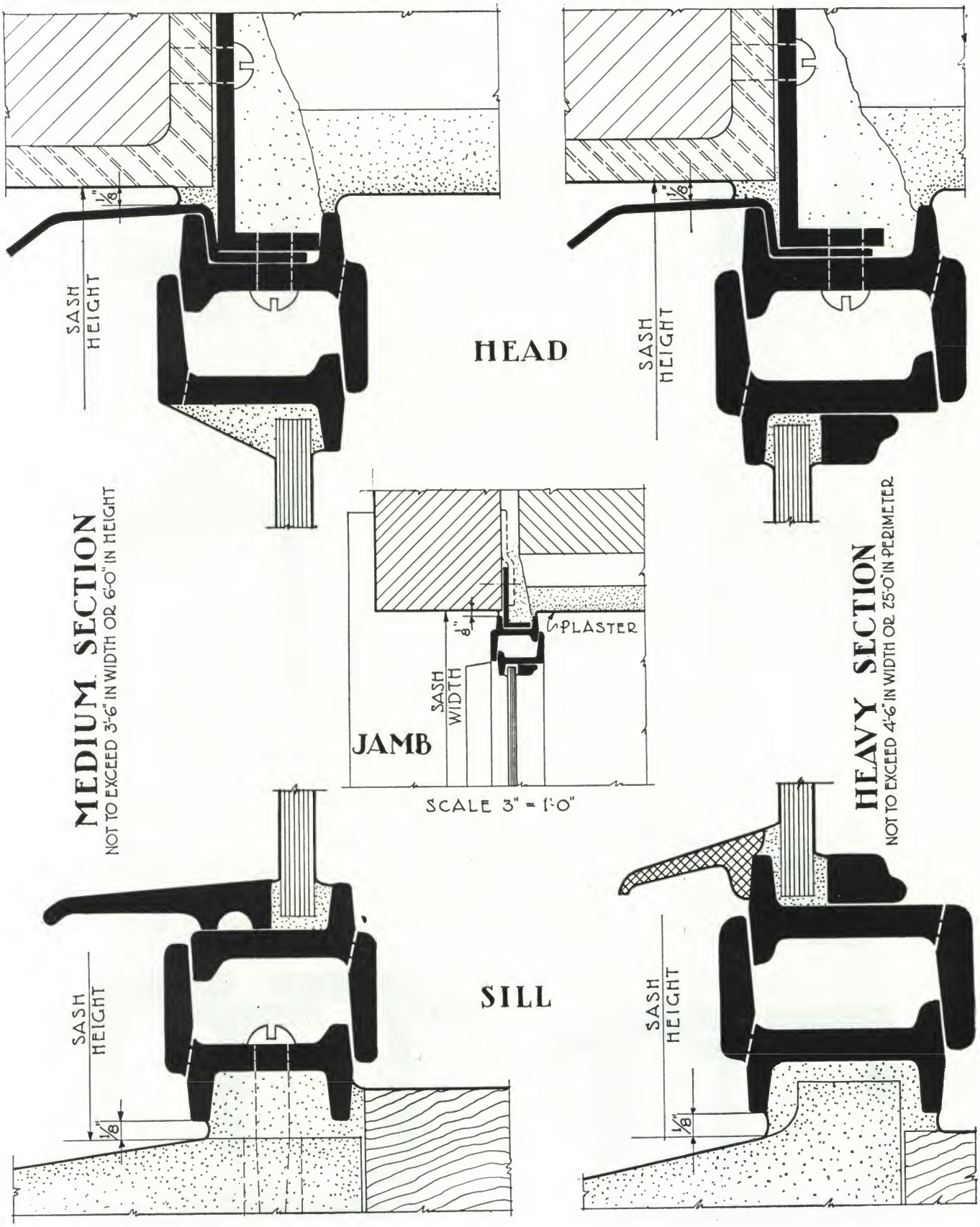
STEEL -T- TRANSOM

*103 TRANSOM BAR OVER IN-OPENING OR STATIONARY SASH BELOW



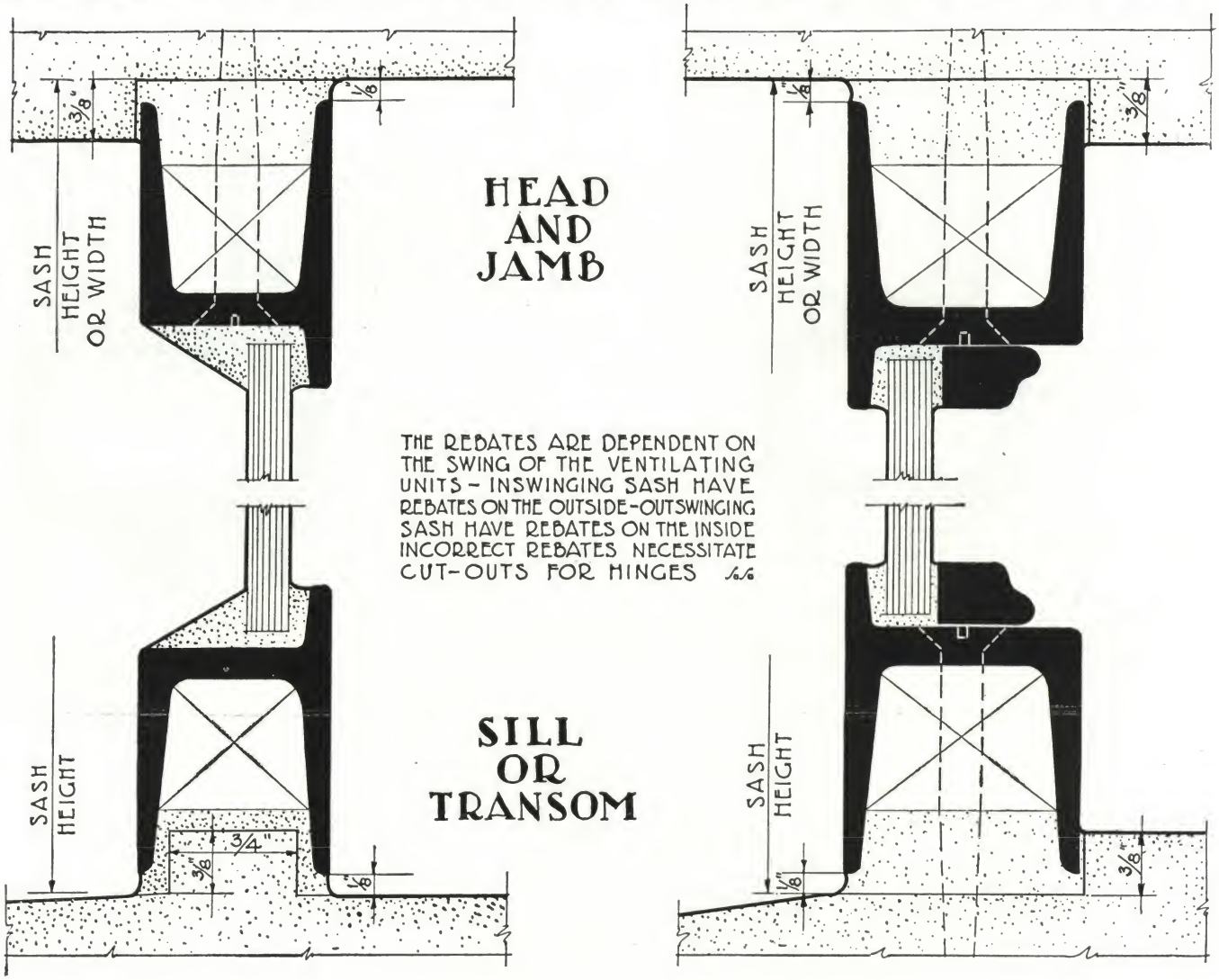
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UNIVERSAL CASEMENTS
VERTICALLY PIVOTED (TOP AND BOTTOM) CASEMENT DETAILS



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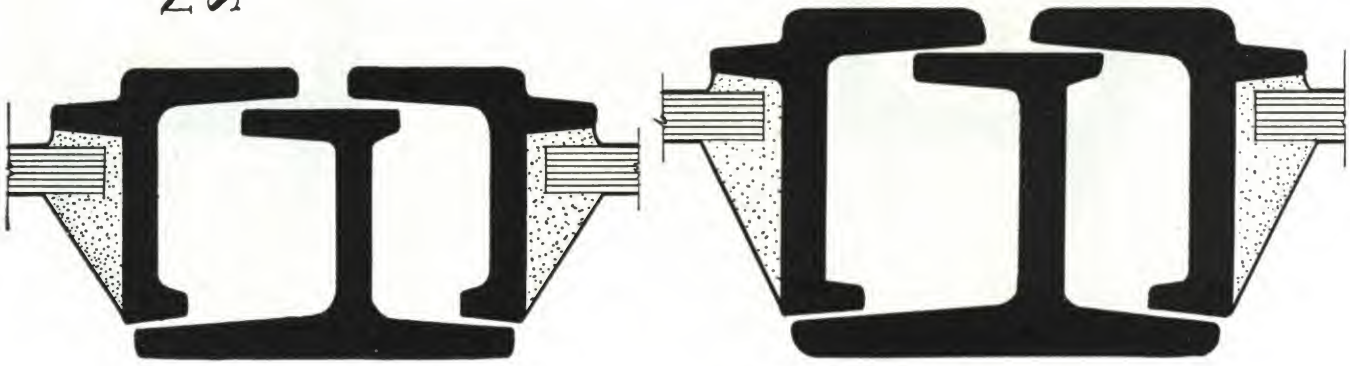
UNIVERSAL CASEMENTS
STATIONARY SASH (FIXED LIGHTS) DETAILS



MEDIUM SECTION

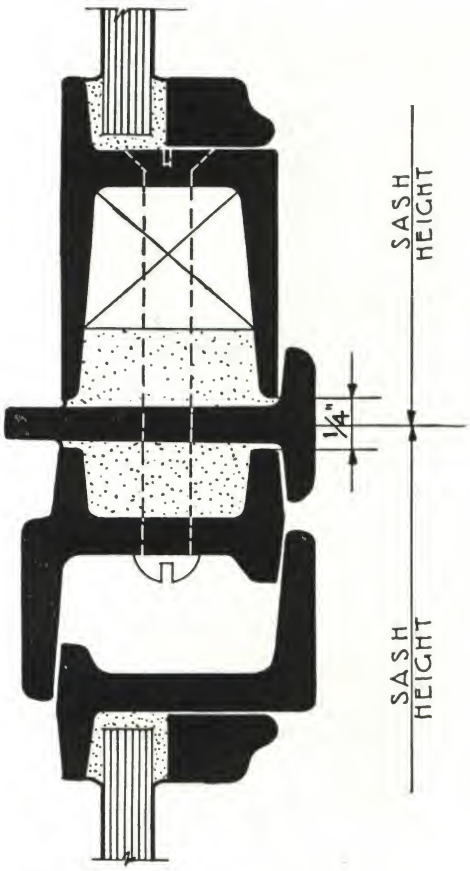
FIXED MEETING RAIL
(BELOW)
FOR USE BETWEEN PAIR OF SIDE HINGED CASEMENTS

HEAVY SECTION

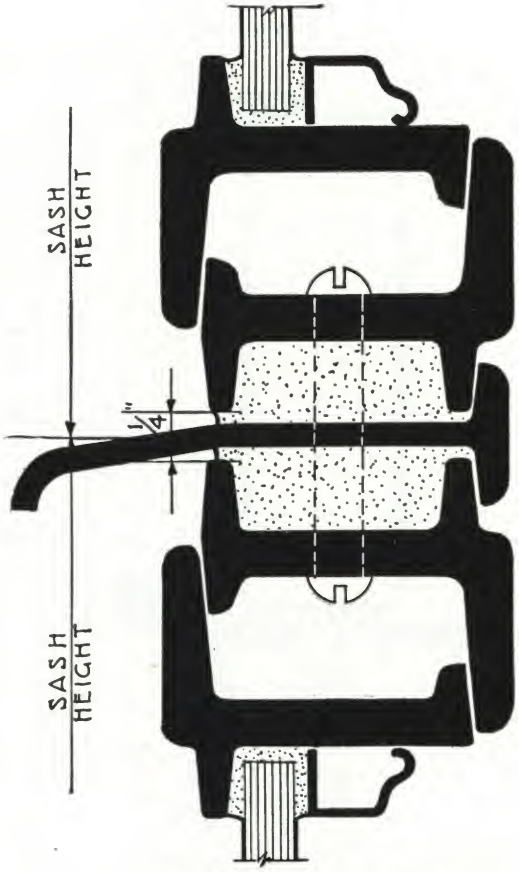


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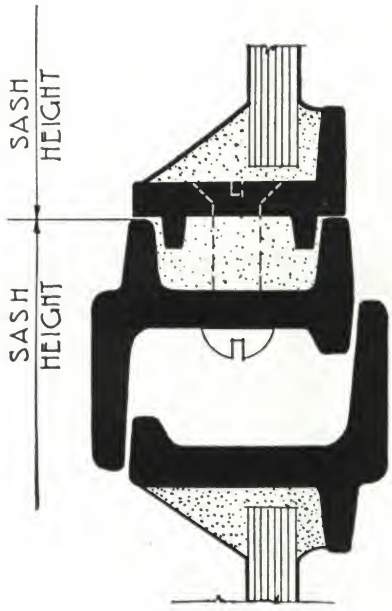
UNIVERSAL CASEMENTS
TRANSOM BAR DETAIL



OVER IN-OPENING SASH

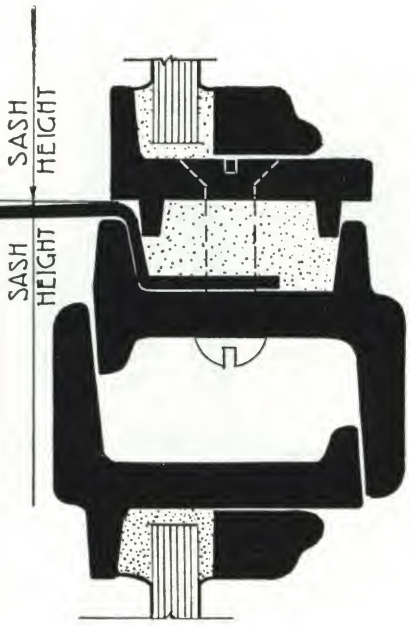


OVER OUT-OPENING SASH



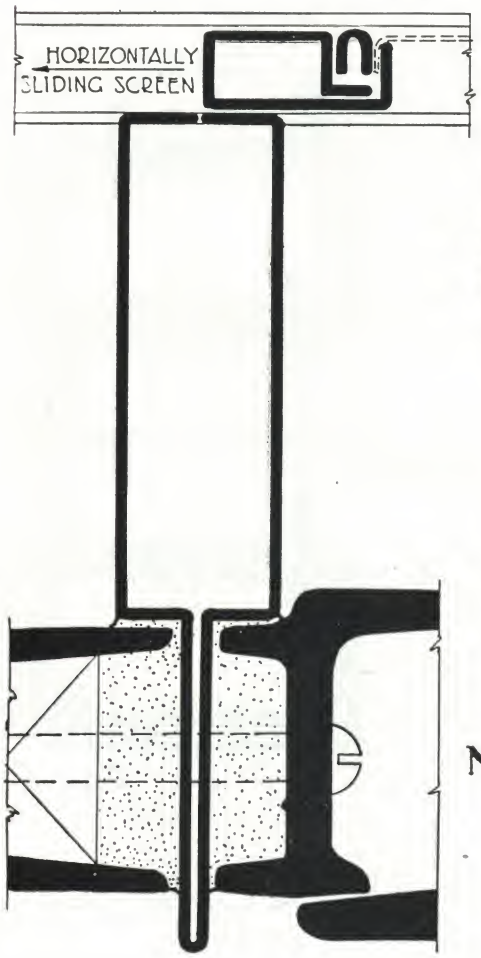
ALTERNATE TRANSOM

FOR USE WHERE NARROW SIGHT LINE IS DESIRABLE



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UNIVERSAL CASEMENTS
MULLION DETAILS

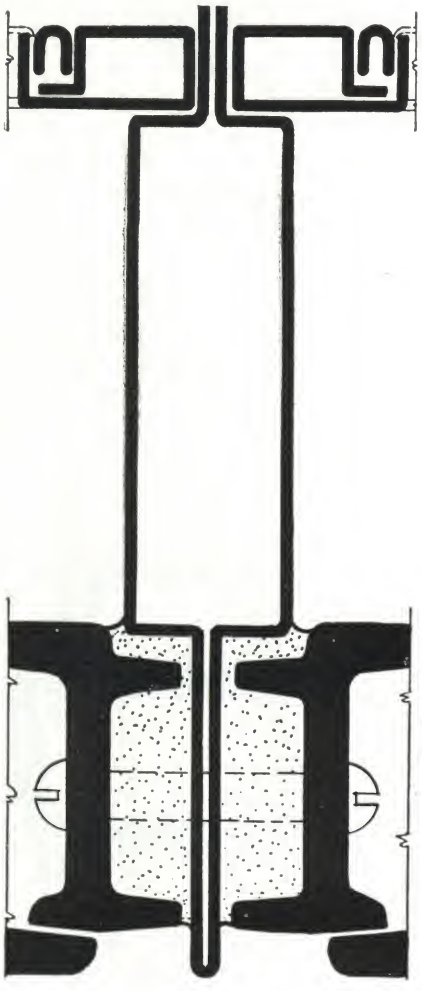


MULLION A

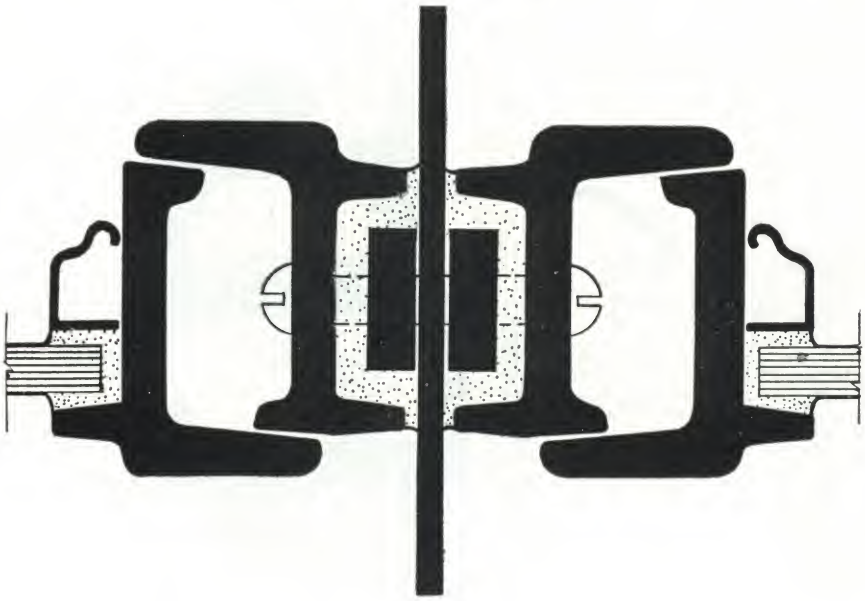


T MULLION # 103

MULLION B
14 GAUGED PRESSED METAL

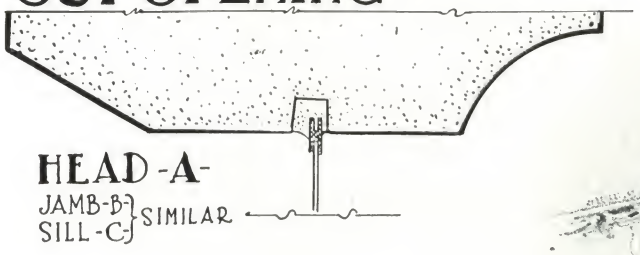


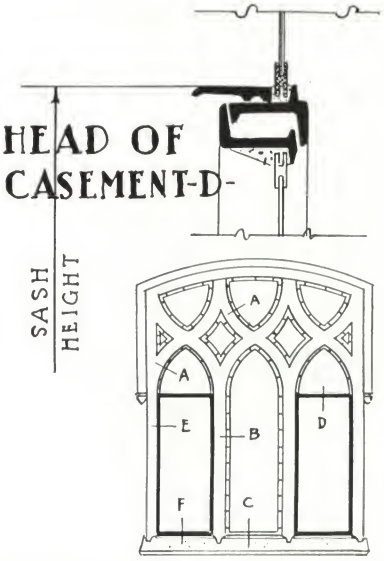
MULLION # 101
FOR GREATER STRENGTH

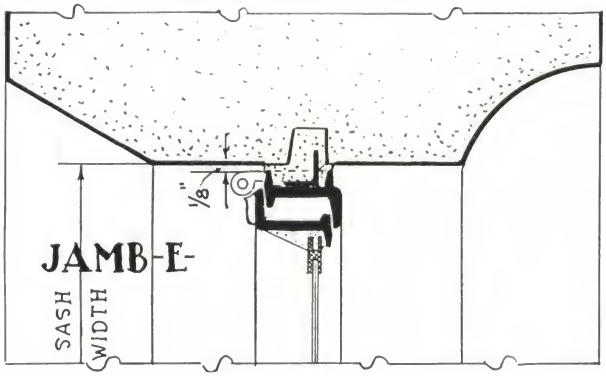


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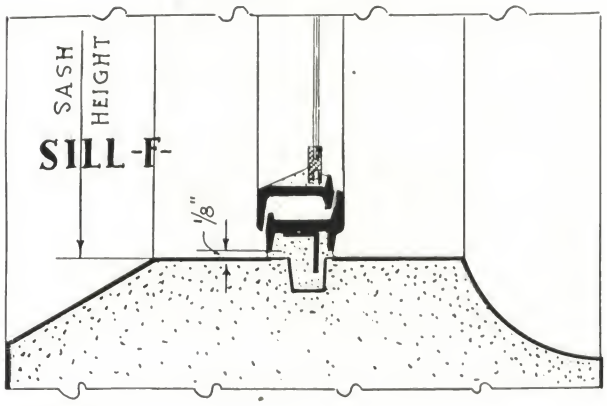
UNIVERSAL CASEMENTS
DETAILS FOR ECCLESIASTICAL WORK
OUT OPENING



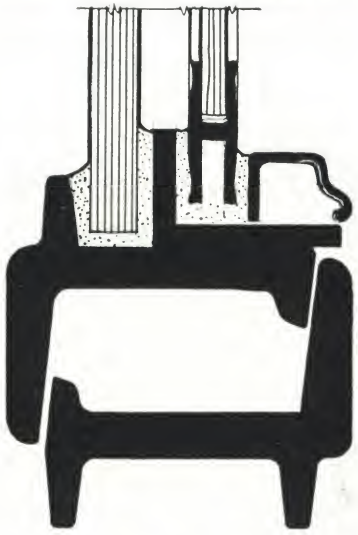




SCALE 3" = 1'-0"





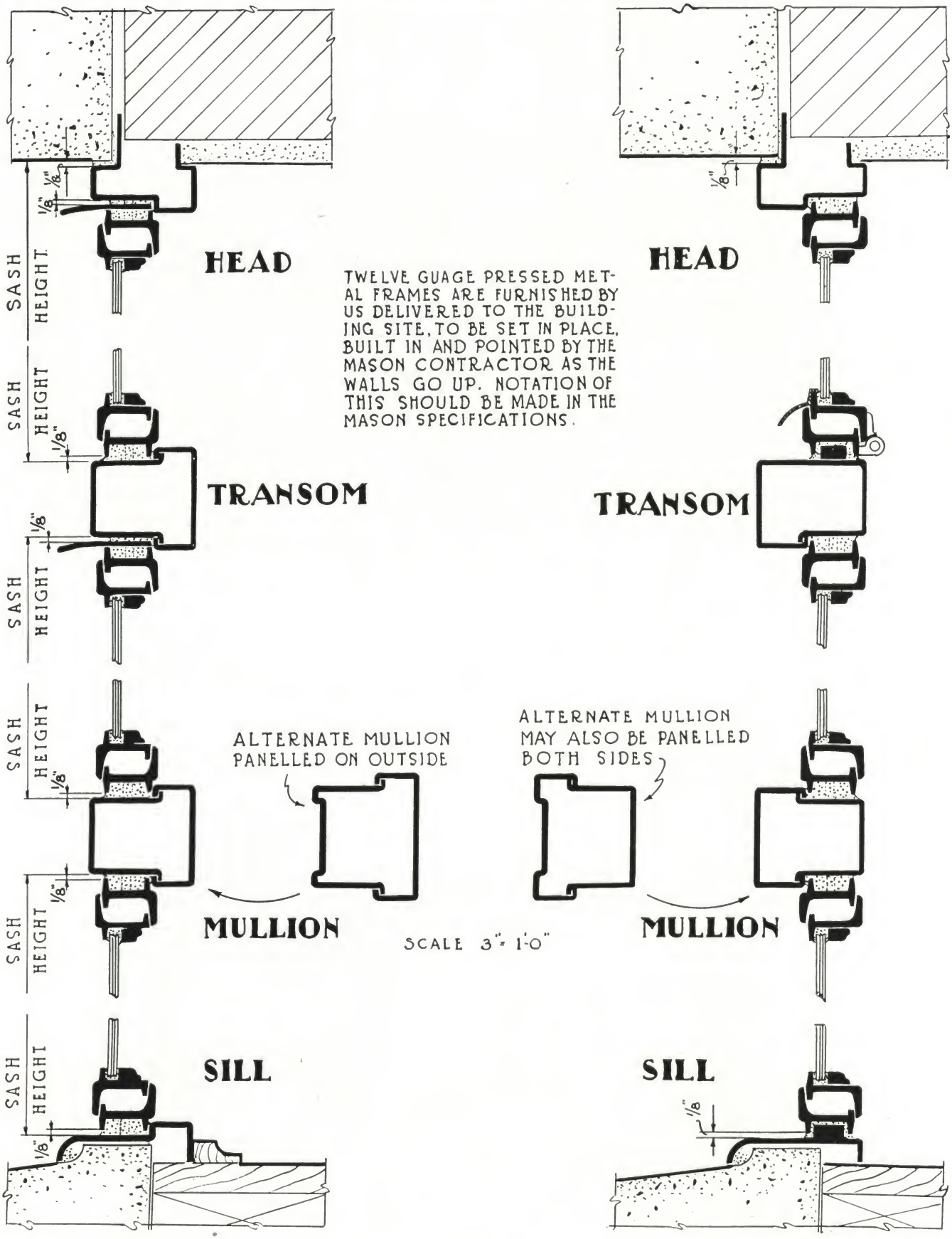


FULL SIZE DOUBLE GLAZING DETAIL

Continued on next page

UNIVERSAL CASEMENTS

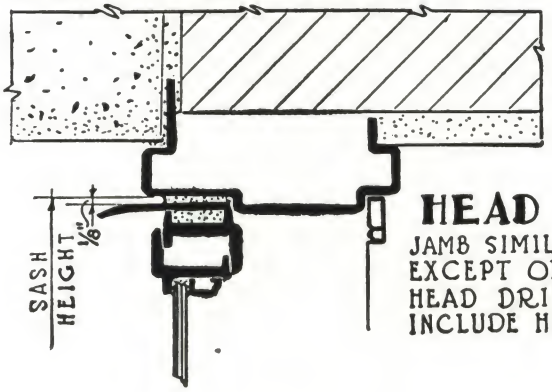
OUT-OPENING SET IN BUILT-IN FRAMES IN-OPENING



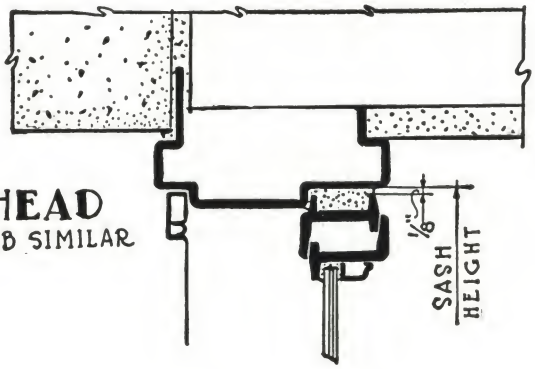
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UNIVERSAL CASEMENTS

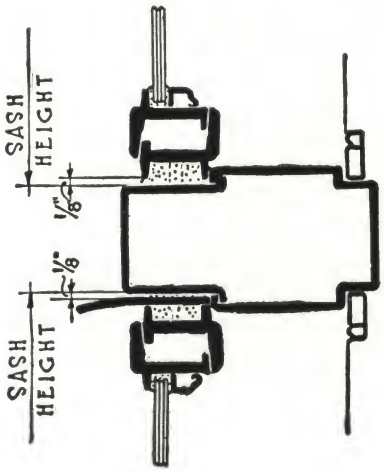
OUT-OPENING SET IN BUILT-IN FRAMES IN-OPENING



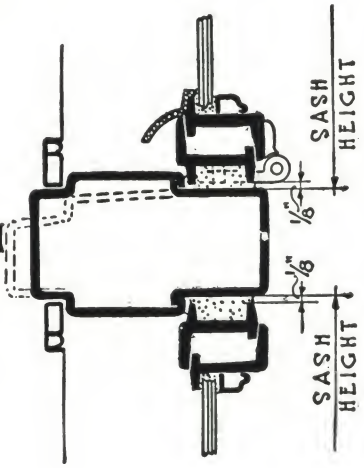
HEAD
JAMB SIMILAR
EXCEPT OMIT
HEAD DRIP &
INCLUDE HINGE



HEAD
JAMB SIMILAR

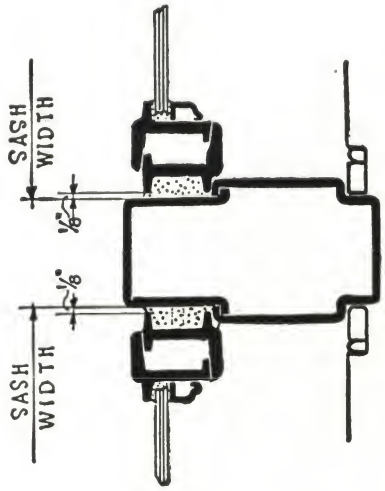


TRANSOM

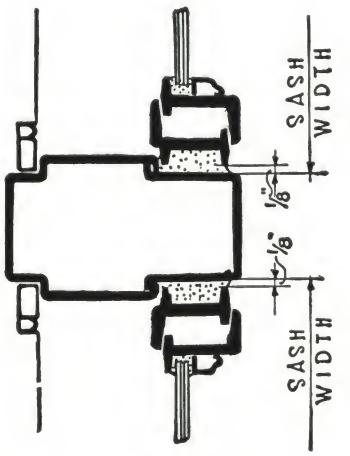


TRANSOM

MULLIONS, TRANSOMS AND FRAMES MAY BE PANELLED INSIDE AND OUT WHEN DESIRED SUCH PANELS MAY HAVE CAST IRON ORNAMENTS APPLIED.

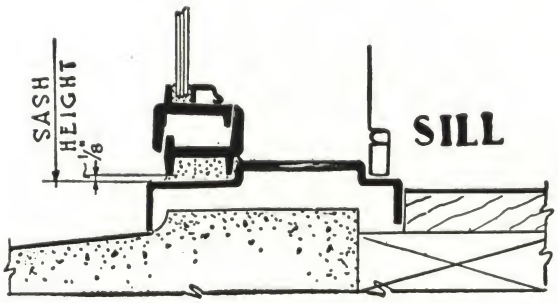


MULLION

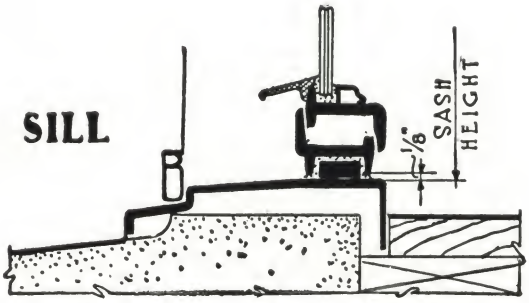


MULLION

SCALE 3" 1:0"



SILL



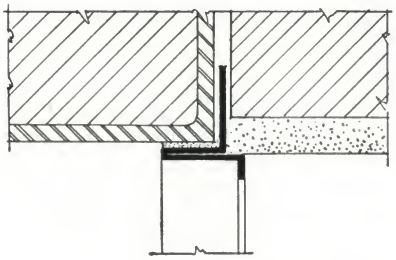
SILL

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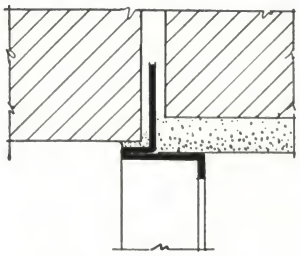
UNIVERSAL CASEMENTS

DETAILS OF BUILT IN UTILITY FRAMES

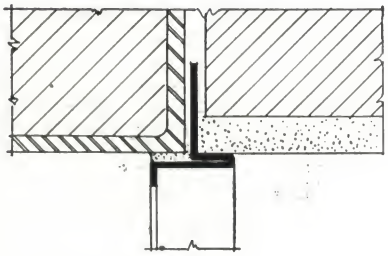
OUT OPENING CURVED HEADS IN OPENING



HEAD



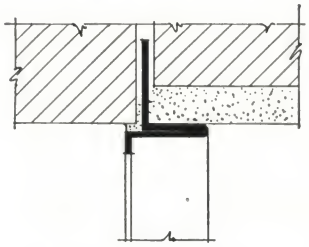
OUT OPENING



HEAD



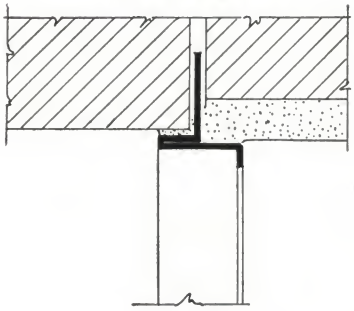
TRANSOM &MULLION



IN OPENING



TRANSOM &MULLION

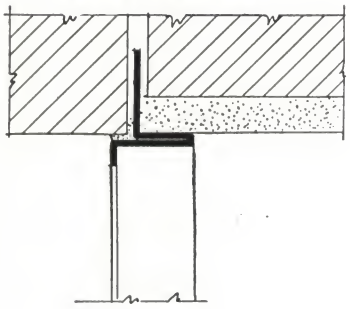


JAMB

SCALE OF DETAILS 3" = 1'-0"

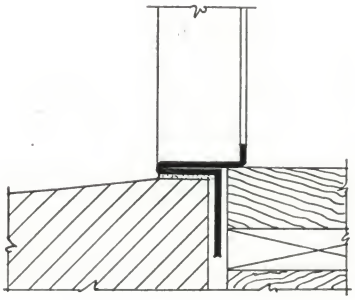
TWELVE GAUGE PRESSED METAL FRAMES ARE FURNISHED BY US DELIVERED TO THE BUILDING SITE, TO BE SET IN PLACE BUILT IN AND POINTED BY THE MASON CONTRACTOR AS THE WALLS GO UP. NOTATION OF THIS SHOULD BE MADE IN THE MASON SPECIFICATIONS

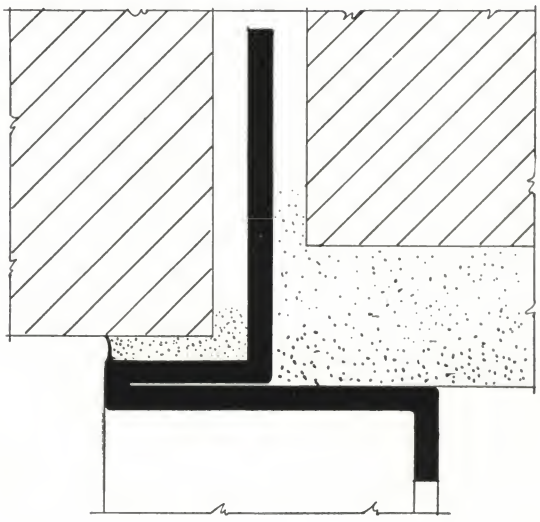
TYPICAL DETAIL-FULL SIZE



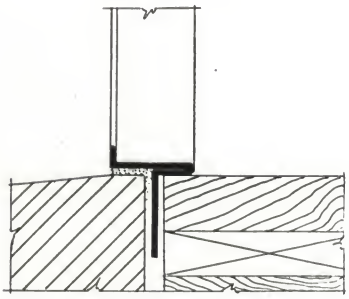
JAMB

SILL



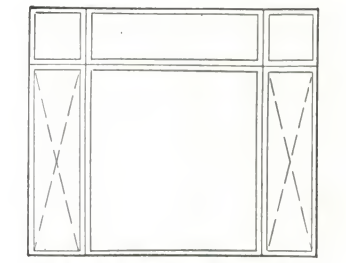


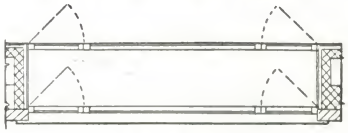
SILL

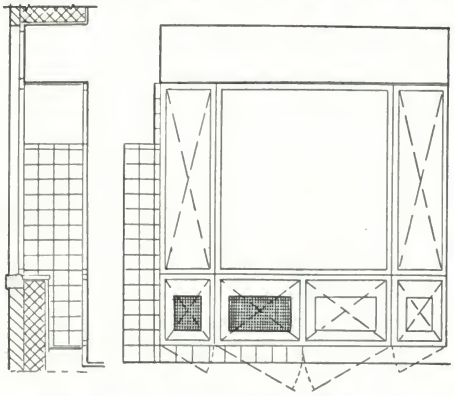


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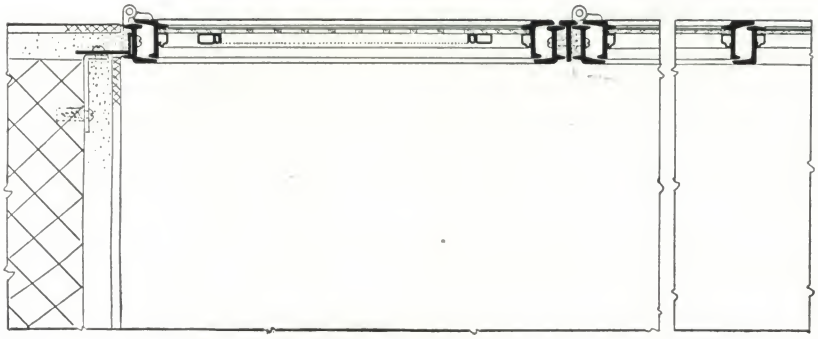
UNIVERSAL CASEMENTS
HOSPITAL OPERATING ROOM DETAILS

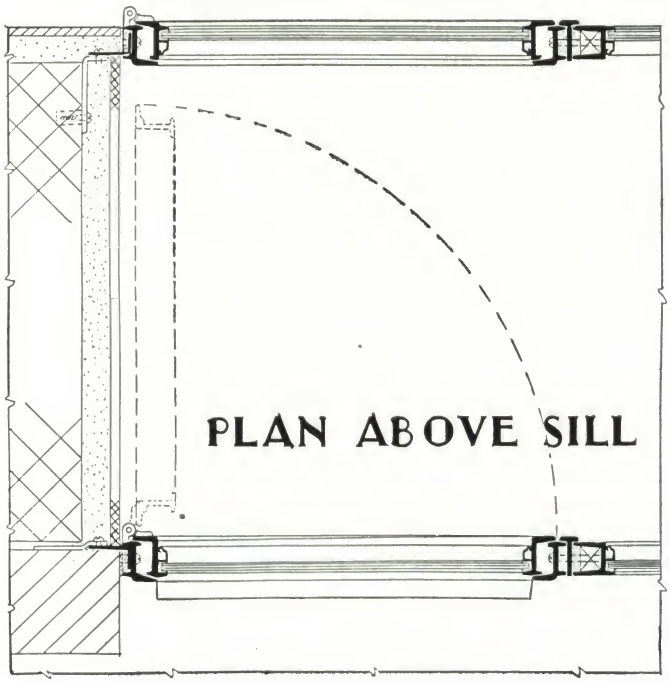




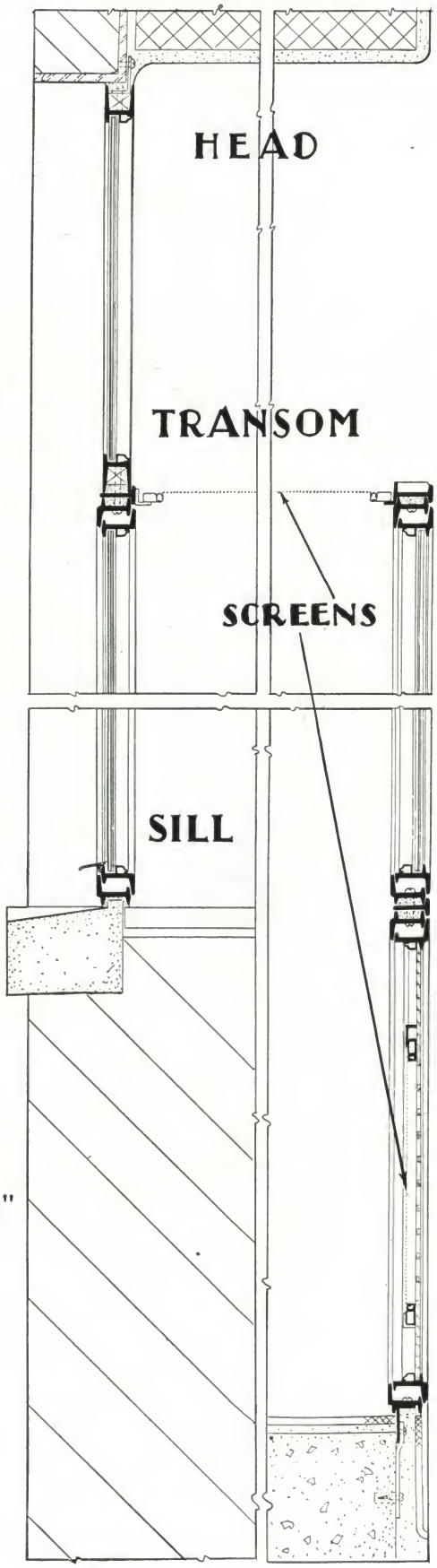


PLAN BELOW SILL





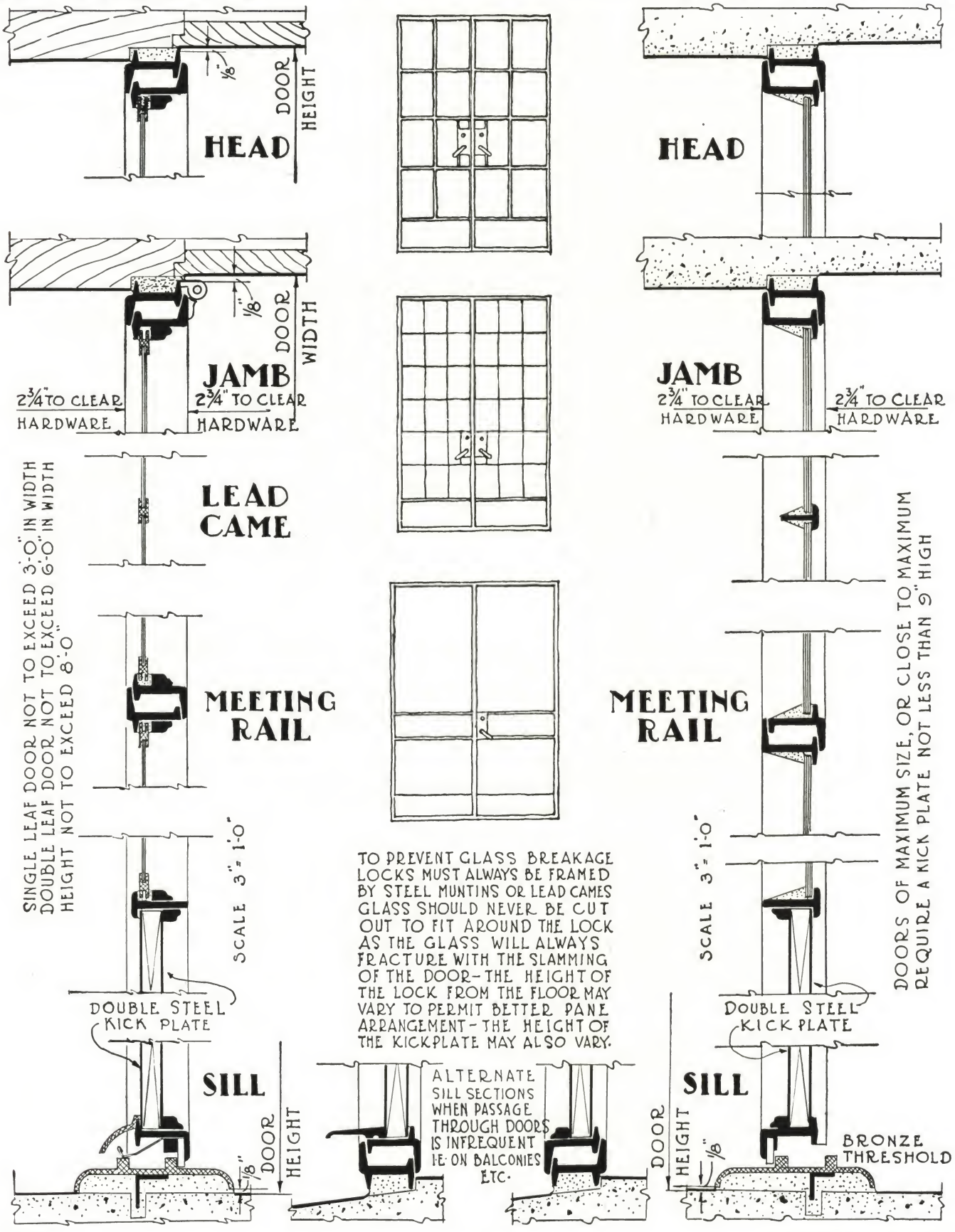
SCALE
1½"=1'-0"



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UNIVERSAL CASEMENTS

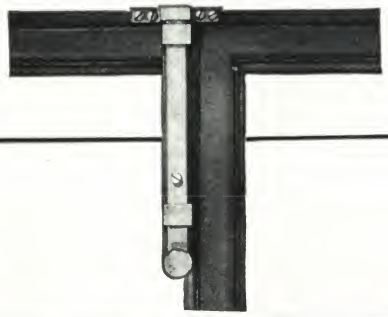
IN-OPENING DOOR DETAILS OUT-OPENING

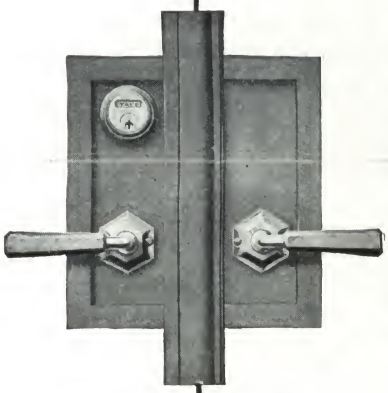


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UNIVERSAL CASEMENTS

DOOR HARDWARE







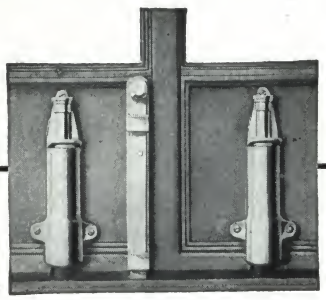


Residence, Grosse Pointe, Michigan
Robert O. Derrick, Inc., Architects

HANDLES No. 310 may be placed horizontally or vertically. Handles No. 306 are also used. These are usually placed at a 45° angle.

Dummy locks are not furnished unless specified.

A double-operating cremorne bolt may be used to operate from both sides of the door and to lock on the inside. This replaces the cylinder lock shown above. It is similar to our standard cremorne bolt except that it has a slight offset similar to a lock case.



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UNIVERSAL CASEMENTS

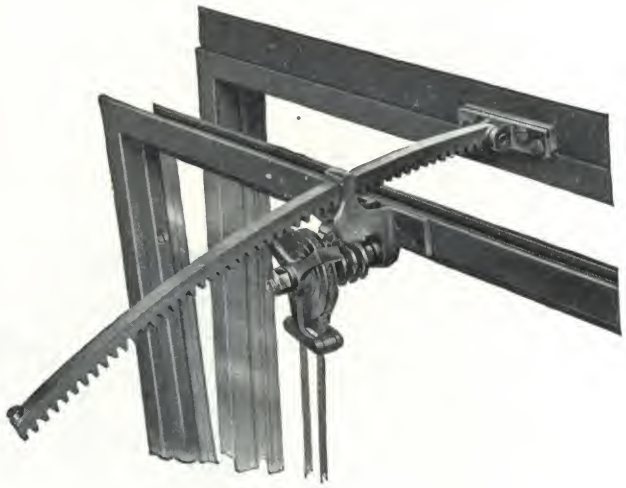
MECHANICAL OPERATING DEVICES



Third Church of Christ Scientist, Kansas City, Mo. Keene and Simpson, Architects

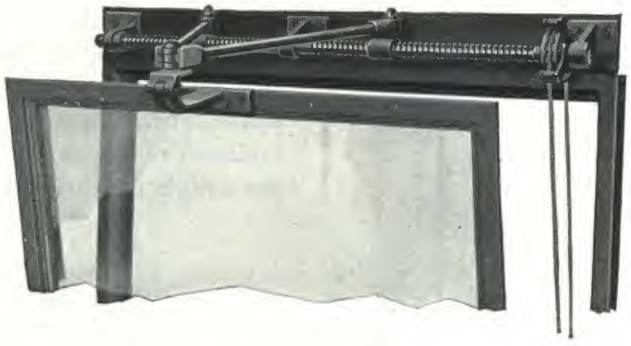
Crittall Rod Gearing

Rod gearing is designed to operate a number of transoms (preferably not over four) from one station. It may be used on any type of ventilating transom except side hinged. The arms and horizontal rods are painted iron. The down rod may be either iron or polished bronze as specified. The gear box and handle are always bronze. Supplied only when specified.



Crittall Rack Openers

Substantially made of solid bronze, this fitting is for the operation of individual transom units where the projecting arm is not objectionable. It is used on either bottom hinged in-opening or top hinged out-opening transoms. It is supplied only when specified.



Crittall Duplex Gearing

This fitting is for use on either bottom hinged in-opening or top hinged out-opening transoms, operating single units only. Supplied only when specified.

Continued on next page

NORMAN CASEMENTS

The same "Standards of Materials and Workmanship" as set forth on page 17 for Crittall Universal Casements govern all work on Norman Casements

OUR GUARANTEE

We maintain an efficient corps of mechanics stationed at various sectional headquarters to enable us to erect our windows economically in almost any locality. We urge that architects insist on having the window manufacturer perform this work as it centralizes responsibility.

When we erect Norman Casements we guarantee them wind and water-tight to you and your client's satisfaction. We guarantee them weather-tight without weather strips of any kind.

This guarantee applies equally to inward and outward-opening types, even when installed in the most exposed positions.

When circumstances do not permit us to erect Norman Casements, we pledge ourselves to deal justly with our customers; to service our windows where possible without charge or at only nominal expense; and to interpret our responsibility in a liberal manner to the end that you and your clients may always be satisfied with our product and our service.

GEO. G. SHEPHERD
Vice President

V. G. CRITTALL
President

KARL F. JORSS
Vice President

SPECIFICATIONS

WINDOWS: The printed general conditions and notice to bidders preceding the specifications must be referred to and shall control all portions of this work.

All work shall conform in all respects to the "Standards of Materials and Workmanship" published on page 17 of Crittall's catalogue in Sweet's 1930 edition.

All windows shall be Crittall Norman Casements as manufactured by the Crittall Casement Window Company, Detroit, Michigan. All windows shall be standard sizes and types as shown on architect's drawings. Shop drawings must be submitted for the architect's approval before starting fabrication. Casements shall be furnished complete with standard solid bronze hardware. Steel sections, including ventilating section and frame, but not including glass stops or subframes, shall weigh not less than 3.25 lbs. per lineal foot.

The casements shall be installed by the manufacturer. (If this is impractical, they can be set by local labor but care should be exercised to see that they are erected according to the manufacturer's instructions.) All joints between the steel sash and the collateral construction are to be made tight with the use of Crittall Mastic Cement neatly pointed on the exterior.

Extras to be included if desired

1. Cleaning Hinges: Supply cleaning hinges on all outward-opening casements or supply cleaning hinges on all single outward-opening casements and, where required, in groups of odd numbers of sash.
2. All outward-opening casements shall have Win-Dor series No. 25 through the screen operators, of cadmium-plated steel with bronze handles (or all bronze).
3. The casements are to set directly into masonry. Supply continuous angle fin around the head and jambs of all openings for making a perfect joint between sash and masonry.
4. Norman Casements are made with spring clips for putty glazing from the outside. If glass stops are required a steel angle stop may be specified applied only on the outside, set with oval head bronze screws.

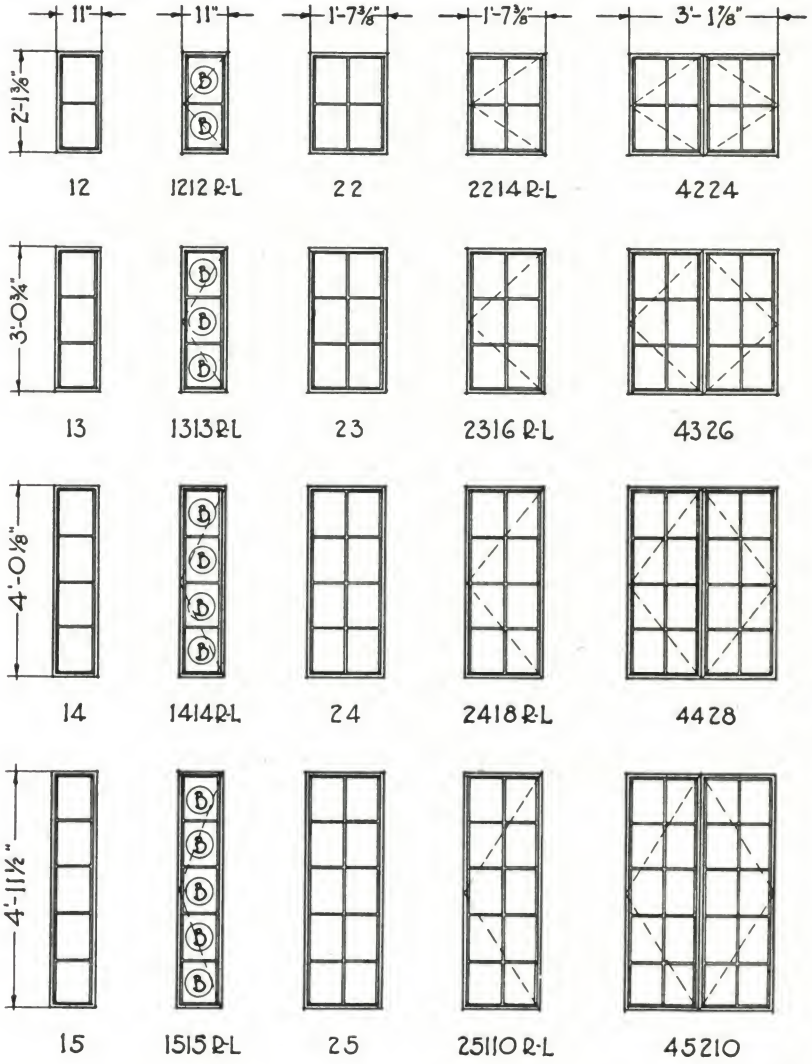
Holy Name of Jesus Church, Chickasha, Oklahoma — *Harold Gimeno, Architect*



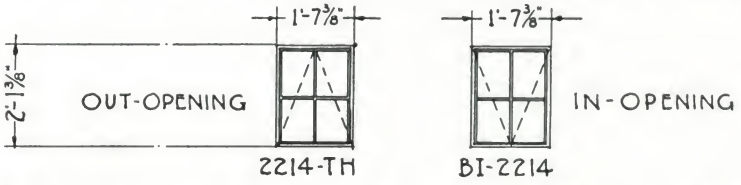
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NORMAN CASEMENTS

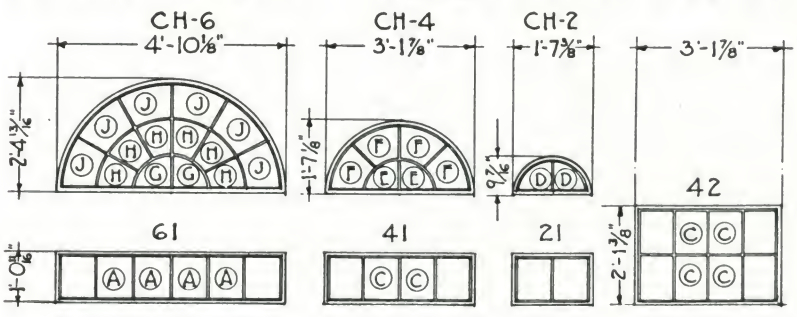
STANDARD TYPES AND SIZES



TOP AND BOTTOM HINGED TRANSOMS



STATIONARY TRANSOM TYPES



GENERAL NOTES

ALL TYPES MAY BE FURNISHED WITHOUT MUNTINS IN WHICH CASE THE LETTER "X" SHOULD PRECEDE THE TYPE NUMBER.

ALL VENTILATING TYPES MAY BE FURNISHED OPENING INWARD IN WHICH CASE THE LETTER "I" SHOULD PRECEDE THE TYPE NUMBER.

ALL HINGED AT SIDE SASH ARE MADE IN BOTH RIGHT AND LEFT HANDS. THE HAND OF A CASEMENT IS THE SIDE WHERE THE HINGES ARE LOCATED, VIEWED FROM THE OUTSIDE.

DIMENSIONS GIVEN ARE MASONRY SIZES ⅛" CLEARANCE HAS BEEN INCLUDED ALL FOUR SIDES. ACTUAL SASH SIZES ARE ¼" LESS IN BOTH WIDTH AND HEIGHT

ACTUAL GLASS SIZES

NO ALLOWANCE NECESSARY FOR CUTTING. ALL LIGHTS ARE 8"x11" EXCEPT THOSE MARKED OTHERWISE.
LIGHTS MARKED "A" ARE - 9⅝"x11"
LIGHTS MARKED "B" ARE - 7⅞"x11"
LIGHTS MARKED "C" ARE - 9" x11"
LIGHTS MARKED "D" TO "J" INCLUSIVE SEE TEMPLATE

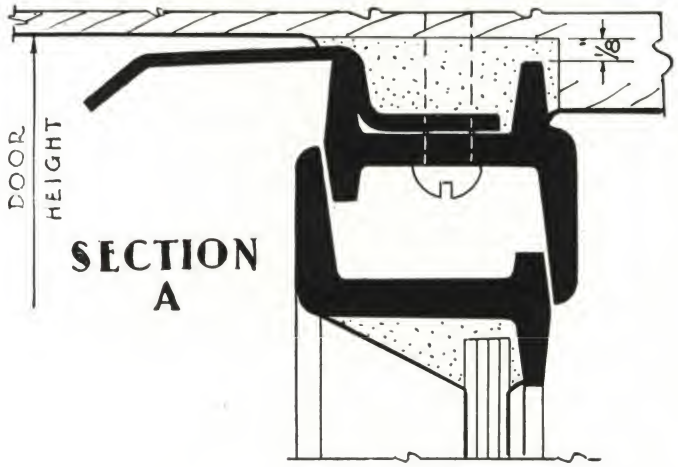
LEADED GLASS SIZES

SASH TYPE	GLASS SIZE
12 AND 1212	7⅞" x 1'-10¼"
13 AND 1313	7⅞" x 2'-9⅝"
14 AND 1414	7⅞" x 3'-9 "
15 AND 1515	7⅞" x 4'-8⅜"
2214TH AND BI2214	1'-4¼" x 1'-10¼"
22 AND 2214 AND 4224	1'-4¼" x 1'-10¼"
23 AND 2316 AND 4326	1'-4¼" x 2'-9⅝"
24 AND 2418 AND 4428	1'-4¼" x 3'-9 "
25 AND 25110 AND 45210	1'-4¼" x 4'-8⅜"
21	1'-4¼" x 11"
41	2'-11¾" x 11"
61	4'-7⅛" x 11"
CH2-CH4 AND CH6	SEE TEMPLATE

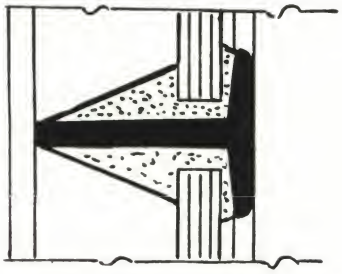
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NORMAN CASEMENTS

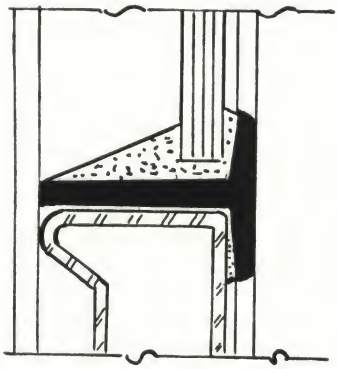
STANDARD NORMAN CASEMENT DOOR



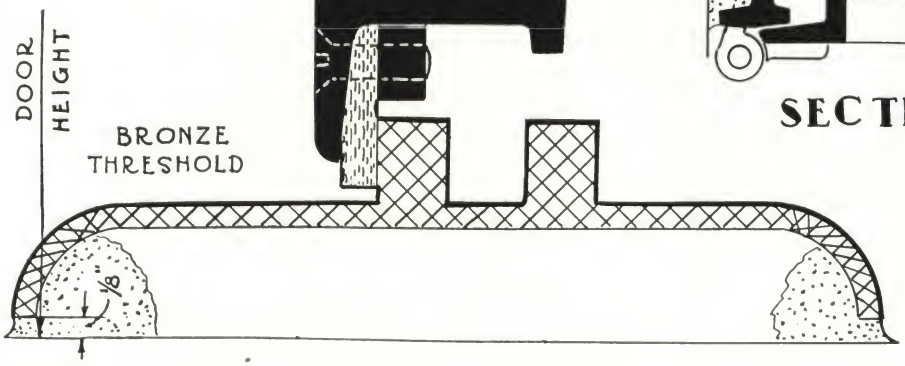
SECTION A

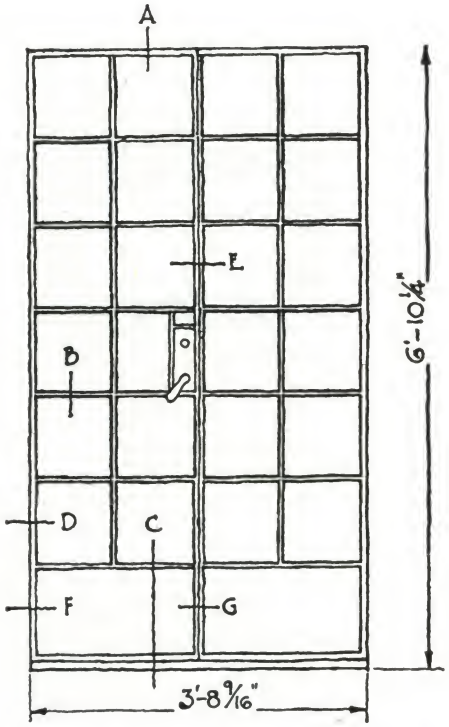


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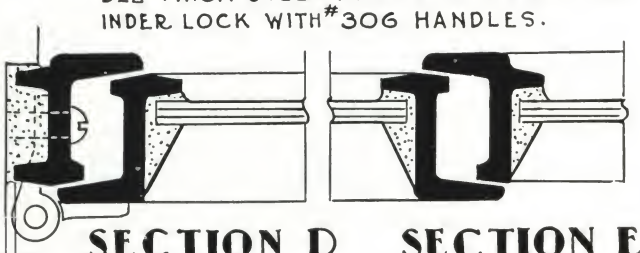


SECTION C

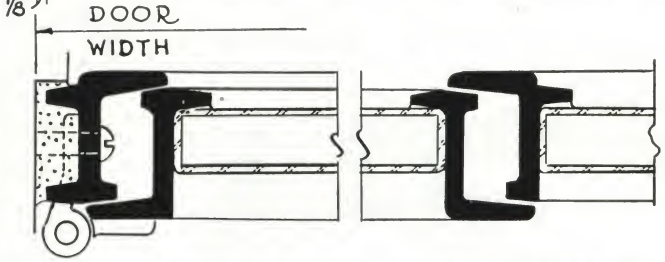




STANDARD NORMAN DOORS ARE MADE ONLY IN DOUBLE DOORS TO OPEN OUT. THEY ARE FITTED WITH STEEL T MUNTINS, SOLID BRONZE THRESHOLDS, BRONZE TOP AND BOTTOM BOLTS DOUBLE THICK STEEL KICK PLATES AND CYLINDER LOCK WITH #306 HANDLES.



SECTION D SECTION E



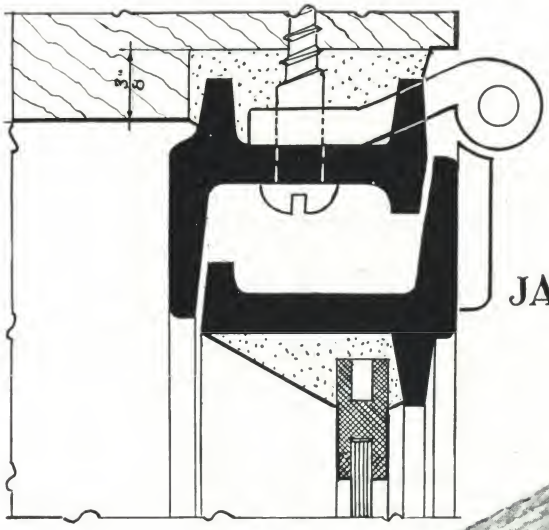
SECTION F SECTION G

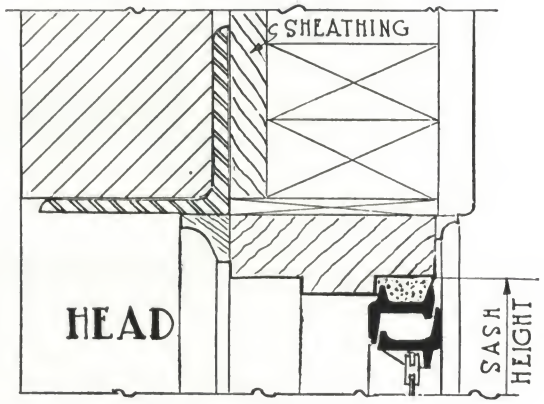
HALF FULL SIZE

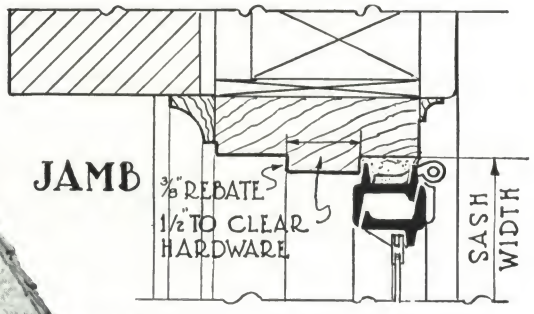
Continued on next page

NORMAN CASEMENTS

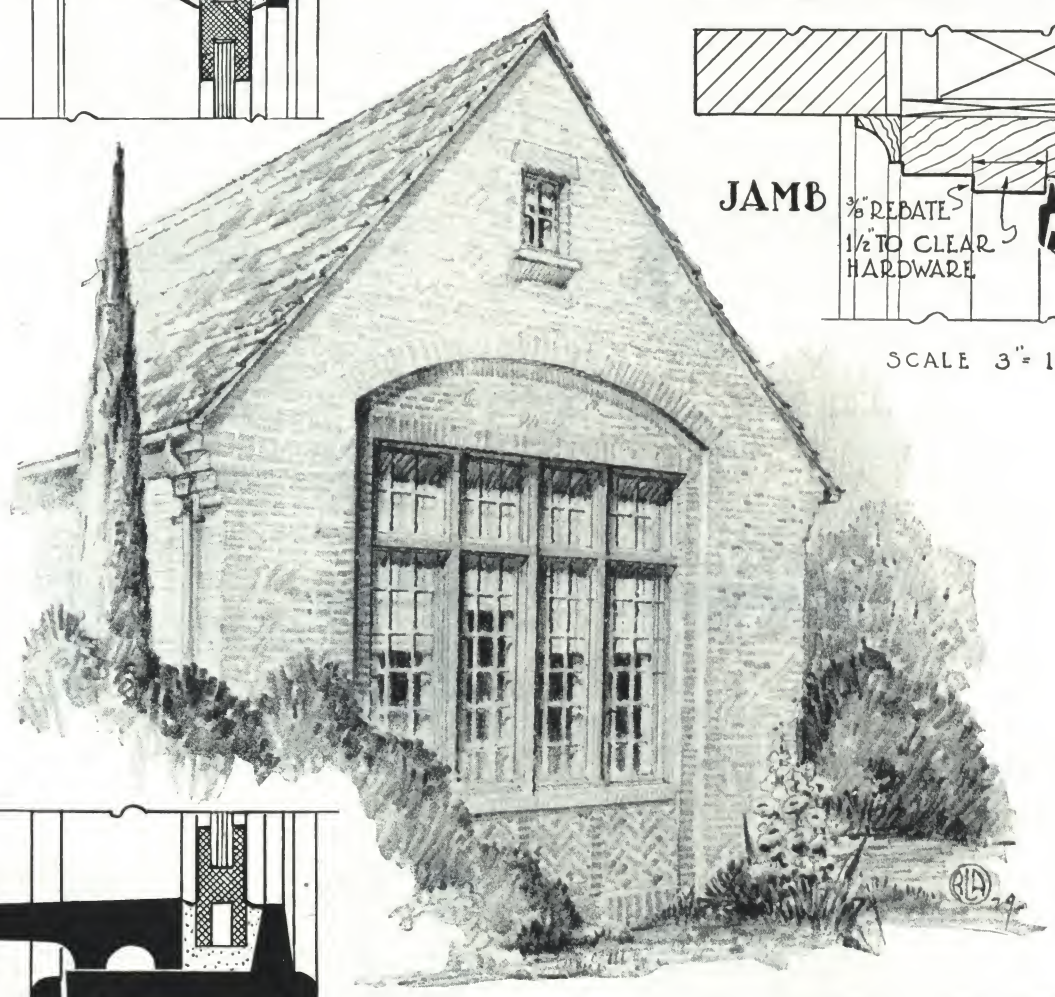
SIDE HINGED IN-OPENING CASEMENT DETAILS

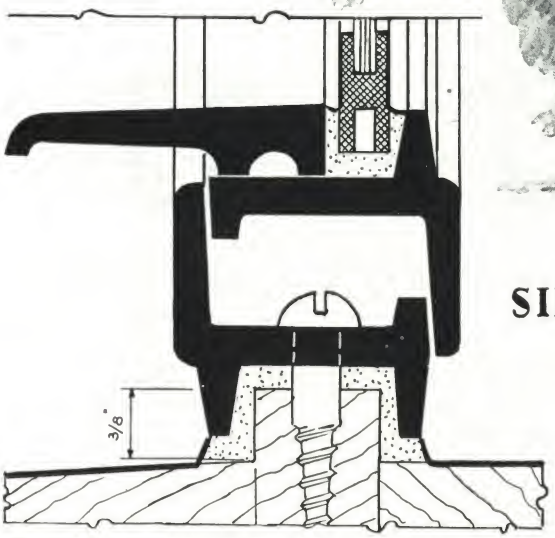


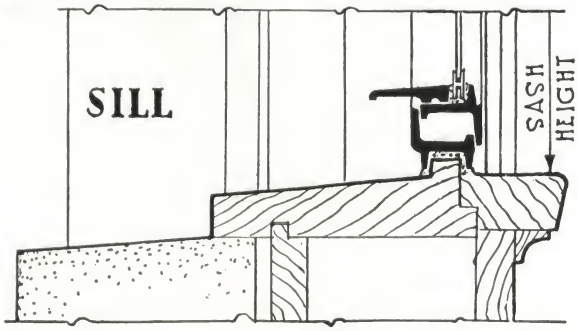




SCALE 3" = 1'-0"



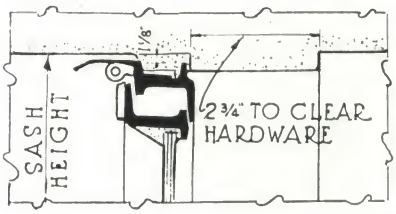




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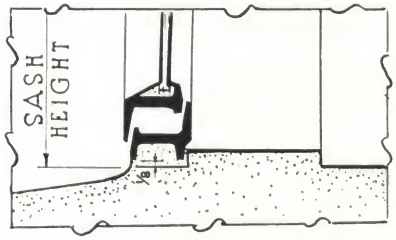
NORMAN CASEMENTS

SIDE HINGED OUT-OPENING CASEMENT DETAILS

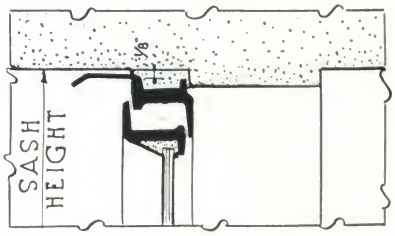


HEAD

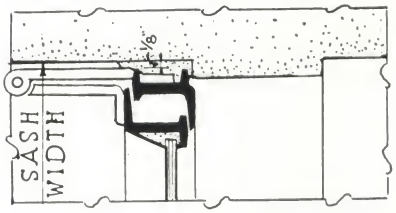
SCALE 3" = 1'-0"



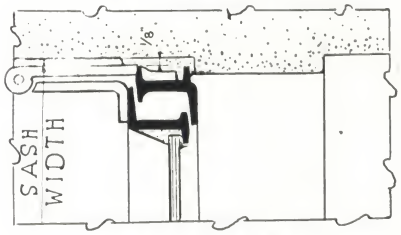
TRANSOM



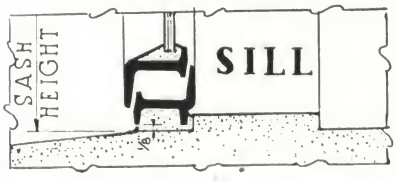
TRANSOM

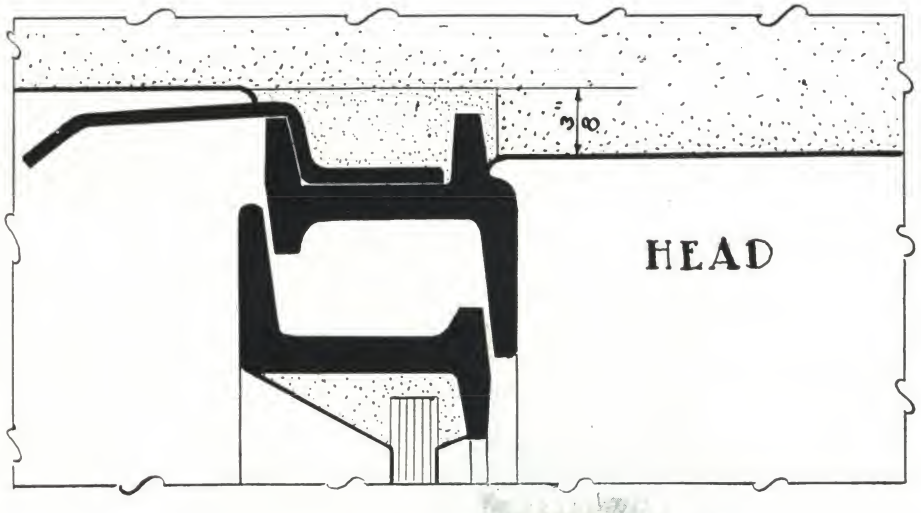


JAMB

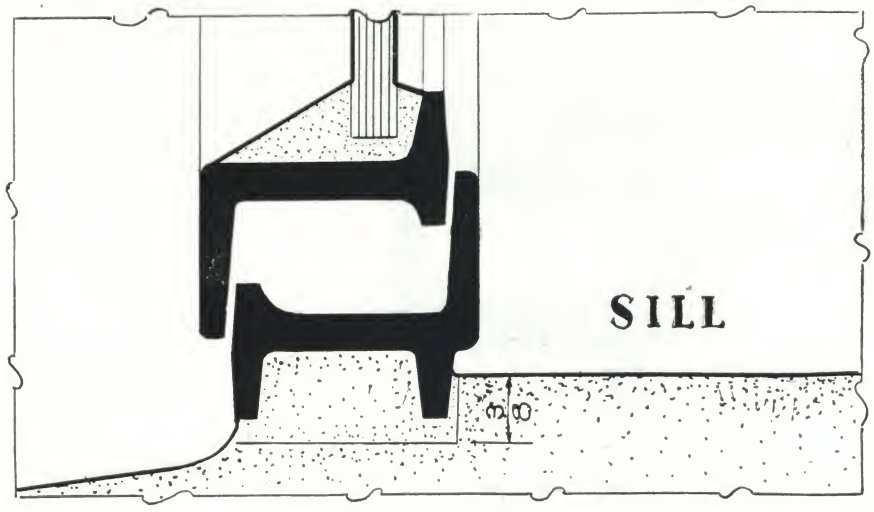


MULLION





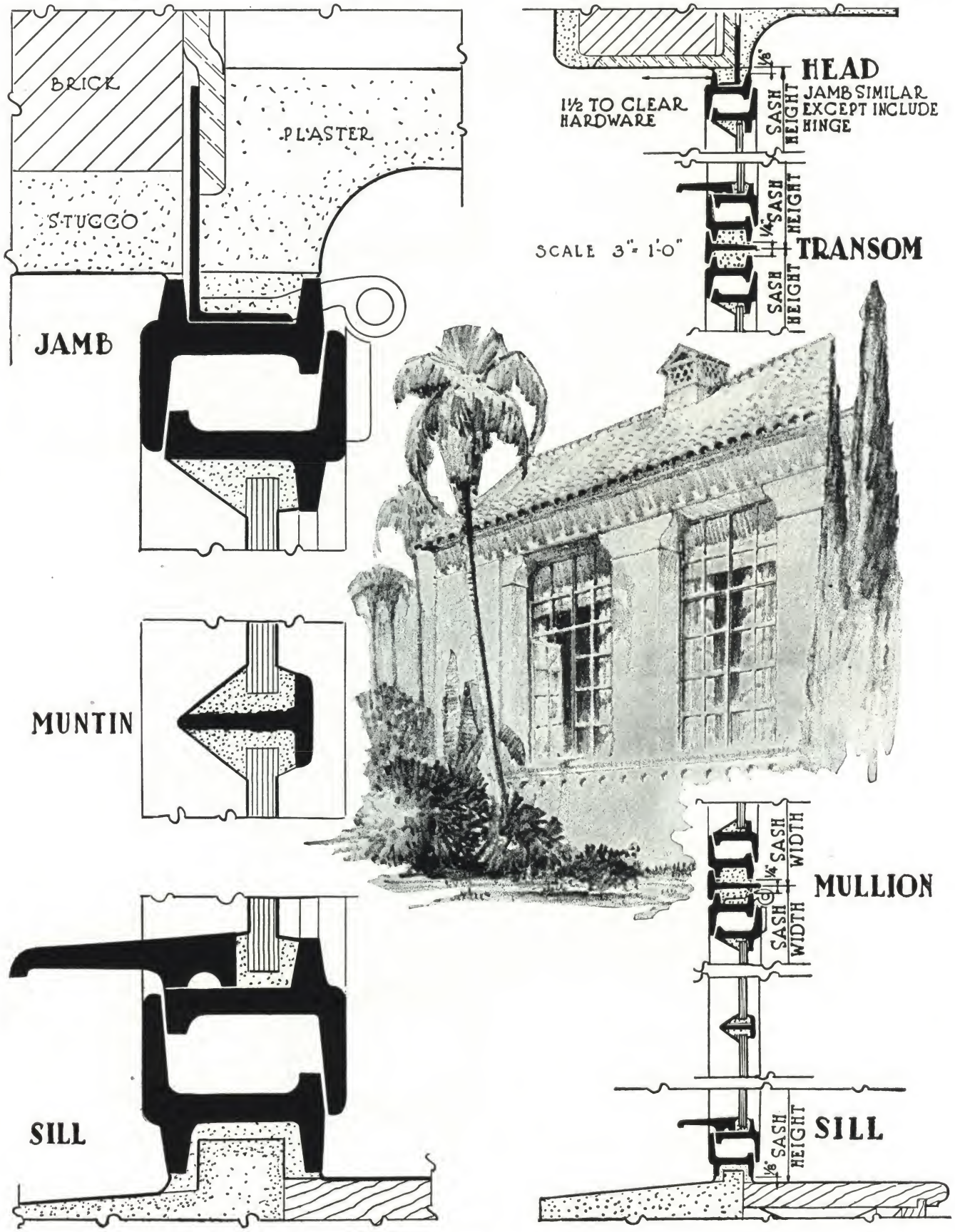




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NORMAN CASEMENTS

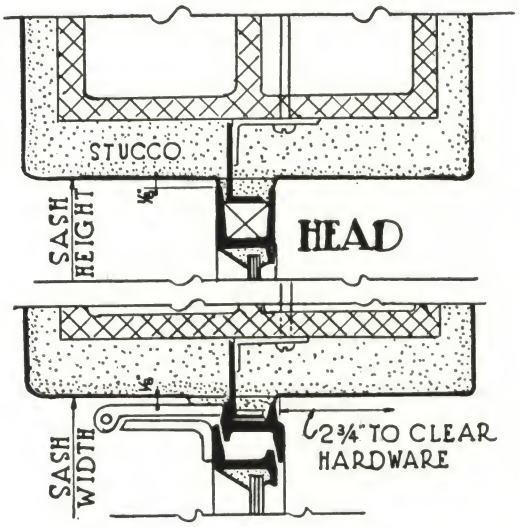
SIDE HINGED IN-OPENING CASEMENT DETAILS



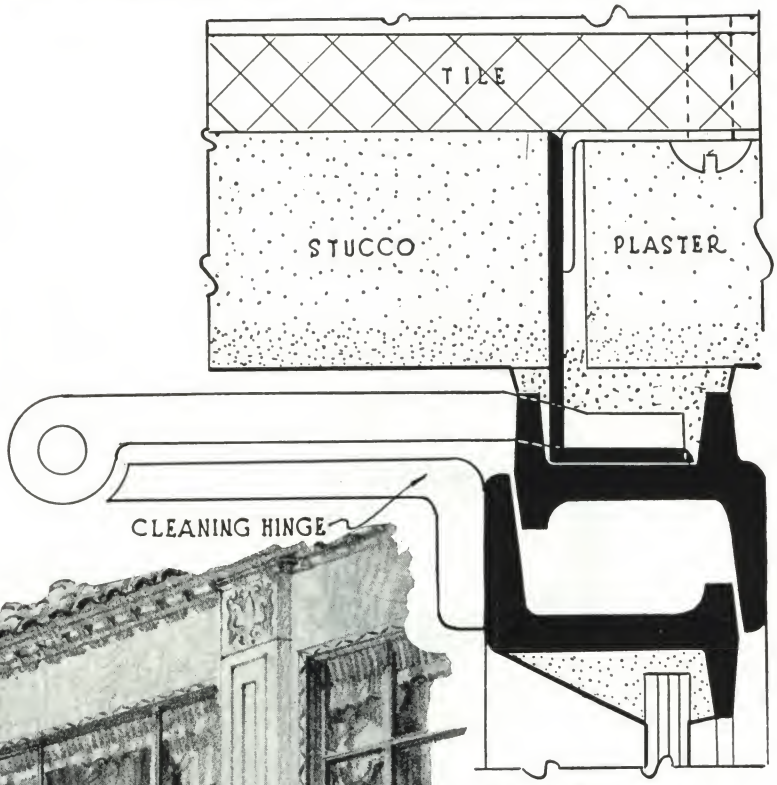
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NORMAN CASEMENTS

SIDE HINGED OUT-OPENING CASEMENT DETAILS



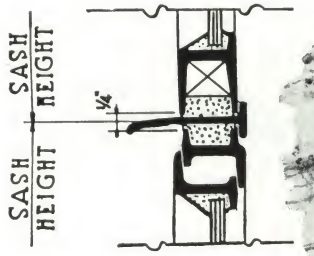
JAMB



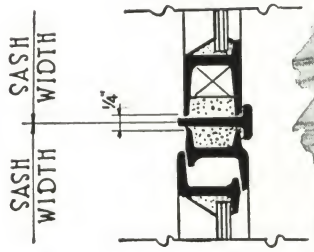
JAMB

HEAD SIMILAR EXCEPT OMIT HINGE AND INCLUDE DRIP.

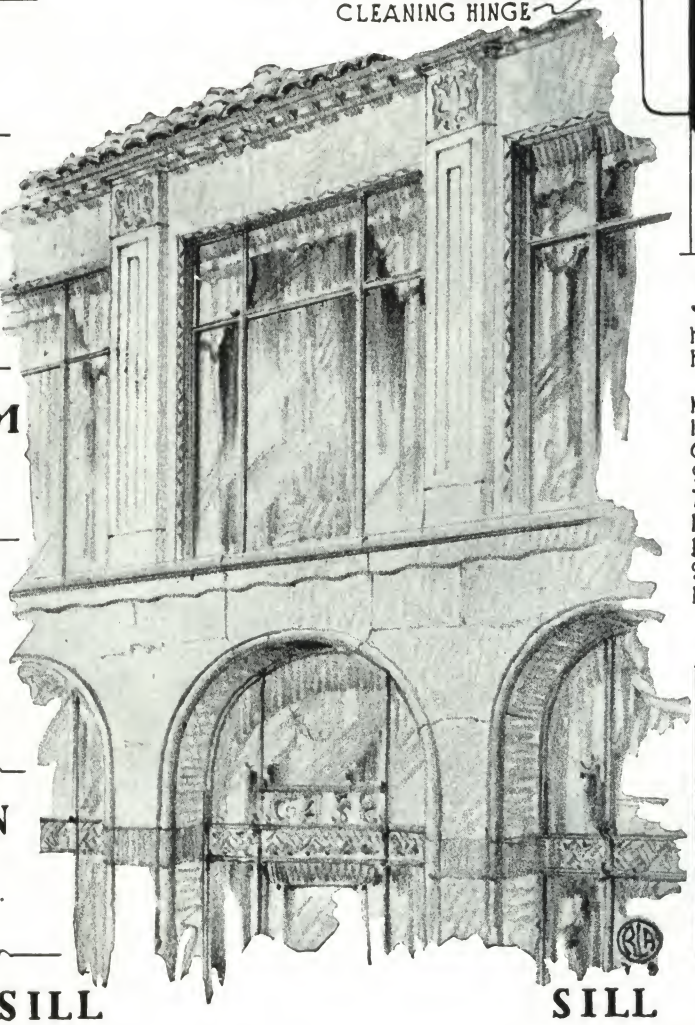
NOTE: STATIONARY SASH IN SPECIAL SIZES CAN BE COMBINED WITH STANDARD SIZES OF VENTILATING UNITS TO COMPOSE A USEFUL OPENING FOR A COMMERCIAL BLDG. THE EXTRA COST FOR SPECIAL STATIONARY SASH IS TRIVIAL.



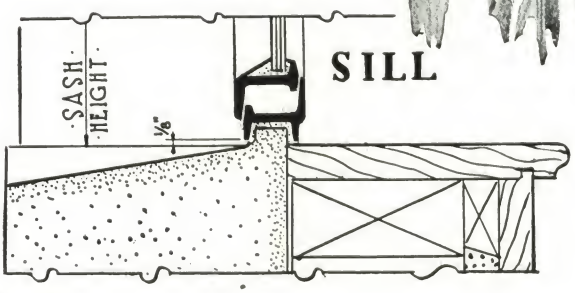
TRANSOM



MULLION



SCALE 3" = 1'-0"



SILL

SILL

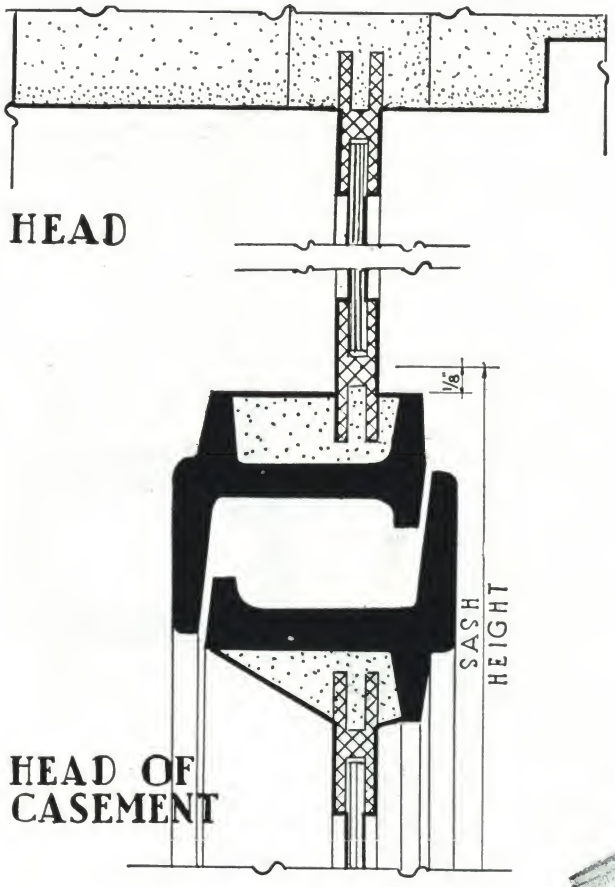


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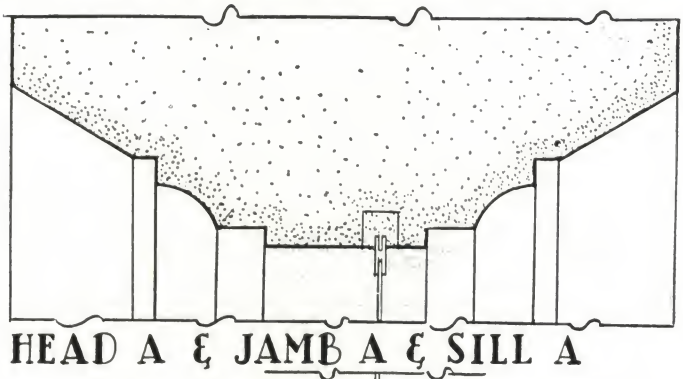
NORMAN CASEMENTS

SIDE HINGED IN-OPENING CASEMENT DETAILS

HEAD

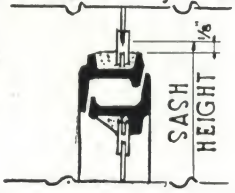


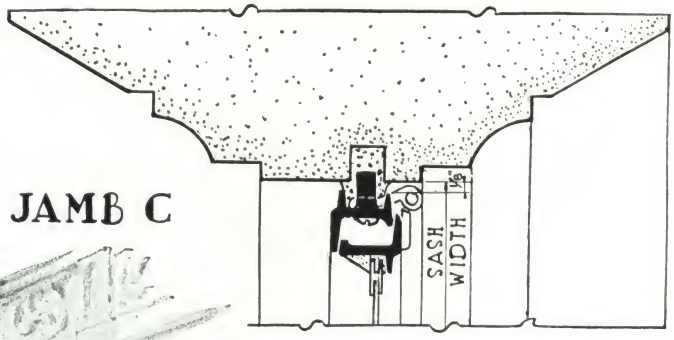
HEAD OF CASEMENT



HEAD A & JAMB A & SILL A

HEAD B OF CASEMENT





JAMB C

NOTE: THESE DETAILS CAN ALSO BE USED FOR OUT OPENING CASEMENTS



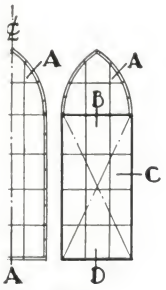
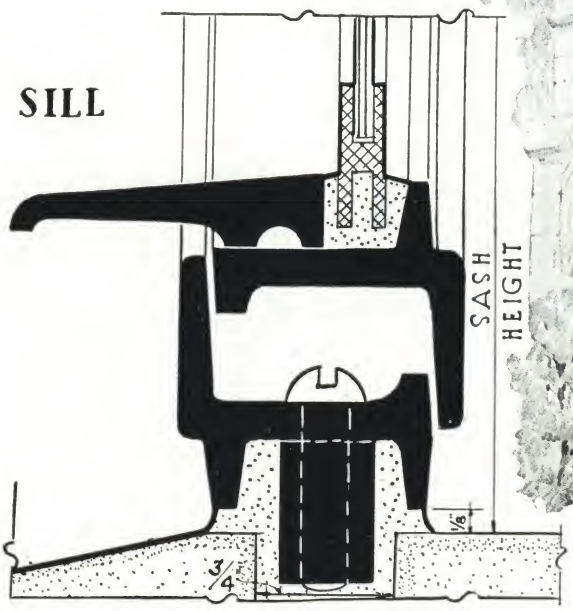
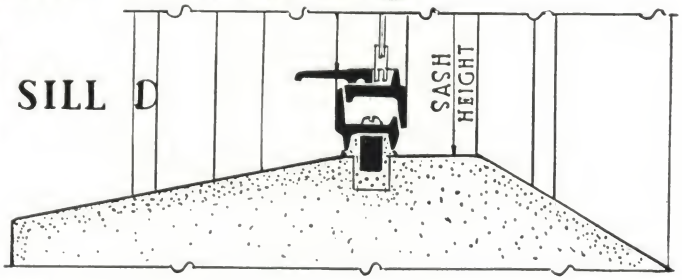


DIAGRAM FOR SECTIONS

SILL



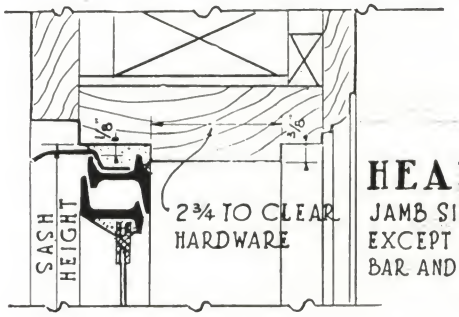
SILL D



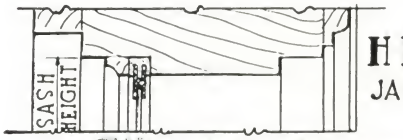
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NORMAN CASEMENTS

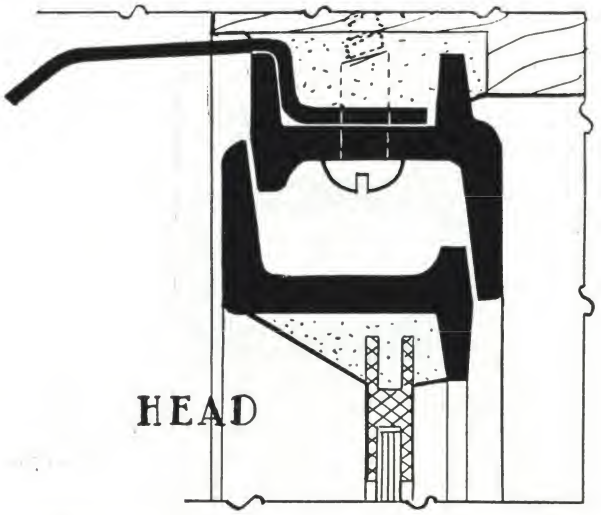
SIDE HINGED OUT-OPENING CASEMENT DETAILS



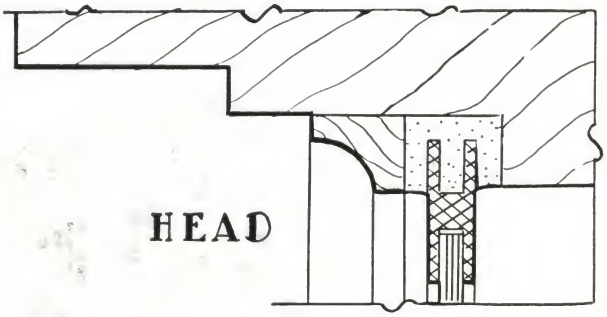
HEAD A
JAMB SIMILAR EXCEPT OMIT WEATHER BAR AND INCLUDE HINGE.



HEAD B
JAMB SIMILAR

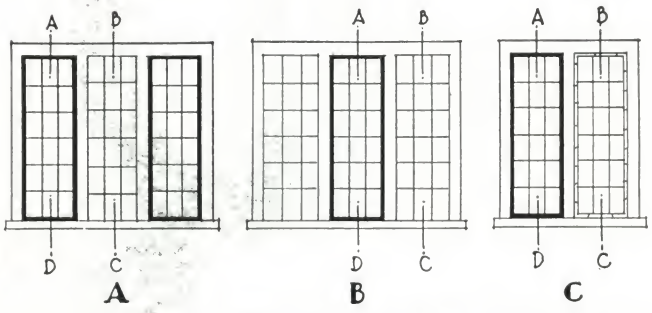


HEAD

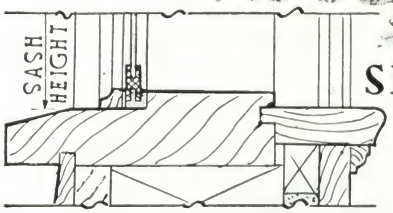


HEAD

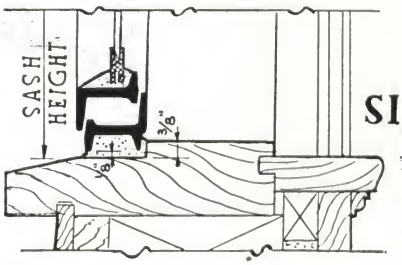




A B C

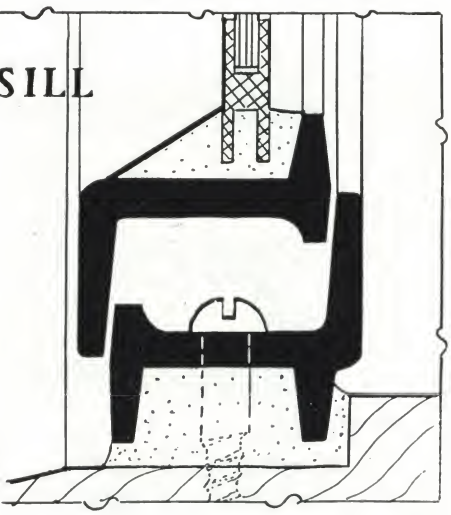


SILL C



SILL D

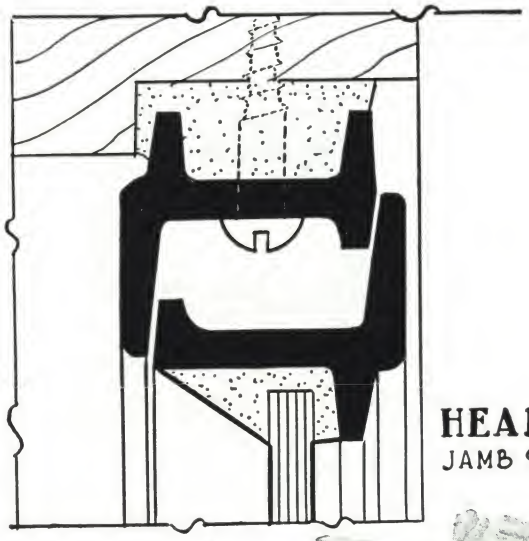
STATIONARY LEADED GLASS GLAZED DIRECTLY INTO WOOD FRAMES IS EXCELLENT PRACTICE AT TIMES. THREE METHODS ARE CUSTOMARY TO EQUALIZE PANES WHERE SASH OCCUR AND WHERE NO SASH ARE USED. METHOD "A" DIVIDES EACH UNIT INTO EQUAL PANES AND CONSEQUENTLY THE HORIZONTAL CAMES DO NOT LINE UP. "B" LINES UP THE HORIZONTAL CAMES AND LEAVES THE TOP & BOTTOM PANES OF UNEVEN HEIGHTS. "C" IS USED IN ORNAMENTAL WINDOWS. A MARGINAL PANE IS USED EQUAL IN SIGHT LINE TO THE CASEMENT SECTION.



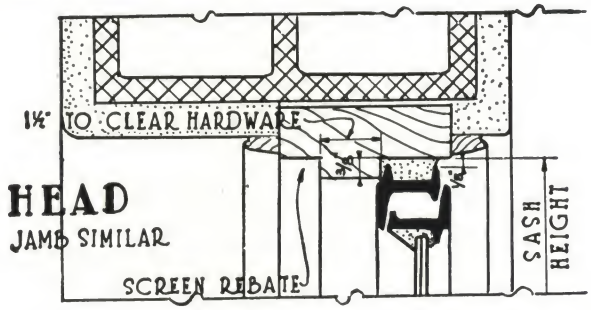
SILL

Continued on next page

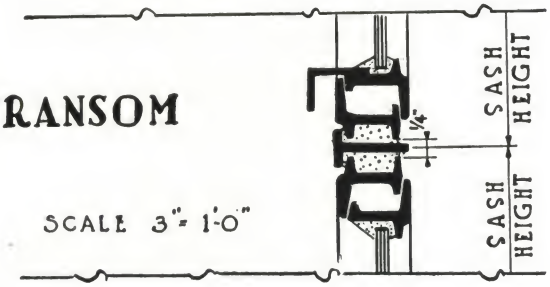
NORMAN CASEMENTS
BOTTOM HINGED IN-OPENING CASEMENT DETAILS



HEAD
JAMB SIMILAR

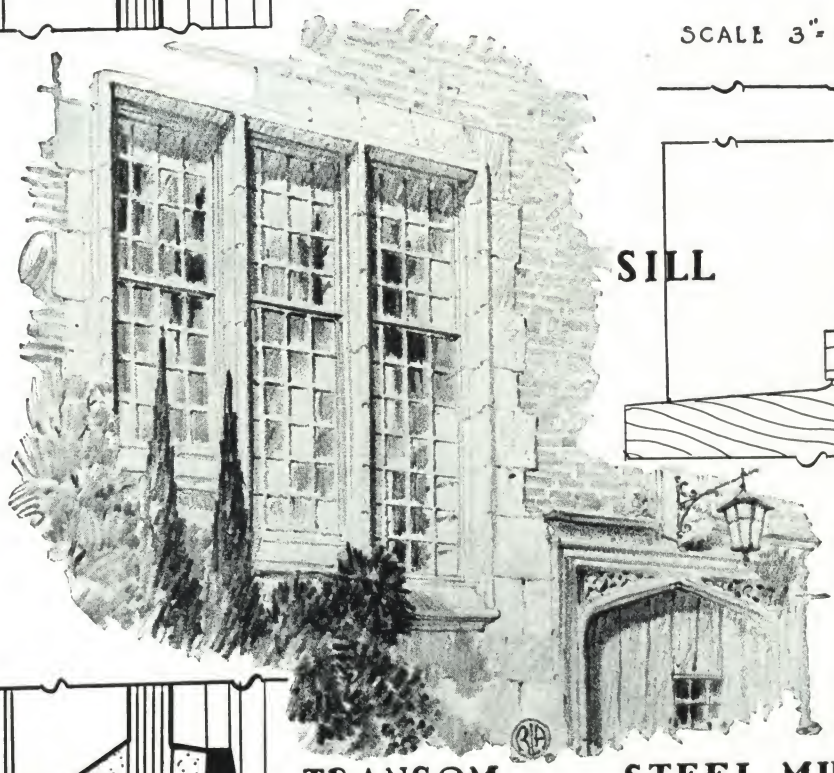


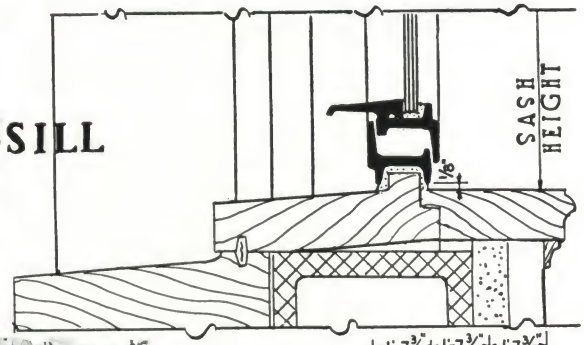
HEAD
JAMB SIMILAR



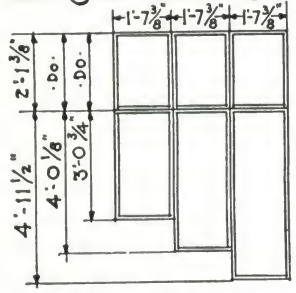
TRANSOM

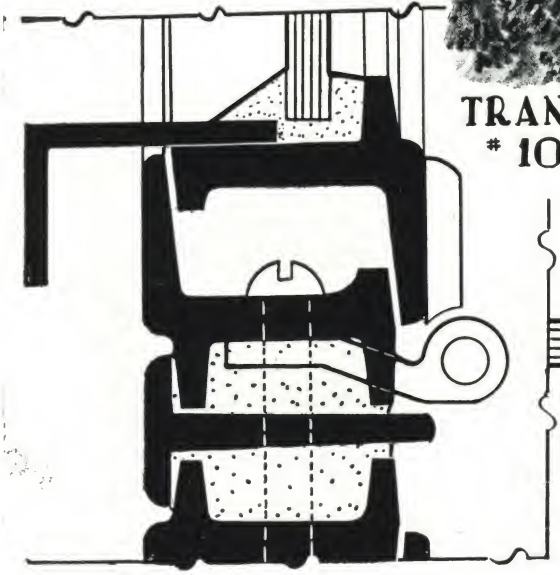
SCALE 3" = 1'-0"





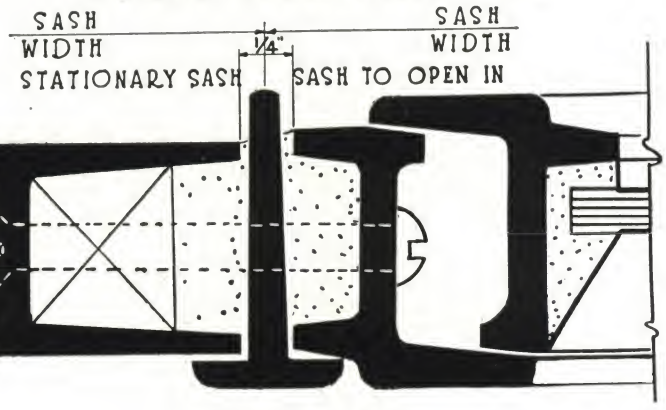
SILL





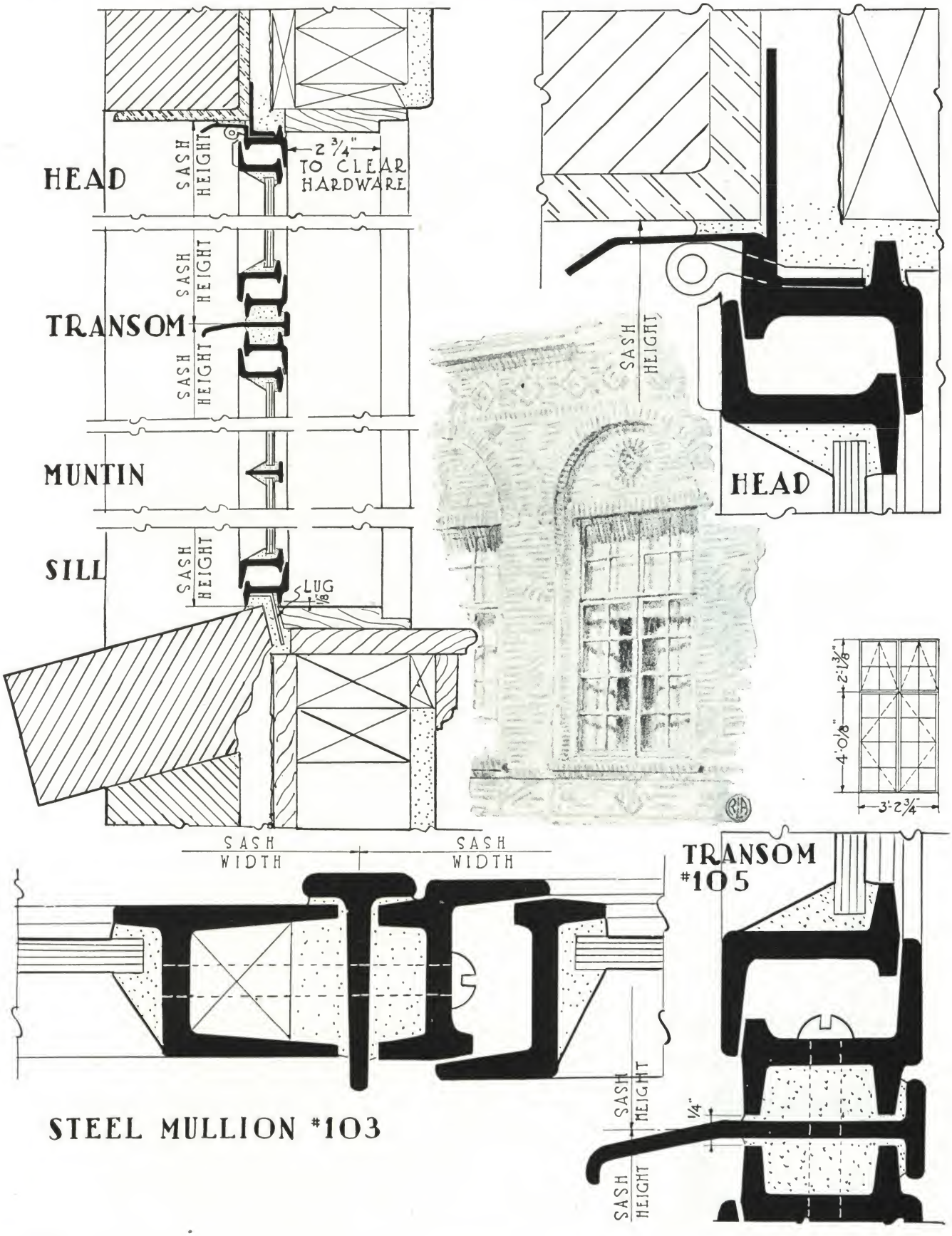
TRANSOM
103

STEEL MULLION #103



Continued on next page

NORMAN CASEMENTS
TOP HINGED OUT-OPENING CASEMENT DETAILS

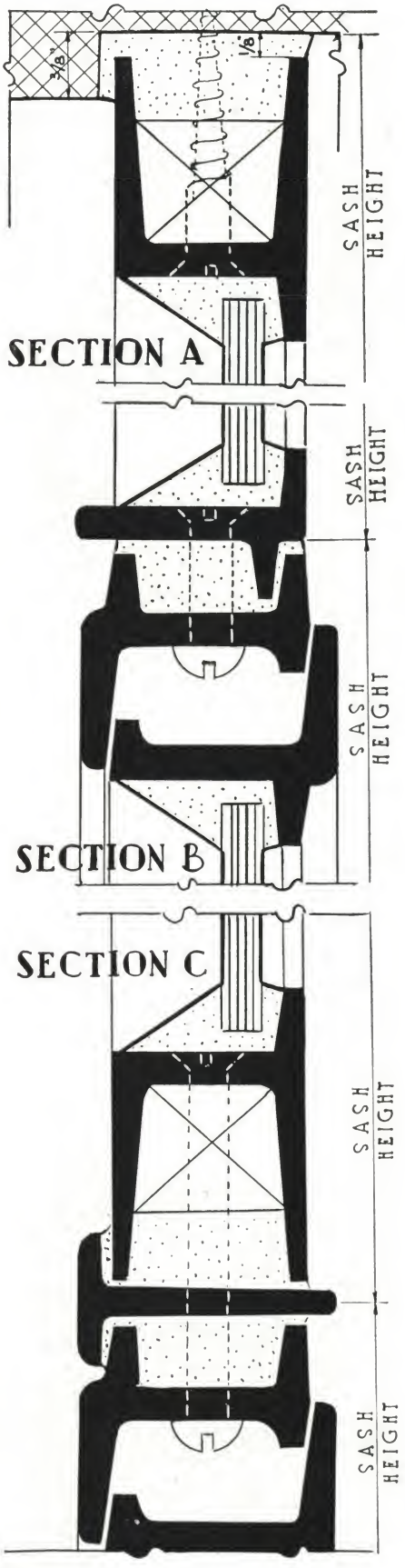


STEEL MULLION #103

Continued on next page

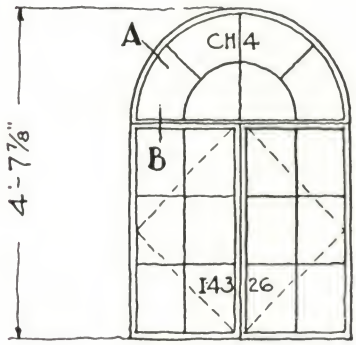
NORMAN CASEMENTS

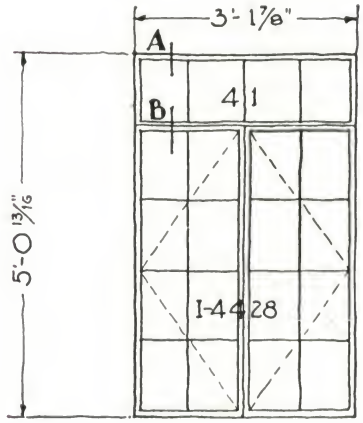
FIXED TRANSOM DETAILS OVER OPEN IN CASEMENTS

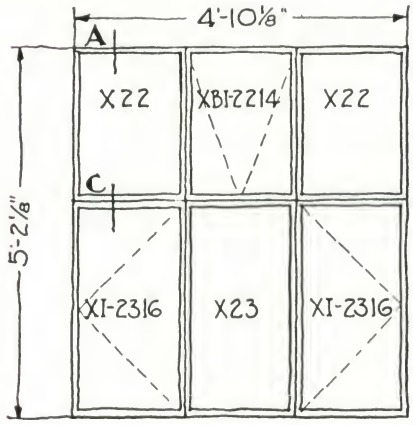


OPENING SIZES

THE SIZES GIVEN ON PAGE 40 INCLUDE ⅛ INCH CLEARANCE ALL AROUND. ACTUAL SASH SIZES ARE ¼ INCH LESS IN WIDTH AND HEIGHT. TO COMPUTE MASONRY SIZES WHEN STEEL MULLIONS AND TRANSOM BARS ARE USED, ADD THE HEIGHTS OF THE RESPECTIVE SASH USED, AS GIVEN ON PAGE 40 AND ADD WIDTHS; THE SUMS WILL BE THE RESPECTIVE HEIGHT AND WIDTH OF THE OPENING. DO NOT ADD ANYTHING FOR MULLIONS AND TRANSOM BARS





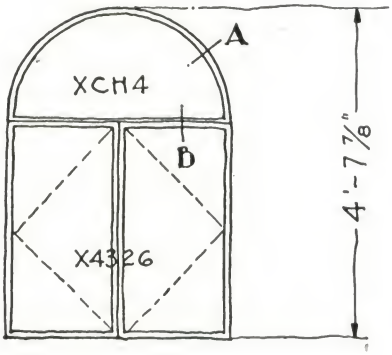


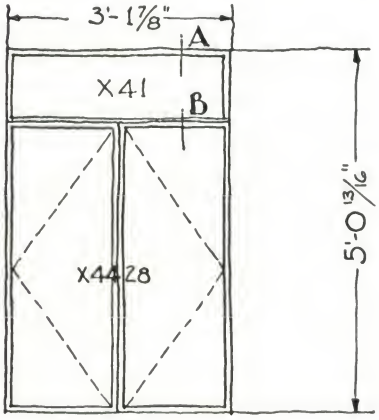
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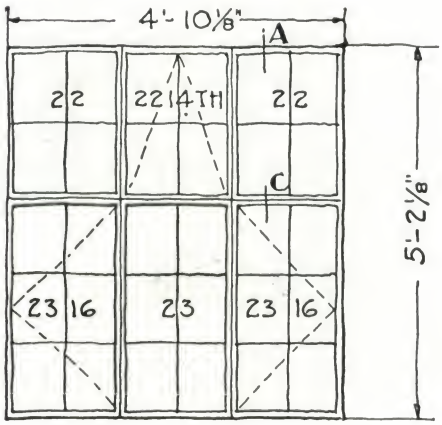
NORMAN CASEMENTS
FIXED TRANSOM DETAILS OVER OPEN OUT CASEMENTS

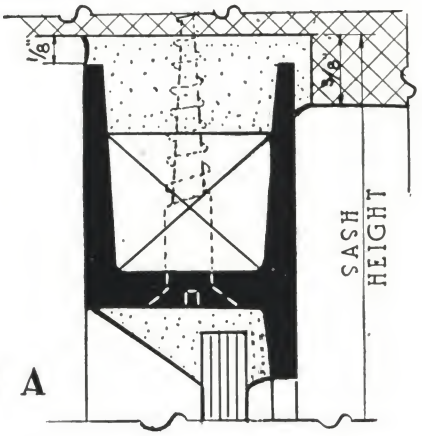
OPENING SIZES

IF TYPES CH2-CH4-CH6-21-41 AND G1 ARE USED ALONE OR SET INTO WOOD TRANSOM BARS 5/8 INCH MUST BE ADDED TO THE HEIGHTS GIVEN ON PAGE 40 TO GIVE SASH OPENING HEIGHT. A DEDUCTION FROM ACTUAL SASH HEIGHT HAS BEEN MADE IN GIVING SIZES OF THESE TYPES ON PAGE 40 TO ALLOW FOR SINKAGE INTO TOP OF SASH BELOW (SEE DETAIL "B" ON PAGES 50 AND 51). WHEN THESE TYPES ARE JOINED DIRECTLY TO THE OTHER SASH, FOLLOW RULE ON PAGE 50.

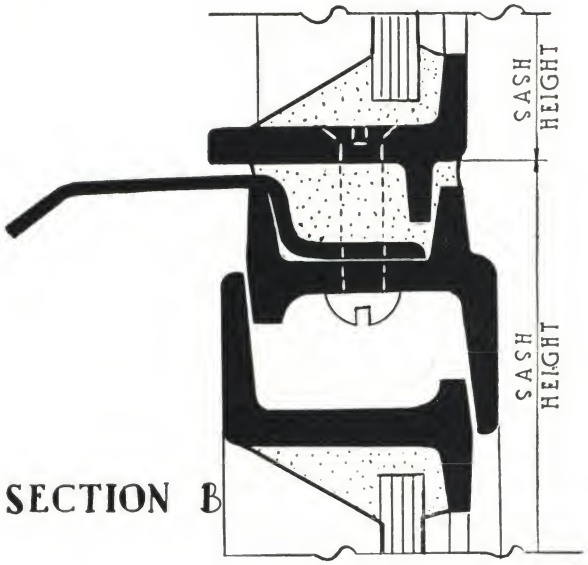




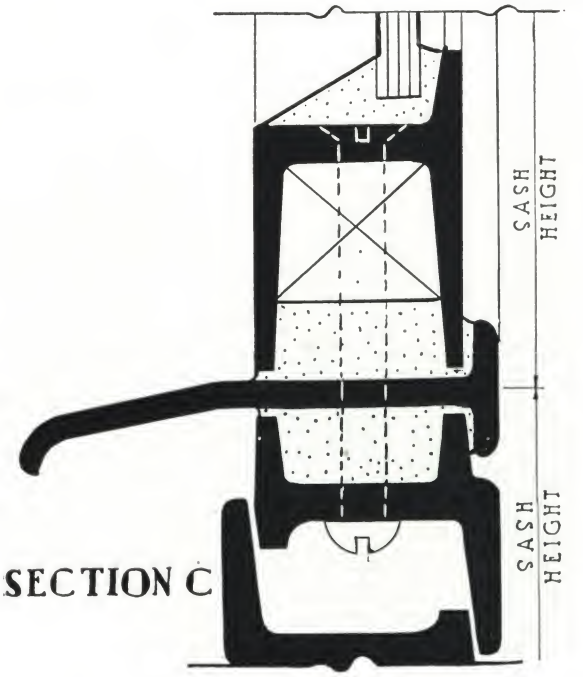




SECTION A



SECTION B



SECTION C

Continued on next page

STANWIN CASEMENTS

SPECIFICATIONS

WINDOWS: Steel Casement Windows shall be Stanwin Casements in standard sizes and types as furnished by the Crittall Casement Window Company, Detroit, Michigan. They shall be constructed of special solid rolled steel casement bars of Zee bar section. The stationary frame member shall weigh not less than .95 lbs. per lineal foot while the swinging leaf section shall weigh not less than 1.20 lbs. per lineal foot. The muntins shall be interlocked at the intersections and riveted into the frame members.

HARDWARE: All side hinged sash shall be hung on cleaning hinges. Hinge leaves shall be of solid rolled steel, riveted to the frames. They shall have bronze pins and be bronze bushed. Side hinged sash shall be fitted with drop-forged bronze casement handles bolted to the handle plate. The striking plates shall be of bronze. Sill adjusters shall be sliding stays with bronze guides, slide bars, and thumb screws.

Top hinged sash shall be equipped with drop-forged bronze peg stays bolted to attachment brackets.

Note: Through-the-screen operators can be furnished in lieu of standard design sliding sill adjusters at additional cost.

PAINTING: All windows shall receive one priming coat of anti-rust primer and a second coat of gray zinc oxide paint before shipment.

GLAZING: All windows shall be glazed with (state if double strength or $\frac{1}{4}''$ thick plate glass or leaded) glass set in special steel sash putty and secured with spring glazing clips.

ERECTION: The window manufacturer shall furnish the necessary lugs, screws, and mastic cement for setting casements. All windows shall be set plumb, square and true, properly aligned, securely anchored, and adjusted before glazing.

Windows shall be set and bedded in mastic. (When desired the Crittall Casement Window Company will erect and caulk casement windows in prepared openings.)

CONTINUOUS FINS: If continuous steel jamb and head fins are to be furnished be sure to so state.

DOORS: All exterior and interior doors in (state here location of doors) shall be Stanwin Doors in standard sizes.

They shall be of medium weight casement sections hung on solid bronze hinges. They shall be fitted with a key lock, bronze lever handles operating from both sides, bronze sliding top and bottom bolts on each leaf, cabin hooks, steel kick plate, and bronze threshold. They shall be furnished and erected with the windows.

Residence of James E. Cooper, Esq., Washington, D. C., Owner and Architect

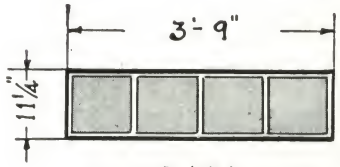


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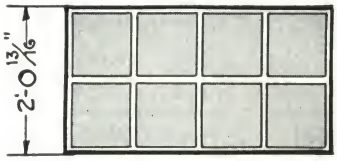
STANWIN CASEMENTS

CASEMENT DOORS IN STANDARD TYPES & SIZES

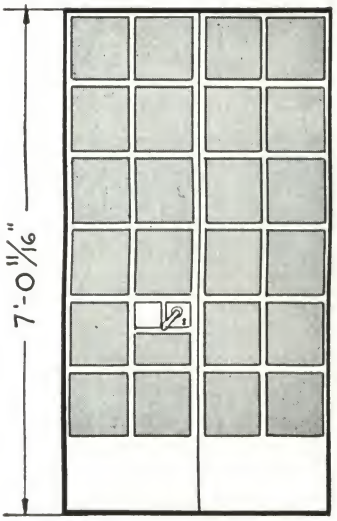
UNITS CARRIED AS WAREHOUSE STOCK SHOWN WITH SHADED BACKGROUND



DAF 1



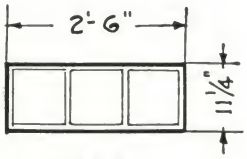
DAF 2



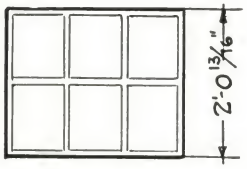
DA



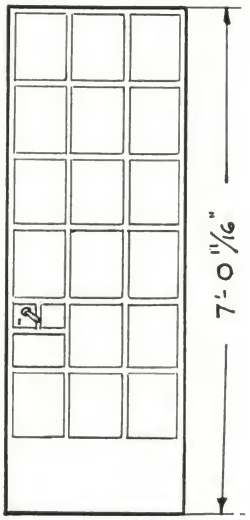
RESIDENCE - WASHINGTON D.C.
GEORGE M. RAY - ARCHITECT



DASF 1



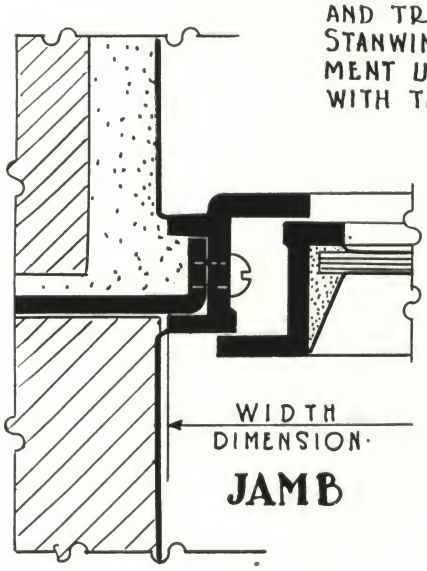
DASF 2



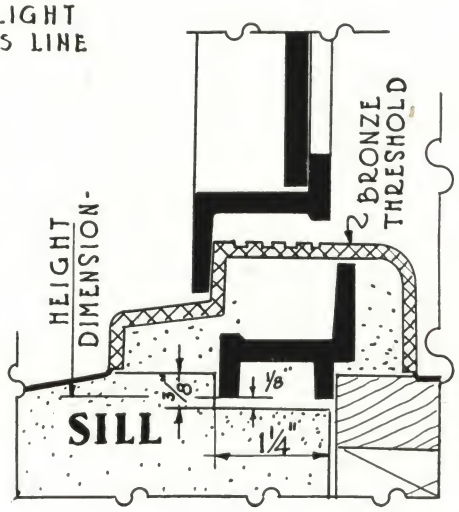
DAS

STANWIN CASEMENT DOORS (OPENING OUT) AND TRANSOMS (STATIONARY) HARMONIZE WITH STANWIN CASEMENTS. ANY STANDARD CASEMENT UNIT MAY BE USED AS A SIDELIGHT WITH THESE DOORS, AS THE MUNTINS LINE UP HORIZONTALLY. THE DOORS ARE MADE OF MEDIUM WEIGHT CASEMENT SECTIONS. THEY ARE HUNG ON BRONZE HINGES, AND ARE FITTED WITH LOCK, BRONZE HANDLES OPERATING FROM BOTH SIDES, BRONZE TOP & BOTTOM BOLTS, BRONZE THRESHOLD AND STEEL KICK PLATES.

SCALE OF DETAILS = HALF FULL SIZE



JAMB

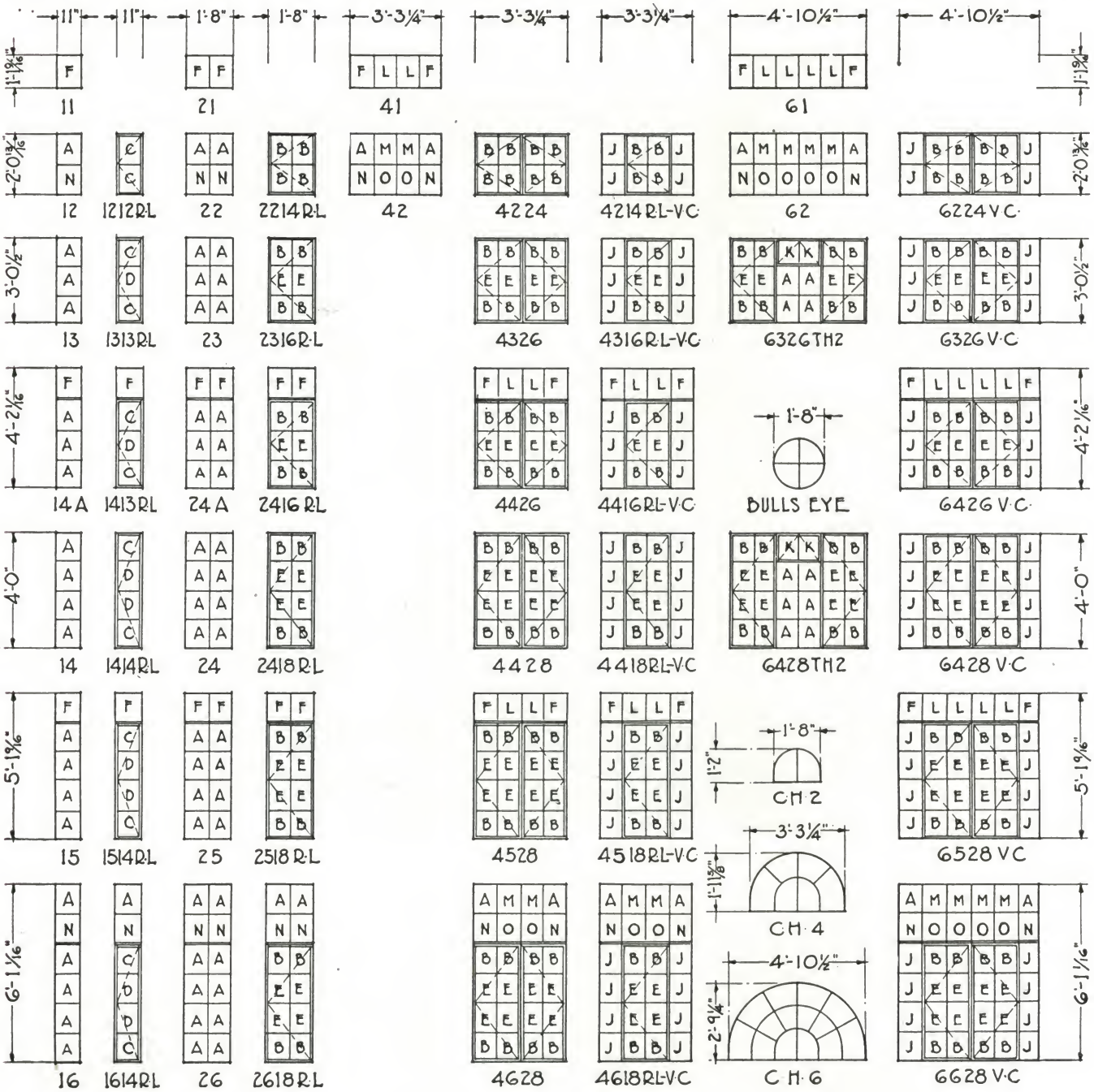


SILL

Continued on next page

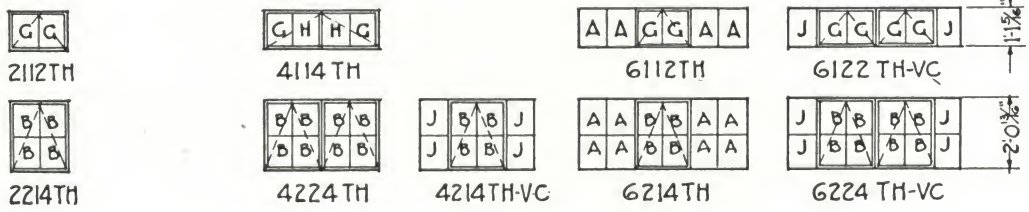
STANWIN CASEMENTS

STANDARD TYPES & SIZES WITH STEEL MUNTINS



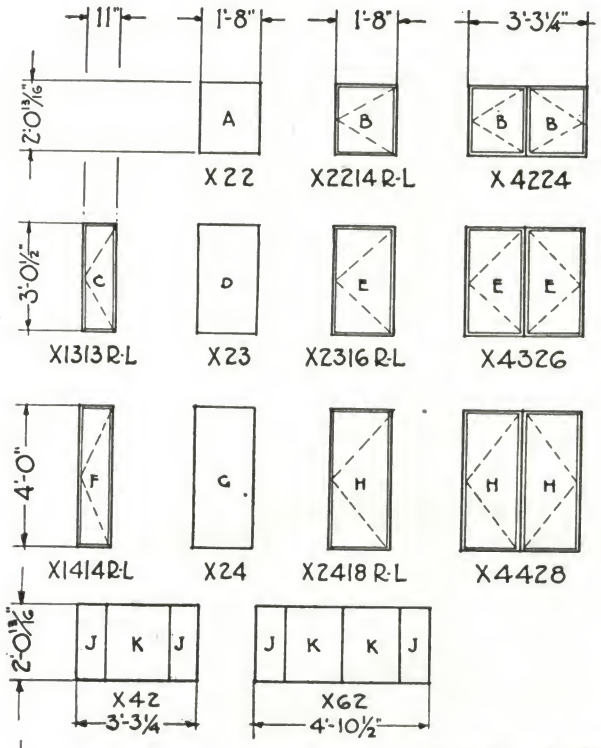
TOP HUNG TRANSOMS

NOTE: THE HANDING OF CASEMENTS IS DETERMINED BY THE HINGE LOCATION VIEWED FROM THE OUTSIDE THUS, A CASEMENT HINGED AT THE RIGHT IS A RIGHT HAND CASEMENT.



Continued on next page

STANWIN CASEMENTS
STANDARD TYPES & SIZES FOR LEADED GLASS



GLASS SIZES

FOR OUT SWINGING SASH ON PAGE 54

A	9 1/16" x 11 3/8"
D	8 7/16" x 10 13/16"
C	8 3/16" x 10 13/16"
D	8 3/16" x 11 3/8"
E	8 7/16" x 11 3/8"
F	9 1/16" x 12 1/2"
G	8 7/16" x 10 1/2"
H	9 1/4" x 10 1/2"
J	8 3/4" x 11 5/16"
K	8 7/16" x 10 5/16"
L	9 3/8" x 12 1/2"
M	9 3/8" x 11 3/8"
N	9 1/16" x 12 1/4"
O	9 3/8" x 12 1/4"

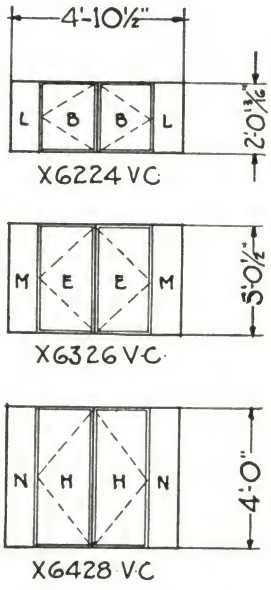
FOR LEADED GLASS UPPER HALF PAGE 55

A	18 5/16" x 23 1/8"
B	17 3/16" x 22"
C	8 3/16" x 33 1/16"
D	18 5/16" x 34 13/16"
E	17 3/16" x 33 1/16"
F	8 3/16" x 45 3/16"
G	18 5/16" x 46 5/16"
H	17 3/16" x 45 3/16"
J	9 1/16" x 23 1/8"
K	18 3/4" x 23 1/8"
L	8 3/4" x 23 1/8"
M	8 3/4" x 34 13/16"
N	8 3/4" x 46 5/16"

FOR ALL SHAPED LIGHTS SEE TEMPLATE

GLASS SIZES FOR IN-OPENING SASH AS SHOWN ON LOWER HALF PAGE 55

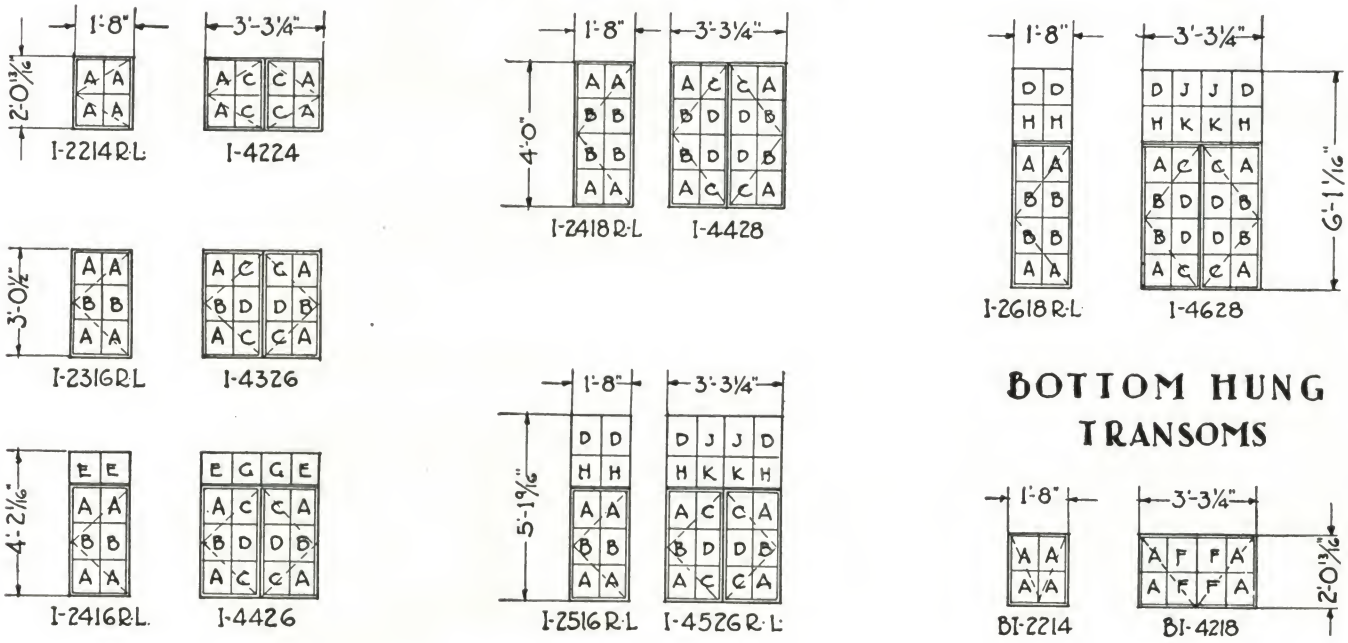
A	7 15/16 x 10 5/16"	F	9 5/16" x 10 5/16"
B	7 15/16" x 11 3/8"	G	9 3/8" x 12 1/2"
C	9 1/16 x 10 5/16"	H	9 1/16" x 12 1/4"
D	9 1/16 x 11 3/8"	J	9 3/8 x 11 3/8"
E	9 1/16" x 12 1/2"	K	9 3/8 x 12 1/4"



TOP HUNG TRANSOMS



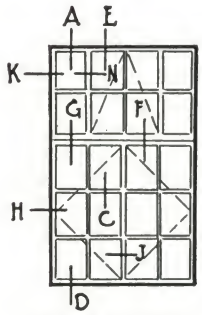
IN-OPENING CASEMENTS IN STANDARD TYPES AND SIZES



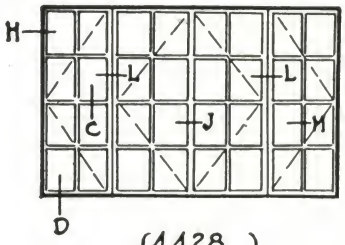
BOTTOM HUNG TRANSOMS

Continued on next page

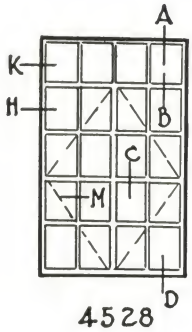
STANWIN CASEMENTS
FULL SIZE DETAILS HORIZONTAL SECTIONS



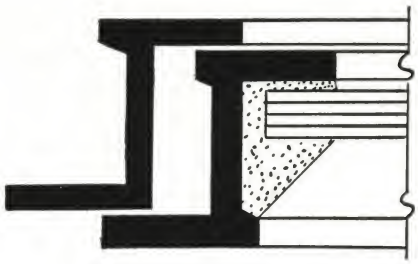
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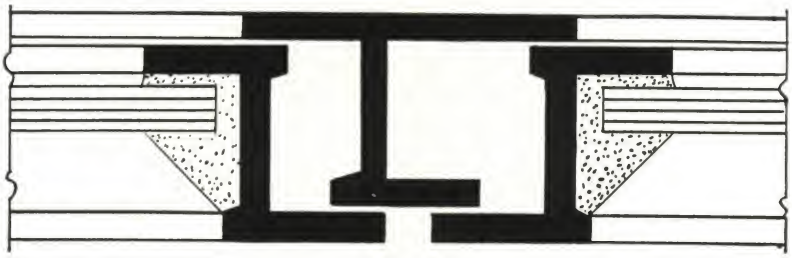
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2418L
2418R}



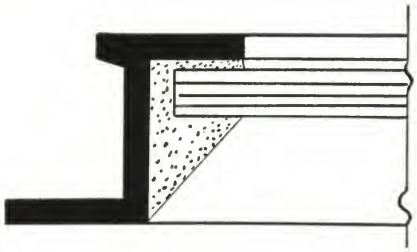
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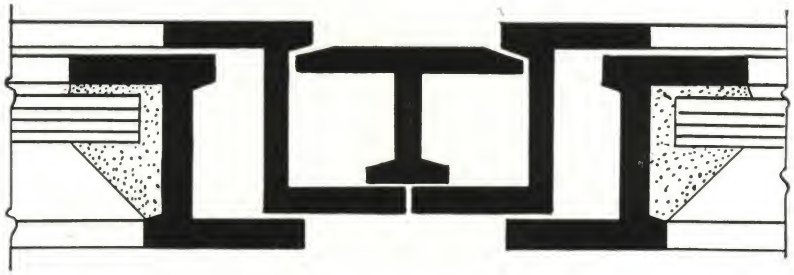
SECTION-H-



SECTION-J-

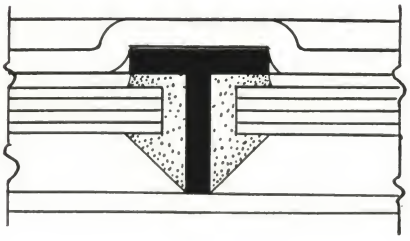


SECTION-K-

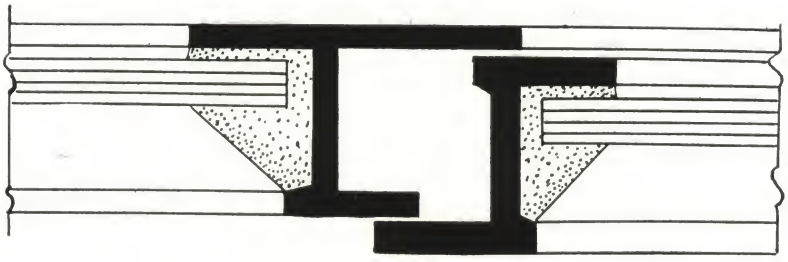


SECTION-L-

SECTION-M-



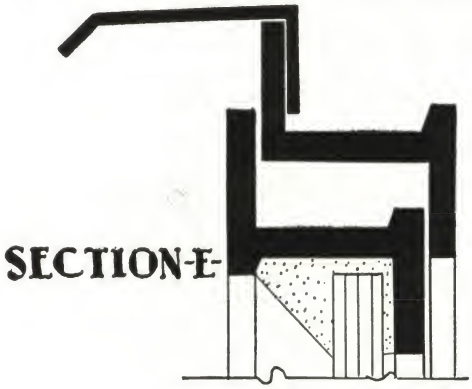
SECTION-N-



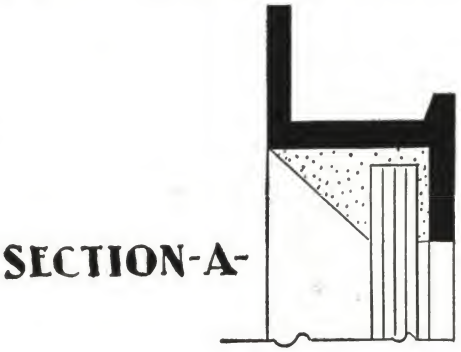
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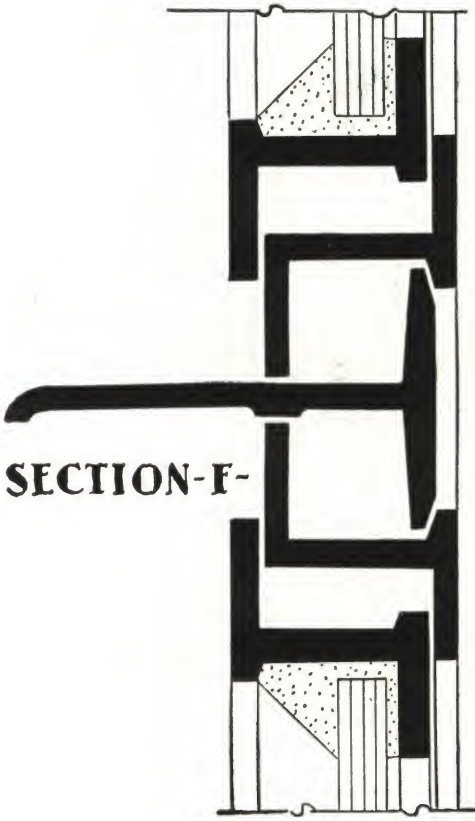
STANWIN CASEMENTS
FULL SIZE DETAILS VERTICAL SECTIONS

SECTION-E-



SECTION-A-

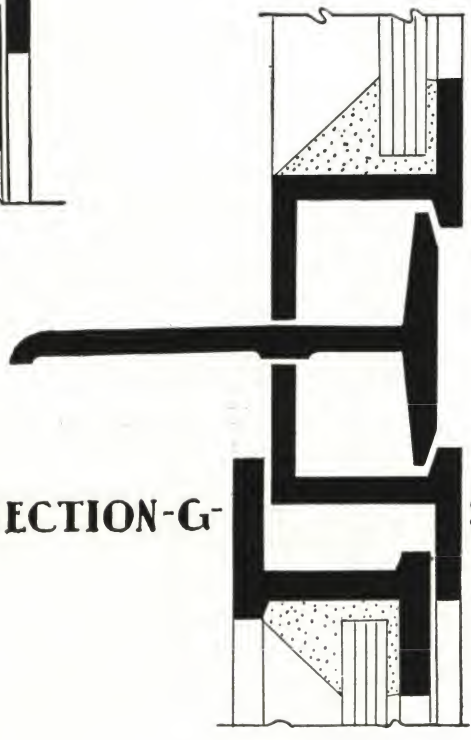




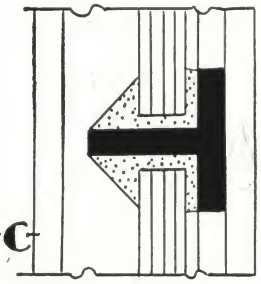
SECTION-F-

SECTION-B





SECTION-C-



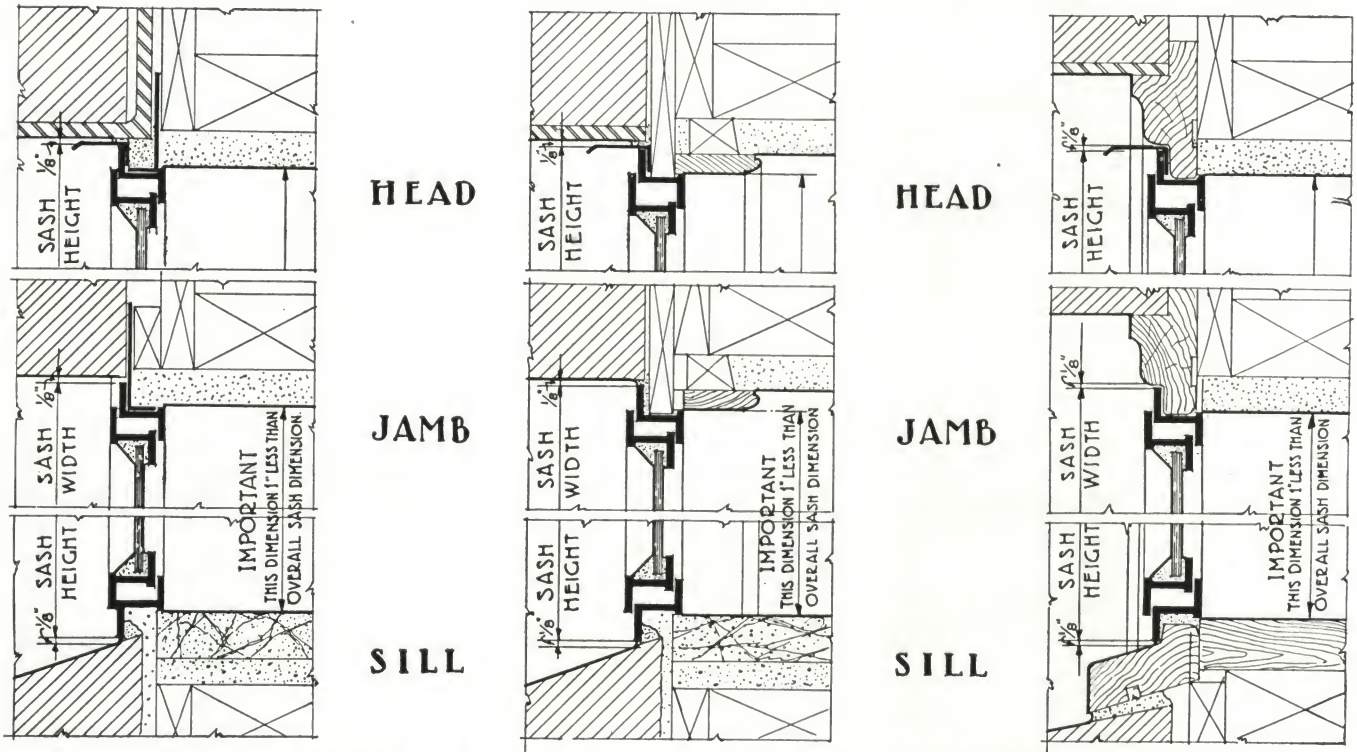
SECTION-G-

SECTION-D



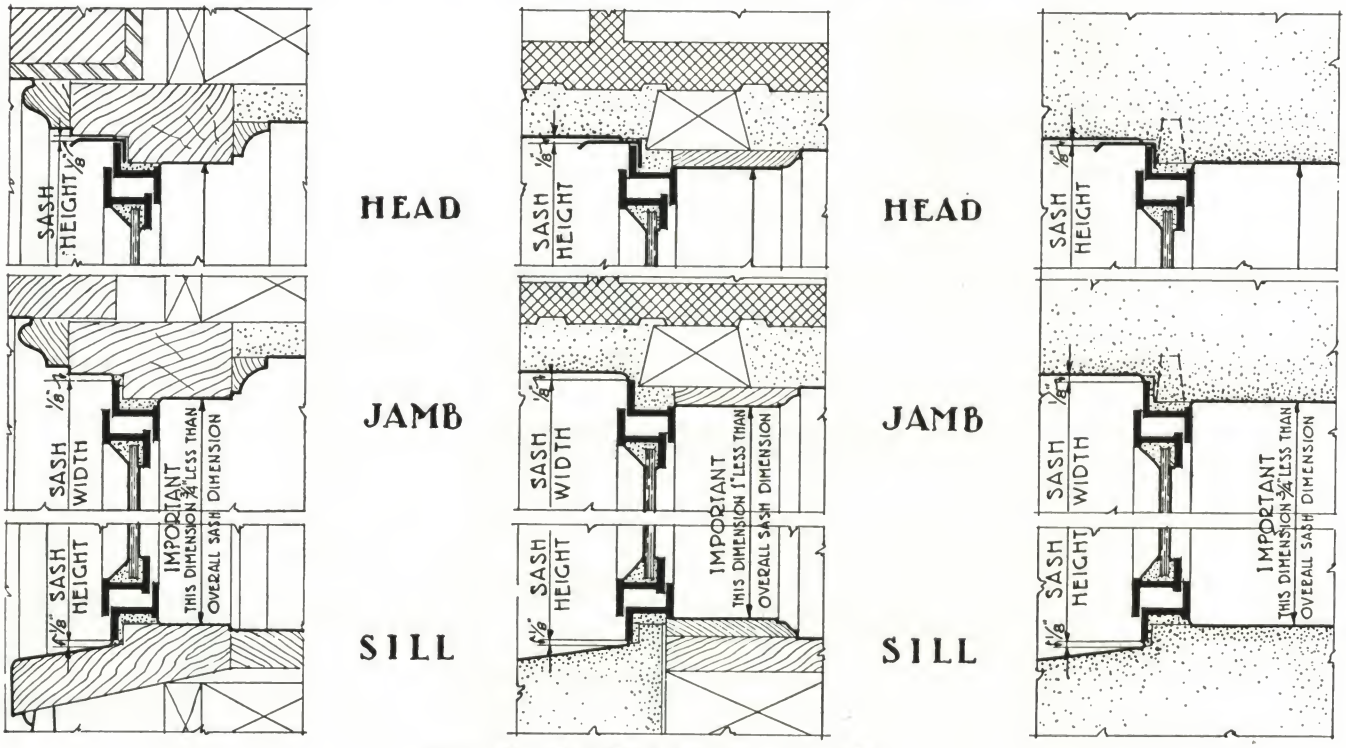
Continued on next page

STANWIN CASEMENTS
OUT-OPENING CASEMENT DETAILS



BRICK WALL INSTALLATION SUGGESTIONS

WHEN CRITTALL SCREENS ARE USED, INTERIOR HEADS, JAMBS AND SILLS MUST BE KEPT CLEAR OF SASH FRAME AS SHOWN ABOVE



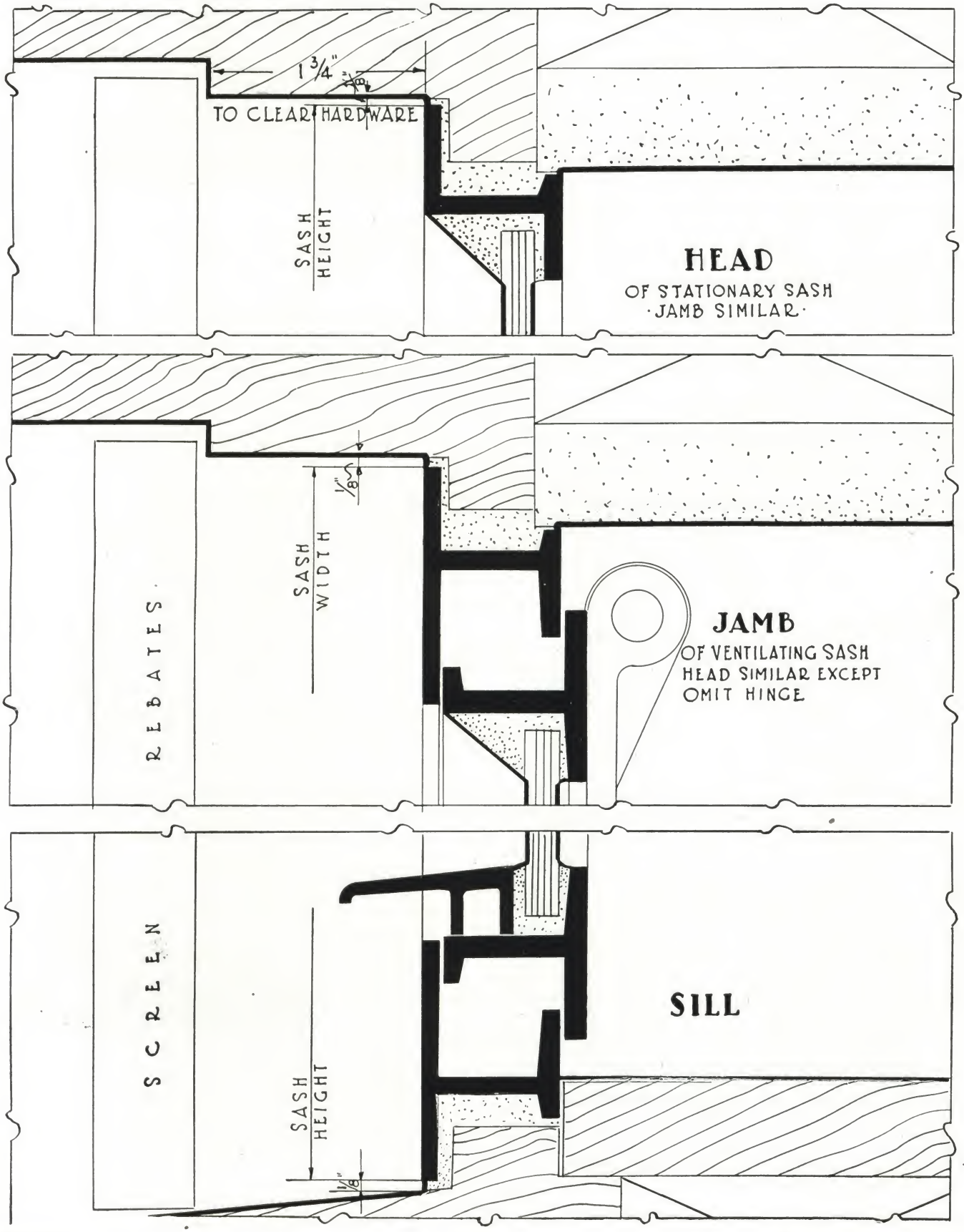
SCALE OF DETAILS 3" = 1'-0"

WOOD FRAME | TILE & STUCCO | STONE DETAIL

Continued on next page

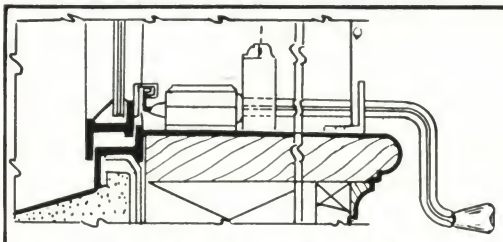
STANWIN CASEMENTS

FULL SIZE IN-OPENING CASEMENT DETAILS

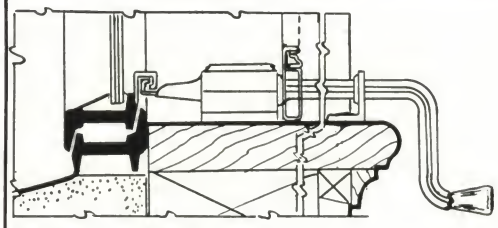


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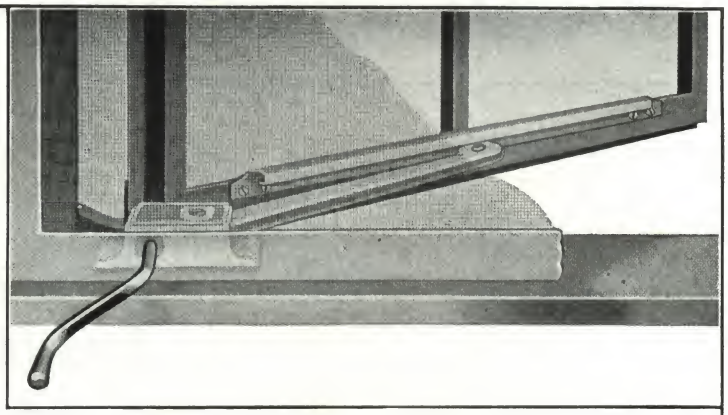
OPERATORS AND SCREENS



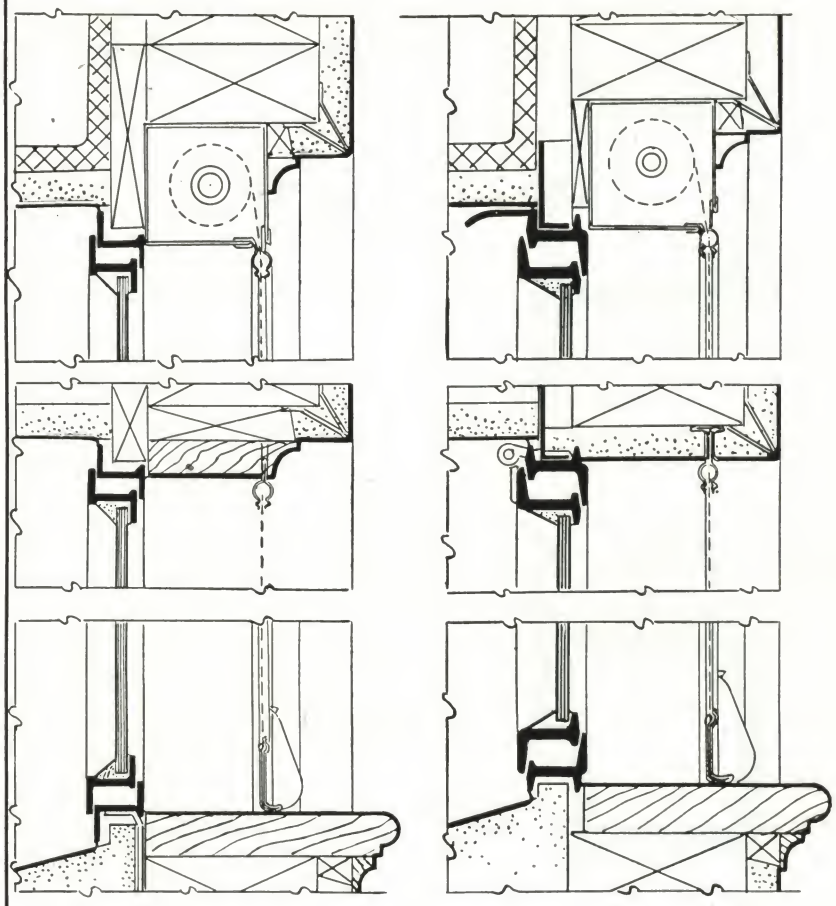
SILL DETAIL OF SERIES 25
OPERATOR APPLIED TO STANWIN CASEMENTS
SCALE 3"=1'-0"



SILL DETAIL
OPERATOR APPLLIED TO NORMAN OR UNIVERSAL CASEMENTS

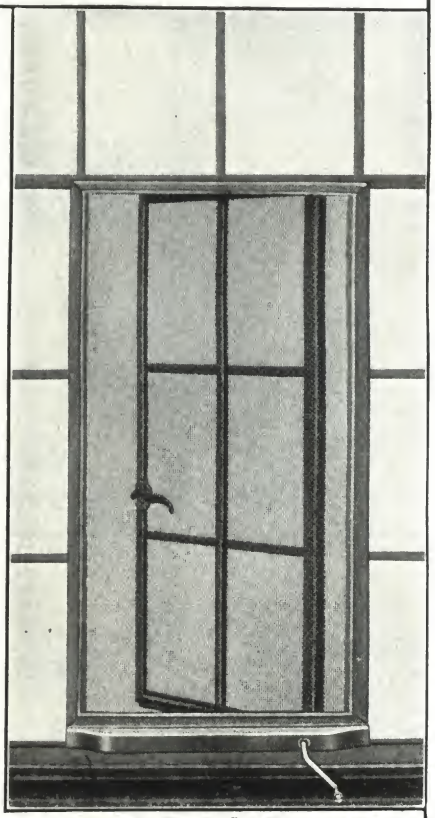


ILLUSTRATED ABOVE. AND DETAILED AT THE LEFT ARE WINDOR SERIES 25 OPERATORS. WE ARE PREPARED TO FURNISH ANY STANDARD OPERATOR WHENEVER PRACTICABLE. WHEN DETAILING OPERATORS CONSULT THE CASEMENT MANUFACTURER



ROLL SCREENS
APPLIED TO STANWIN CASEMENTS
SCALE 3"=1'-0"

ROLL SCREENS
APPLIED TO NORMAN OR UNIVERSAL CASEMENTS



WINDOR CASEMENT
OPERATOR AND SCREEN UNIT. WHEN A FLUSH TYPE SCREEN WITH THROUGH THE SCREEN OPERATOR IS DESIRED WE ARE PREPARED TO FURNISH THIS COMBINATION ON STANWIN AND NORMAN CASEMENTS

Continued on next page

CRITTALL SCREENS

FOR NORMAN AND STANWIN CASEMENTS

CRITTALL Screens for Norman and Stanwin Casements are simple and sturdy in construction and design. A screen unit consists of a lower vertical sliding screen and an upper fixed screen mounted in a steel frame which is attached directly to the window on the inside. The screen itself is designed and built as a unit and is furnished complete by Crittall.

The casements have four steel anchor buttons on which the screen frame is attached. All casement hardware remains standard — no novel devices are used. The screen panels are of antique bronze cloth, 18-mesh.

Compactly designed, the new Crittall Screens fit snugly and lie flat against the window, occupying a minimum amount of space. It takes but a moment to remove the screen from the casement or to apply it again, and this is done without tools and almost without effort.

Screens are available for all standard types of side hinged out-opening Norman and Stanwin Casements.



Crittall Screens are easy to put on and remove —no tools of any sort are required



Screens may be operated with the tips of the fingers. They stay in place when raised



Free access to open or close the casement—or to operate awnings—is readily permitted

Continued on next page

REVERSIBLE WINDOWS



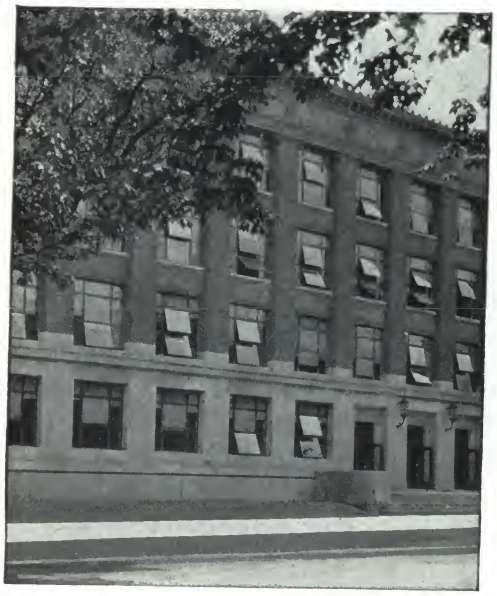
Jefferson Standard Building, Greensboro, North Carolina, Charles C. Hartmann, Architect

For work of more than usual distinction where a window of the projected type is contemplated, Crittall Reversible Windows will exactly fit the architect's needs. Rugged construction, simplicity of operation, and perfection of detail characterize these windows.

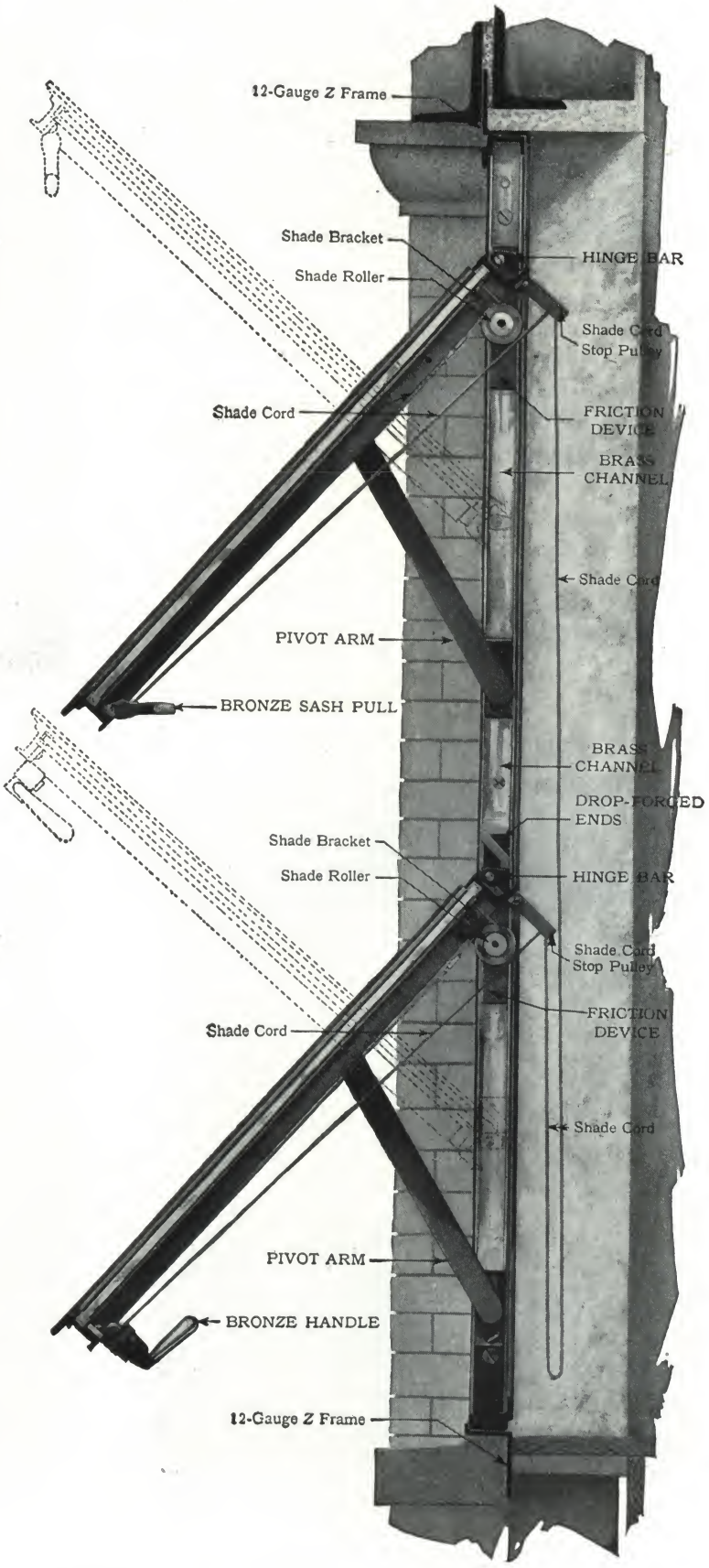
Twelve-gauge pressed metal Z frames are detailed but these windows may be set into cast iron or pressed metal frames of different contour similar to Universal Casements.

They are supplied with Underwriters Labels when required.

Engineering Building, University of Michigan, Ann Arbor, Michigan, Smith, Hinchman & Grylls, Architects

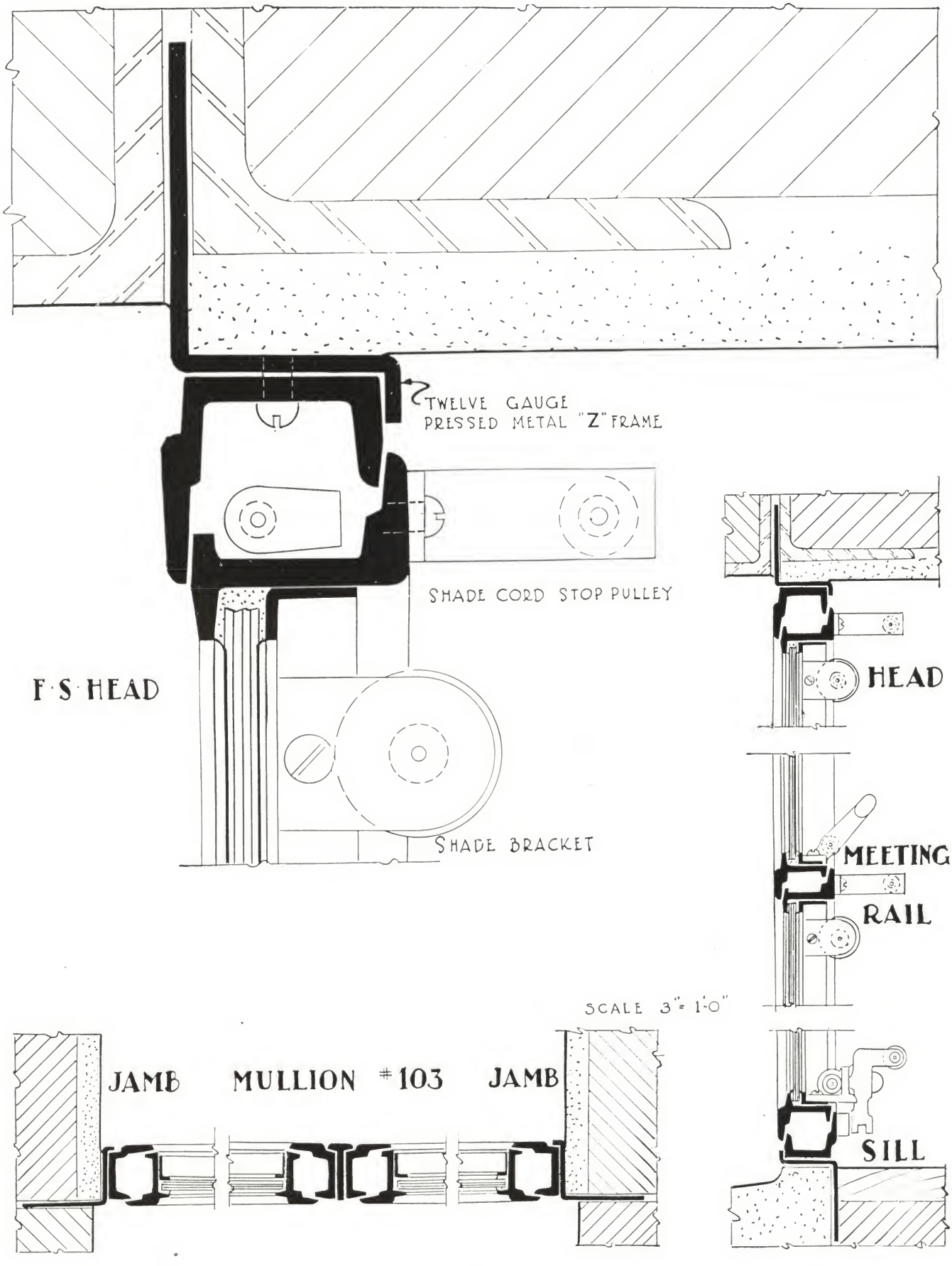


CROSS SECTION



Continued on next page

REVERSIBLE WINDOWS



Continued on next page

PRODUCTS OF

CRITTALL

UNIVERSAL CASEMENTS

Custom built, of solid steel or bronze, to meet the architects' sizes, designs, and most exacting specifications.

NORMAN CASEMENTS

An economical, heavy standardized casement of excellent quality for better class projects.

STANWIN CASEMENTS

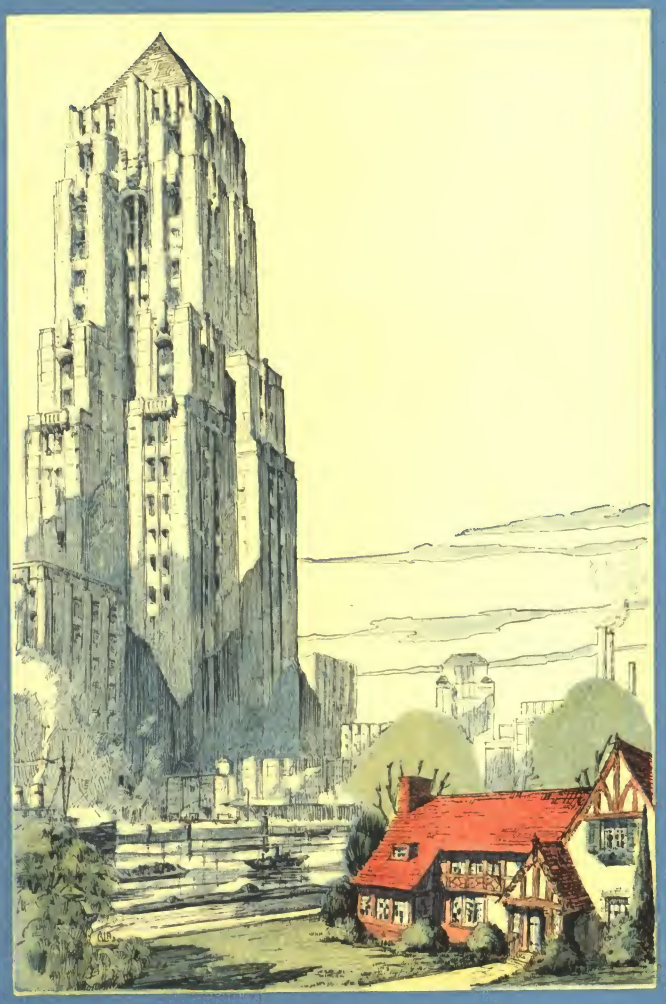
A standard lightweight casement stocked in warehouses for convenient distribution.

REVERSIBLE WINDOWS

Heavy, custom-built windows of the projected type, for work of unusual distinction and character.

CRITTALL
CASEMENT WINDOW CO.
DETROIT, MICHIGAN.

420 Lexington Ave
Phone Mohawk 4-4311



Fenestra

BLUE BOOK OF STEEL WINDOWS

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Fenestra
WINDOWS OF STEEL

DETROIT STEEL PRODUCTS COMPANY

Factories: Detroit, Michigan, Cleveland, Ohio and Oakland, California
General Offices: 2250 East Grand Boulevard, Detroit, Michigan
Local Offices in 217 Cities

FENESTRA ARCHITECTURAL SERVICE

TO ASSIST the architect in visualizing Fenestra Windows as they actually will appear in the building he is designing, Detroit Steel Products Company maintains an Architectural Service Department with architects trained in the correct use of Fenestra in monumental structures.

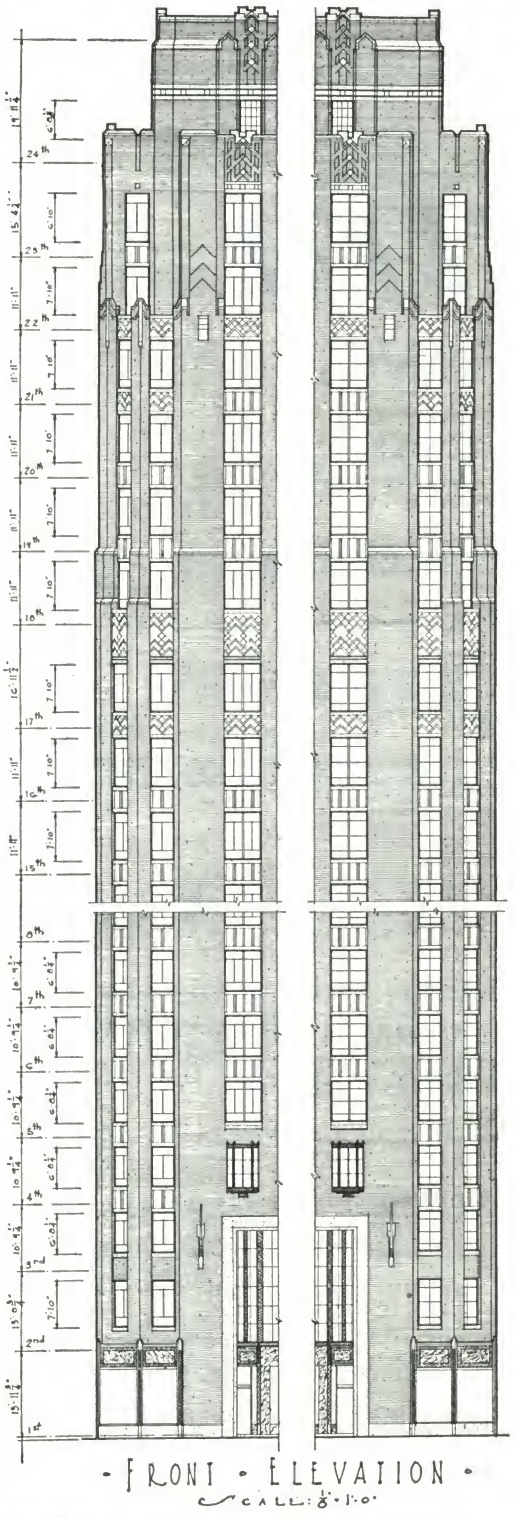
Without charge or obligation to you, this department will be glad to work up drawings showing exactly how Fenestra Windows may be detailed into the type of construction you are using and made to harmonize with your own architectural design.

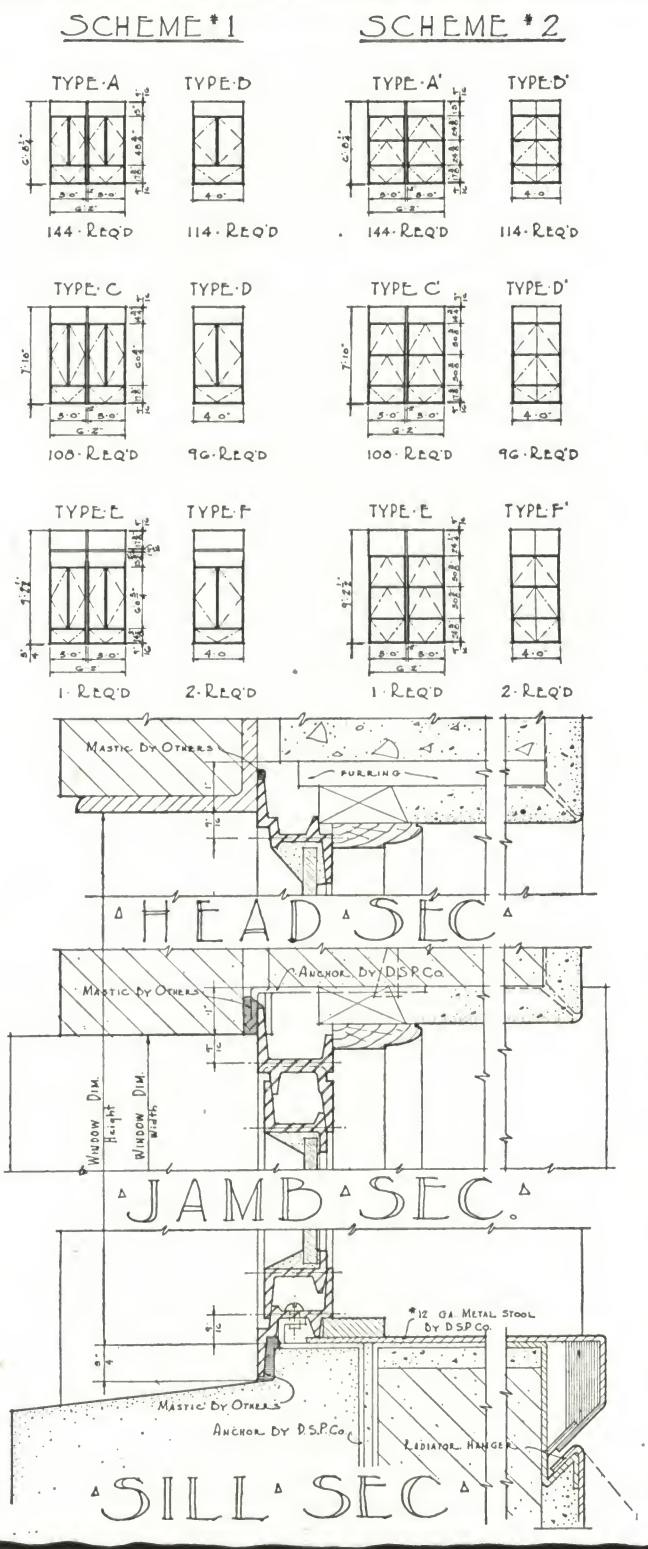
The plate on the next page gives an idea of the work of this department.

It has been our privilege to work with some of the largest architects in the country with very gratifying results. Sometimes we are able to indicate a saving through the use of standard types. Almost always there are problems of appearance, arrangement of ventilators, amount of light or ventilation, on which our knowledge of steel window application to architectural requirements is helpful.

The men in the Architectural Service Department all know how to use a pencil. They talk an architect's own language. They are not salesmen. Their service is available for the asking. A word to your local Fenestra representative or to the Home Office at Detroit will enlist their immediate co-operation.

Continued on next page





Fenestra 1930 TYPICAL DETAILS AS PREPARED BY ARCHITECTURAL SERVICE DEPT. **Fenestra 1930**

Continued on next page

FENESTRA "FENMARK" WINDOWS

A series of solid section, steel windows with swing leaves opening out and a sill ventilator opening in at the top while sliding up from the bottom. Ornamental hardware of polished bronze. Friction, extension hinges. Designed for use in monumental and public buildings of the highest type. No Fenestra screens

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

All windows shall be Fenestra Fenmark Windows as manufactured by the Detroit Steel Products Company.

MATERIAL

SECTIONS shall be specially designed, hot rolled, individually straightened, solid steel bars with heavy fillets in all re-entrant angles, designed for exterior glazing.

FRAME MEMBERS—Jamb members shall be heavy unequal leg sections designed for adequate anchorage. Head, sills and horizontal intermediate bars shall be Z sections with offset baffles.

SWING LEAF AND SILL VENTILATOR MEMBERS shall be Z-shaped sections with baffles.

JAMB WEATHERING (at sill ventilator) shall be offset unequal leg channels forming beveled, interior, sliding-shoe grooves.

MUNTINS shall be T sections.

MULLIONS shall be exterior and interior plates secured by bolts and acorn nuts.

TRANSOM BARS shall be standard Fenestra—1 (Z bars and angles). 2 (angle and channel sections with interior pressed steel mullion covers).

(Note:—Other designs of mullions and transom bars may be used. If desired, provisions for them should be made in the ornamental iron or structural steel specifications.)

CONSTRUCTION

FRAMES including intermediate bars shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish.

SWING LEAVES AND SILL VENTILATORS shall be mitered and electrically welded at all corners and exposed faces at all welds shall be ground smooth. Provide continuous two-point flat contact weathering between swing leaves and frame.

MUNTINS, when required, shall be continuous from head to sill and from jamb to jamb, interlocked to increase strength and rigidity at points of intersection. Joints at frame shall be mortise and tenon, air hammer riveted.

MULLIONS OR TRANSOM BARS shall be provided between units where two or more windows are placed side by side or one above another in the same opening.

(Note:—Specify as above when manufacturer is to supply steel mullions or transom bars.)

HEAD DRIP—Provide a continuous, heavy electro-galvanized steel head drip above all swing leaves.

(Note:—Drip is shipped unattached. See installation details.)

SILL AND JAMB ANCHOR CLIPS—Supply (sill) (jamb) anchor clips with bolts to attach to frame where required.

ATTACHED HARDWARE

(Note:—Attach at the factory.)

SWING LEAF HINGES—All side hung swing leaves shall be hung on two heavy, extension (cleaning), friction hinges of special solid rolled, sherardized steel with heavy fillets in re-entrant angles. Each hinge shall be equipped with two die cast friction washers. Washers and hinge members shall be held by lock washers and a bronze stud with acorn nut so arranged that friction may be increased or decreased by adjusting the nut.

(Note:—"Close In" hinges standard on all types with adjacent swing leaves.)

SWING LEAF LOCKING HANDLE BRACKET—Each side hung open-out swing leaf shall have an ornamental locking handle bracket of solid rolled steel, electrically welded into the swing leaf stile.

(Note:—Locking handle brackets for Fenmark Casements are attached at the factory.)

Continued on next page

SILL VENTILATOR OPERATING HARDWARE—Sill ventilators shall swing in from the top while sliding up from the bottom and shall be so constructed that by tilting they may be easily washed from inside of the building. Each ventilator shall be balanced on two supporting arms of solid spring steel. Connections between the supporting arms and window frame and between supporting arms and ventilator shall be made by steel brackets rigidly supported and double riveted to the vertical members. Arms shall be attached to brackets by bronze shoulder pivots. Each ventilator shall be equipped with two bronze friction shoes sliding vertically in the weathering channels of the window frame.

STRIKES—All handles for vertical swing leaves shall lock against painted brass strikes attached to the casement frame.

KEEPER—All handles for sill ventilator shall lock into malleable iron keepers rigidly attached to the casement frame.

DETACHED HARDWARE

(Note:—All detached hardware shall be shipped carefully packed to prevent damage until applied for use.)

SWING LEAF AND SILL VENTILATOR LOCKING HANDLES—Provide for each side hung swing leaf and each sill ventilator solid bronze cam locking handles (U. S. Government specification) of ornamental design and coinage finish obtained without the use of plating or chemicals. Swing leaf handle No. 1119. Ventilator handle No. 1122.

Each handle to be equipped with a concealed coil spring, to take up wear and prevent rattle, and attached to the leaf stile or the ventilator rail by three bronze screws.

SWING LEAF OPERATING HARDWARE—(1) Standard.

(Note:—Friction hinges without operator are standard.)

(2) Optional—Solid bronze thumb screw operator, No. 1101, with non-friction hinges.

(Note:—No. 2 at extra cost over No. 1.)

(Note:—Bronze multiple locking device, where necessary, at added cost.)

(Note:—Bronze finger pull, No. 1130, furnished at extra cost at sill of each swing leaf when specified.)

PROJECTED OUT TRANSOM HARDWARE—Provide for each open-out transom, one solid bronze locking handle, No. 914, to attach at the sill and one solid bronze pole ring, No. 151, to attach at the head. (See Plate G-101.)

MASTIC

The window manufacturer shall furnish sufficient mastic to form a weathertight union between window frames and mullions or transom bars. No caulking by window manufacturer for head, sill or jambs.

ERECTION

(Note:—Include in the masonry specifications that all windows shall be caulked at head, sill and jambs with mastic or other caulking compound to be supplied and applied by the general contractor, to form a weathertight union between the window frames and the building construction.)

(Note:—Include in the masonry specifications that all masonry openings shall be accurately constructed in accordance with standard Fenestra installation details so that windows may be erected after masonry is completed.)

(Note:—Include in the masonry specifications that all mortar grouting, pointing, etc., shall be done by the mason contractor after the windows have been erected.)

All Fenestra Fenmark Windows shall be erected in prepared openings by the Fenestra Construction Company under a separate contract.

All windows shall be set plumb and true, properly aligned and securely anchored and all ventilators properly adjusted before glazing.

Standard Fenestra sill anchors shall be used in all cases. Standard Fenestra jamb anchor clips, No. 822, to be used as necessary.

Apply all hardware in accordance with manufacturer's directions. Detached hardware shall not be applied until after windows are erected and painted and the building is plastered.

PAINTING

All windows shall be given one dip coat of gray lead and oil paint by the manufacturer before shipment.

(Note:—The following should be provided for in the painting specifications: "One additional coat of paint should be applied after erection, before glazing. Painting contractor shall apply one field coat of paint before erection, to all parts of window which cannot be painted after erection." Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.)

(Note:—Where desired, the Fenestra Construction Company, at reasonable added cost, will do field painting after erection. If required, so specify here, including specification for paint and its application.)

GLASS AND GLAZING

(Note:—The following should be included in the glass and glazing specifications: "Glass shall be (⅛" light plate) (¼" thick plate)." Single or double strength glass is not recommended.

"Putty shall be steel sash putty." This is a special, high grade putty which insures quick setting. Ordinary wood window putty must not be used.)

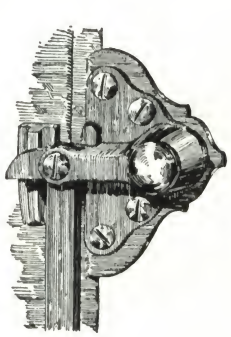
All windows shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated steel spring glazing clips furnished by the window manufacturer. Face putty should be applied in a neat, clean-cut, smooth manner.

SHADING

(Note:—All shades must be located at least 2½" from the inside face of the window to clear hardware.)

(Note:—Each Fenmark Window is drilled at both jambs near the head for attachment of standard shade bracket clips which are supplied at slight added cost. These clips are of sufficient depth to bring the shade bracket to the proper position and are slotted to accommodate any standard shade bracket. If shade bracket clips are required, so specify.)

Continued on next page





Handle
No. 1119



Handle
No. 1122



Multiple
Locking Device



Handle
No. 1115



Finger Pull
No. 1130



Thru-Screen Operator - No. 1116



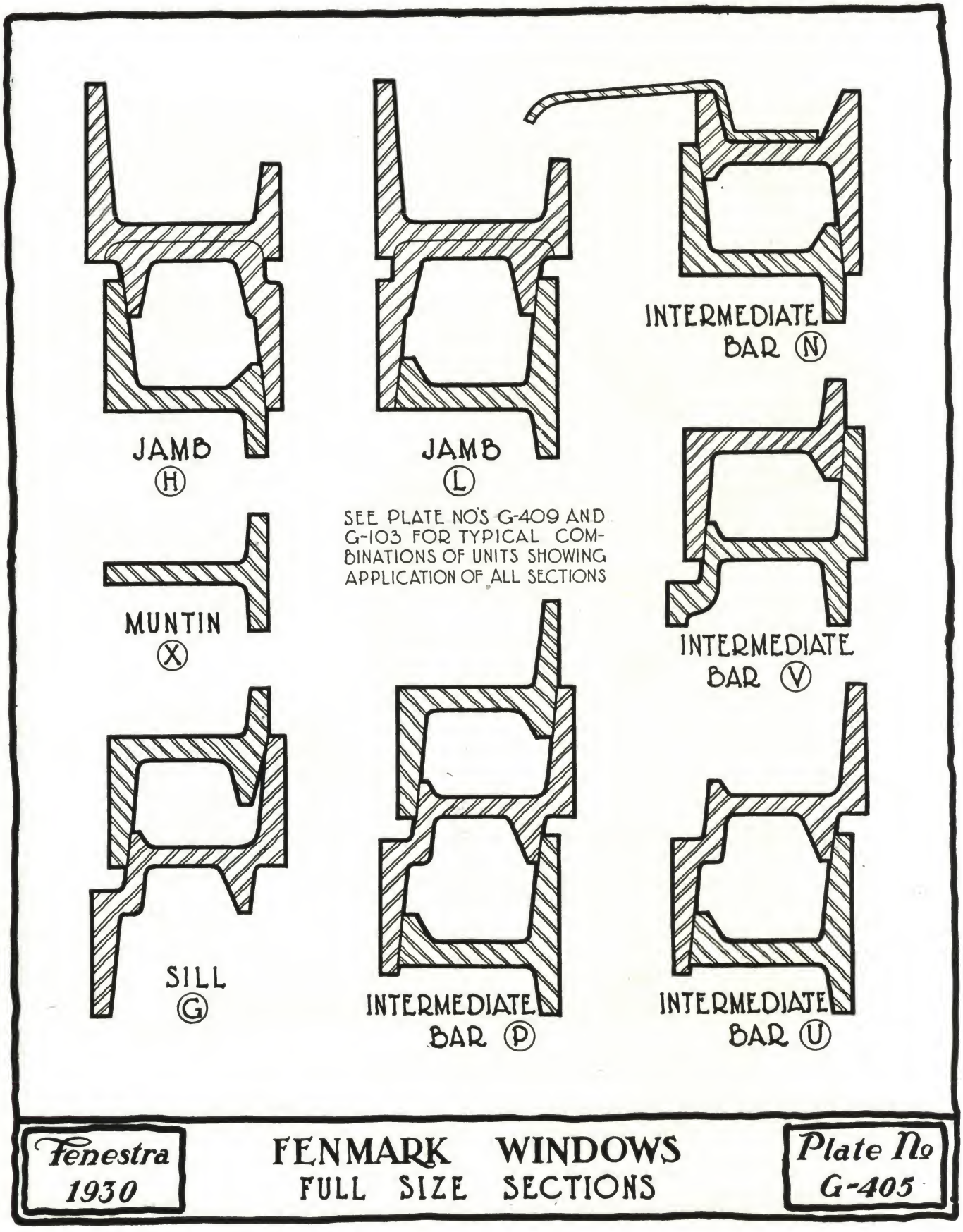
Thumb Screw Operator - No. 1101

Fenestra 1930

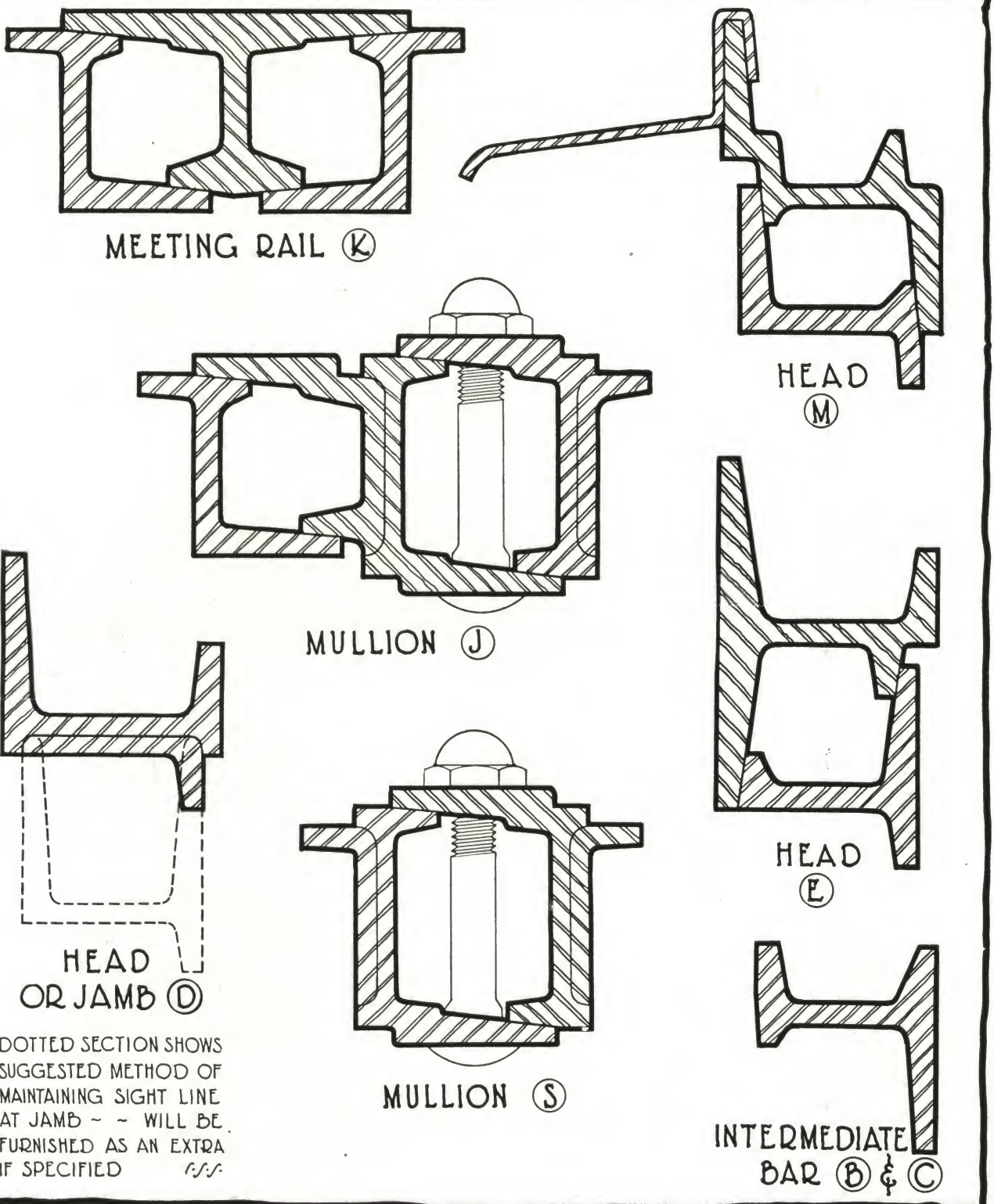
FENMARK WINDOWS
HARDWARE

Plate No G-404

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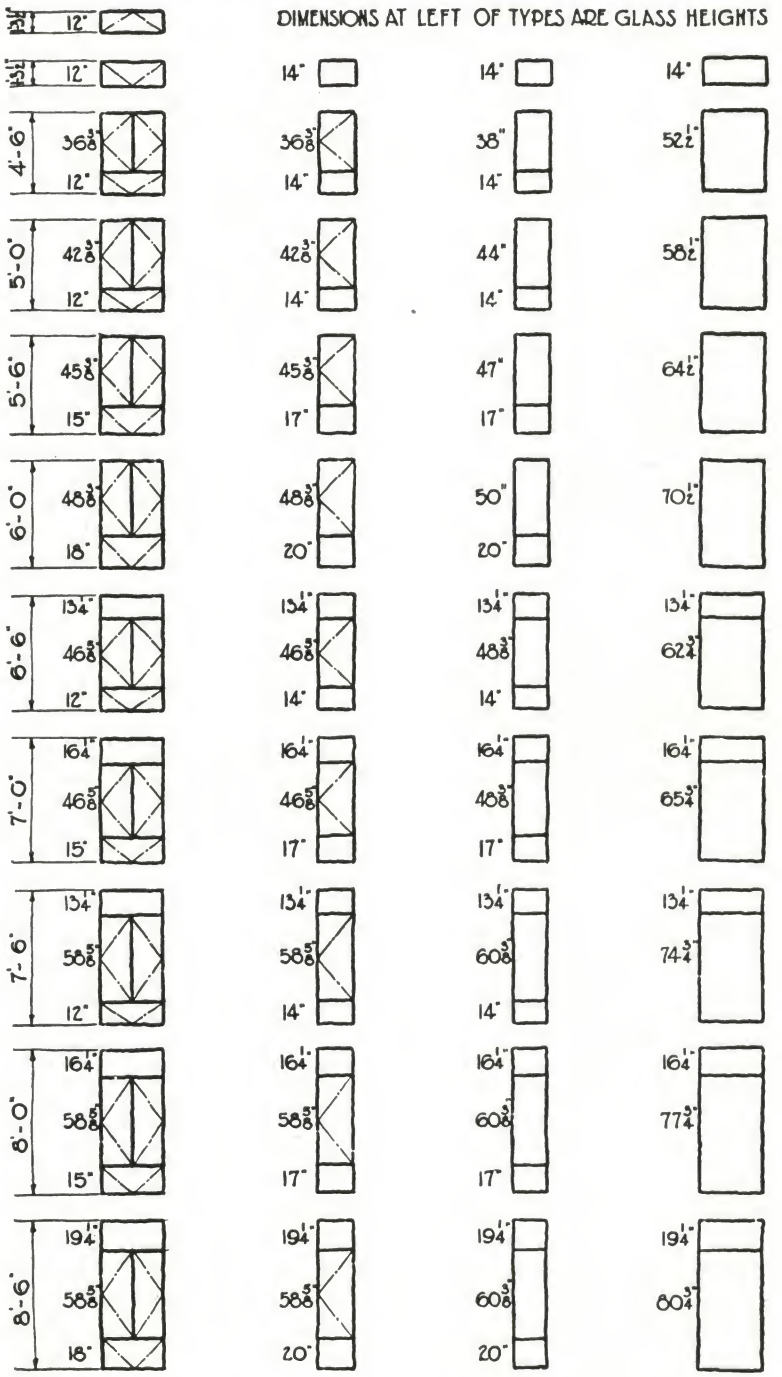


Fenestra 1930

FENMARK WINDOWS
FULL SIZE SECTIONS

Plate No G-406

Continued on next page



4'-6", 4'-0", 3'-6" 3'-0" AND 2'-6" ARE STD. WIDTHS FOR TYPES SHOWN

2'-0" AND 1'-6" ARE STANDARD WIDTHS FOR TYPES SHOWN

2'-0", 1'-6" AND 1'-0" ARE STD WIDTHS FOR TYPES SHOWN.

4'-6", 4'-0", 3'-6" 3'-0" AND 2'-6" ARE STD WIDTHS FOR TYPES SHOWN

NOTES

FULL SIZE SECTIONS ARE FOUND ON PLATE NO'S G-405, G-406

ALL FENMARK WINDOW DIMENSIONS ARE EQUAL TO THE CLEAR OPENING

FRAME MEMBERS PROJECT BEYOND THESE ON ALL FOUR SIDES FOR ANCHORAGE IN BUILDING CONSTRUCTION.

WIDTH OF BARS "F" AND "T" SHOWN ON PLATE NO. G-409 MUST BE ADDED TO OVER-ALL SIZE WHEN COMBINED UNITS ARE USED WITHIN MASONRY OPENING.

SECTION "F" IS LIMITED TO OPENINGS UP TO 9'-0" IN WIDTH

SECTIONS "J", "R" AND "S" ON PLATE NO. G-409 SHOW HOW UNITS MAY BE COMBINED WITHOUT USE OF PLATE MULLION, AND MUST BE SPECIFIED IF DESIRED.

HANDING OF WINDOWS IS DETERMINED BY LOCATION OF HINGE VIEWED FROM OUTSIDE

RIGHT HAND CASEMENT LEAVES ARE HINGED AT RIGHT AND LEFT HAND CASEMENT LEAVES ARE HINGED AT LEFT.

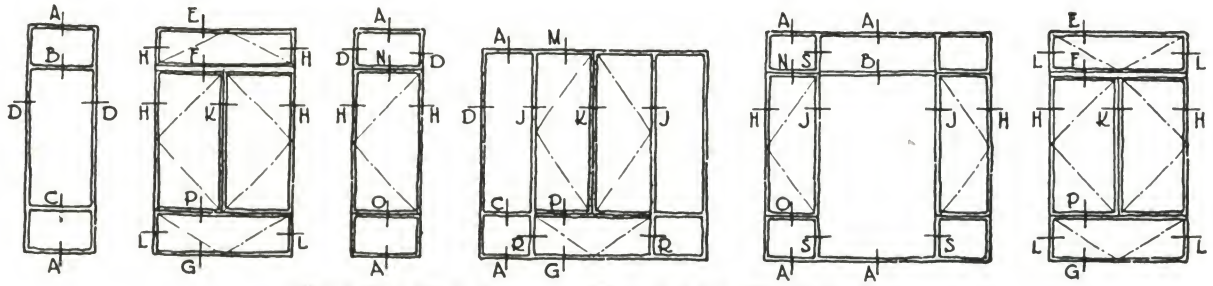
AT EXTRA COST ALL TYPES MAY BE FURNISHED WITH MUNTINS IF DESIRED

Fenestra 1930

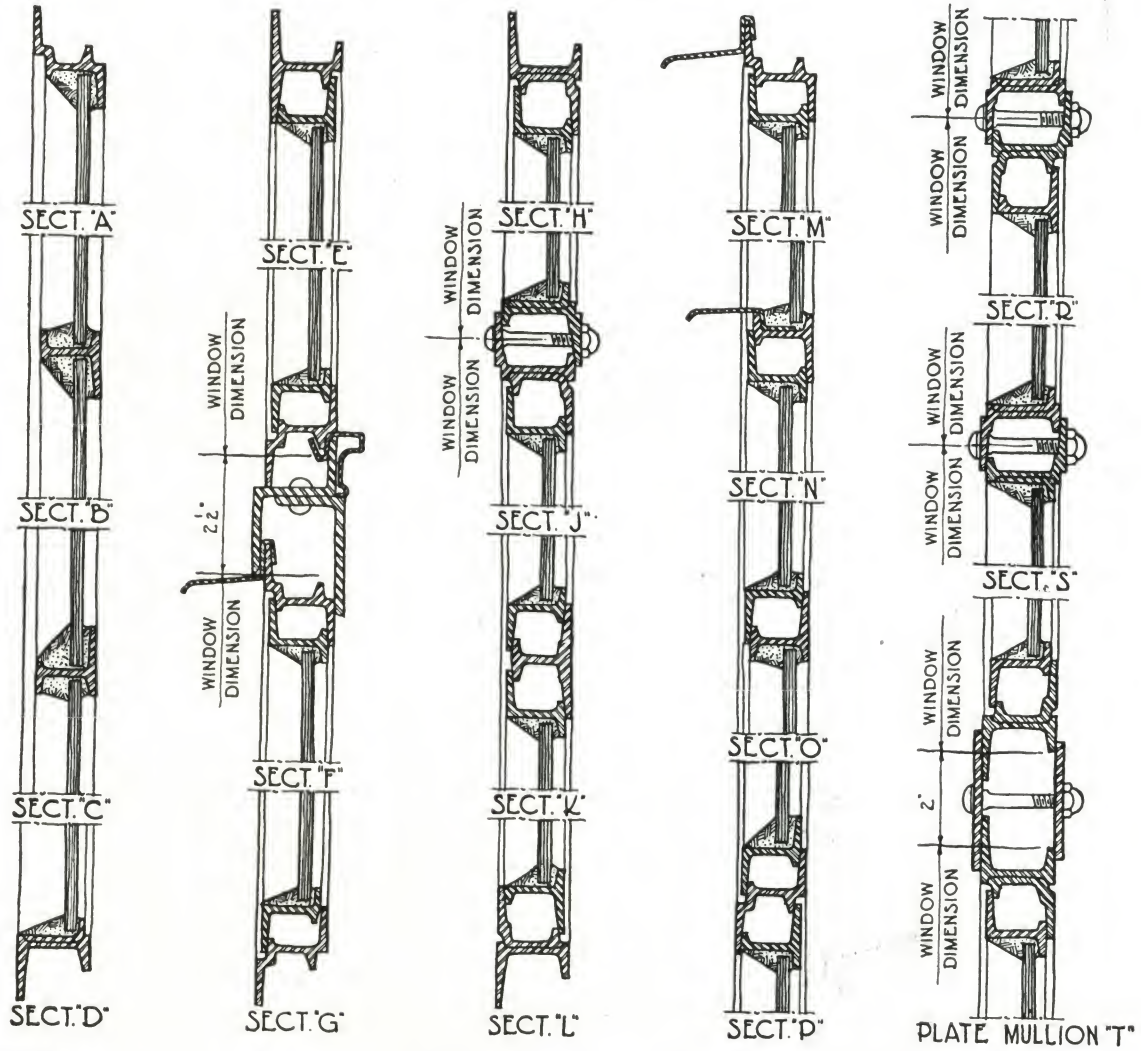
FENMARK WINDOWS TYPES AND SIZES

Plate No. G-408

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TYPICAL ELEVATIONS



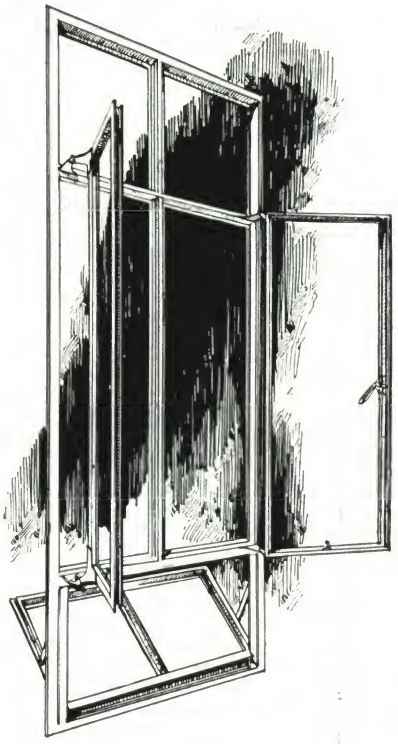
NOTE: DETAILS ON THIS PLATE ALSO APPLY TO SCREENED FENMARK WINDOWS.

Fenestra 1930

FENMARK WINDOWS
COMBINATION DETAILS

Plate No G-409

Continued on next page

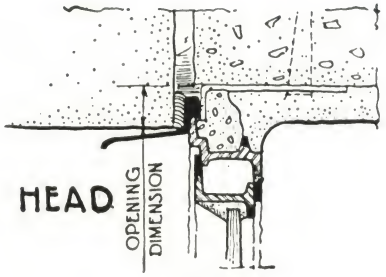


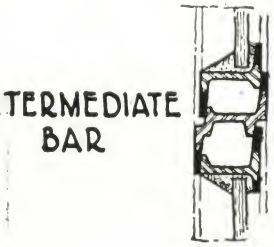
TYPICAL
FENMARK WINDOW

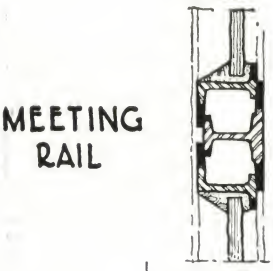
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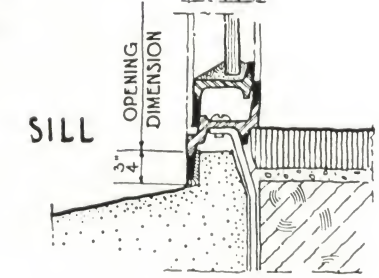
CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS

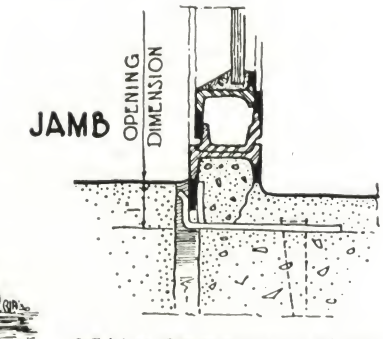
SECTIONS ON THIS PLATE ARE "M", "P", "K", "G" AND "H" AS SHOWN ON PLATES NUMBERS G-405, G-406











SCALE OF DETAILS - 3"-1'-0"



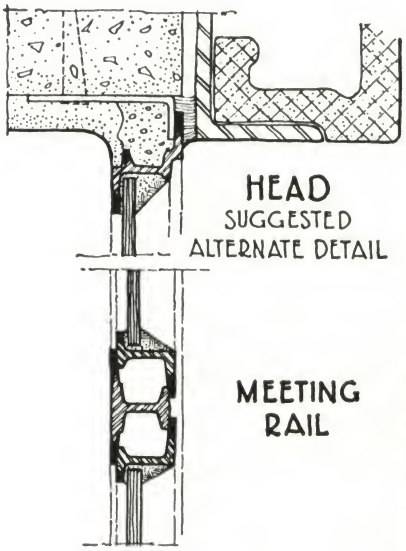
INTEGRITY TRUST COMPANY BUILDING
PAUL P. CRET - ARCH'T. PHILADELPHIA, PA.

Fenestra 1930

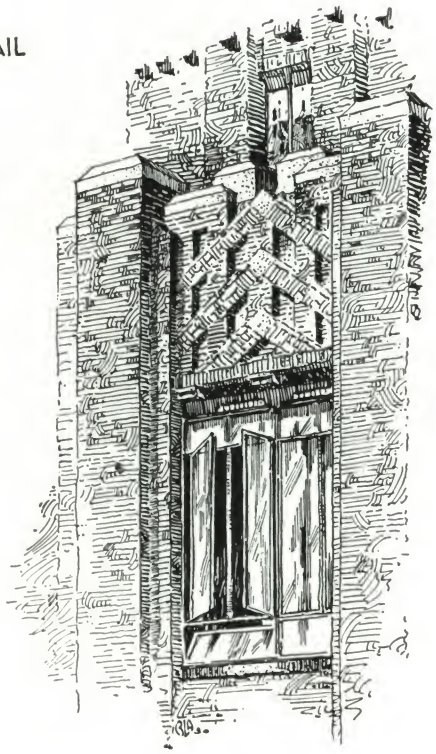
FENMARK WINDOWS
STONE INSTALLATION

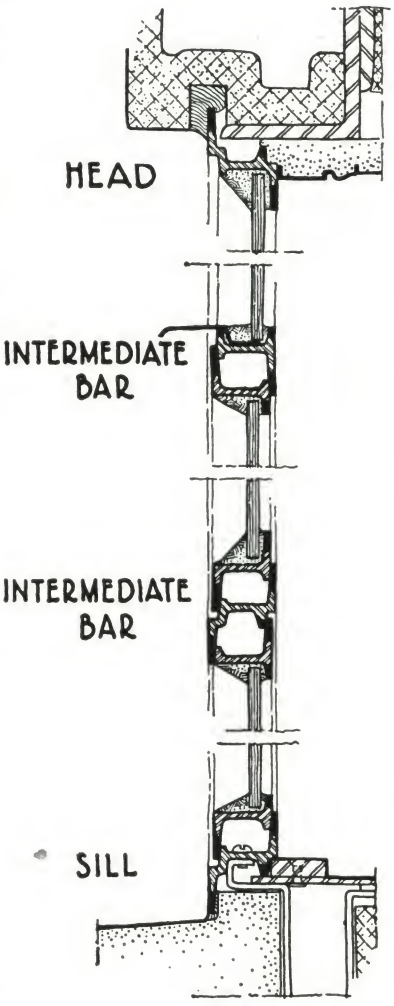
Plate No G-411

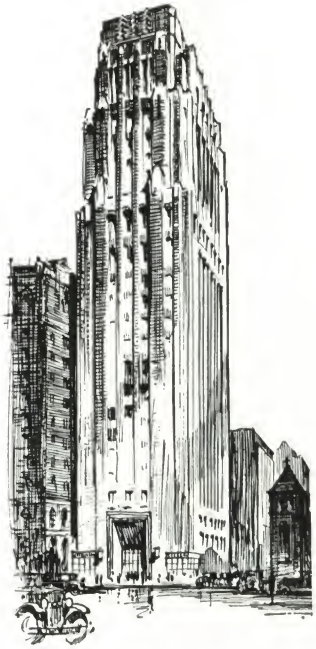
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CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS

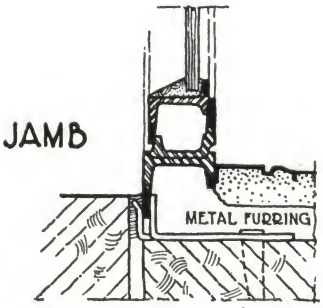






SECTIONS ON THIS PLATE ARE "A", "N", "P", "G", "H" AND "K" SHOWN ON PLATES NUMBERS G-405, G-406

ARCHITECTS BUILDING
PHILADELPHIA - PENNA
BISSEL & SINKLER - BOYD, ABEL & GUGERT
A.H. BROCKIE - I.T. CATHERINE - P.P. CRET
FOLSOM & STANTON - E.B. GILCHRIST
R.H. JOHNSON - G.I. LOVATT - R.R. McGOODWIN
RANKIN & KELLOGG - H. STERNFELD - THOMAS, MARTIN & KIRKPATRICK - F.R. WATSON
C.E. WUNDER - ZANTZINGER, BORIE & MEDARY
ASSOCIATED ARCHITECTS



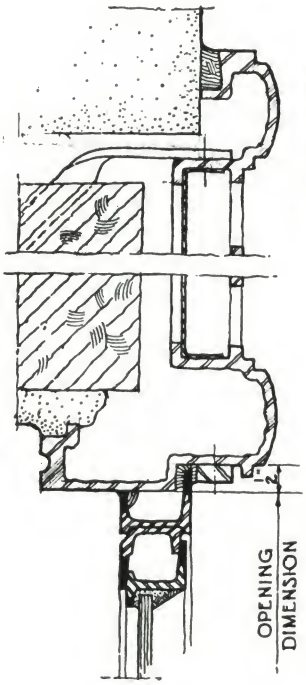
SCALE OF DETAILS - 3"-1'-0"

Fenestra 1930

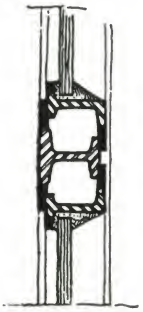
FENMARK WINDOWS
TERRA COTTA INSTALLATION

Plate No G-412

Continued on next page



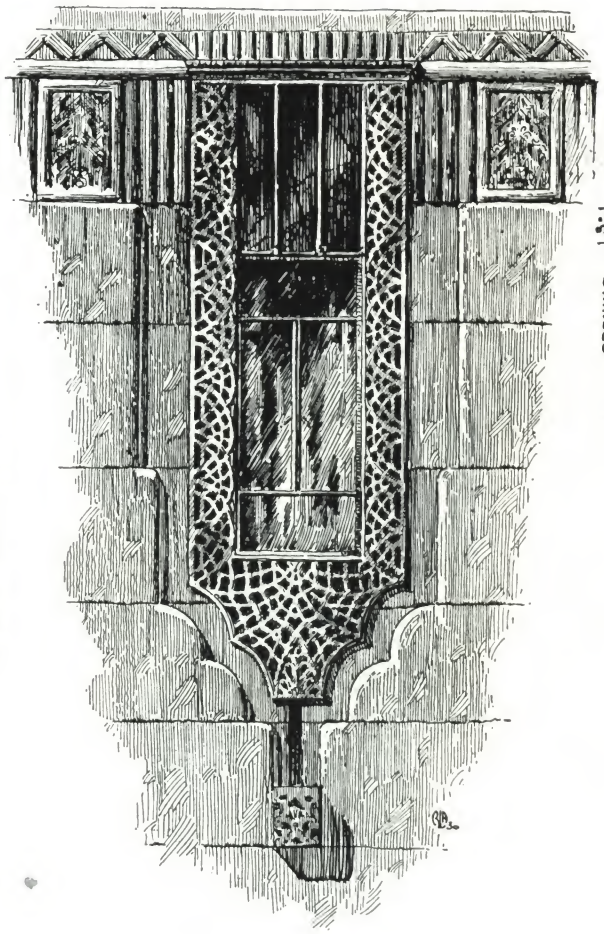
JAMB

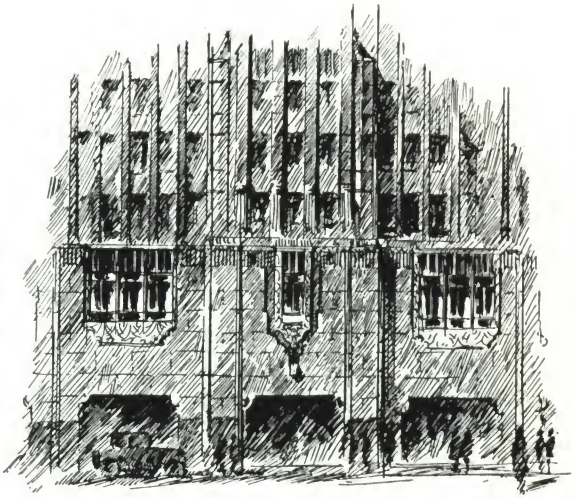


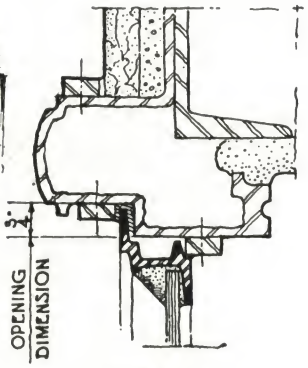
MEETING RAIL

CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS.

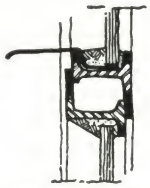
SECTIONS ON THIS PLATE ARE "H", "K", "A", "N", "P" AND "G" AS SHOWN ON PLATES NUMBERS G-405, G-406







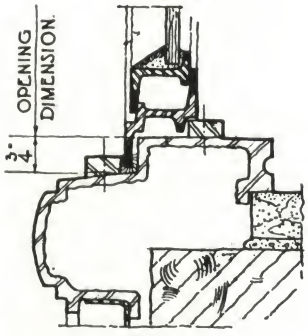
HEAD



INTERMEDIATE BAR



INTERMEDIATE BAR



SILL

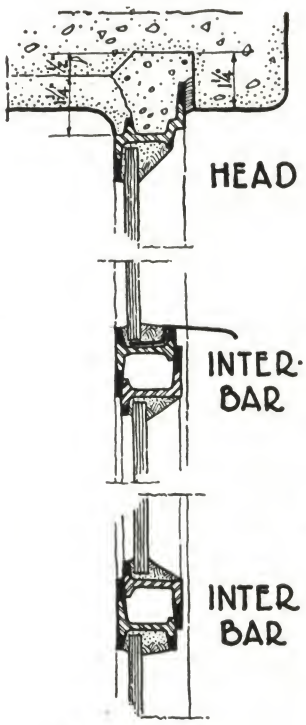
SCALE OF DETAILS - 3"-1'-0"

Fenestra 1930

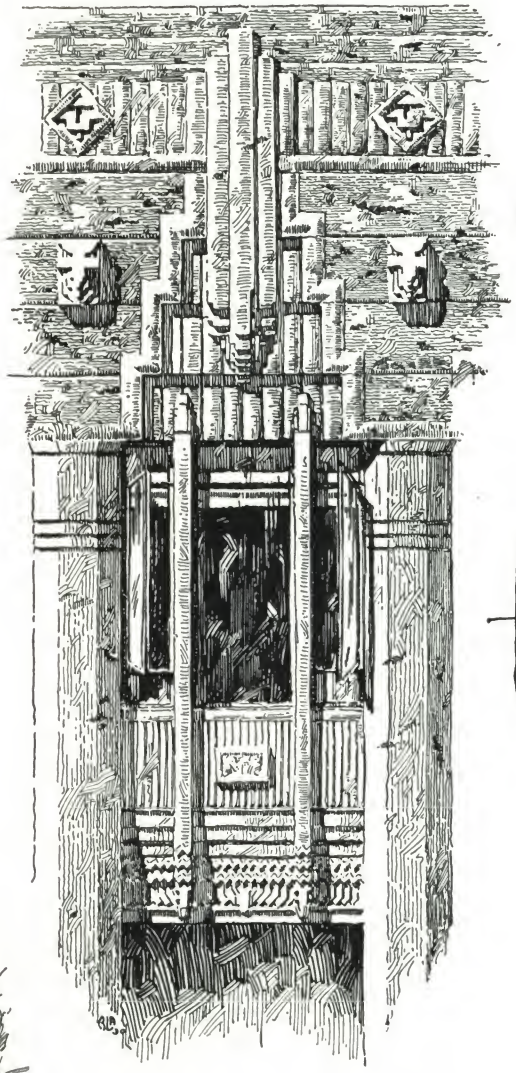
FENMARK WINDOWS
METAL FRAME INSTALLATION

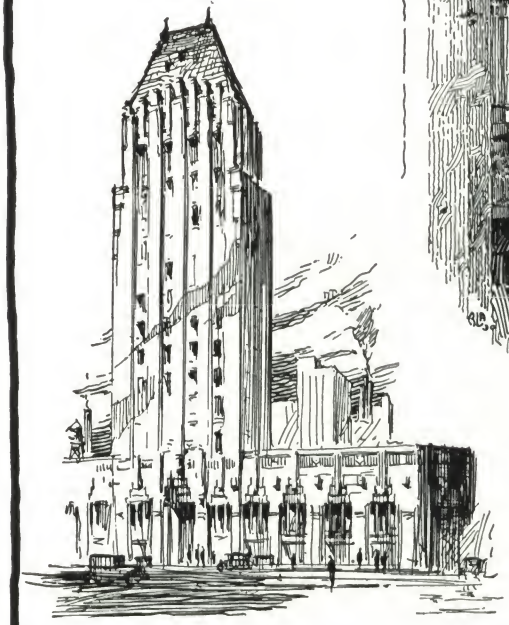
Plate No G-413

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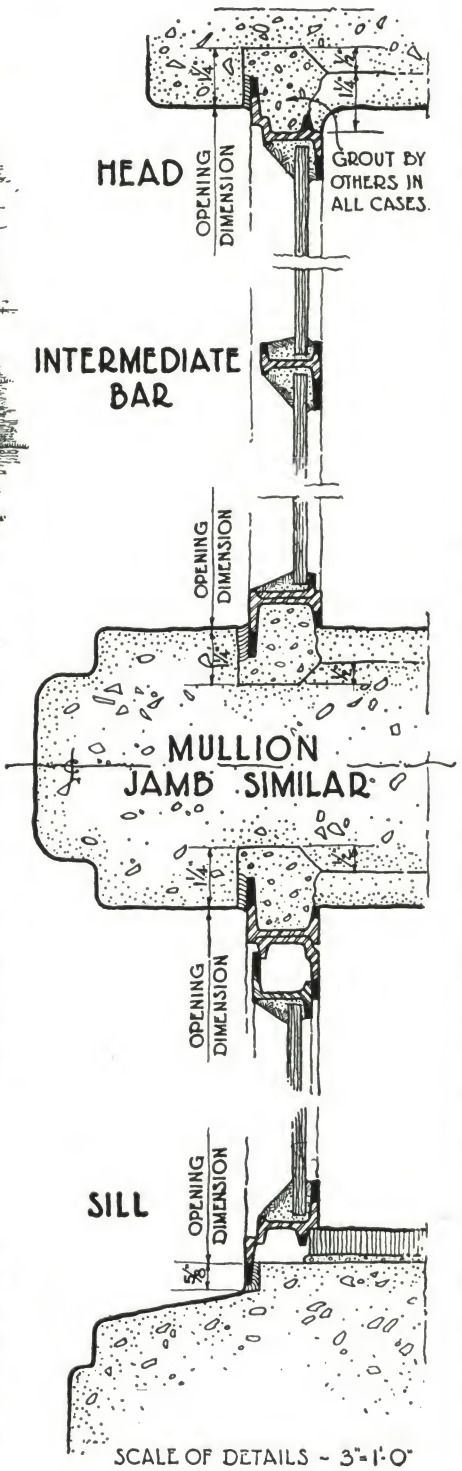
SECTION THRU SIDE LIGHTS





CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS

SECTIONS ON THIS PLATE ARE "A", "N", "B", "D" AND "H" AS SHOWN ON PLATES NUMBERS G-405, G-406



SCALE OF DETAILS - 3"-1'-0"

Fenestra 1930

FENMARK WINDOWS CONCRETE INSTALLATION

Plate No G-414

Continued on next page

SCREENED "FENMARK" WINDOWS

Solid section, steel windows designed to accommodate Fenestra bronze screens. Swing leaves open out and sill ventilator opens in at the top while sliding up from the bottom. Polished, solid bronze hardware operating through the screen. Designed for use in hospitals, hotel dining rooms, restaurants, or other public or semi-public buildings where freedom from insects is desirable

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

All windows shall be Fenestra Screened "Fenmark" Windows manufactured by Detroit Steel Products Company.

MATERIAL

(Note:—Same as the Material Specifications for Fenmark Windows except that Fenestra Screens are supplied.)

SCREENS—Material for screens and screen frames shall be as shown under "Screens."

CONSTRUCTION

(Note:—Same as the Construction Specifications for Fenmark Windows.)

ATTACHED HARDWARE

(Note:—Attach at the factory.)

SWING LEAF HINGES—All side hung swing leaves shall be hung on two heavy extension (cleaning) hinges of special, solid rolled, sherardized steel with heavy fillets in re-entrant angles. Hinge pins of solid bronze (non-removable) shall be fitted into flanged bronze bushings.

(Note:—Bronze pins and bushings provide 100 per cent bronze bearing at all moving pivot points.)

(Note:—"Close In" hinges standard on all types with adjacent swing leaves.)

LOCKING HANDLE BRACKET—Provide tapped holes in frame stile for attachment of bracket.

(Note:—Locking handle brackets for Screened Fenmark Windows will be shipped separately from the window and attached in the field. See Detached Hardware.)

SWING LEAF KEEPER shall be of forged steel welded to the swing leaf stile.

KEEPER—One malleable iron keeper shall be supplied for each sill ventilator handle, to be solidly riveted to the meeting rail.

SWING LEAF OPERATOR PROVISIONS—Provide die cast brackets rigidly attached to the frame meeting rail above the sill ventilator for the attachment of Fenestra standard through screen operator. Provide tapped holes in the bottom rails of all swing leaves for operator attachment.

SILL VENTILATOR OPERATOR PROVISIONS

(Note:—Same as the Sill Ventilator Operating Specifications for Fenmark Windows.)

SCREEN PROVISIONS—Provide one or more pairs of tapped holes in the top and bottom rail of the frame for attachment of screen retaining clips. Provide two pairs of tapped holes in each frame stile opposite sill ventilator for attachment of sill screen retaining clips.

DETACHED HARDWARE

(Note:—All detached hardware shall be shipped carefully packed to prevent damage until applied for use.)

LOCKING HANDLES AND HANDLE BRACKETS shall be assembled at the factory and designed to attach to the casement frame by three countersunk screws inserted from the outside of the windows.

Handle bracket shall be an ornamental die casting designed to accommodate and entirely conceal the locking cam and the swing leaf keeper when the window is closed.

LOCKING HANDLES FOR SIDE HUNG SWING LEAVES shall be of solid bronze, No. 1115 (U. S. Government specification), of ornamental design and coinage finish obtained without the use of plating or chemicals. All locking handles shall be designed with a hinge action to permit their slipping through the screen escutcheon when screen is placed or removed. Each handle to be rigidly attached to a die cast stud and cam, equipped with concealed coil spring to take up wear and prevent rattle. (Plate G404.)

CAM LOCKING HANDLE FOR SILL VENTILATOR shall be of solid bronze (U. S. Government specification) of ornamental design and coinage finish obtained without the use of plating or chemicals. Each handle shall be equipped

Continued on next page

with a concealed coil spring to take up wear and prevent rattle and shall be attached to the top rail of the sill ventilator by three bronze screws. Handle No. 1122.

Operators for Side Hung Leaves shall be Fenestra special thumbscrew type No. 1116, designed to provide easy operating movement through the screen.

Operator shall consist of a solid bronze arm passing through a solid bronze fulcrum guide equipped with a friction plate. One end of the arm to attach to the sill of the swing leaf by a pressed steel bracket; the other end to carry a solid bronze peg for a finger grip. Operating mechanism to be mortised into the frame bracket and held by bronze screws. (Plate G404.)

Open-In Transom Hardware—Provide for each open-in transom one solid bronze automatic spring catch, No. 739. (Plate G101.)

MASTIC

(Note:—Same as the Mastic Specifications for Fenmark Windows.)

ERECTION

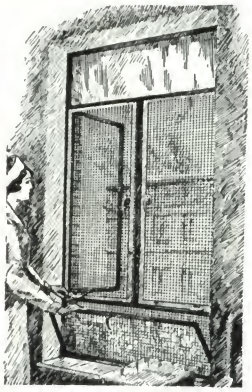
(Note:—Same as the Erection Specifications for Fenmark Windows.)

PAINTING

(Note:—Same as the Painting Specifications for Fenmark Windows.)

GLASS AND GLAZING

(Note:—Same as the Glass and Glazing Specifications for Fenmark Windows.)



SCREENS

For Side Hung Swing Leaves—Screens shall be designed to set flat against the inside of the casement frame with casement locking handle and operating hardware extending through the screen to permit operation of the swing leaf without touching the screen.

Screen frames shall be of best quality, cold rolled, rust-proofed, strip steel or bronze, formed 1″ wide by ½″ thick at head and jambs (bottom rails 1½″ x ½″). All frames shall contain a triangular reinforcing brace running the full length of the stile. Paint steel frames two coats of gray lead and oil, baked on. Screen cloth shall be standard woven 16-mesh of oxidized finish bronze wire and shall be held taut along both stiles and rails by a specially formed cap interlocked with the main portion of the frame.

(Note:—Screens with bronze frames or with finer mesh may be had at extra cost.)

Each screen shall be provided with a 22-gauge steel escutcheon with circular hole to fit over and around the locking handle. Bottom rail of each screen shall be designed with a slot to permit the passage of the operator arm.

For Sill Ventilator the screen shall correspond in material and workmanship to screens for side hung swing leaves and shall be attached to the outside of the frame by four pressed angle clips.

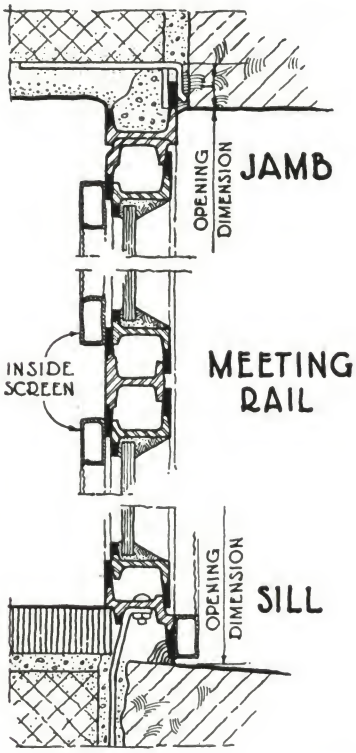
SHADING

(Note:—Same as the Shading Specifications for Fenmark Windows.)



FLORENCE CRITTENTON HOSPITAL DETROIT MICHIGAN
SMITH HINCHMAN & GRYLLS, ARCHITECTS

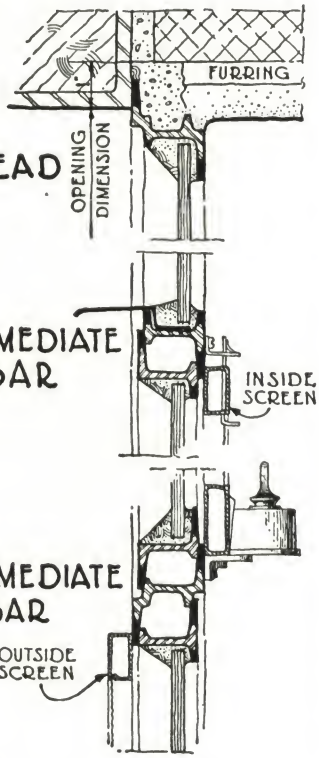
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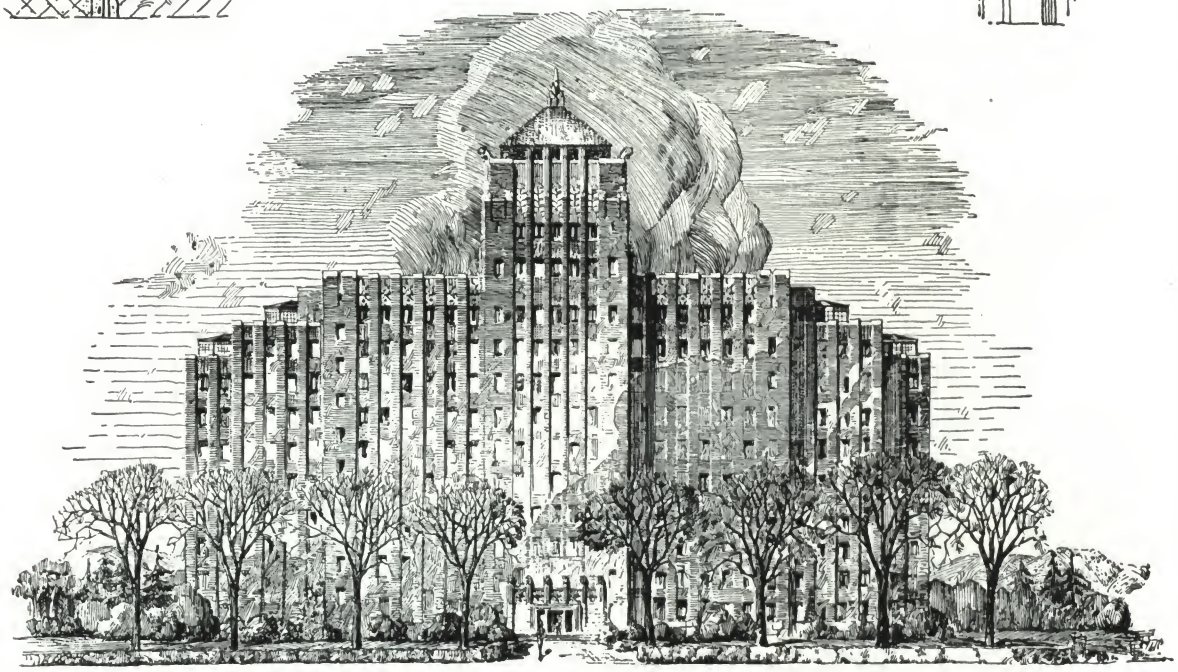
CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS

SECTIONS ON THIS PLATE ARE "H", "K", "G", "A", "N" AND "P" AS SHOWN ON PLATES NUMBERS G-405 G-406





SCALE OF DETAILS - 3"=1'-0"



HARBORVIEW HOSPITAL KINGS COUNTY SEATTLE WASH
THOMAS, GRAINGER & THOMAS - ARCHITECT'S

Fenestra 1930

SCREENED FENMARK TYPICAL HOSPITAL INSTALLATION

Plate No G-501

Continued on next page

PROJECTED "FENMARK" WINDOWS

Solid section, steel windows with upper ventilators opening out from the bottom while sliding down from the top and sill ventilator opening in from the top while sliding up from the bottom. Solid bronze hardware of ornamental design. No Fenestra screens are supplied. Intended for use in offices, schools, and public and commercial buildings

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

All windows shall be Fenestra Projected "Fenmark" Windows as manufactured by Detroit Steel Products Company.

MATERIAL

WINDOW SECTIONS shall be specially designed, hot rolled, individually straightened, solid steel bars with heavy fillets in re-entrant angles, designed for exterior glazing.

FRAME MEMBERS—Jam and head members shall be heavy unequal leg sections, designed for adequate anchorage. Sills and horizontal intermediate bars shall be Z's with offset baffles.

SWING LEAF AND SILL VENTILATOR MEMBERS shall be Z-shaped sections with baffles. Jamb weathering (at sill ventilator) shall be offset unequal leg channels forming beveled, interior, sliding shoe grooves.

MUNTINS shall be T sections.

MULLIONS shall be interior and exterior plates secured with bolts and nuts.

TRANSOM BARS shall be standard Fenestra (Z bars and angles) (angles and channels with interior pressed steel mullion covers).

(Note:—Other designs of mullions and transom bars may be used. If desired, provisions for them should be made in the ornamental iron or structural steel specifications.)

CONSTRUCTION

FRAMES, including intermediate bars, shall be mortise and tenon, air hammer riveted and electrically welded at corners. All exposed faces at welds shall be ground to a smooth finish.

VENTILATORS—All stiles and rails of ventilators shall be mitered at corners and electrically butt welded with all exposed faces at welds ground smooth.

MUNTINS—Joints at frame and ventilator members shall be closely fitted mortise and tenon, air hammer riveted.

MULLIONS—Provide mullions wherever two or more windows are placed side by side in the same opening.

SILL AND JAMB ANCHOR CLIPS—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frames where required.

ATTACHED HARDWARE

(Note:—Attached at factory.)

LOCKING HANDLE BRACKETS—On open-out ventilators, provide special design solid, rolled Z-bar brackets, electrically welded to ventilator bottom rails for attachment of locking handle.

VENTILATOR OPERATING HARDWARE—Ventilators shall (project out from the bottom while sliding down from the top) (or) (project in from the top while sliding up from the bottom) as indicated. The ventilators shall be so constructed that by tilting they may be conveniently washed from inside the building.

(Note:—Specify swing-out, swing-in or both as required.)

Each ventilator shall be balanced on two supporting arms of solid spring steel. Connections between supporting arms and ventilators shall be made by steel brackets rigidly supported and double riveted to the vertical members, with arms attached to brackets by bronze shoulder pivots. Each ventilator shall be equipped with two brass friction shoes sliding vertically in the weathering channels.

Continued on next page

ALIGNMENT SPRINGS—Each open-out ventilator shall be equipped with two shouldered, alignment control springs riveted to the channel jambs.

(Note:—Include if ventilators are more than 20" high.)

(Note:—The shoulders of these springs are so designed and located as to limit the downward travel of the friction shoes and stop all open ventilators in uniform alignment of approximately 60 degrees. When it is desired to open the ventilator at a greater angle for washing, light pressure on the strings depresses the shoulders and allows the friction shoes to slide past. As the ventilator is returned to a closed position, the action of the spring is automatic.)

DETACHED HARDWARE

OPERATING HARDWARE FOR PROJECTED FENMARK WINDOWS shall be of bronze, with coinage finish, and shall be carefully packed to prevent damage until applied for use.

LOCKING AND OPERATING HARDWARE

(Note:—Select as required.)

FOR OPEN-OUT VENTILATORS—Bronze pole ring, No. 151, at head of ventilator. Bronze, cam action handle, No. 733 or No. 914, attached to bracket on bottom rail by bronze bolt and friction clevis (No. 733 shall be provided with a notched head to permit restricted ventilation), steel strike plate with brass rubbing rivet.

FOR OPEN-IN VENTILATORS—Bronze cam action handle No. 1071, with riveted, iron-lipped strike or bronze automatic spring catch, No. 739, for pole operation.

Where open-in ventilator is located immediately below an open-out ventilator, use combination riveted iron strike.

MASTIC

The window manufacturer shall furnish sufficient mastic to form a weathertight union between window frames and mullions or transom bars. No caulking by window manufacturer at head or jambs.

ERECTION

(Note:—Include in the masonry specifications that all windows shall be caulked at head, sill and jambs with mastic or other caulking compound to be supplied and applied by the erectors, to form a weathertight union between the window frames and the building construction.)

(Note:—Include in the masonry specifications that all masonry openings shall be accurately constructed in accordance with standard Fenestra installation details so that windows may be erected after masonry is completed.)

(Note:—Include in the masonry specifications that all mortar grouting, pointing, etc., shall be done by the mason contractor after the windows have been erected.)

All Fenestra Projected Fenmark Windows shall be erected in prepared openings by the Fenestra Construction Company, under a separate contract.

All windows shall be set plumb and true, properly aligned and securely anchored and all ventilators properly adjusted before glazing.

Standard Fenestra sill anchors shall be used (1) in all cases where a ventilator comes at the sill of the window; (2) in all multiple unit openings where mullions are not anchored into the sills.

Standard Fenestra Jamb Anchor Clips, No. 822, to be used as necessary.

Apply all hardware in accordance with the manufacturer's directions. Detached hardware shall not be installed until after glazing and painting have been completed and building has been plastered.

PAINTING

All windows shall be given one dip-coat of gray lead and oil paint by the manufacturer before shipment.

(Note:—The following should be provided for in the painting specifications: "One additional coat of paint should be applied after erection, before glazing. Painting contractor shall apply one field coat of paint before erection to all parts of window which cannot be painted after erection." Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.)

(Note:—Where desired, the Fenestra Construction Company at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.)

GLASS AND GLAZING

(Note:—The following should be included in the glass and glazing specifications: "Glass shall be (⅛" light plate) (¼" thick plate)." Single or double strength glass is not recommended.

"Putty shall be steel casement putty." This is a special, high grade putty which insures quick setting. Ordinary wood window putty must not be used.)

All windows shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated steel spring glazing clips furnished by the window manufacturer. Face putty should be applied in a neat, clean-cut, smooth manner.

SHADING

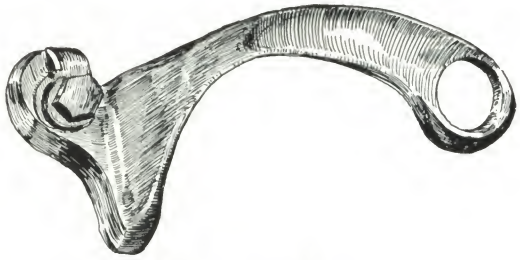
(Note:—All shades must be located at least 2" from the inside face of the window to clear hardware.)

(Note:—Each Projected Fenmark Window is drilled at both jambs near the head for attachment of standard shade bracket clips which are supplied at slight added cost. These clips are of sufficient depth to bring the shade bracket to the proper position and are slotted to accommodate any standard bracket. If shade bracket clips are required, so specify.)

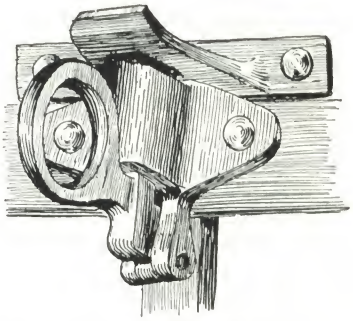
UNDERWRITERS

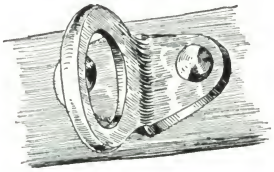
(Note:—Under certain conditions and limitations these windows can be supplied with Underwriters' Label.)

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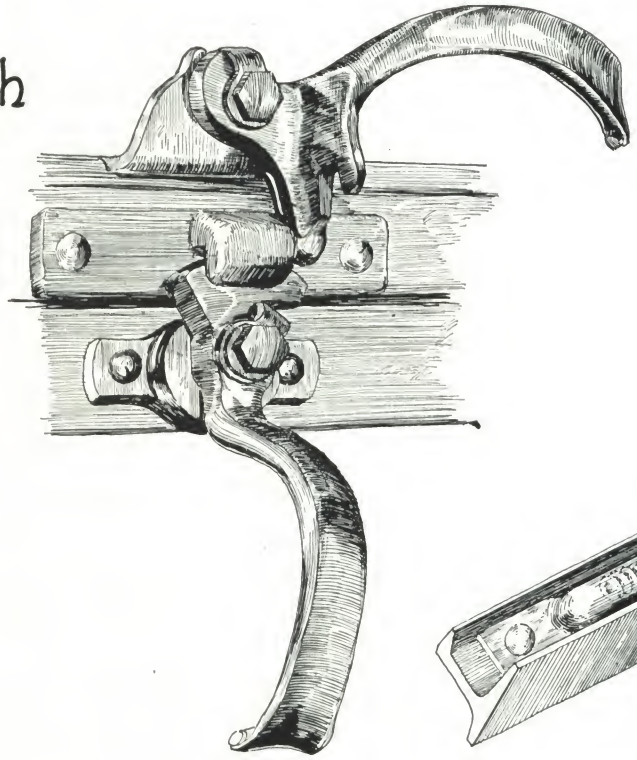
Handle
NO.-914
FOR POLE OPERATION

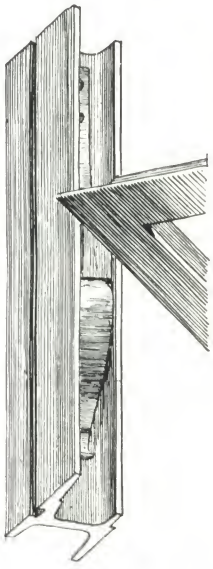


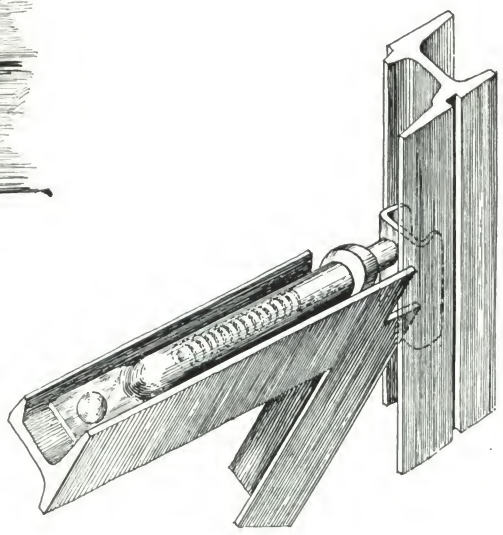


Spring Catch
NO.-739B

Pole Ring
NO-151







Alignment Stop

Upper Handle NO.-733
Lower Handle NO.-1071

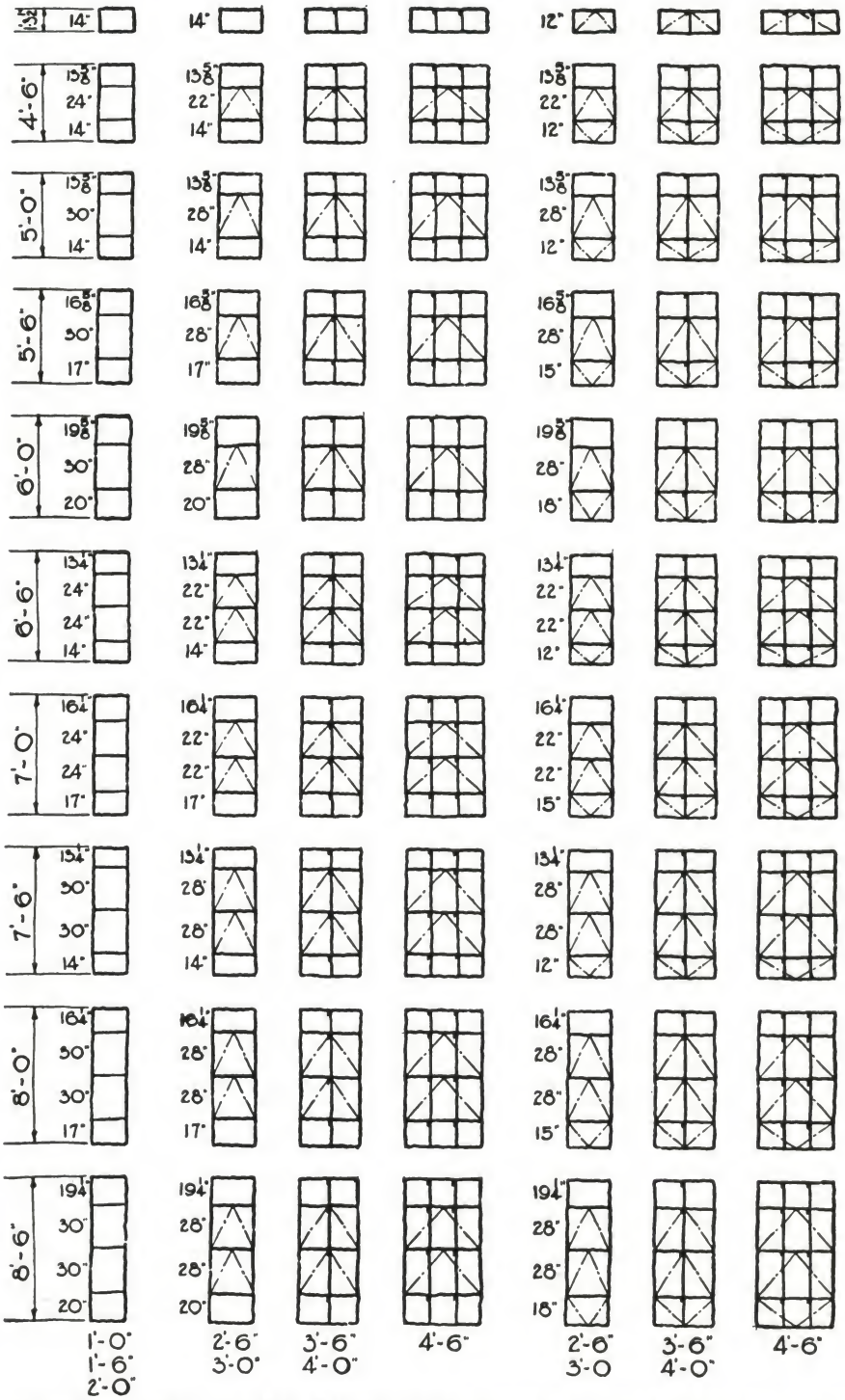
Sliding Friction Shoe

Fenestra 1930

FENMARK PROJECTED HARDWARE

Plate No G-101

Continued on next page



NOTES

ALL PROJECTED FENMARK WINDOW DIMENSIONS ARE EQUAL TO THE CLEAR OPENING DIMENSION FRAME MEMBERS PROJECT BEYOND THESE ON ALL FOUR SIDES FOR ANCHORAGE IN BLDG CONSTRUCTION

DIMENSIONS SHOWN AT LEFT OF EACH GROUP OF TYPES ARE STANDARD GLASS HEIGHTS GIVEN TO SHOW PROPER PROPORTIONS FOR HORIZONTAL DIVISIONS

TYPICAL ELEVATIONS SHOWING COMBINATIONS OF UNITS AND APPLICABLE DETAILS ARE FOUND ON PLATE NUMBER G-103.

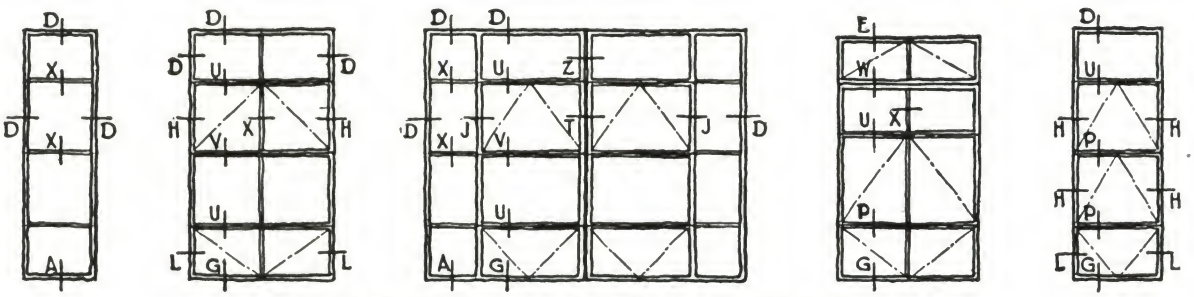
SIZES GIVEN UNDER EACH COLUMN ARE STANDARD WIDTHS OF CLEAR OPENINGS

Fenestra 1930

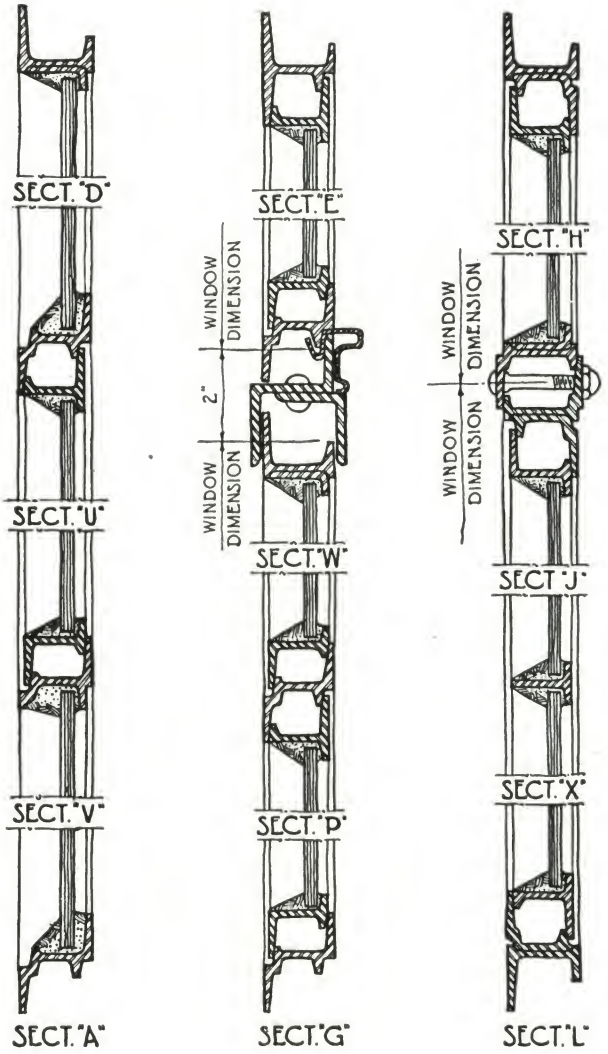
FENMARK PROJECTED TYPES AND SIZES

Plate No G-102

Continued on next page



TYPICAL ELEVATIONS



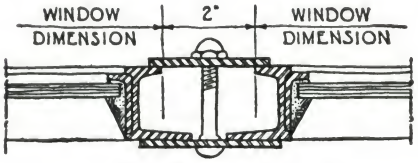
NOTES

FULL SIZE SECTIONS ARE FOUND ON PLATES NUMBERS G-405, G-406

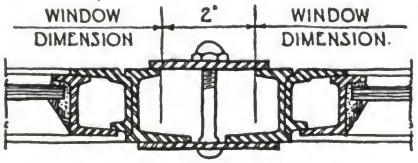
WIDTH OF BARS "W", "Z" AND "T" MUST BE ADDED TO OVER-ALL SIZES WHEN COMBINED UNITS ARE USED WITHIN MASONRY OPENING.

SECTION "W" IS LIMITED TO OPENINGS UP TO 9'-0" IN WIDTH.

SECTION "J" SHOWS HOW UNITS MAY BE COMBINED WITHOUT USE OF PLATE MULLION AND MUST BE SPECIFIED IF DESIRED.



SECT."Z"



SECT."T"

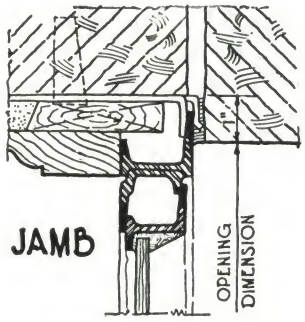
Fenestra 1930

FENMARK PROJECTED COMBINATION DETAILS

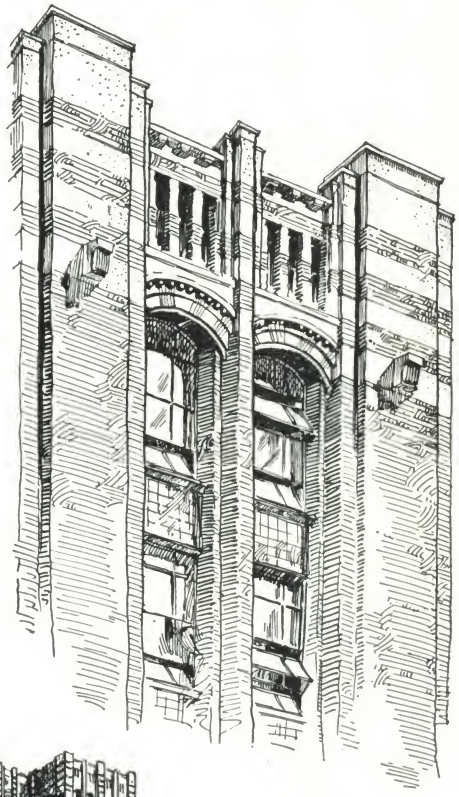
Plate No G-103

Continued on next page

SCALE OF DETAILS - 3"-1'-0"



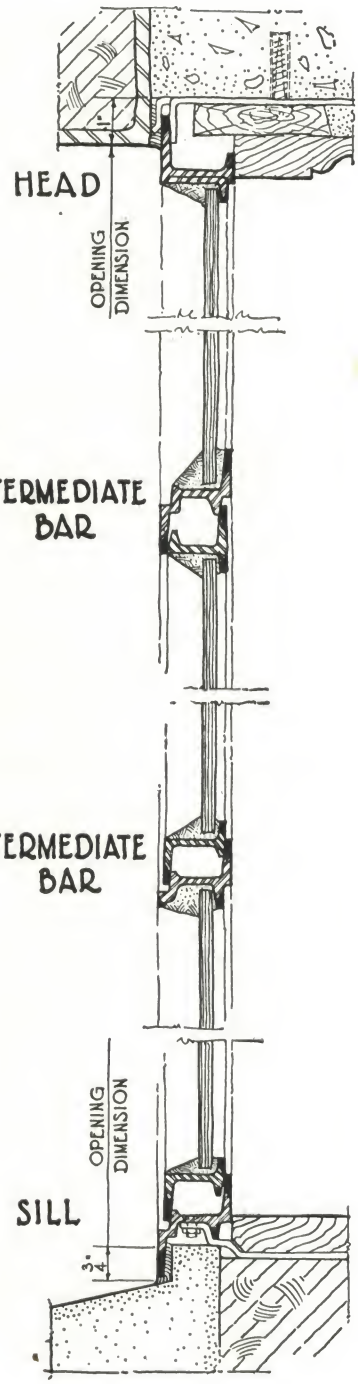
CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS





GRISWOLD BUILDING
DETROIT - MICHIGAN
ALBERT KAHN INC.
ARCHITECT

SECTIONS ON THIS PLATE ARE "D", "U", "V", "G" AND "H" AS SHOWN ON PLATES NUMBERS G-405, G-406

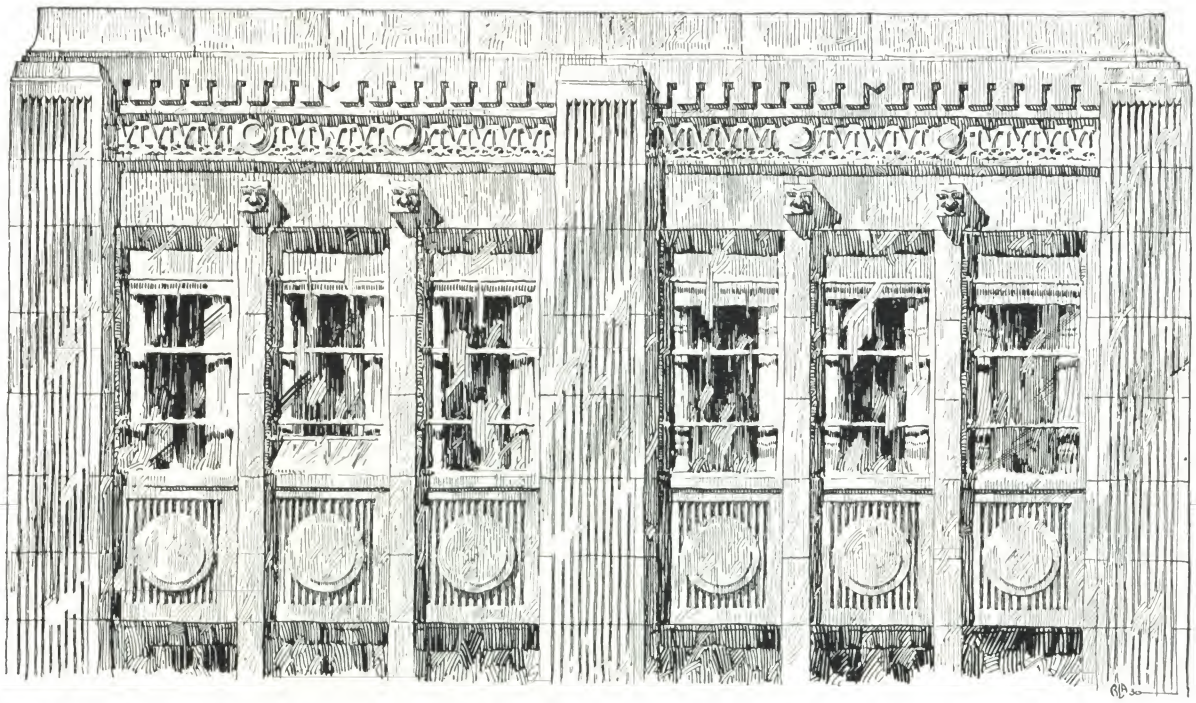


Fenestra 1930

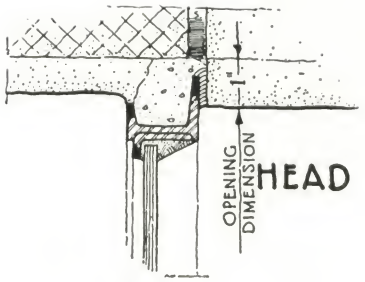
FENMARK PROJECTED BRICK INSTALLATION

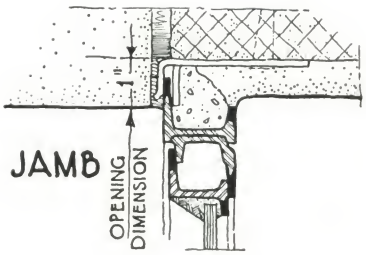
Plate No G-104

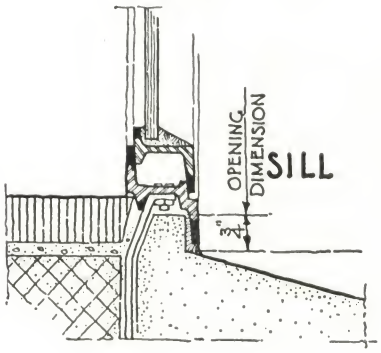
Continued on next page



JOSEPH HILTON BLDG.
NEW YORK CITY
D. R. SWARTBURG
ARCHITECT











NOTES

CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS.

SECTIONS ON THIS PLATE ARE "D", "G", "H", "U" AND "V" AS SHOWN ON PLATES NUMBERS G-405, G-406

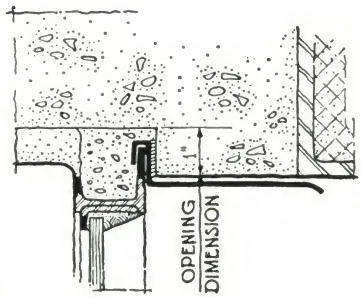
SCALE OF DETAILS - 3"=1'-0"

Fenestra 1930

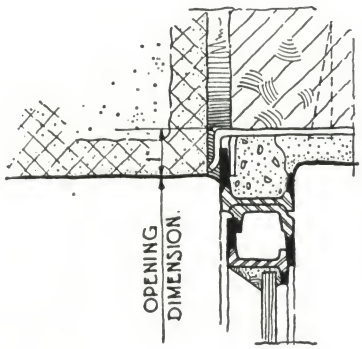
FENMARK PROJECTED STONE INSTALLATION

Plate No G-105

Continued on next page



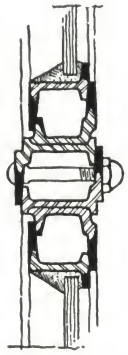
HEAD



JAMB



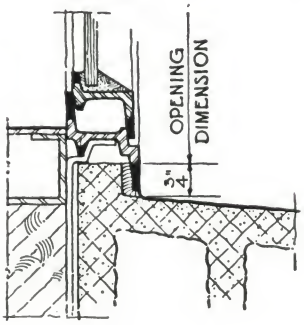
INTERMEDIATE BAR



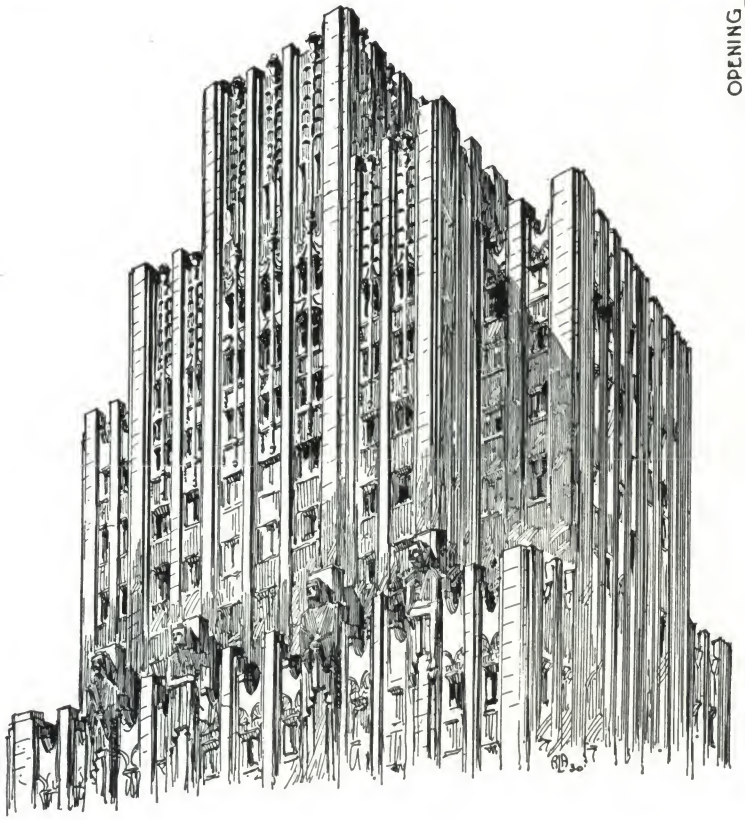
MULLION



INTERMEDIATE BAR



SILL



DETAIL UPPER PORTION
CONTINENTAL LIFE INSURANCE
BUILDING - ST. LOUIS, MISSOURI
WILLIAM B. ITTNER - ARCHITECT

SCALE OF DETAILS - 3"-1'-0"

NOTES

CAULKING BETWEEN WINDOW FRAME AND BUILDING CONSTRUCTION SHALL BE SUPPLIED AND APPLIED BY OTHERS.

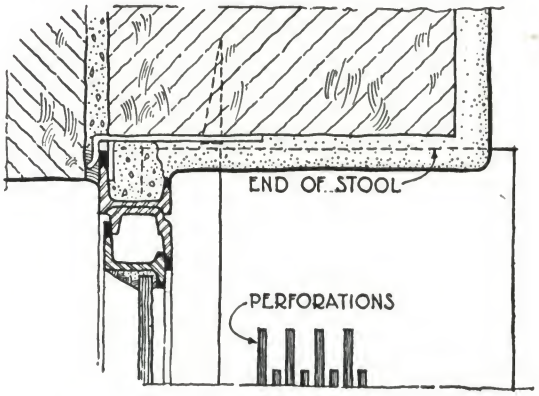
SECTIONS ON THIS PLATE ARE "D", "U", "P", "G", "H" AND "J" AS SHOWN ON PLATES NUMBERS G-405, G-406

Fenestra 1930

FENMARK PROJECTED TERRA COTTA INSTALLATION

Plate No G-106

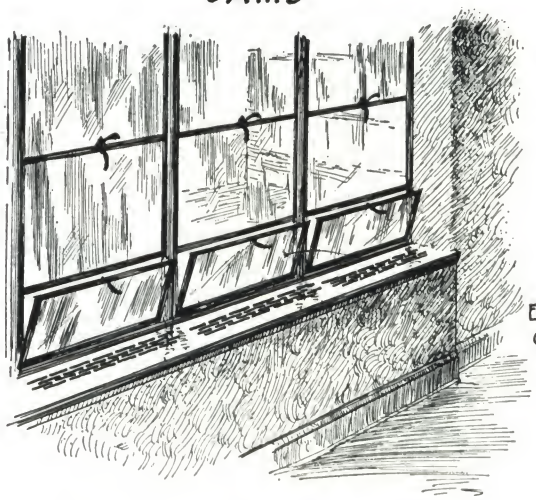
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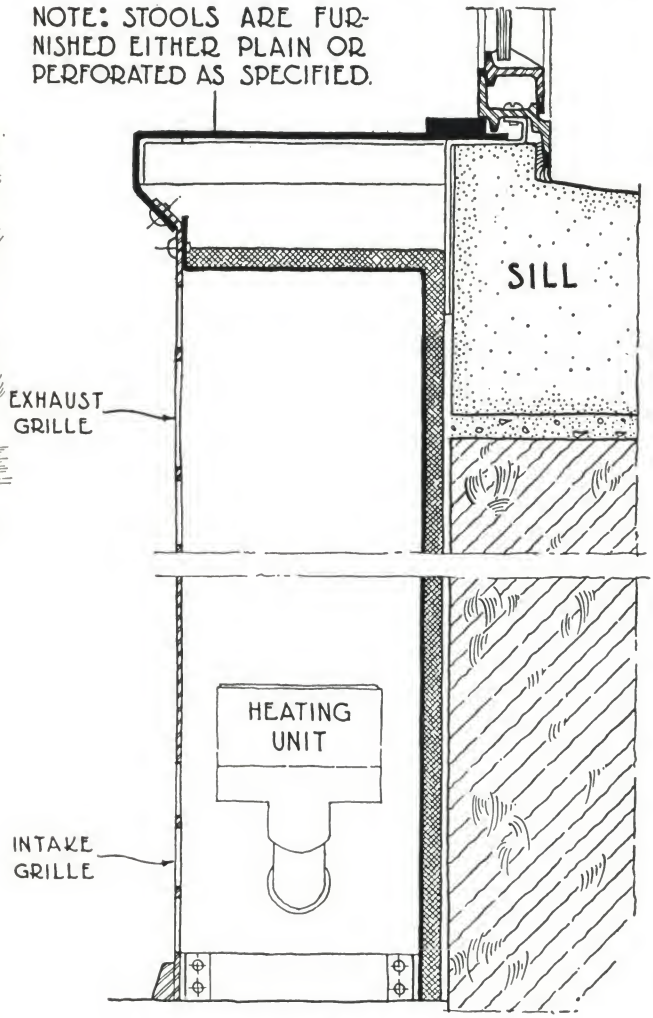


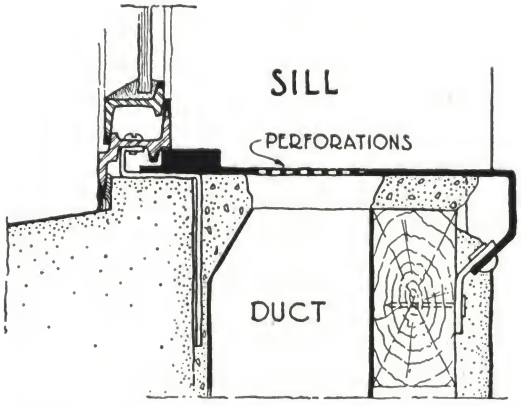
JAMB



NOTE: STOOLS ARE FURNISHED EITHER PLAIN OR PERFORATED AS SPECIFIED.







SECTION THROUGH STOOL WITH HOT AIR SUPPLY DUCT

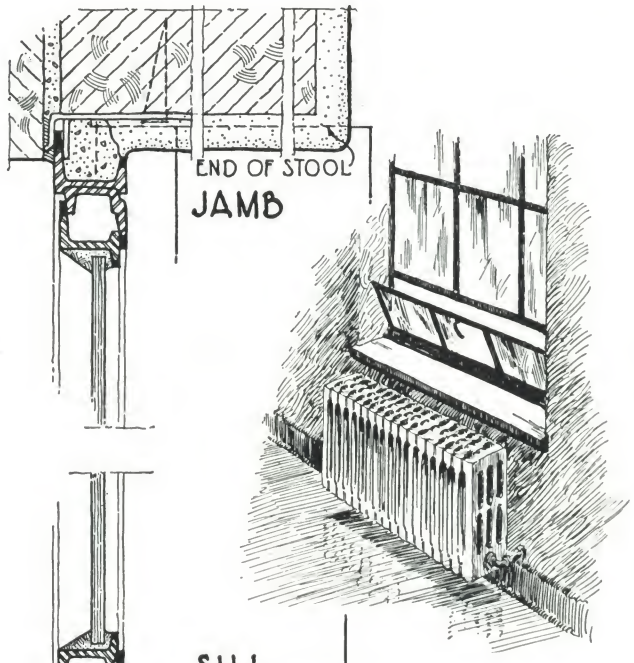
SECTION THROUGH STOOL SHOWING CONCEALED RADIATION

Fenestra 1930

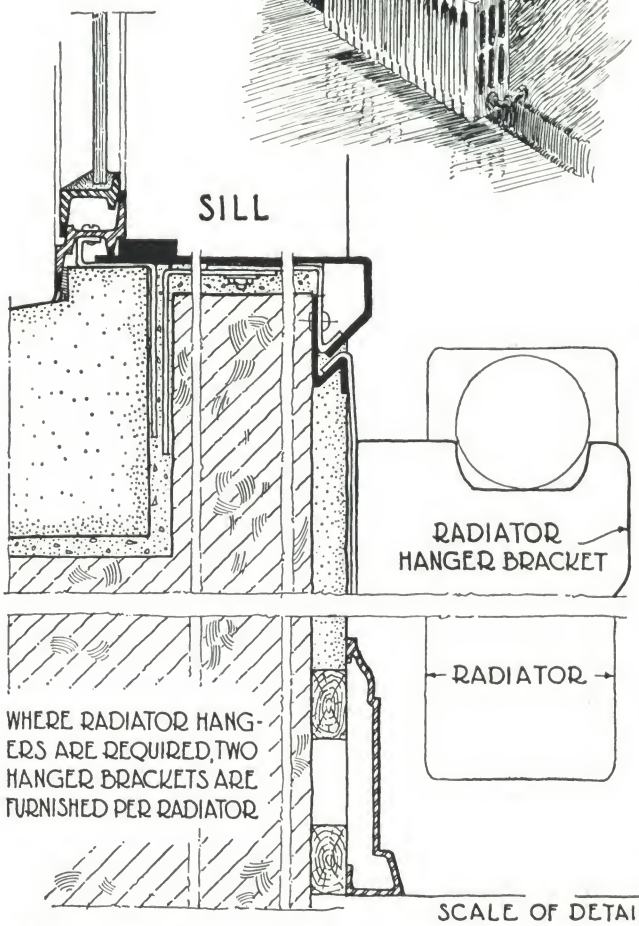
FENMARK WINDOWS
METAL STOOL SUGGESTIONS

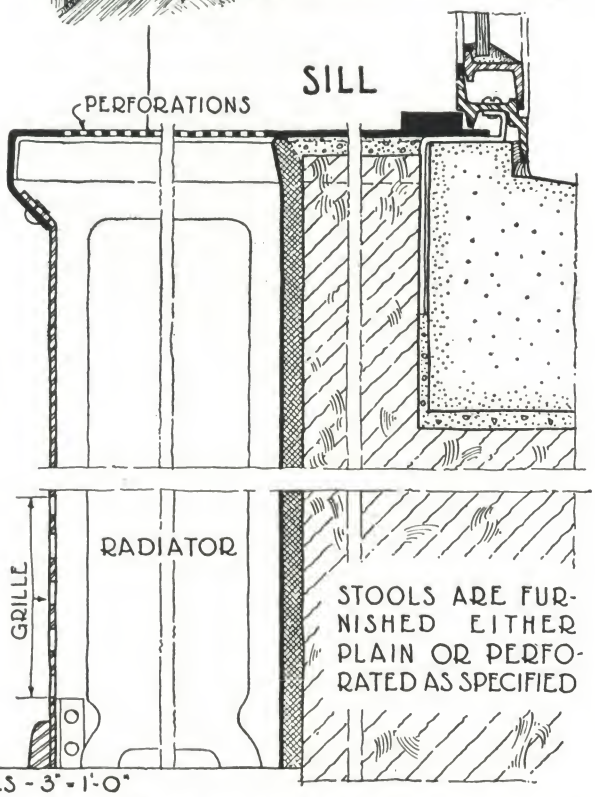
Plate No G-107

Continued on next page









SCALE OF DETAILS - 3" - 1'-0"

SECTION THRU STOOL SHOWING RADIATOR TOTALLY EXPOSED

SECTION THRU STOOL SHOWING RADIATOR TOTALLY CONCEALED

Fenestra 1930

FENMARK WINDOWS

METAL STOOL SUGGESTIONS

Plate No G-108

Continued on next page

SCREENED "FENCRAFT" CASEMENTS

A series of solid section, steel casement windows with swing leaves opening out on extension, bronze bearing hinges. Designed to accommodate Fenestra interior bronze mesh screens. Hardware of solid bronze or nickel silver, supplied in Coinage, Scaly, Sand or Hammered finishes as selected. Arranged for leaded or plate glass or made with interior muntins and small glass lights if desired

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

Windows shall be Fenestra Screened Fencraft as manufactured by Detroit Steel Products Company.

(Note:—Shop drawings from window manufacturer shall be submitted for architect's approval before starting fabrication.)

MATERIAL

CASEMENT SECTIONS shall be specially designed, hot rolled, solid steel casement bars, individually gauged for straightness, with heavy fillets in all re-entrant angles.

FRAME MEMBERS shall be equal leg channel sections.

SWING LEAF MEMBERS shall be Z-shaped sections with baffles.

MUNTINS shall be T sections.

MULLIONS AND TRANSOM BARS shall be Fenestra, hot rolled, solid steel, double head, T sections so designed as to form an interlocking assembly.

MEETING RAILS shall be unequal leg H sections.

SCREENS—Material for screens and screen frames shall be as shown under "Screens."

CONSTRUCTION

FRAMES AND SWING LEAVES shall be mitered and electrically butt welded at all corners. All exposed faces at welds shall be ground to a smooth finish. Provide continuous, two-point, flat contact weathering between swing leaves and frames.

MUNTINS shall be continuous from head to sill and from jamb to jamb and so interlocked as to increase the strength and rigidity at each point of intersection. Joints at frame shall be mortise and tenon, air-hammer riveted.

(Note:—Muntins may be omitted to permit glazing in single lights of leaded or plate glass. If desired, so specify. We do not supply leaded glass.)

MULLIONS OR TRANSOM BARS shall be provided between casements where two or more windows are placed side by side or one above another in the same opening.

(Note:—Specify as above when manufacturer is to supply steel mullions and transom bars.)

HEAD DRIP—Provide a continuous, heavy, electro-galvanized steel head drip above all swing leaves.

ATTACHED HARDWARE

(Note:—Attach at the factory.)

SIDE HINGES—All side hung swing leaves shall be hung on two heavy, extension (cleaning) hinges of special, solid rolled, sherardized steel with heavy fillets in re-entrant angles. Hinge pins of solid bronze (non-removable) shall be fitted into flanged bronze bushings.

(Note:—Bronze pins and bushings provide 100 per cent bronze bearing at all moving pivot points.)

TOP HINGES—Swing leaves hung from the top shall be hung on heavy, flush, extruded bronze hinges with bronze hinge pins.

SWING LEAF KEEPER shall be a steel forging and welded to the swing leaf stile.

LOCKING HANDLE BRACKET—Provide countersunk holes in frame stile for attachment of bracket.

(Note:—Locking handle brackets for Screened Fencraft Casements will be shipped separate and attached in the field. See Detached Hardware.)

OPERATOR PROVISIONS—Provide a die cast bracket rigidly attached to the sill of the frame by three countersunk machine screws for the attachment of Fenestra standard through-screen operator. Provide tapped holes in bottom rails of all swing leaves for operator attachment.

SCREEN PROVISIONS—Provide one or more pairs of tapped holes in the top rail of the frame for the attachment of screen retaining clips. The bottom rail of each single unit shall have one pair of tapped holes for attachment of screen supporting bracket.

Continued on next page

DETACHED HARDWARE

All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

LOCKING HANDLES AND HANDLE BRACKETS shall be assembled at the factory and designed to attach to the casement frame by three countersunk screws inserted from the outside of the windows.

Handle bracket shall be an ornamental die casting designed to accommodate and entirely conceal the locking cam and the swing leaf keeper when the window is closed.

Locking handles for side hung swing leaves shall be of solid bronze (U. S. Government specification), of ornamental design and coinage finish obtained without the use of plating or chemicals. All locking handles shall be designed with a hinge action to permit their slipping through the screen escutcheon when screen is placed or removed. Each handle to be rigidly attached to a die cast stud and cam and equipped with a concealed coil spring to take up wear and prevent rattle. No. 1115.

(Note:—At extra cost special finishes may be secured: "Scaly," "Coarse Sand," or "Hammered" in either bronze or nickel silver; or Chromium-Plated in bronze only.)

OPERATORS FOR SIDE HUNG LEAVES shall be Fenestra special thumb screw type designed to provide easy operating movement through the screen. No. 1116.

Operator shall consist of a solid bronze arm passing through a solid bronze fulcrum guide equipped with a friction plate. One end of the arm to attach to the sill of the swing leaf by a pressed steel bracket; the other end to carry a solid bronze peg for a finger grip. Operating mechanism to be mortised into the frame bracket and held by bronze screws.

OPERATOR FOR TOP HUNG LEAVES shall be solid bronze peg and stay type designed to operate through the screen. No. 1117.

(Note:—Special operator finishes corresponding to special handle finishes may be had at extra cost.)

MASTIC

The window manufacturer shall furnish sufficient mastic (3 lbs. per each lineal foot of perimeter) to form a weather tight bond at head, sill, both jambs and mullions.

ERECTION

(Note:—Where desired, the Fenestra Construction Company, under a separate contract will erect windows in prepared openings. If desired, so specify.)

(Note:—We recommend that casements be installed in prepared openings accurately constructed in accordance with the Standard Fenestra installation details. We do not recommend building casements directly into masonry as the walls are laid up, as this frequently delays erection and is apt to result in springing or racking the casements out of shape.)

All casements shall be set plumb and true properly aligned and securely anchored before glazing.

All mullions shall be bolted rigidly to the frames.

Set all frames in mastic, neatly applied where they come in contact with the building construction or steel mullions.

(Note:—When casements are set directly into stone construction, apply one coat of shellac to stone to avoid stain by mastic.)

Apply all hardware in accordance with manufacturer's directions.

PAINTING

All casements shall receive one coat of rust-resisting primer and one coat of dark battleship gray paint at the factory—each coat to be sprayed on and baked separately.

(Note:—Finish coat should be applied after glazing.)

GLASS AND GLAZING

(Note:—The following should be included in the Glass and Glazing Specifications:

"Glass shall be (⅛" light plate) (¼" thick plate)." Single or double strength glass is not recommended.

"Putty shall be steel casement putty." This is a special high grade putty which assures quick setting. Ordinary wood window putty must not be used. If leaded glass is desired, so specify.)

All casements shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the casement manufacturer. Face putty shall be applied in a neat, clean cut, smooth manner.

(Note:—Do not paint until putty has thoroughly hardened.)

(Note:—Glazing beads at extra cost.)

SCREENS

Screens shall be designed to set flat against the inside of the casement frame with casement locking handle and operating hardware extending through the screen to permit operation of the swing leaf without touching the screen.

Screen frames shall be of best quality, cold rolled, rustproofed, strip steel, formed 1" wide by ½" thick at head and jambs (bottom rails 1½" x ½"). All frames to contain a triangular reinforcing brace running the full length of the stile. Paint to be two coats of gray lead and oil baked on. Screen cloth to be standard woven 16-mesh, oxidized finish bronze wire held taut along both stiles and rails by a specially formed cap interlocked with the main portion of the frame, but quickly removable for rewiring.

(Note:—Screens with bronze frames or with finer mesh may be had at extra cost.)

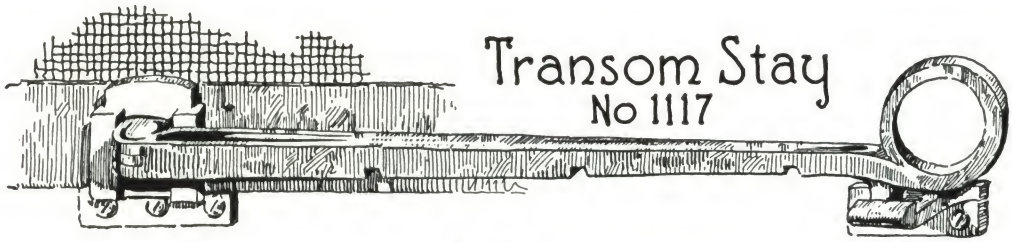
Each screen shall be provided with a 22-gauge steel escutcheon with circular hole to fit over and around the locking handle. Bottom rail of each screen shall be designed with a slot to permit the passage of the operator arm. (See Screened Fenmark specifications.)

SCREEN SUPPORTING BRACKET shall be a steel stamping attached to bottom frame rail of each single unit. Screen retaining clip shall be a steel stamping attached at the head.

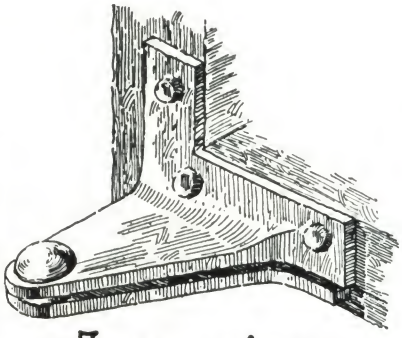
SHADING

(Note:—Each casement is drilled at both jambs near the head for the attachment of standard shade and drapery brackets which can be purchased from local decorators.)

Continued on next page



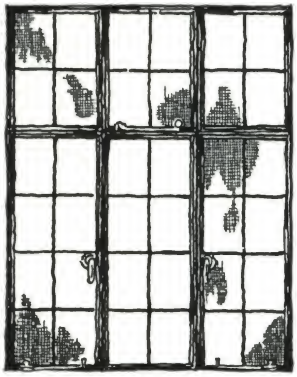
Transom Stay
No 1117



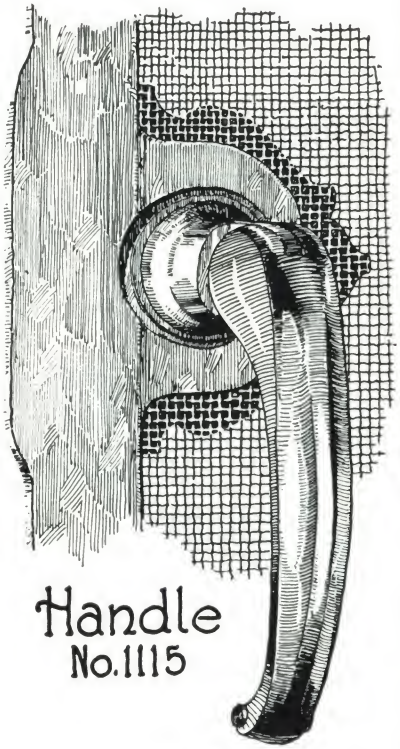
Extension Hinge



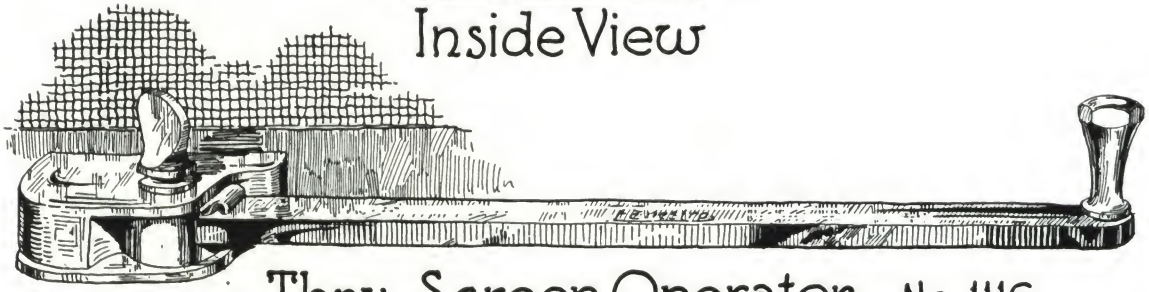
Handle
No. 1115



Inside View



Handle
No. 1115



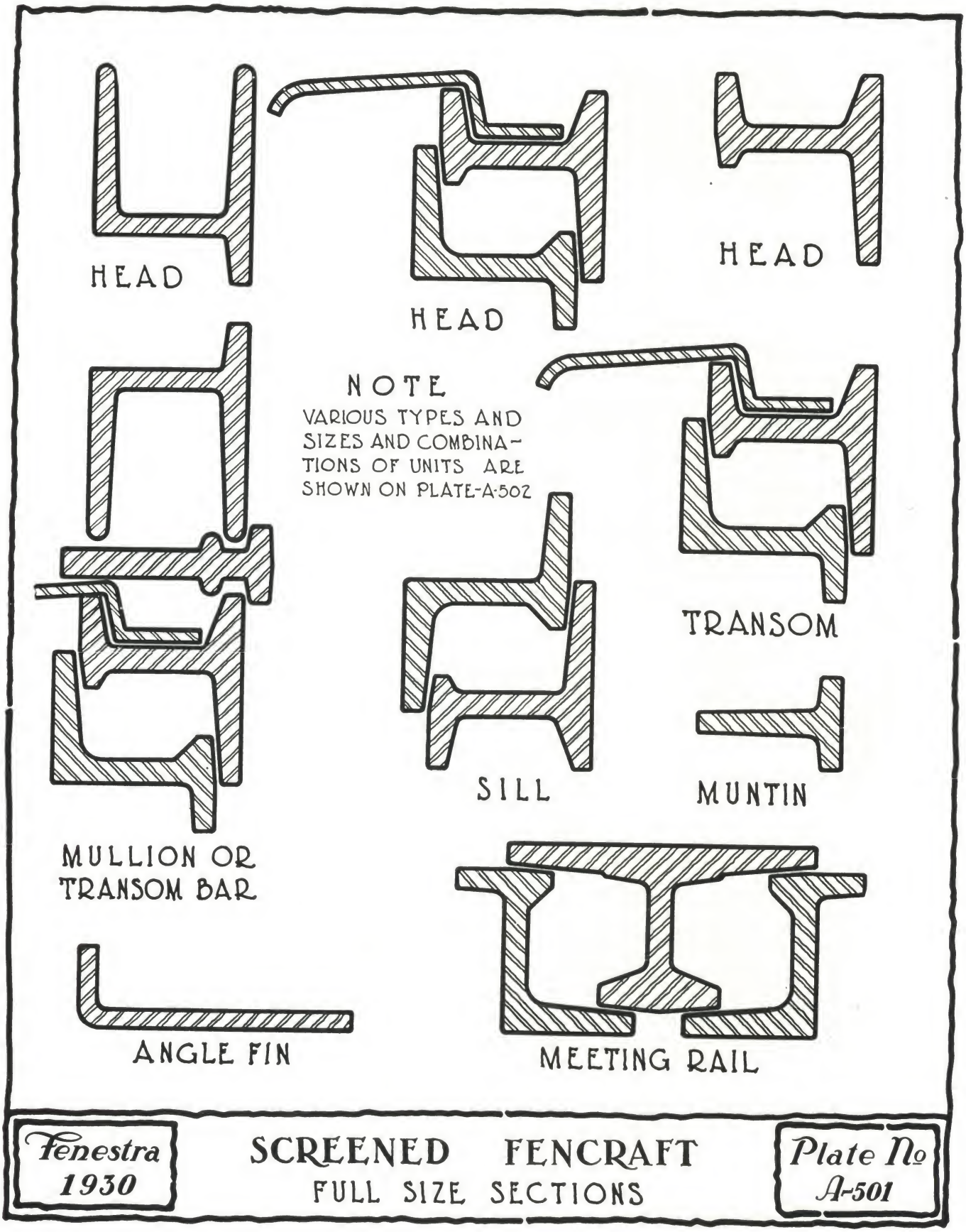
Thru-Screen Operator - No. 1116

Fenestra 1930

SCREENED FENCRAFT HARDWARE

Plate No A-504

Continued on next page



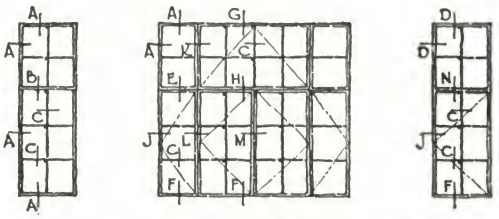
Fenestra 1930

SCREENED FENCRAFT

FULL SIZE SECTIONS

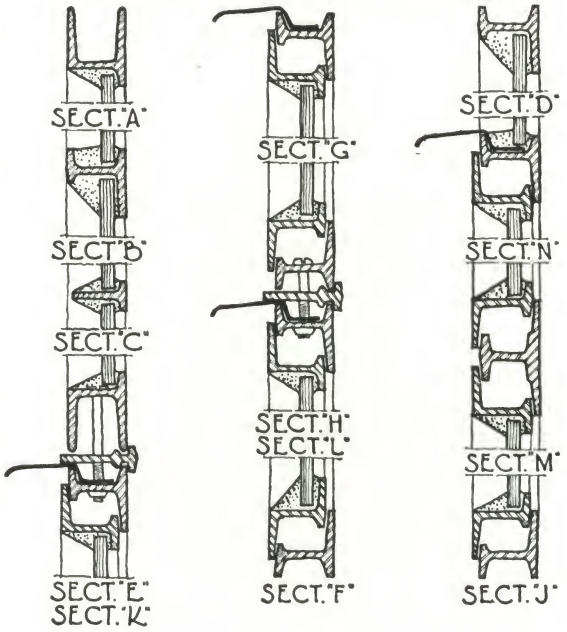
Plate No. A-501

Continued on next page



TYPICAL ELEVATIONS

(DRIP IS OMITTED ON SECTIONS "K" & "L")



NOTES

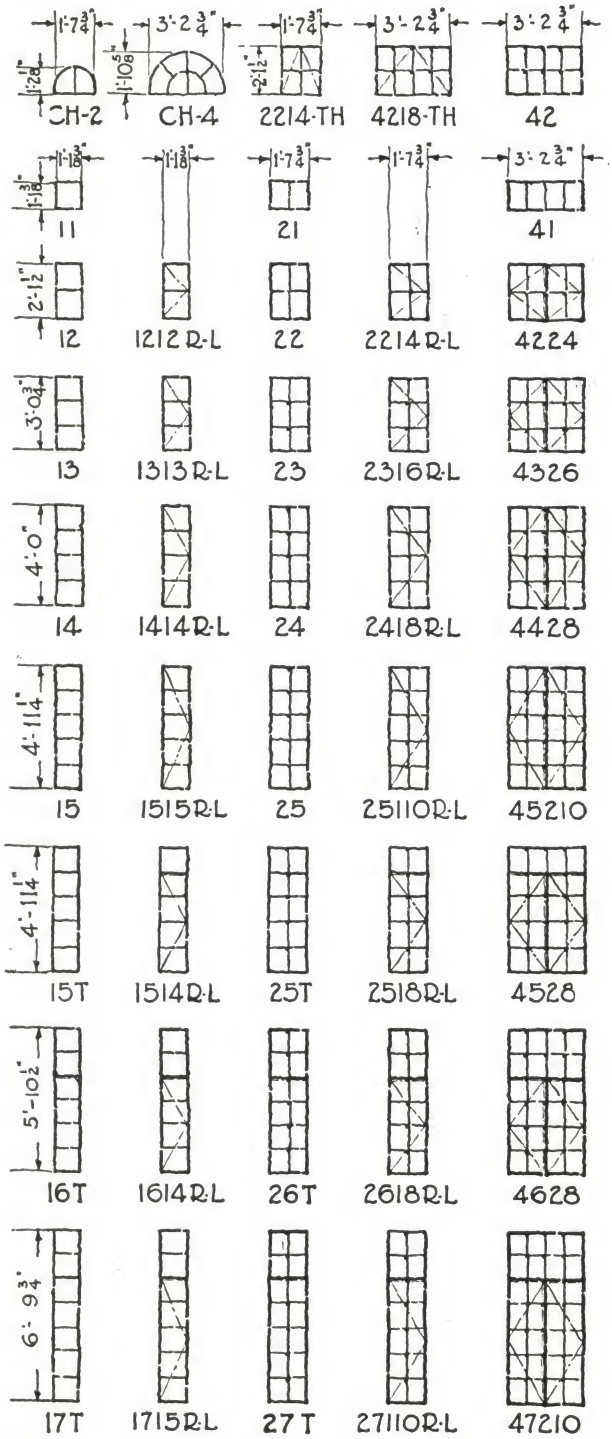
SIZES GIVEN ARE OPENING SIZES AND ARE ¼" LARGER THAN WINDOW DIMENSIONS~NOTHING NEED BE ADDED FOR STEEL MULLIONS.

HANDING OF CASEMENTS IS DETERMINED BY LOCATION OF HINGE VIEWED FROM OUTSIDE~RIGHT HAND CASEMENTS ARE HINGED AT RIGHT AND LEFT HAND CASEMENTS ARE HINGED AT LEFT

WHEN FENCRAFT CASEMENTS ARE DIVIDED BY MUNTINS GLASS SIZES ARE FIGURED FROM A BASIC SIZE OF 8"×11"

R-RIGHT HAND CH-CIRCULAR HEAD T-{FIXED UNIT WITH TRANSOM BAR
L-LEFT HAND TH-TOP HINGED

ALL TYPES MAY BE FURNISHED WITH OR WITHOUT MUNTINS



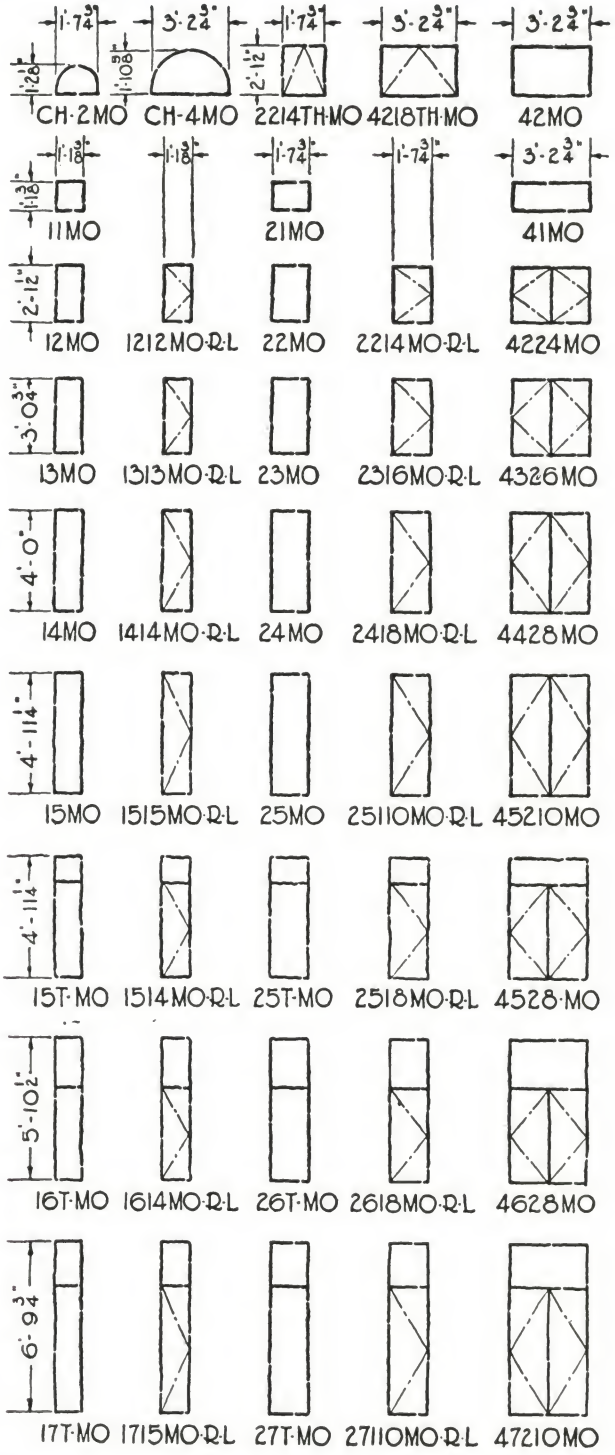
Fenestra 1930

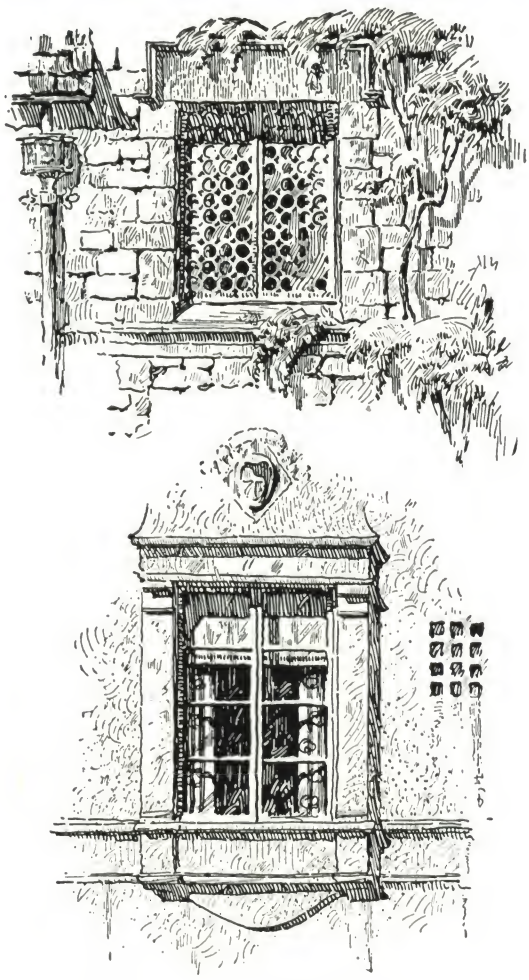
SCREENED FENCRAFT

TYPES AND SIZES AND COMBINATION DETAILS

Plate No A502

Continued on next page





FENCRAFT SYMMETRICAL WIDTHS

OPENING WIDTH	LIGHTS WIDE	NO. UNITS	TYPES OF UNITS	NO. MULL.
1'-1⅜"	1	1	1	0
1'-7¾"	2	1	2	0
2'-2¾"	2	2	1,1	1
3'-2¾"	4	1	4	0
3'-3½"	4	2	2,2	1
3'-4⅛"	3	3	1,1,1	2
3'-10½"	4	3	1,2,1	2
4'-4⅞"	5	3	2,1,2	2
5'-5½"	6	3	1,4,1	2
4'-11¼"	6	3	2,2,2	2
6'-5½"	8	2	4,4	1
6'-6¼"	8	3	2,4,2	2
6'-7"	8	4	2,2,2,2	3

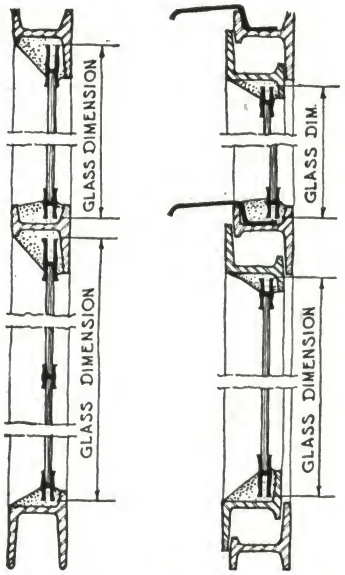
Fenestra 1930

FENCRAFT CASEMENTS

TYPES AND SIZES - WITHOUT MUNTINS

Plate No. A-509

Continued on next page



LEAD CAMES USED WITH VARIOUS SASH SECTIONS

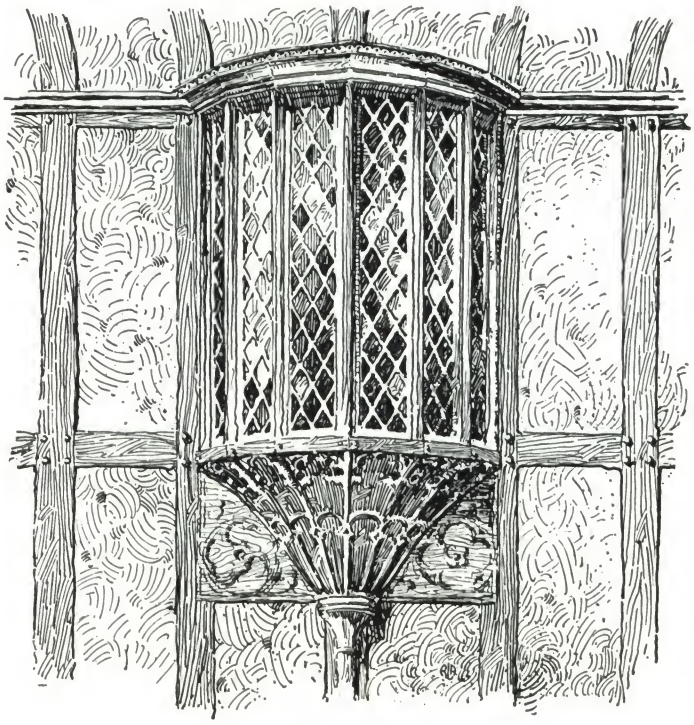
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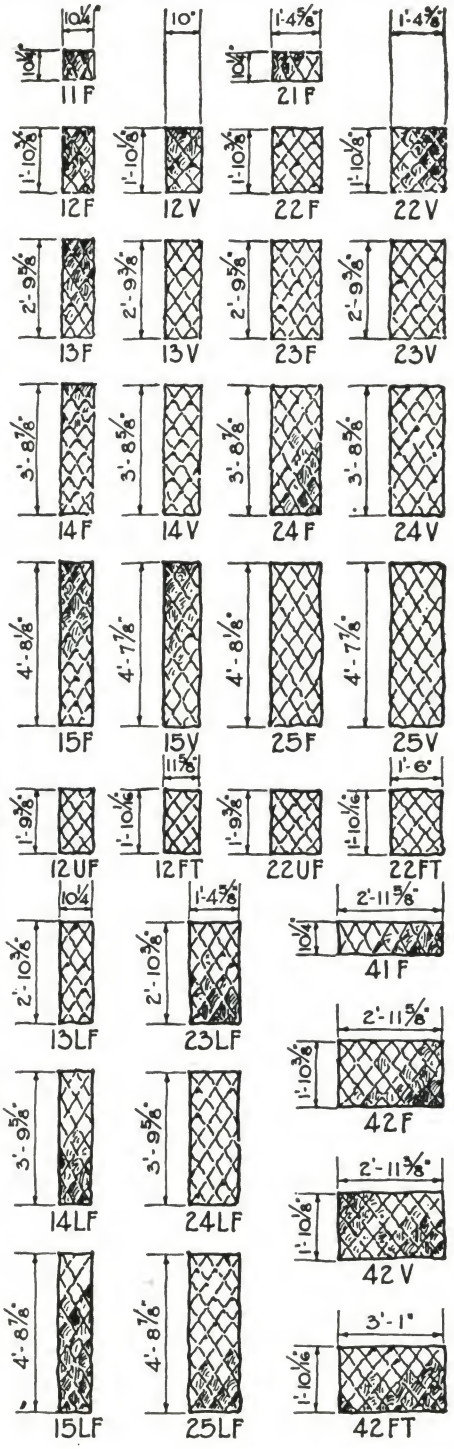
LEADED GLASS IS NOT FURNISHED BY DETROIT STEEL PRODUCTS COMPANY.

PANELS SHOWN ARE SUGGESTIONS FOR PURCHASE LOCALLY TO FIT STOCK FENCRAFT TYPES WITHOUT MUNTINS. DIAMOND LEADED OR RECTANGULAR LEADED PANELS OR PLATE GLASS OF SIZES SHOWN WILL FIT WITH 1/8" CLEARANCE ON ALL SIDES.

EXPLANATION OF NOMENCLATURE

"F" - PANEL FOR FIXED UNIT.
"V" - PANEL FOR VENTILATOR UNIT.
"UF" - UPPER PANEL OF COMBINED FIXED UNIT
"LF" - LOWER PANEL OF COMBINED FIXED UNIT
"FT" - FIXED TRANSOM PANEL OVER VENTILATED UNIT



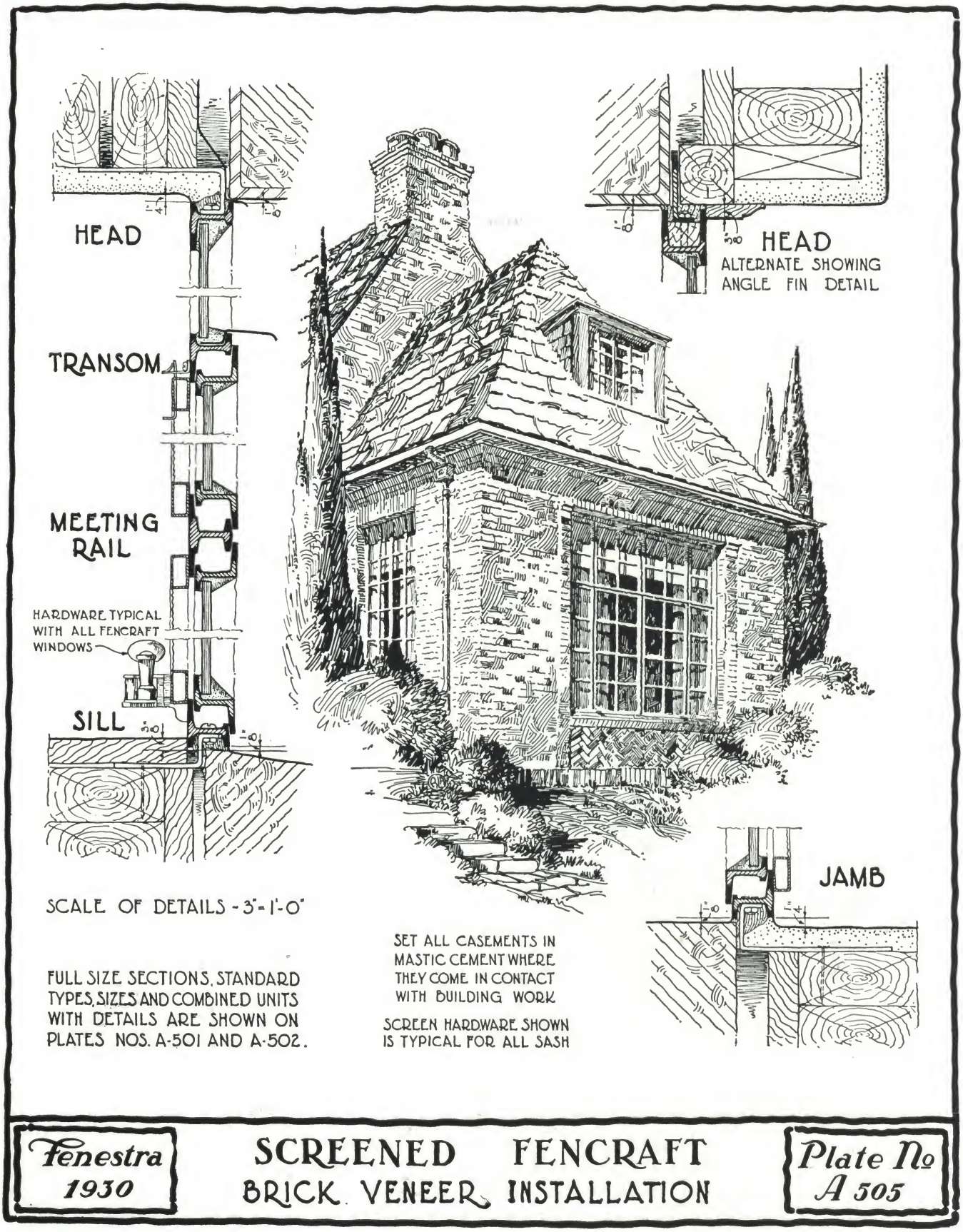


Fenestra 1930

SCREENED FENCRAFT SUGGESTIONS FOR LEADED GLASS

Plate No A 503

Continued on next page

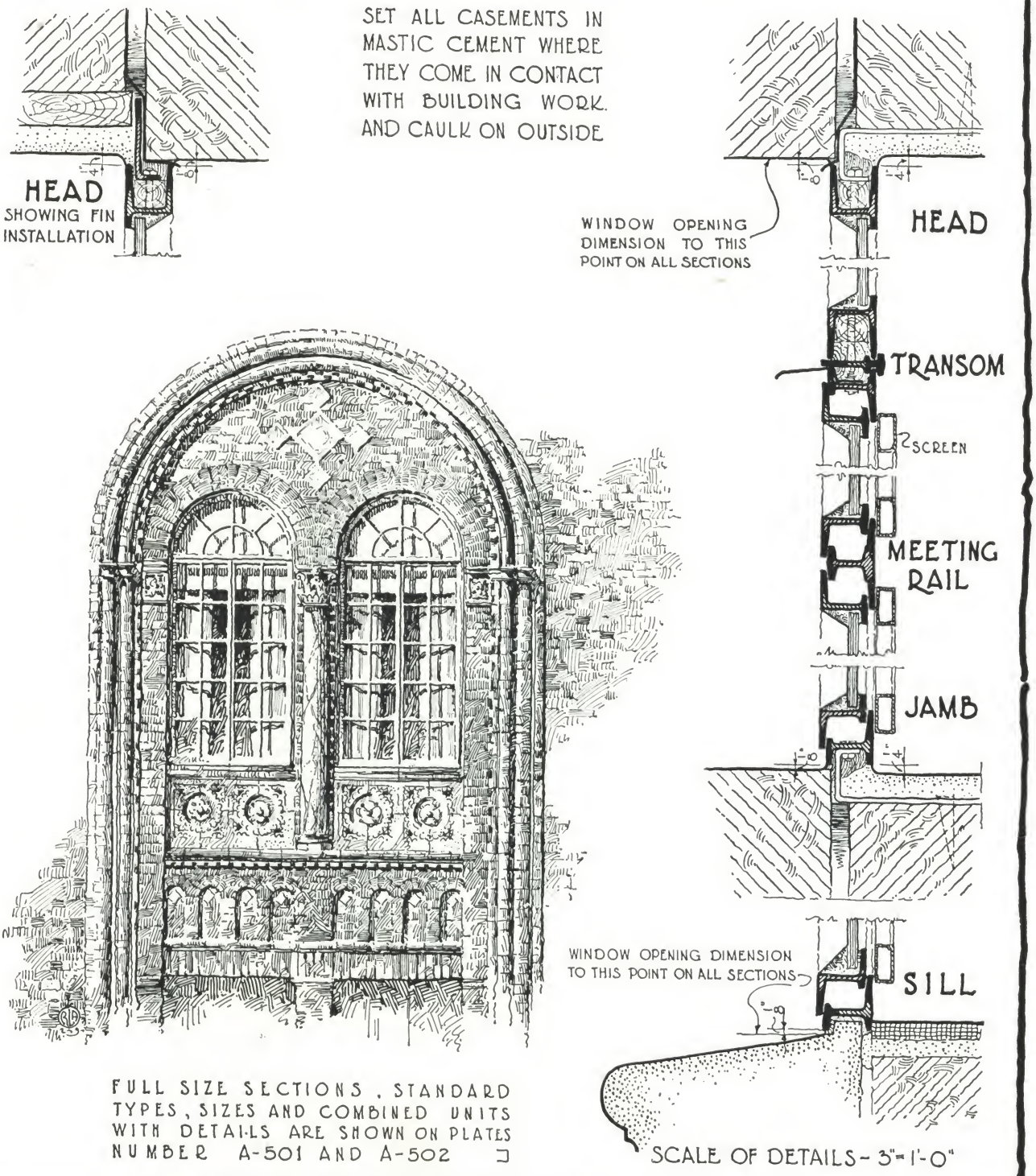


Fenestra 1930

SCREENED FENCRAFT BRICK VENEER INSTALLATION

Plate No A 505

Continued on next page

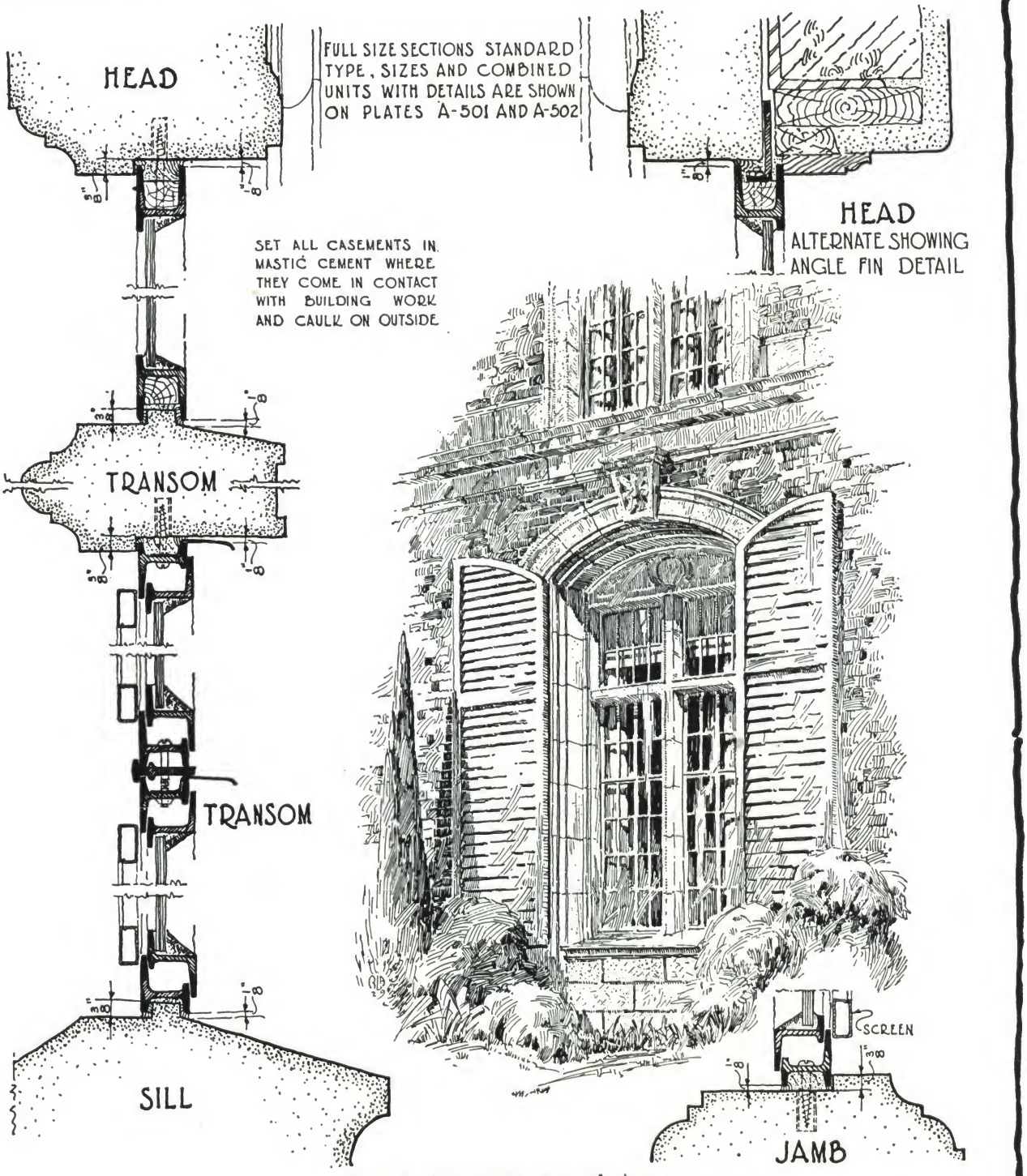


Fenestra 1930

SCREENED FENCRAFT BRICK - INSTALLATION

Plate No. A 506

Continued on next page

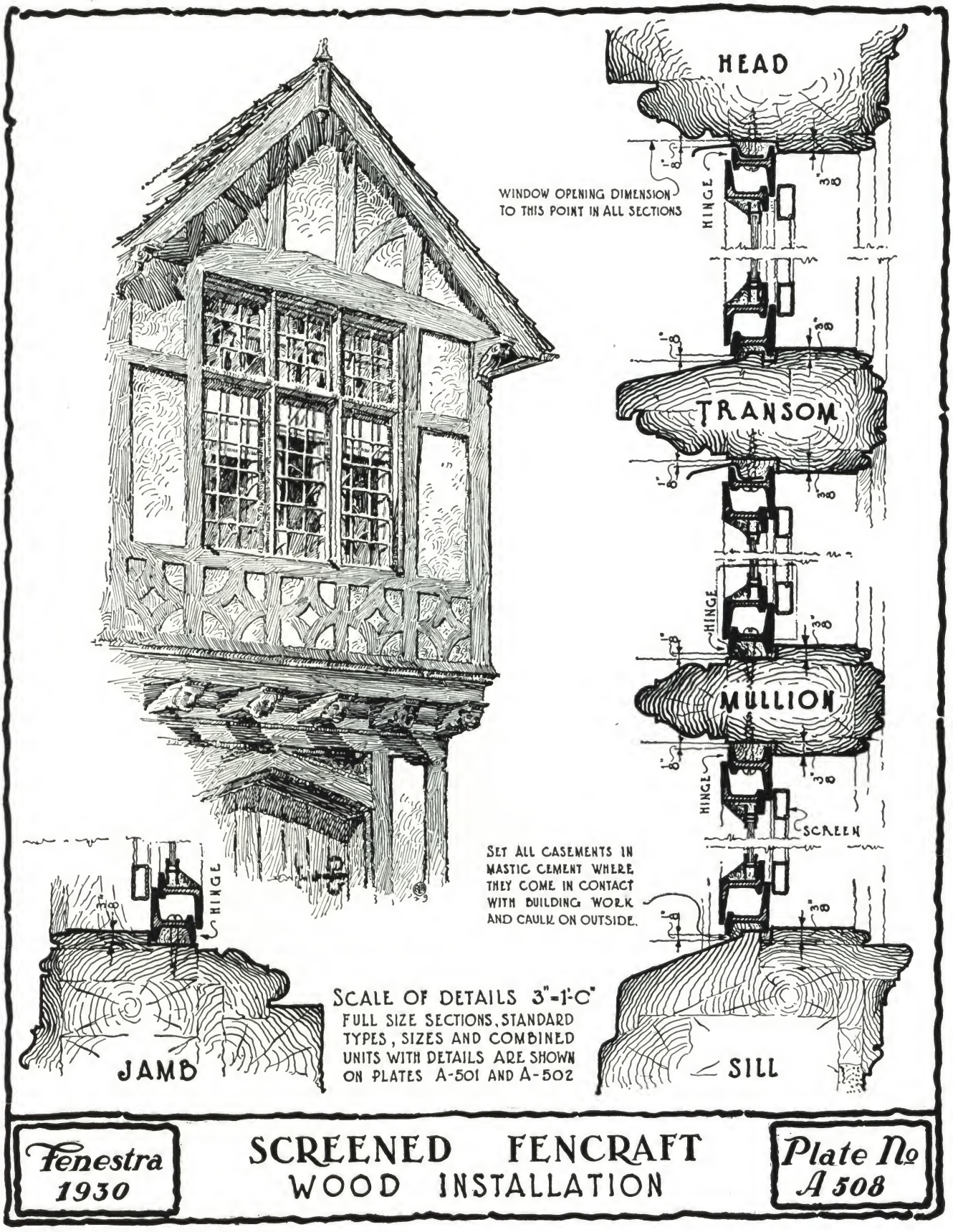


Fenestra 1930

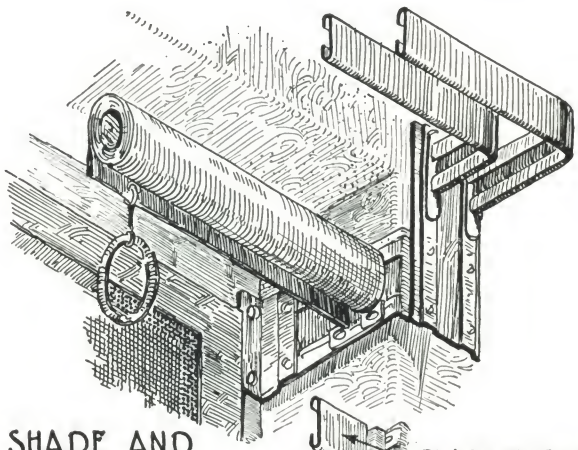
SCREENED FENCRAFT STONE INSTALLATIONS

Plate No A 507

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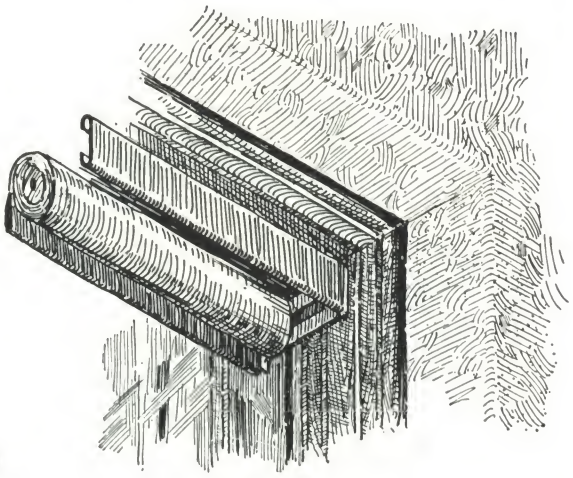
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SHADE AND DRAPERY BRACKET SUGGESTED FOR FENCRAFT CASEMENTS OPENING OUT



GLASS CURTAIN ROD USED IN PLACE OF SHADE ROLLER.



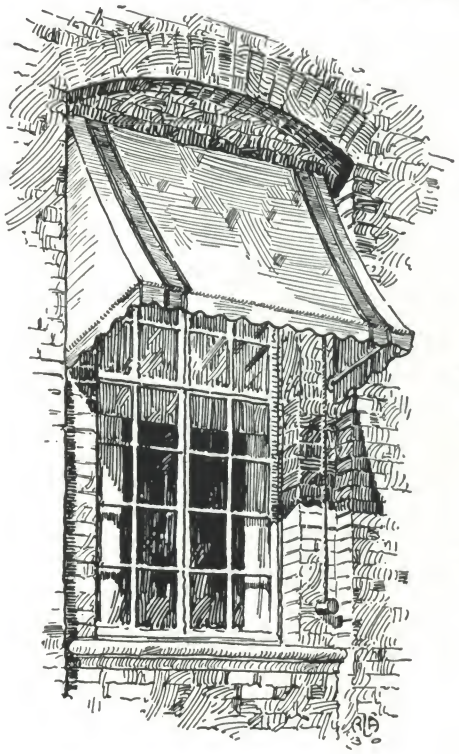
SHADE & DRAPERY BRACKET AND SUGGESTED ATTACHMENT TO OPEN IN SWING LEAVES.

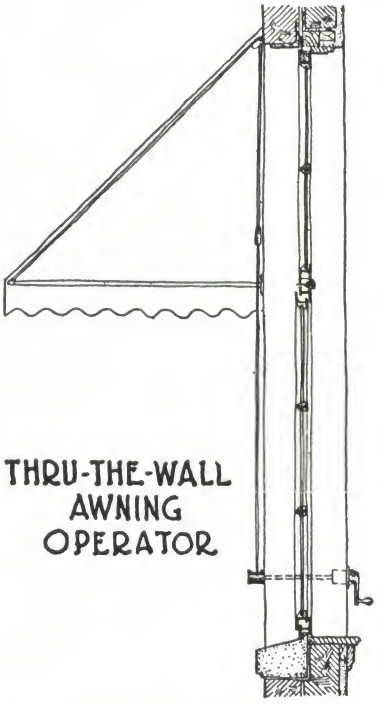
NOTES

SCREENED CASEMENTS ARE DRILLED FOR ATTACHMENT OF SHADE & DRAPERY BRACKETS, BUT NEITHER BRACKETS NOR AWNING OPERATORS ARE FURNISHED BY DETROIT STEEL PRODUCTS COMPANY.

AT EXTRA COST OPEN IN CASEMENTS MAY BE DRILLED AND TAPPED IN THE FIELD FOR ATTACHMENT OF SHADE AND DRAPERY BRACKETS DIRECT TO THE SWING LEAVES.

LEAVE MINIMUM CLEARANCE OF 2" FROM SASH TO REVEAL IF BRACKET IS ATTACHED TO OPEN IN LEAF. SEE PLATE NO. A-303.





THRU-THE-WALL AWNING OPERATOR

VERTICAL SECTION.

Fenestra 1930

FENCRAFT CASEMENTS

DRAPING & AWNING OPERATOR SUGGESTIONS

Plate No A-510

Continued on next page

FENESTRA "FENCRAFT" CASEMENTS

Solid section, steel casement windows with swing leaves opening out on extension, bronze bearing, friction hinges. Designed without Fenestra screens though any other accepted method of screening may be used. Solid bronze or nickel silver hardware with a selection from four finishes. Arranged for leaded or plate glass or made with interior muntins if desired. Full sized details same as Fenestra Screened Fencraft Windows

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

Windows shall be Fenestra Fencraft as manufactured by Detroit Steel Products Company.

MATERIAL

(Note:—Same as the Material Specifications for Screened Fencraft Windows except that Fenestra Screens are not supplied.)

CONSTRUCTION

(Note:—Same as the Construction Specifications for Screened Fencraft Windows.)

ATTACHED HARDWARE

(Note:—Attach at the factory.)

SIDE HINGES—All side hung swing leaves shall be hung on two heavy, extension (cleaning) friction hinges of special, solid rolled, sherardized steel with heavy fillets in re-entrant angles. Each hinge shall be equipped with two friction washers. Washers and hinge members shall be held by lock washers and a bronze stud with acorn nut, so designed that friction may be increased or decreased by adjusting the nut.

(Note:—"Close-In" hinges supplied when specified.)

TOP HINGES—All top hung swing leaves shall be hung on heavy, flush, extruded bronze hinges with bronze hinge pins.

LOCKING HANDLE BRACKET—Each side hung swing leaf shall have an ornamental locking handle bracket of solid rolled steel, electrically welded to the swing leaf stile.

(Note:—Locking handle brackets for Fencraft Casements will be attached at the factory.)

STRIKES—All handles shall lock against strikes attached to the casement frame.

DETACHED HARDWARE

All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

LOCKING HANDLES—All locking handles on side hung swing leaves, shall be of solid bronze (U. S. Government specification), of ornamental design and coinage finish obtained without the use of plating or chemicals. Each handle to be equipped with a concealed coil spring to take up wear and prevent rattle, and to be attached to swing leaf stile by three bronze screws. No. 1119.

(Note:—Bronze double locking device where necessary at added cost.)

(Note:—At extra cost, special finishes may be secured: "Scaly," "Coarse Sand," or "Hammered" in either bronze or nickel silver; or Chromium-Plated in bronze only.)

OPERATOR

FOR SIDE HUNG SWING LEAVES—(1) Standard.

(Note:—Friction hinges without operator are standard.)

(2) Optional — Solid bronze thumbscrew operator, No. 1101, with non-friction hinges.

(3) Optional—Solid bronze gear type operator, No. 385, with non-friction hinges.

(Note:—Nos. 2 or 3 at extra cost over No. 1.)

FOR TOP HUNG SWING LEAVES the operator shall consist of a solid bronze peg and stay. No. 1110.

(Note:—Special finishes corresponding with special handle finishes may be had at extra cost.)

MASTIC

(Note:—Same as the Mastic Specifications for Screened Fencraft Windows.)

ERECTION

(Note:—Same as the Erection Specifications for Screened Fencraft Windows.)

PAINTING

(Note:—Same as the Painting Specifications for Screened Fencraft Windows.)

GLASS AND GLAZING

(Note:—Same as the Glass and Glazing Specifications for Screened Fencraft Windows.)

SCREENING AND SHADING

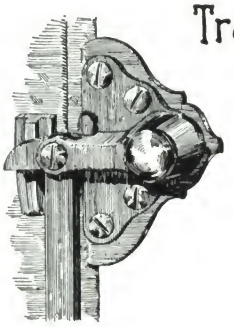
(Note:—Fenestra Screens are not furnished, but sliding, rolling, hinged or any accepted method of screening casements may be used. If desired, so specify. Minimum distance for clearance of hardware, 2½".)

(Note:—Shading Specifications same as Shading Specifications for Screened Fencraft Casements.)

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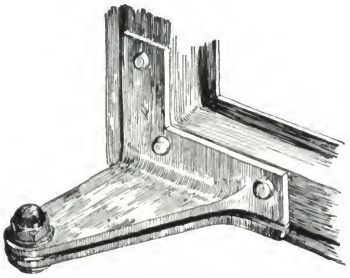


Transom Peg Stay
No. 1110

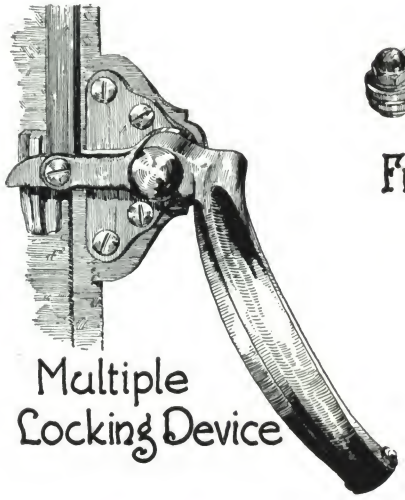




Handle
No. 1119



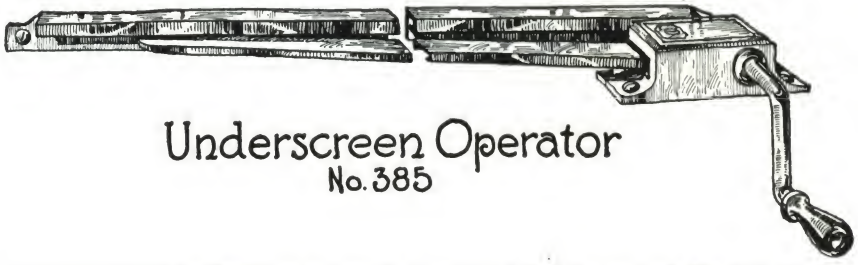
Friction Hinge



Multiple
Locking Device



Thumb Screw Operator - No. 1101



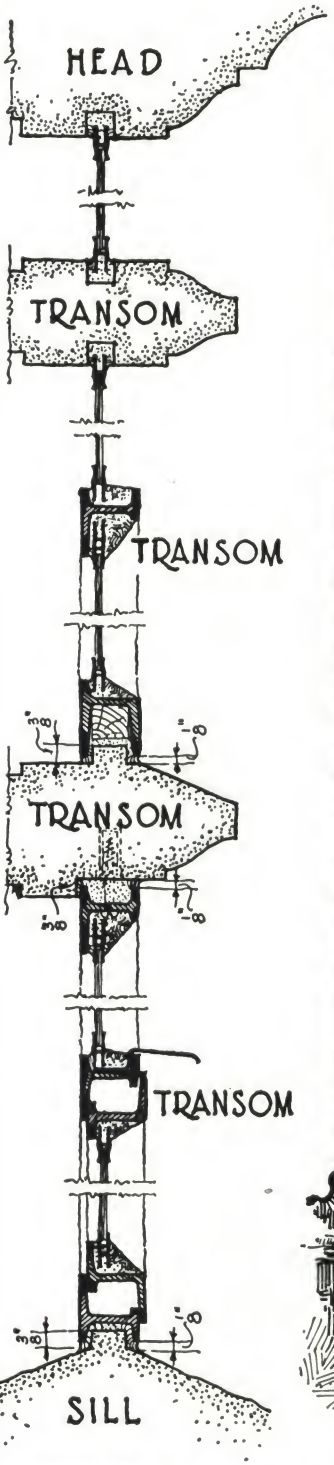
Underscreen Operator
No. 385

Fenestra 1930

FENCRAFT CASEMENTS HARDWARE

Plate No. A-401

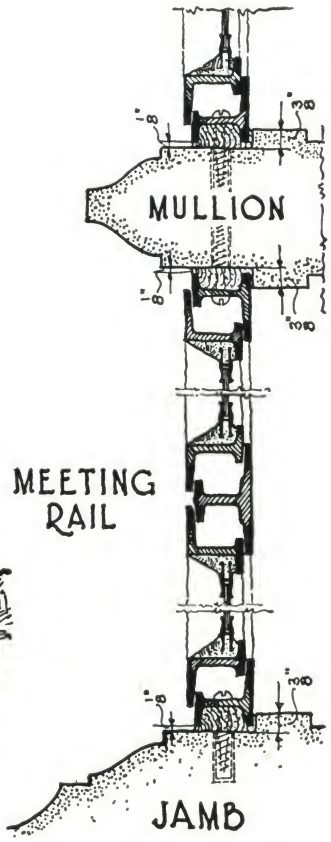
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NOTE -
SET ALL CASEMENTS IN MASTIC CEMENT WHERE THEY COME IN CONTACT WITH BUILDING WORK.

FULL SIZE SECTIONS STANDARD TYPES, AND COMBINED UNITS WITH DETAILS ARE SHOWN ON PLATES NO - A-501 AND A-502



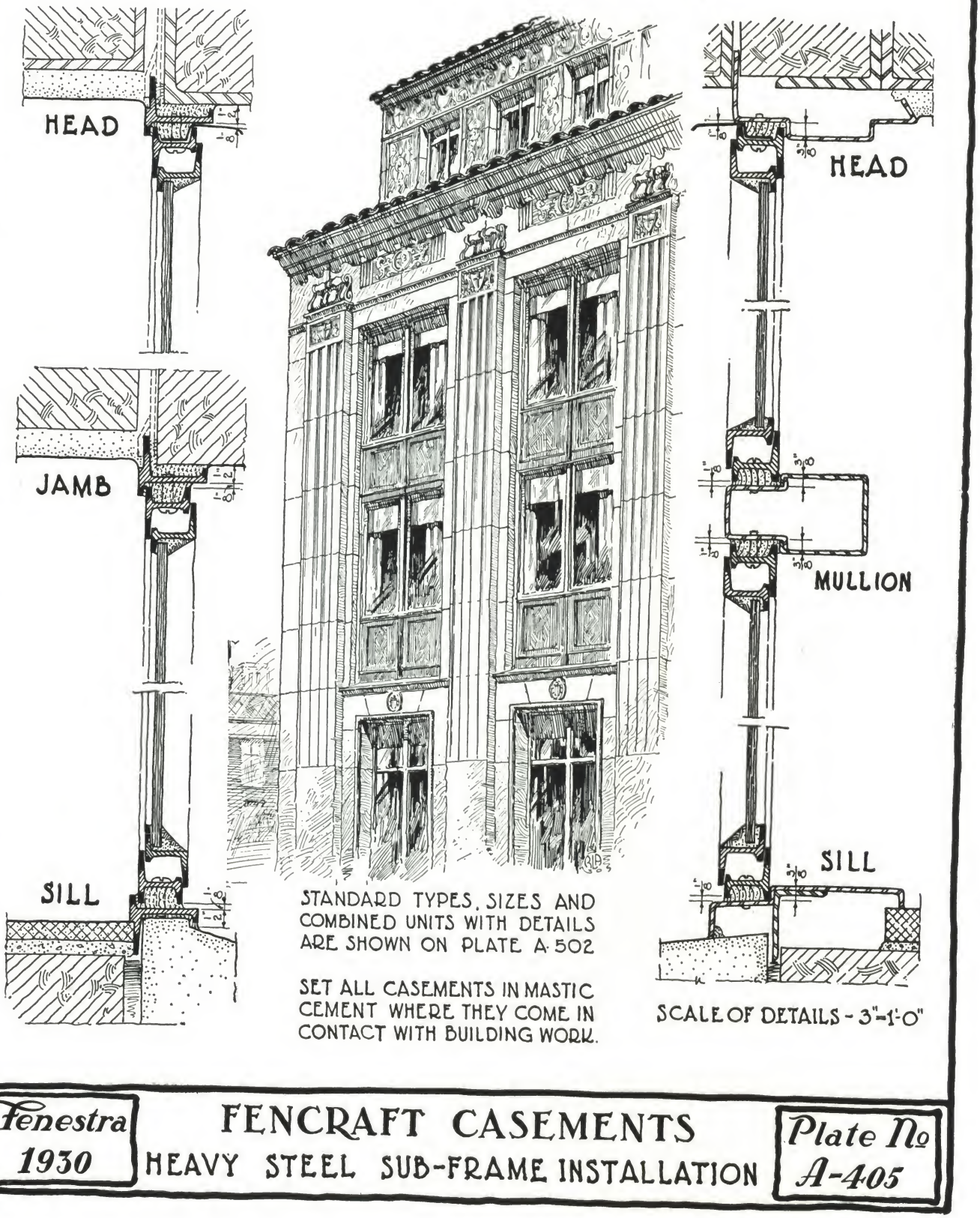
SCALE OF DETAILS - 3" = 1'-0"

Fenestra 1930

FENCRAFT CASEMENTS STONE INSTALLATION

Plate No A-402

Continued on next page



Fenestra 1930

FENCRAFT CASEMENTS

HEAVY STEEL SUB-FRAME INSTALLATION

Plate No A-405

Continued on next page

"FENCRAFT" CASEMENTS—OPEN IN

Solid section, steel casement windows with swing leaves opening in on extruded bronze flush hinges and held by concealed bronze friction adjusters. Solid bronze or nickel silver hardware with a selection of four different finishes. Designed without muntins, if desired, to accommodate leaded or plate glass. No Fenestra screens supplied but outside screens may be used

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

Windows shall be Fenestra Fencraft, open in, as manufactured by Detroit Steel Products Company.

STANDARD TYPES

(Note:—Standard types are: CH2, 22, 2214R-L, 23, 2316R-L, 24, 2418R-L, 25, 25-1-10R-L as shown on Screened Fencraft Plates A-502 and A-509, and Type 2214 Bottom Hung.)

MATERIAL

(Note:—Same as the Material Specifications for Screened Fenestra Fencraft Windows except that Fenestra Screens are not supplied.)

CONSTRUCTION

(Note:—Same as the Construction Specifications for Screened Fencraft Windows.)

ATTACHED HARDWARE

(Note:—Attach at the factory.)

SIDE AND BOTTOM HINGES—All side hung and all bottom hung swing leaves shall be hung on heavy extruded bronze flush hinges with bronze hinge pins.

(Note:—This provides 100 per cent bronze bearing.)

LOCKING HANDLE BRACKET—Each side hung swing leaf shall have an ornamental locking handle bracket of solid rolled steel, electrically welded to the swing leaf stile.

(Note:—Locking handle brackets on Fencraft Open-In Casements will be attached at the factory.)

DETACHED HARDWARE

All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

LOCKING HANDLES on side hung swing leaves shall be of solid bronze (U. S. Government specification) of ornamental design and coinage finish obtained without the use of plating or chemicals. Each handle shall be equipped with a concealed coil spring to take up wear and prevent rattle, and shall be attached to the swing leaf by three bronze screws. (Handle 1119.)

(Note:—At extra cost, special finishes may be secured: "Scaly," "Coarse Sand," or "Hammered" in either bronze or nickel silver; or Chromium-Plated in Bronze only.)

(Note:—Multiple locking device in bronze where necessary, at added cost.)

LOCKS FOR BOTTOM HUNG SWING LEAVES shall be solid bronze spring latches with pole hook ring handles, attached to top rail of swing leaves. (Handle 739.)

KEEPERS—All handles on side hung swing leaves and spring catches on bottom hung leaves shall lock into malleable iron keepers attached to the casement frame.

FRICTION ADJUSTER—Each side hung swing leaf shall be equipped with one flat type friction adjuster consisting of a solid bronze arm, and sliding, adjustable friction shoe moving in a bronze channel attached to the head of the frame and the head of the swing leaf in such a manner as to be entirely concealed when the window is closed.

SIDE ARMS—All bottom hung swing leaves shall have two friction side arms designed with solid bronze arms and sliding, adjustable friction shoes moving in bronze channels attached to the frame members.

OPERATORS

(Note:—No operator is necessary with side hung swing leaves open in or with bottom hung swing leaves open in.)

MASTIC

(Note:—Same as the Mastic Specifications for Screened Fencraft Windows.)

ERECTION

(Note:—Same as the Erection Specifications for Screened Fencraft Windows.)

PAINTING

(Note:—Same as the Painting Specifications for Screened Fencraft Windows.)

GLASS AND GLAZING

(Note:—Same as the Glass and Glazing Specifications for Screened Fencraft Windows.)

SCREENING AND SHADING

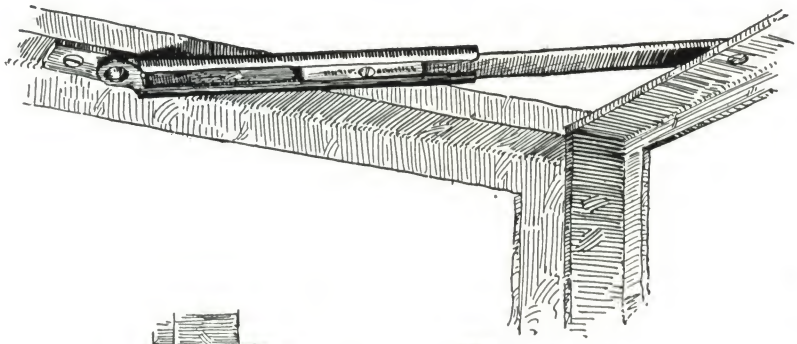
(Note:—Outside screens, if used, should be kept 1½" from the outside face of the window to clear sill drip.)

(Note:—Care should be taken to attach shade and drapery brackets to the building construction in such a manner as to clear all open-in swing leaves. At extra cost, the casements may be drilled in the field so that roller shades or glass curtains may be attached directly to the swing leaves. When this is done, jambs should be kept back a minimum of 2" from the window on the inside so swing leaves will open without fouling. See plate A-303.)

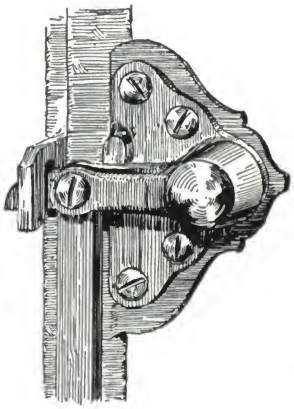
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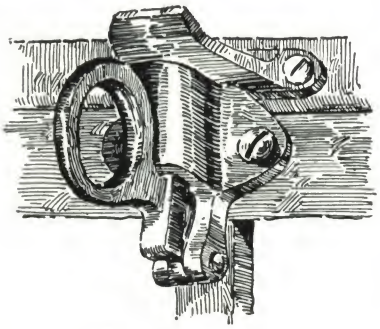


Handle
No. 1119

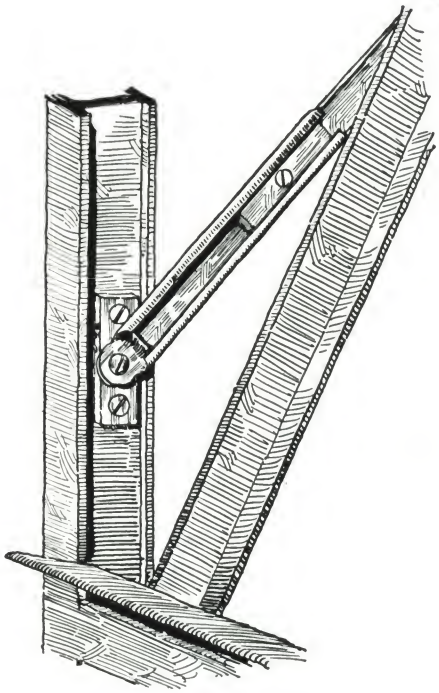


Friction
Adjuster





Transom
Spring Catch
No-739



Friction
Side Arm



Multiple
Locking Device

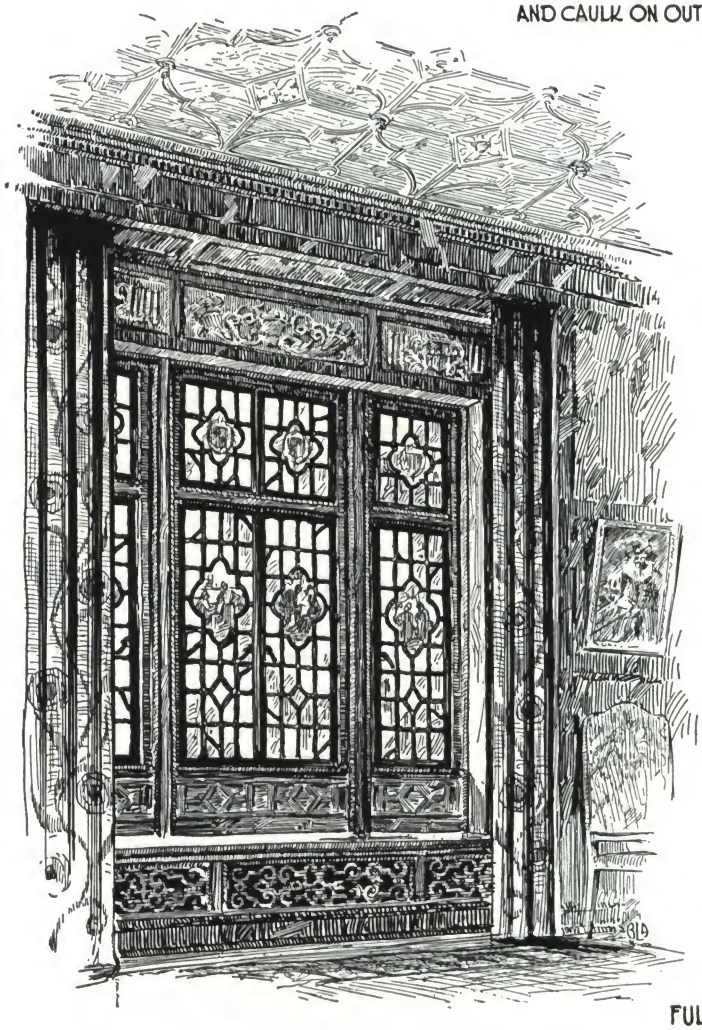
Fenestra 1930

FENCRAFT OPEN IN HARDWARE

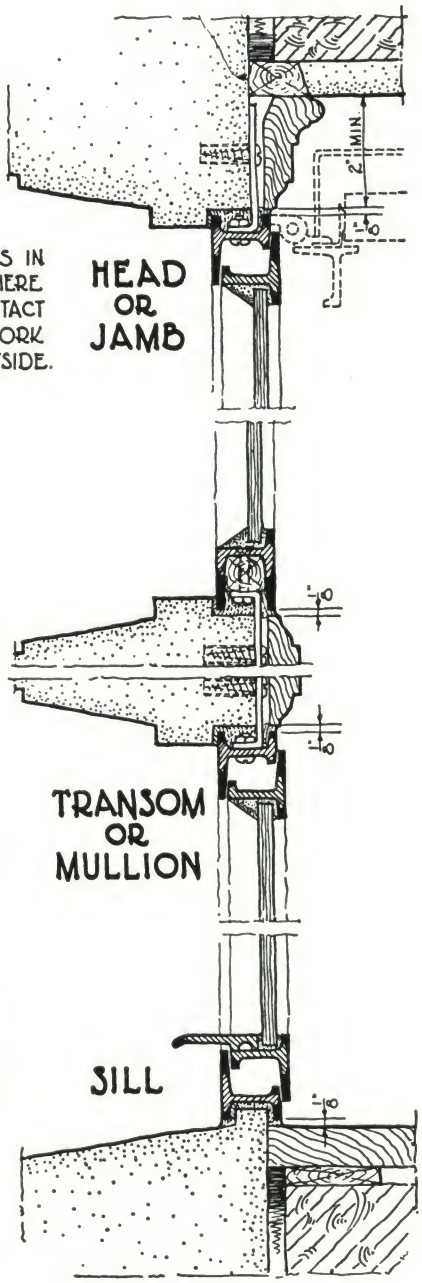
Plate No A-301

Continued on next page

A MINIMUM DIMENSION OF 2" FROM SASH TO REVEAL AT JAMB IS REQUIRED FOR CLEARANCE WHEN SHADE AND DRAPERY BRACKET IS ATTACHED TO SWING LEAF. SEE DETAIL AT RIGHT.



SET ALL CASEMENTS IN MASTIC CEMENT WHERE THEY COME IN CONTACT WITH BUILDING WORK AND CAULK ON OUTSIDE.



SCALE OF DETAILS - 3"-1'-0"

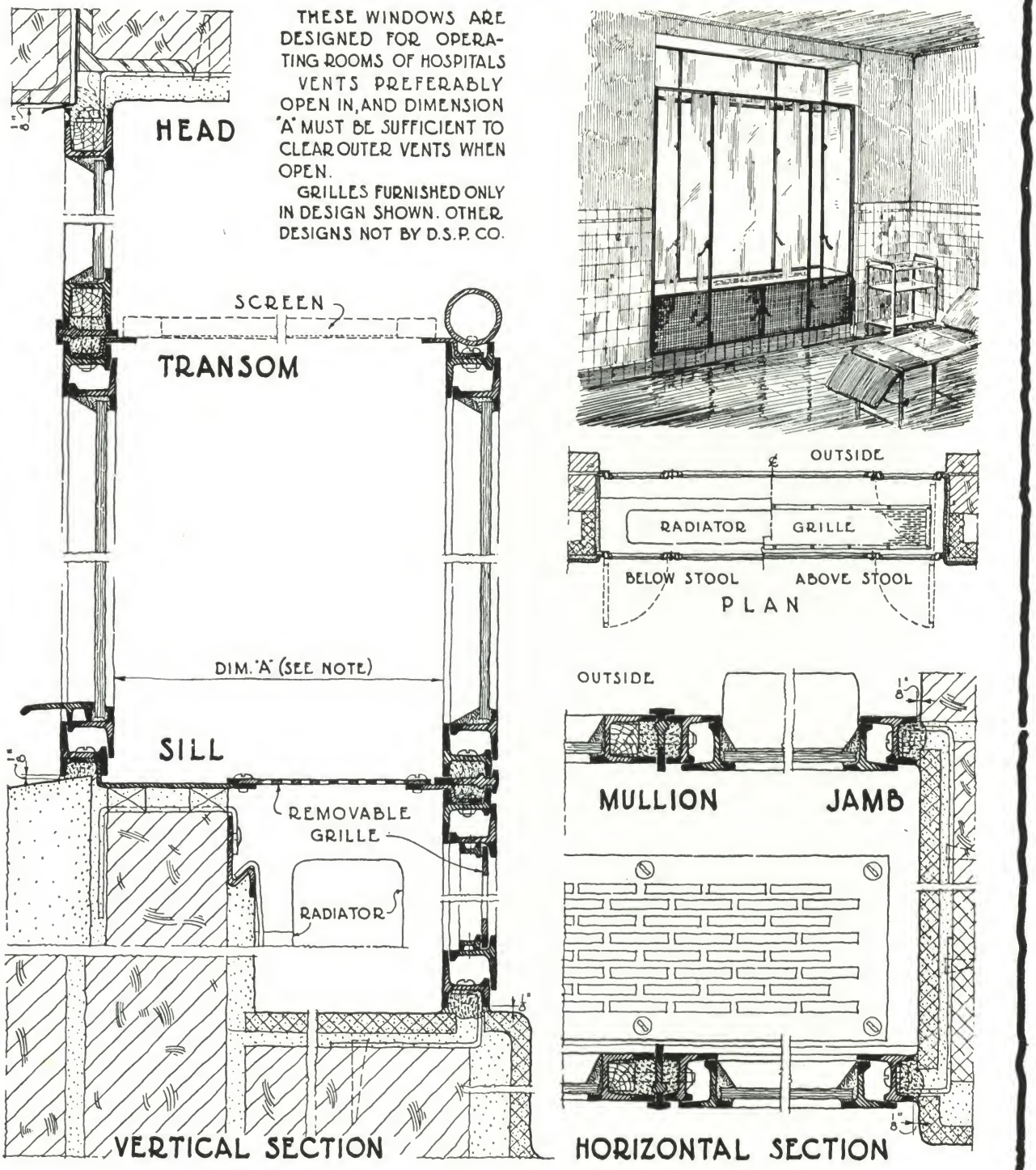
FULL SIZE SECTIONS AND STANDARD TYPES AND SIZES ARE SHOWN ON PLATE-A-302.

Fenestra 1930

FENCRAFT OPEN IN TYPICAL INSTALLATION

Plate No A-303

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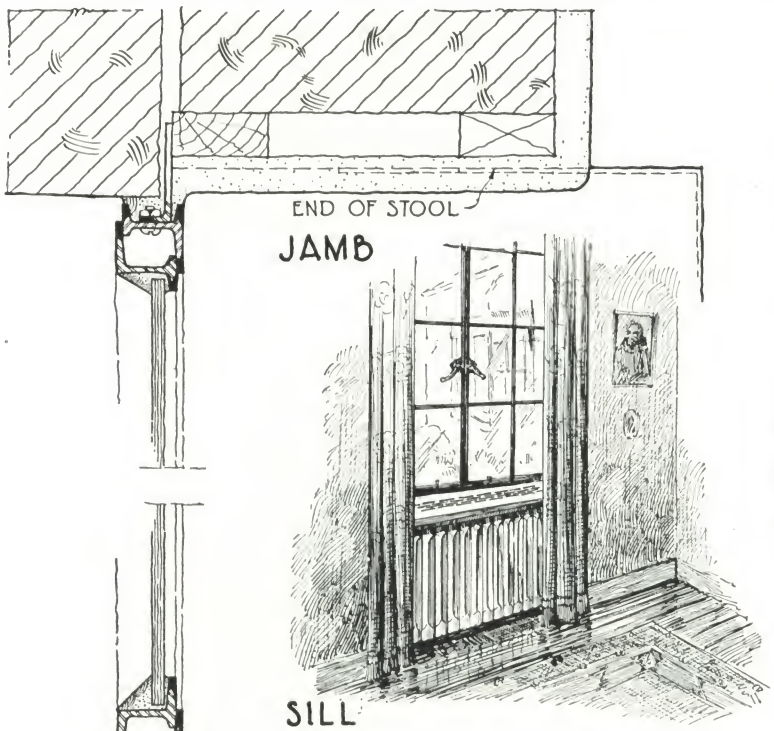


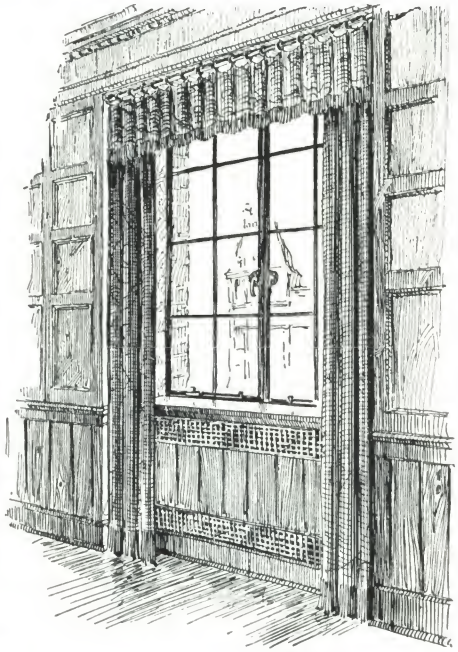
Fenestra 1930

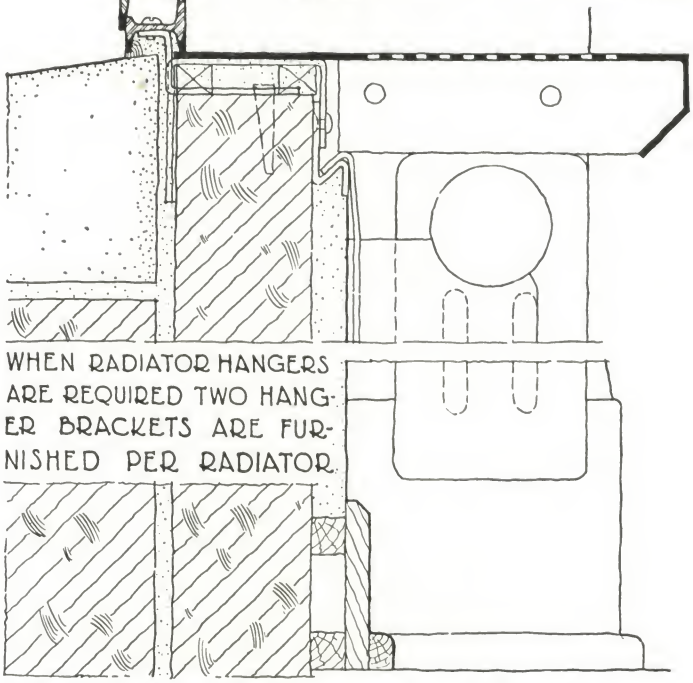
FENCRAFT OPEN IN OPERATING ROOM INSTALLATION.

Plate No A-304

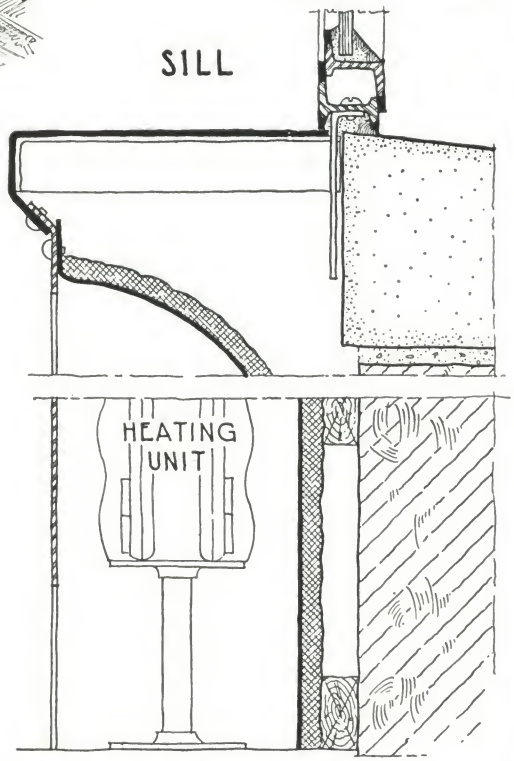
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SECTION THROUGH STOOL SHOWING RADIATOR RECESSED IN WALL



SECTION THROUGH STOOL SHOWING CONCEALED RADIATION

Fenestra 1930

FENCRAFT CASEMENTS
METAL STOOL SUGGESTIONS

Plate No A-406

Continued on next page

FENESTRA CASEMENT DOORS

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

Doors shall be Fenestra (open in) or (open out) as manufactured by the Detroit Steel Products Company.

(Note:—Shop drawings from door manufacturer shall be submitted for architect's approval before starting fabrication.)

MATERIAL

All sections shall be specially designed, hot rolled, solid steel casement bars, individually gauged for straightness, with heavy fillets in all re-entrant angles.

FRAME MEMBERS shall be equal leg channel sections.

Swing leaf members shall be Z-shaped sections with baffles.

MUNTINS shall be T sections.

MULLIONS shall be Fenestra, hot rolled, solid steel, built-up sections, so designed as to form an interlocking assembly.

KICK PLATES shall be of 16-gauge sheet steel.

CONSTRUCTION

FRAMES AND SWING LEAVES shall be mitered and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish. Provide continuous, two point, flat contact weathering between door leaves and frames.

MUNTINS shall be continuous from head to sill and from jamb to jamb, and so interlocked as to form a flat joint and increase strength and rigidity at each point of intersection. Joints at frame shall be mortise and tenon, air hammer riveted.

MULLIONS shall be provided between doors and Fenestra sidelights and transoms where these are shown on either side or above the door in the same opening.

Provide a continuous, heavy, electro-galvanized steel drip at the head of the frame on all open out doors.

Provide a continuous, heavy, non-corrosive extruded drip at the sill of the swing section on all open in doors.

Provide a double kick plate in lower section of door with wood inserted between 16-gauge steel sheets for sound deadener.

BRONZE THRESHOLD

(Note:—Extruded bronze threshold will be furnished by the door manufacturer at added cost if desired. Drawings will be submitted for architect's approval before fabrication.)

ATTACHED HARDWARE

(Note:—Attach at the factory.)

All door leaves shall be hung on three heavy bronze hinges of special design fitted with solid bronze hinge pins.

(Note:—Bronze pins provide 100% bronze bearing at all moving pivot points.)

LOCKING HANDLE—Ornamental solid bronze locking handles, No. 1059, with coinage finish shall be provided operating a concealed bronze cremone bolt which actuates three locking bolts, one each at head, sill, and center of door. Night latch shall be provided to lock doors from the inside.

(Note:—Night latch on inside and cylinder lock on outside or cylinder locks on both sides, supplied at extra cost.)

STRIKE PLATES—Provide solid bronze strike plates at top and bottom of doors.

FRICTION ADJUSTERS

(Note:—All doors are drilled and tapped for the attachment of friction adjusters, supplied at extra cost if desired.)

MASTIC

The door manufacturer shall furnish sufficient mastic to form a weather tight bond at head, sill, both jambs and mullions.

ERECTION

(Note:—Where desired, the Fenestra Construction Company, under a separate contract, will erect doors in prepared openings. If desired, so specify.)

(Note:—We recommend that all doors be installed in prepared openings. Where doors are built directly into the masonry, include in masonry specifications that mason shall use every precaution against springing or racking doors out of shape.)

All doors shall be set plumb and true, properly aligned, and securely anchored before glazing.

All mullions shall be rigidly bolted to the frame.

Set all frames in mastic, neatly applied where they come in contact with the building construction or steel mullions.

(Note:—Where doors are set directly into stone construction, apply one coat of shellac to stone to avoid stain by mastic.)

Necessary erection clips and wood screws for satisfactory installation, as shown on the detailed drawings, shall be furnished by the manufacturer at no added cost.

PAINTING

All doors shall receive one coat of rust-resisting primer and one coat of dark battleship gray paint at the factory—each coat to be sprayed on and baked separately.

(Note:—Finish coat should be applied after glazing.)

GLASS AND GLAZING

(Note:—The following should be included in the glass and glazing specifications:
"Glass shall be (⅛" light plate) (¼" thick plate). Single or double strength glass is not recommended."
"Putty shall be steel casement putty." This is a special high grade putty which assures quick setting. Ordinary wood window putty must not be used.)

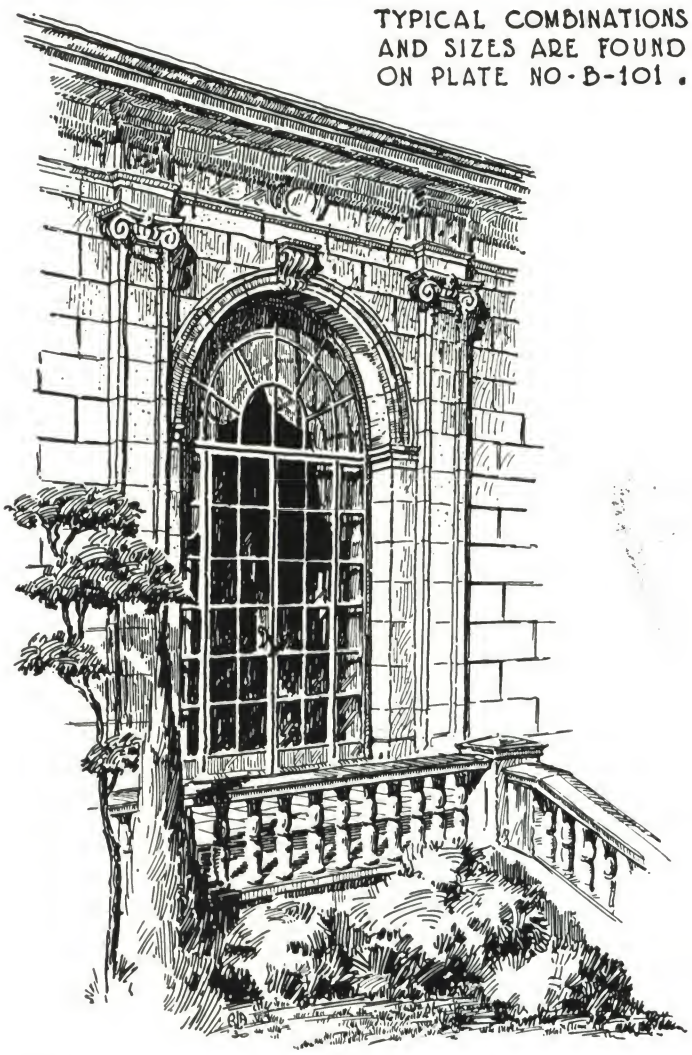
All doors shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the casement manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

(Note:—Do not paint until putty has thoroughly hardened.)

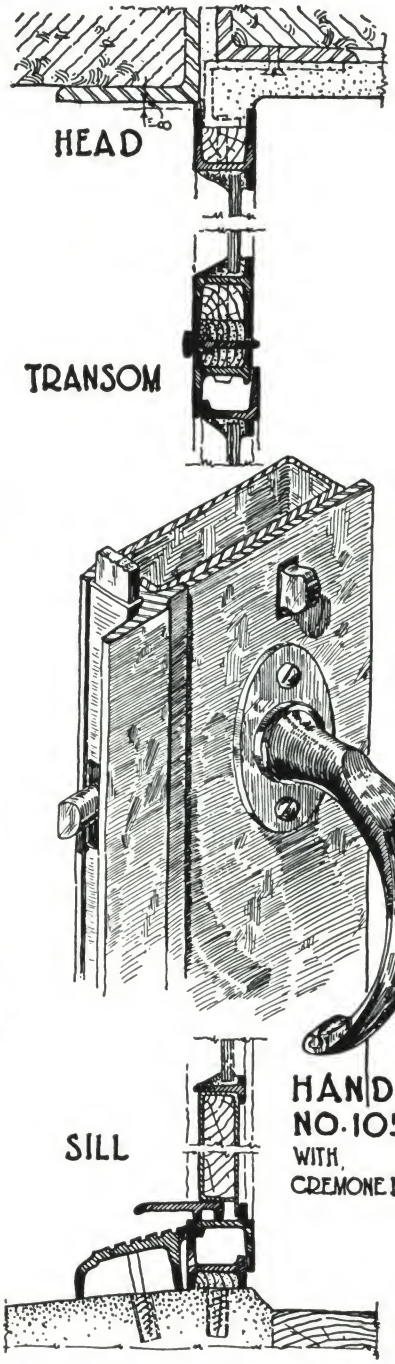
SCREENS

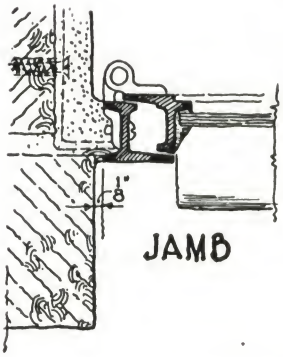
(Note:—We do not supply screens for casement doors.)

Continued on next page



TYPICAL COMBINATIONS AND SIZES ARE FOUND ON PLATE NO-B-101 .





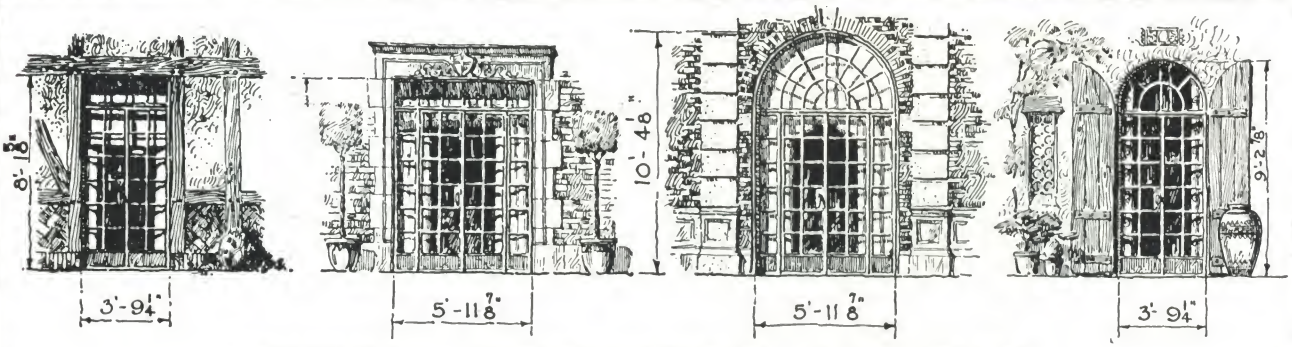


MEETING RAIL
SHOWING ATTACHMENT OF CREMONE BOLT & SHOT BOLT
SCALE-HALF SIZE

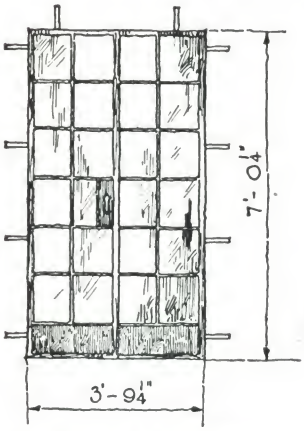
SCALE OF DETAILS-3"-1'-0"

Fenestra 1930 — FENESTRA CASEMENT DOORS OPEN IN WITH FENCRAFT CASEMENTS — Plate No. B 201

Continued on next page



TYPICAL COMBINATIONS AND SIZES



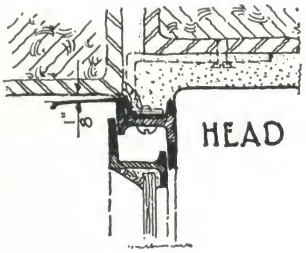
OUTSIDE ELEVATION OF DOOR UNIT

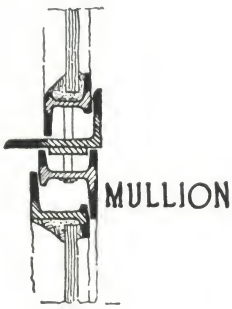
NOTES

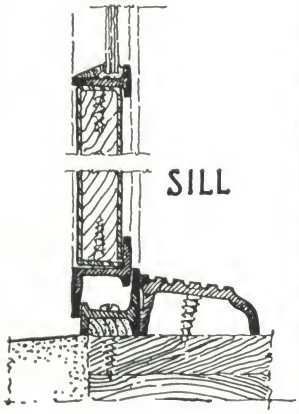
ELEVATIONS SHOWN OF TYPICAL COMBINATIONS AND DOOR UNIT WITH ANCHOR CLIPS ATTACHED APPLY TO BOTH OPEN IN AND OPEN OUT DOORS

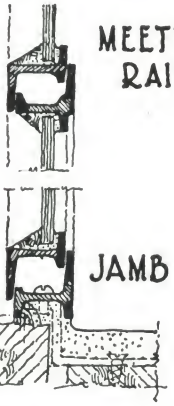
HEAVY ANCHOR CLIPS OF 1"x 3/16" FLAT STEEL ARE SUPPLIED FOR ANCHORING DOOR WHEN INSTALLED INTO MASONRY OPENINGS

ALL DIMENSIONS SHOWN ARE OPENING SIZES, ALLOWING FOR 1/8" CLEARANCE ON ALL SIDES.











SCALE OF DETAILS - 3"=1'-0"

Fenestra 1930

FENESTRA CASEMENT DOORS OPEN OUT WITH FENWROUGHT CASEMENTS

Plate No B-101

Continued on next page

SCREENED FENWROUGHT CASEMENTS

A series of solid section steel casement windows with swing leaves opening out. Designed to give the attractiveness and convenience demanded in all modern homes and apartments. Accommodate Fenestra flat bronze screens so arranged that the swing leaves may be opened, closed and locked through the screens, but without touching them

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory or advisory and need not be included in the specifications.

GENERAL

Steel casement windows shall be Fenestra Screened Fenwrought as manufactured by the Detroit Steel Products Company.

MATERIAL

CASEMENT SECTIONS—All sections shall be specially designed, hot rolled, solid steel casement bars with heavy fillets in all re-entrant angles.

FRAME MEMBERS and the stiles and rails of each swing leaf shall be rolled with a 1/8" baffle.

MUNTINS shall be T bars.

MULLIONS—All Mullions shall be hot rolled, solid steel T bars.

(Note:—Use when two or more casements are placed side by side or one above another in the same opening. Pressed metal or built-up sections shall not be used for either vertical or horizontal mullions.)

SCREENS—Material for screens and screen frames shall be as shown in screen specifications.

CONSTRUCTION

FRAMES AND SWING LEAVES shall be of baffled Z bars mitered at all corners and electrically butt welded. All exposed faces at welds shall be ground to a smooth finish. Provide continuous, two-point, flat contact weathering between swing leaves and frame.

MUNTINS shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at intersections. Joints at frames, stiles and rails shall be mortise and tenon, air hammer riveted.

(Note:—Muntins may be omitted to permit glazing in single lights of plate glass or leaded glass. If desired, so specify. We do not supply leaded glass. In four light high swing leaves, we recommend the use of one horizontal muntin in the center.)

MULLIONS shall be 1 3/8" deep. Provide bolts for frame attachment.

TRANSOM BARS shall not be less than 2 1/4" deep with tip of protruding web bent downward to form a drip. They shall be continuous from jamb to jamb. Provide bolts for frame attachment.

COPPER HEAD DRIP—Wherever swing leaves extend to head of frame, provide a continuous, heavy, electro-galvanized steel drip.

(Note:—Drip is shipped unattached.)

SILL AND JAMB ANCHOR CLIPS—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

ATTACHED HARDWARE

(Note:—Attached at factory.)

SIDE HINGES—All side hung swing leaves shall be hung on two heavy extension (cleaning) hinges of special solid rolled steel with heavy re-entrant angle fillets. Hinge pins (non-removable) shall be of solid bronze accurately fitted into flanged bronze bushings.

(Note:—Bronze pins and bushings provide 100% bronze bearing at all moving pivot points.)

SWING LEAF KEEPER shall be cut from a solid rolled steel section welded to the swing leaf stile.

LOCKING HANDLE BRACKET—Ornamental locking handle bracket shall be heavy gauge steel plate, stamped to special design and solidly attached to the frame section.

(Note:—On units with only one swing leaf, the bracket is welded to the frame section. (Specify left or right.) On units with two adjacent swing leaves, the bracket is screwed with four screws to the meeting rail.)

OPERATOR PROVISIONS—Provide means for the attachment of Fenestra standard through screen operator. Provide tapped holes in bottom rails of all swing leaves for operator attachment.

Continued on next page

SCREEN PROVISIONS—Provide one or more pairs of tapped holes in the top rail of the frame for the attachment of screen retaining clips.

DETACHED HARDWARE

All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

LOCKING HANDLES (for side hung swing leaves)—Ornamental locking handles shall be of malleable iron with dull black, rust-resisting finish and shall be designed with a hinge action, to permit slipping through circular hole in screen escutcheon when screen is placed or removed. Handles to be rigidly attached to a stud and beveled cam. Handle No. 1023.

(Note:—At extra cost special finishes may be secured: "Scaley," "Coarse Sand," "Hammered" or "Polished" either in bronze or nickel silver, or chromium plated in bronze only.)

OPERATOR—All operators shall be Fenestra special thumbscrew type, designed to provide easy operating movement through the screen. No. 1033.

Operator shall consist of a die cast arm passing through a die cast fulcrum guide equipped with a bronze friction plate. One end of the arm to attach to the sill of the swing leaf by a pressed steel bracket; the other end to carry a solid steel peg for a finger grip. Operating mechanism to be mortised into the frame bracket and held by machine screws.

(Note:—Special operator finishes corresponding to special handle finishes may be had at extra cost.)

OPEN OUT TRANSOM OPERATOR shall be iron and bronze peg and stay, No. 1125, designed to operate through the screen.

MASTIC

The casement manufacturer shall furnish mastic (one pound to ten lineal feet) to form a weather-tight frame bed, at head, jambs and sill (and mullions).

ERECTION

(Note:—We recommend that all casements be installed in prepared openings accurately constructed in accordance with the Standard Fenestra installation details. We do not recommend building casements directly into the masonry as the walls are laid up, as this frequently delays erection and is apt to result in springing or racking the casements out of shape.)

All casement windows shall be set plumb and true, properly aligned and securely anchored before glazing.

All mullions shall be rigidly bolted to frames.

Set all frames in mastic neatly applied in a narrow beading where they come in contact with the building construction (or steel mullions). Use one pound of mastic to ten lineal feet.

Apply all hardware in accordance with the manufacturer's directions.

(Note:—Give second coat of paint and glaze before applying finish hardware.)

PAINTING

All casement windows shall be given one dip coat of gray lead and oil paint by the manufacturer before shipment.

(Note:—The following should be provided for in the painting specifications: "One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.")

GLASS AND GLAZING

(Note:—The following should be included in the Glass and Glazing Specifications:

"Glass shall be: (⅛" light plate) (¼" thick plate) (double strength for small lights only.) Single strength glass is not recommended."

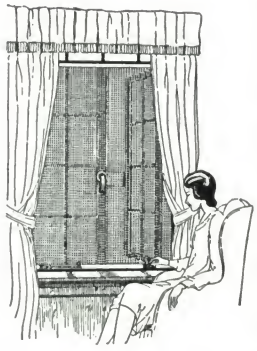
"Putty shall be steel casement putty." This is a special high grade putty which insures quick setting. Ordinary wood window putty must not be used. If leaded glass is desired, so specify.")

All casement windows shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated steel spring glazing clips furnished by the casement manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

(Note:—Do not paint until putty has thoroughly hardened.)

FLAT SCREENS

Screens shall be designed to set flat against the inside of the casement frame with handle and operating hardware extending through the screen to permit operation of the swing leaf without touching the screen.



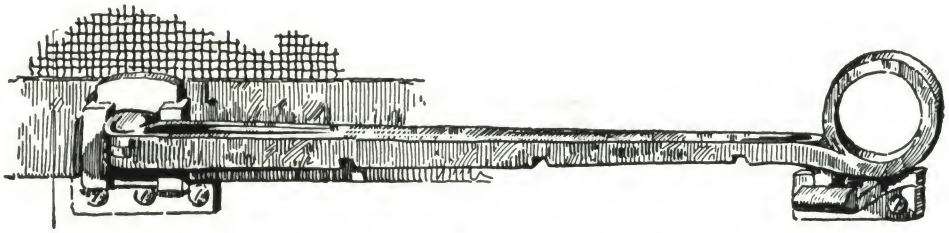
Screen frames shall be of best quality strip steel, formed 1" wide by ½" thick at head and jambs. All frames shall contain a triangular reinforcing brace running the full length of the stile. Paint to be two coats of gray lead and oil, baked on. Screen cloth shall be standard woven 16-mesh of antique finish bronze wire, held taut along both stiles and rails by a specially formed cap interlocked with the main portion of the frame, but quickly removable for rewiring. Each screen shall be provided with a 22-gauge steel escutcheon with circular hole to fit over and around the locking handle. Bottom rail of each screen shall be designed with a slot, to permit the passage of the operator arm.

(Note:—Screens with bronze frames or with finer mesh may be had at extra cost.)

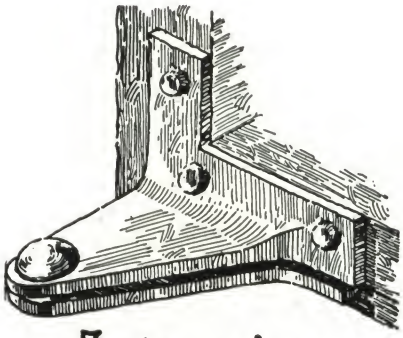
SHADE AND DRAPERY BRACKETS

(Note:—Each casement is drilled at both jambs near the head, for attaching standard shade and drapery brackets which can be purchased from local interior decorators.)

Continued on next page



Transom Stay No. 1125

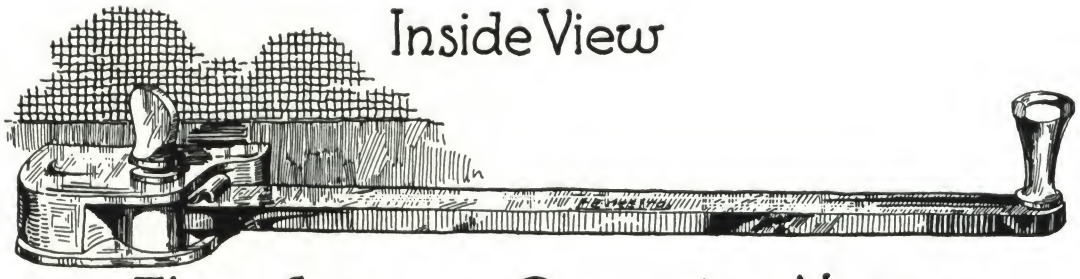


Extension Hinge



Handle No. 1023

Inside View



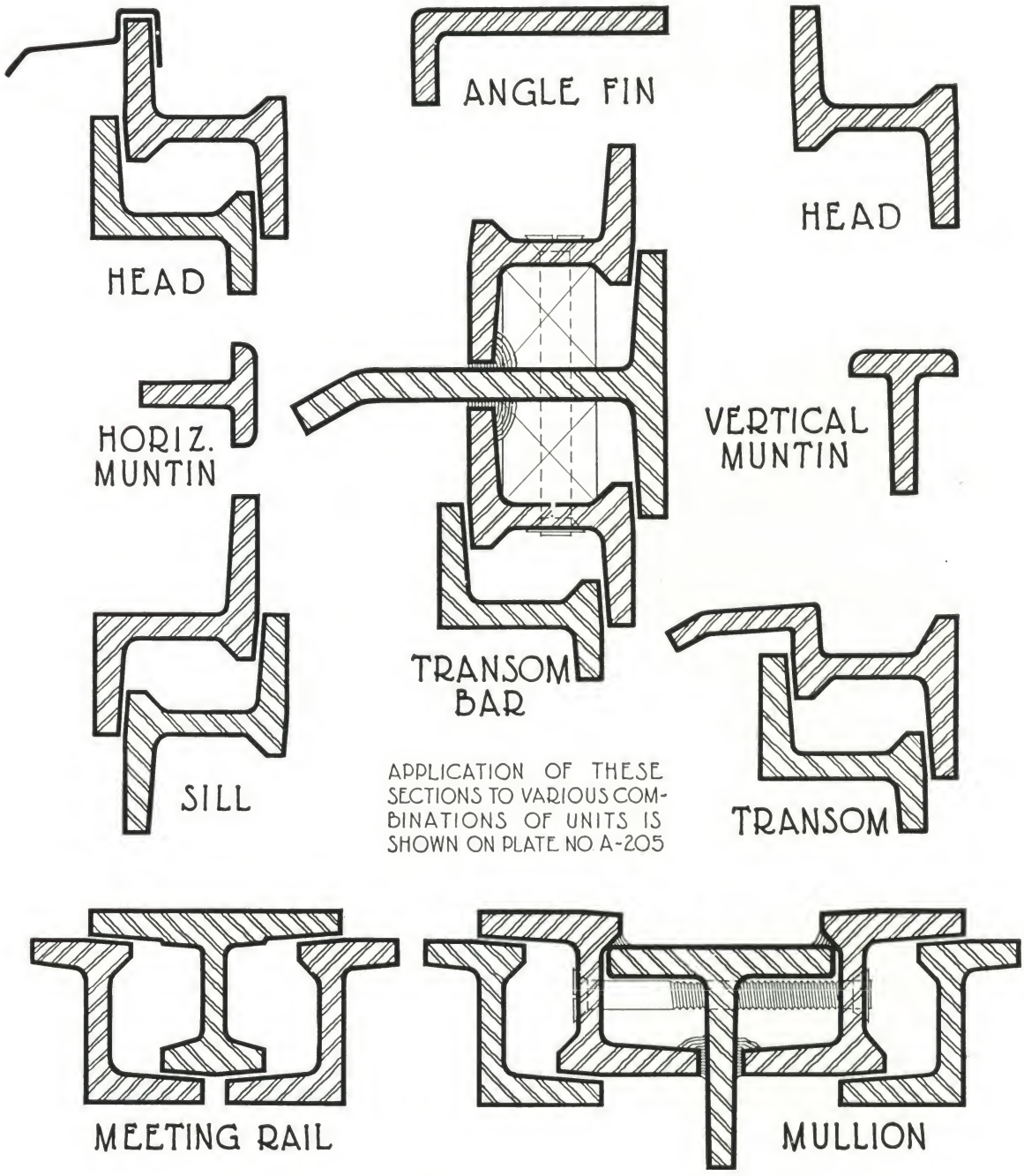
Thru-Screen Operator No. 1033

Fenestra 1930

SCREENED FENWROUGHT HARDWARE

Plate No A-201

Continued on next page

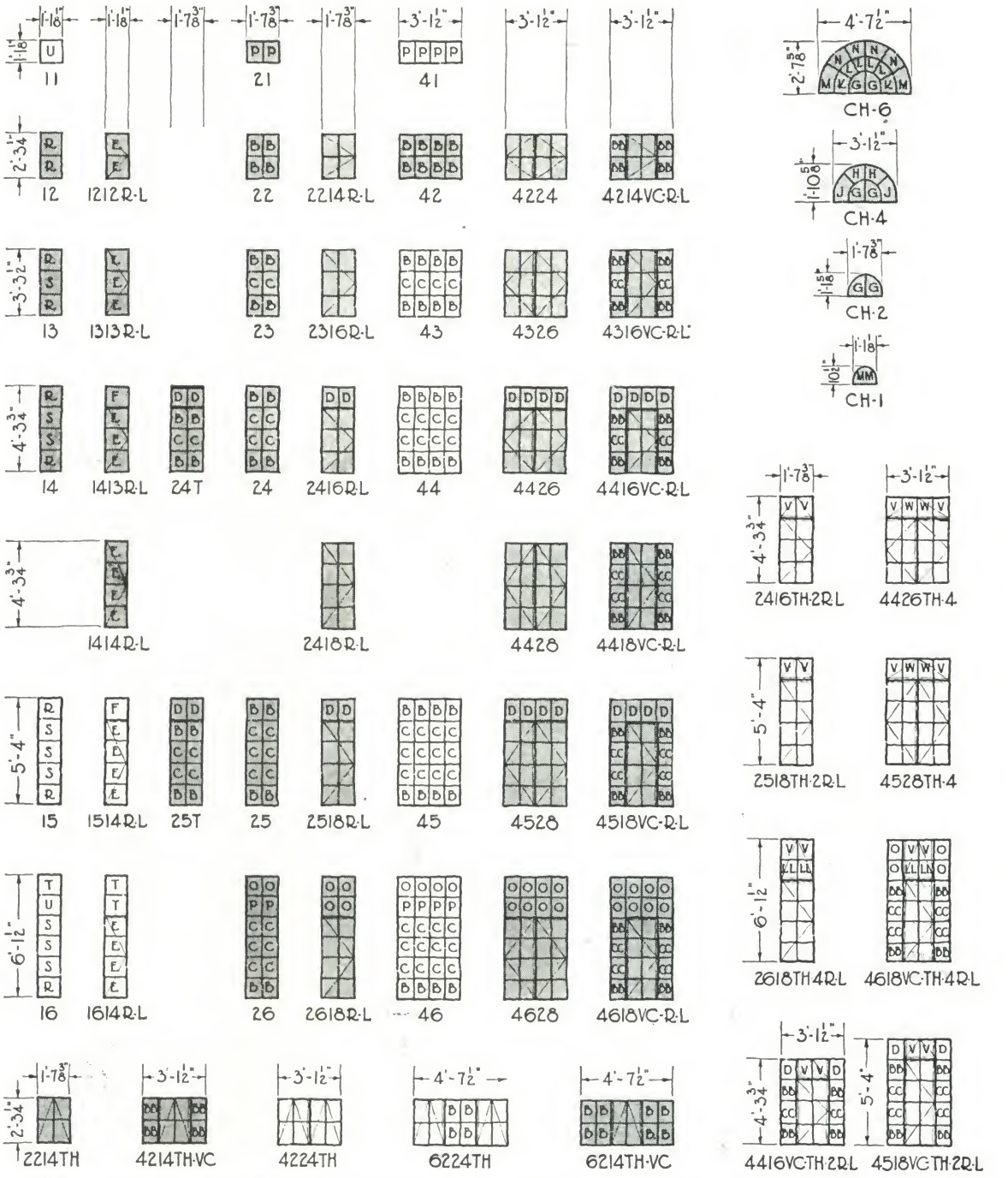


Fenestra 1930

SCREENED FENWROUGHT
FULL SIZE SECTIONS

Plate No A-202

Continued on next page



TYPES SHOWN SHADED ARE CARRIED IN STOCK – OTHER TYPES ARE STANDARD

Fenestra 1930

SCREENED FENWROUGHT TYPES AND SIZES

Plate No A-203

Continued on next page

GLASS SIZES

		CUT FROM
A	8" x 12"	STOCKED
B	8 1/16" x 12 3/8"	STOCKED
C	8 1/16" x 12"	STOCKED
D	8 1/16" x 11 3/4"	STOCKED
E	10" x 12"	R
F	11 3/16" x 11 3/4"	R
G	TEMPLATE	C
H	TEMPLATE	M
J	TEMPLATE	M
K	TEMPLATE	R
L	TEMPLATE	D
M	11 1/4" x 16 1/2"	STOCKED
N	TEMPLATE	M
O	8 1/16" x 10 1/2"	D
P	8 1/16" x 11 3/16"	D
R	11 3/16" x 12 3/8"	STOCKED
S	11 3/16" x 12"	R
T	11 3/16" x 10 1/2"	R
U	11 3/16" x 11 3/16"	R
V	8" x 10"	A
W	8 1/16" x 10"	D
DD	8 3/8" x 12 3/8"	STOCKED
CC	8 3/8" x 12"	STOCKED
LL	8" x 9 1/8"	A
MM	TEMPLATE	D

LIGHTS IN VENTILATORS (NOT LETTERED) ARE "A" SIZE 8"x12" GLASS.

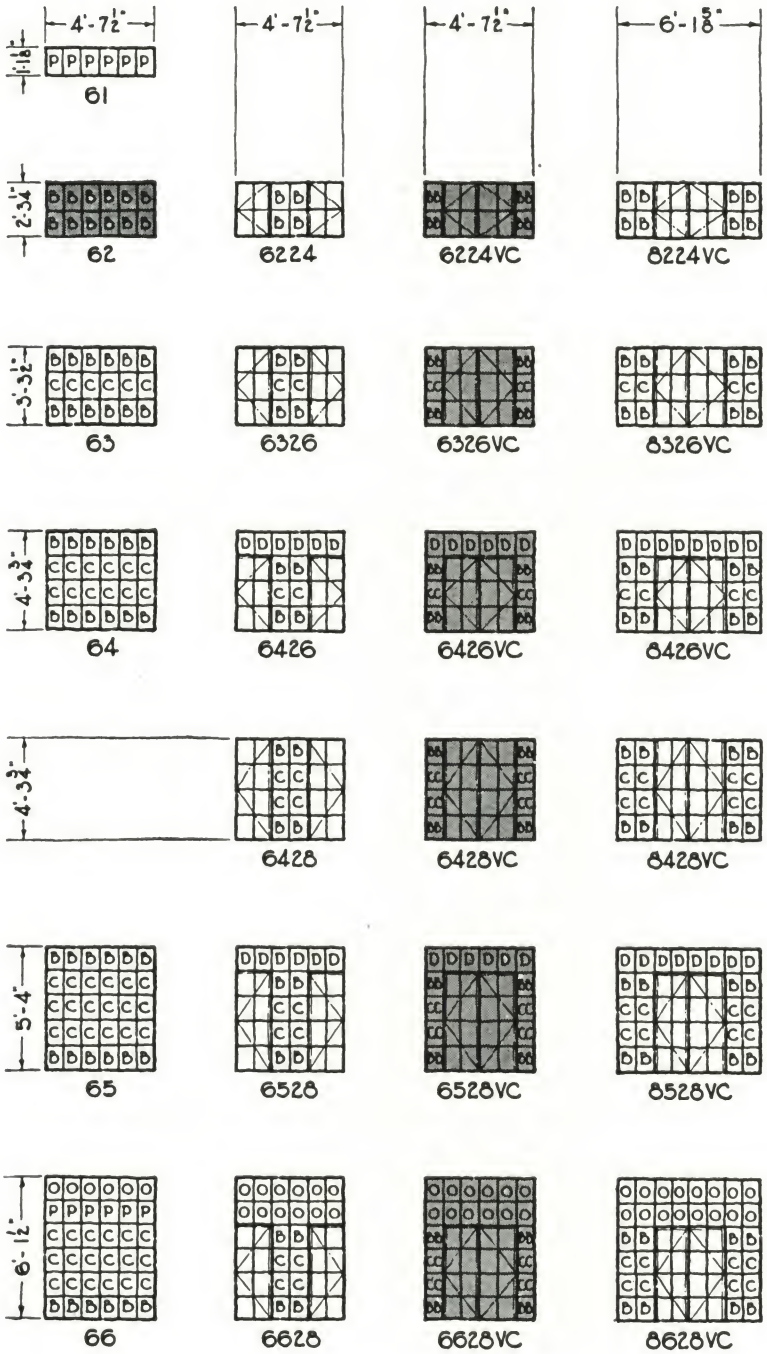
NOTES

VC - VENTILATOR IN CENTER
TH - TOP HINGED TRANSOM

SIZES GIVEN ARE WINDOW DIMENSIONS. 1/8" SHOULD BE ALLOWED FOR CLEARANCE ON ALL SIDES

HANDING OF CASEMENTS IS DETERMINED BY LOCATION OF HINGE VIEWED FROM OUTSIDE. RIGHT HAND CASEMENTS ARE HINGED AT RIGHT AND LEFT HAND CASEMENTS ARE HINGED AT LEFT.

TYPES SHOWN SHADED ARE CARRIED IN STOCK. OTHER TYPES ARE STANDARD.

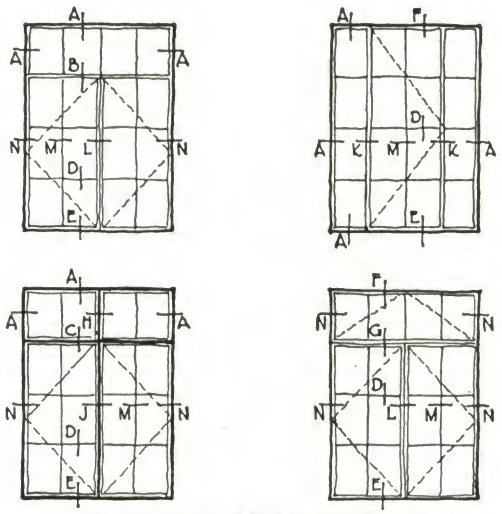


Fenestra 1930

SCREENED FENWROUGHT TYPES AND SIZES

Plate No A-204

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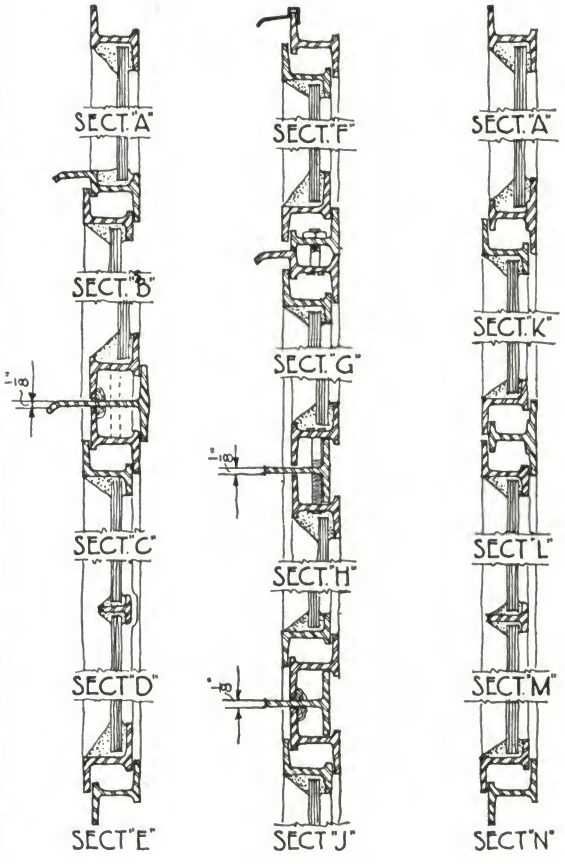


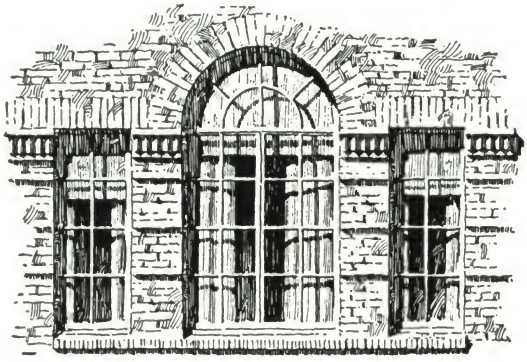
TYPICAL ELEVATIONS

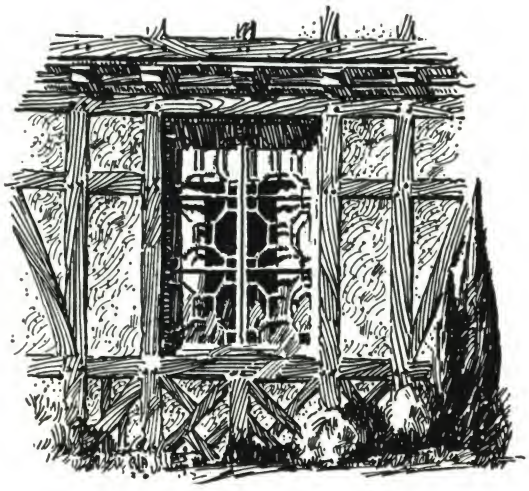
SYMMETRICAL COMBINED WIDTHS

WHERE TWO OR MORE FENWROUGHT CASEMENTS ARE COMBINED IN THE SAME OPENING 1/8" MUST BE ADDED FOR EACH MULLION OR TRANSOM-BAR USED

STANDARD WIDTHS	UNITS WIDE	PANES WIDE	PANES WIDE PER UNIT	VERT. MULL.
1'-7 3/8"	1	2	2	0
3'-1 1/2"	1	4	4	0
3'-2 1/8"	2	4	2,2	1
4'-7 1/2"	1	6	6	0
4'-10 3/8"	3	6	2,2,2	2
6'-1 5/8"	1	8	8	0
6'-3 1/8"	2	8	4,4	1
6'-4 1/2"	3	8	2,4,2	2
6'-5 7/8"	4	8	2,2,2,2	3
7'-10 1/2"	3	10	2,6,2	2
7'-10 5/8"	3	10	4,2,4	2
8'-1 3/8"	5	10	2,2,2,2,2	4





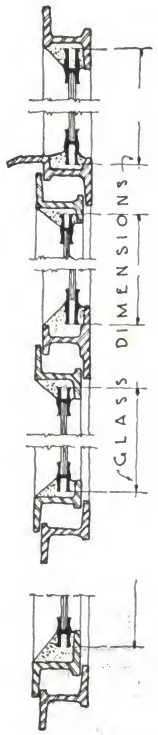


Fenestra 1930

SCREENED FENWROUGHT COMBINATION DETAILS

Plate No A-205

Continued on next page



NOTES

LEADED GLASS IS NOT FURNISHED BY DETROIT STEEL PRODUCTS CO. PANELS SHOWN ARE SUGGESTIONS FOR PURCHASE LOCALLY TO FIT STOCK FENWROUGHT TYPES WITHOUT MUNTINS. – PATTERN AND ALIGNMENT OF CAMES TO COINCIDE WITH THOSE OF ADJOINING UNITS DIAMOND OR RECTANGULAR LEADED PANELS OR PLATE GLASS OF SIZES SHOWN WILL FIT WITH ⅛ CLEARANCE DETAILS AT LEFT SHOWS LEADED CAMES USED WITH VARIOUS SASH SECTIONS

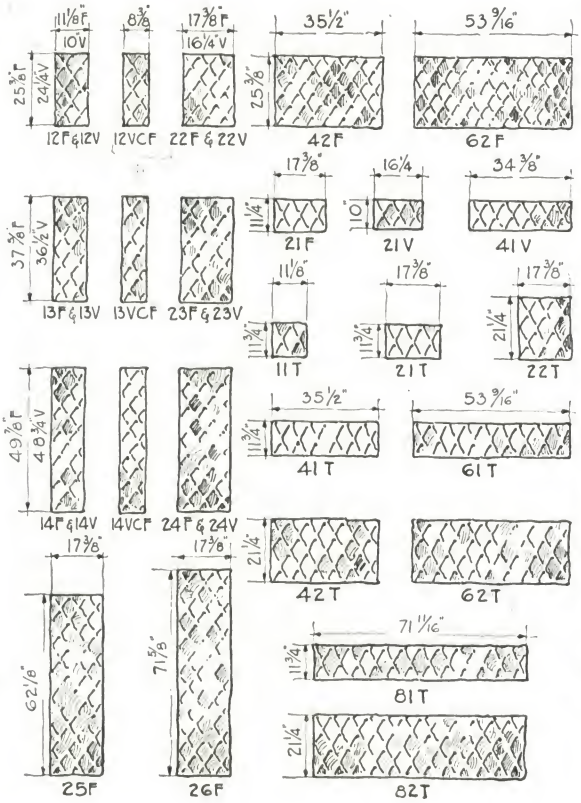
EXPLANATION OF NOMENCLATURE

F- PANEL FOR FIXED UNIT
V- PANEL FOR VENTILATOR UNIT
T- PANEL FOR FIXED TRANSOMS
VCF- PANEL FOR FIXED SIDE-LIGHTS





DANIEL LIPSKY RESIDENCE
GREAT NECK LONG ISLAND N.Y.
A·W·COOTE ARCHITECT

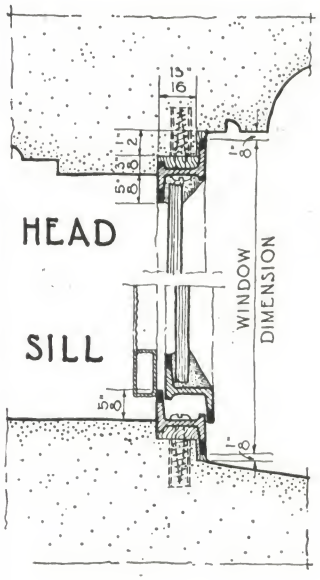


Fenestra 1930

SCREENED FENWROUGHT SUGGESTIONS FOR LEADED GLASS

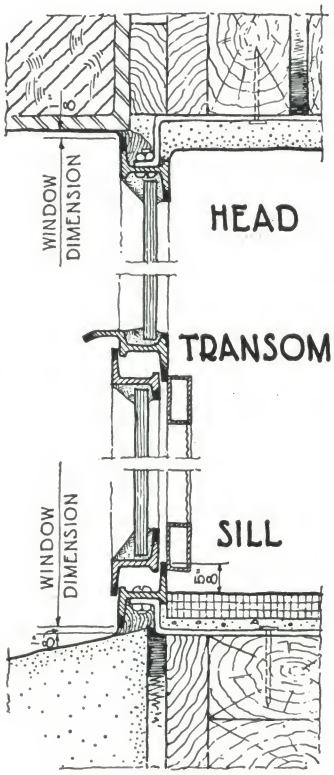
Plate No A-206

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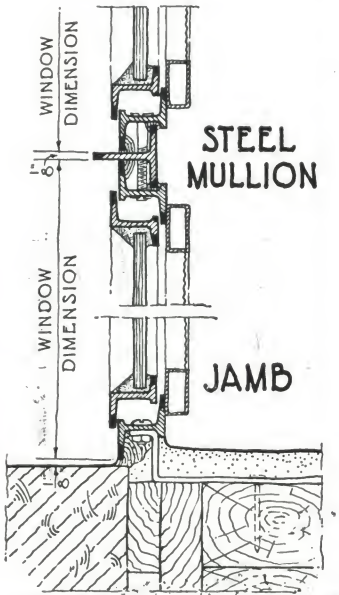
SET ALL CASEMENTS IN MASTIC CEMENT WHERE THEY COME IN CONTACT WITH BUILDING WORK.







L.A. LAYNE RESIDENCE ~ RIVER OAKS COUNTRY CLUB
C.W. OLIVER - ARCHITECT HOUSTON, TEXAS



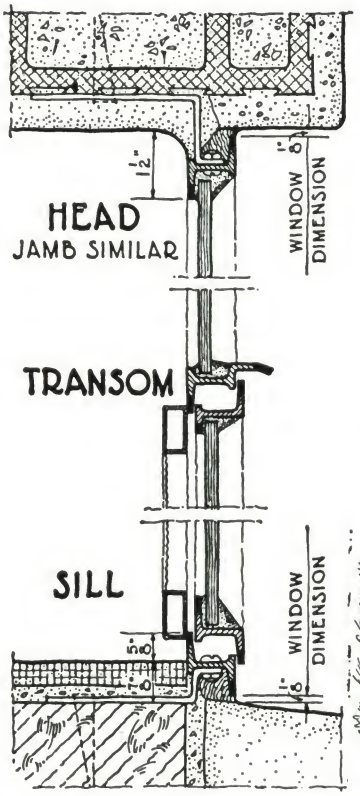
SCALE OF DETAILS - 3"-1'-0"

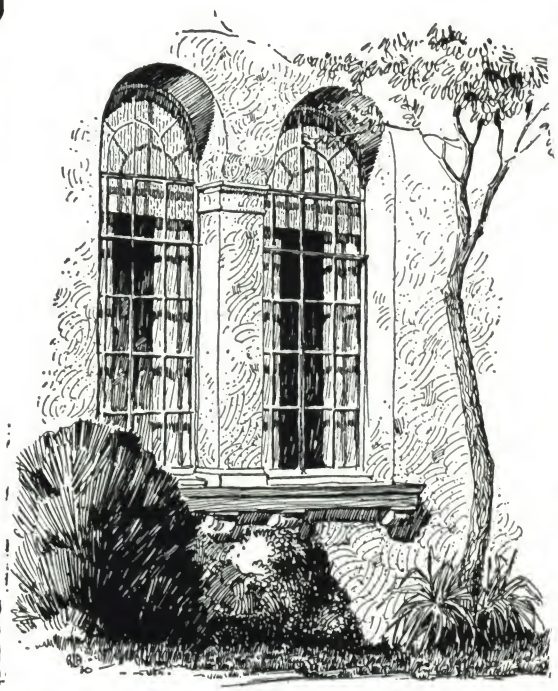
Fenestra 1930

SCREENED FENWROUGHT BRICK VENEER & STONE INSTALLATIONS

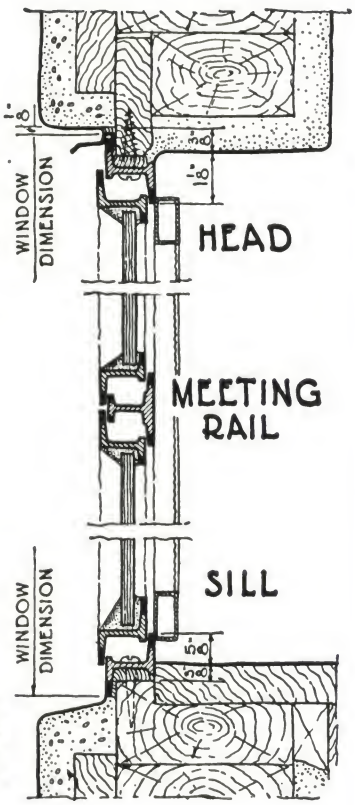
Plate No A-207

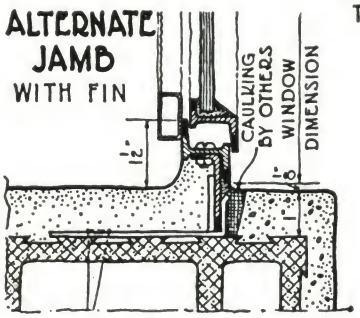
Continued on next page





HENRY BARKHAUSEN RES.-WEST PALM BEACH, FLA.
TREANOR AND FATIO - - ARCHITECTS.





SCALE OF DETAILS - 3"-1'-0"

SET ALL CASEMENTS IN MASTIC CEMENT WHERE THEY COME IN CONTACT WITH BUILDING WORK.



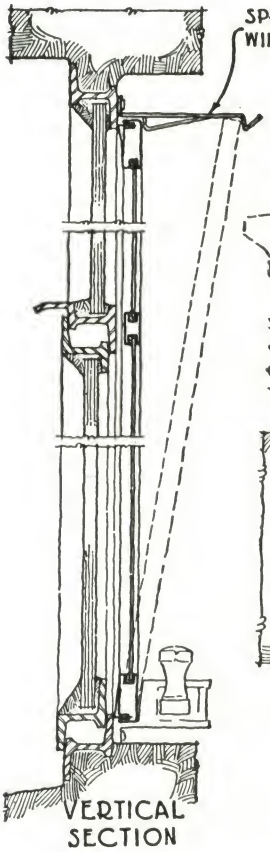
HALLAM COOLEY RES.- LOS ANGELES, CALIF.
JONES AND WARD - - ARCHITECTS.

Fenestra 1930

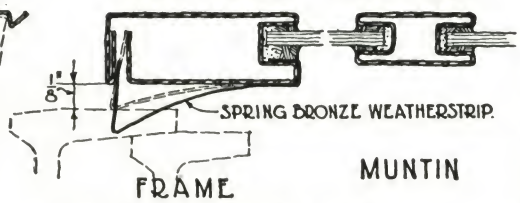
SCREENED FENWROUGHT STUCCO ON HOLLOW TILE & FRAME

Plate No A-208

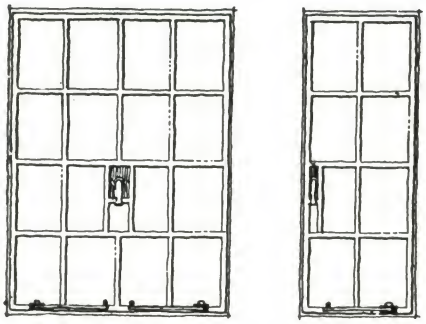
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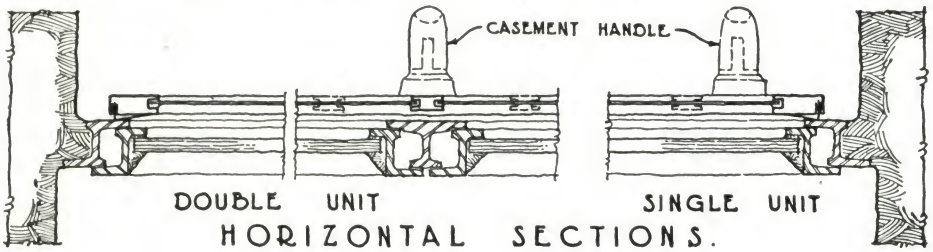
FULL SIZE SECTIONS.



DOTTED LINES SHOW FRAME IN PLACE ON CASEMENT WITH WEATHERSTRIP COMPRESSED MAKING A WEATHER-TIGHT CONTACT WITH CASEMENT



DOUBLE UNIT SINGLE UNIT
TYPICAL INSIDE ELEVATIONS



HORIZONTAL SECTIONS.

ATTACHMENT OF WINTER WINDOW

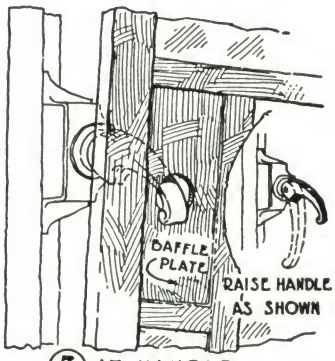
THE THREE SIMPLE OPERATIONS SHOWN BELOW ARE ALL THAT ARE REQUIRED IN INSTALLING WINDOW

CLIPS

CLIPS ARE PROVIDED AT HEAD TO HOLD WINDOW IN PLACE & ALLOW A LIMITED OPENING FOR VENTILATION IF DESIRED.

WHEN VENTS COME TO THE HEAD OF UNIT THE PUNCHING FOR SCREEN CLIPS IS USED FOR ATTACHING ABOVE CLIPS. FOR FIXED UNITS, AND THOSE WITH FIXED TRANSOMS. HOLES MUST BE DRILLED & TAPPED IN FIELD FOR THESE CLIPS. IN CASE SHADE BRACKETS ARE NOT USED, THIS FIELD WORK CAN BE ELIMINATED BY USING THE PUNCHING FOR SHADE BRACKETS

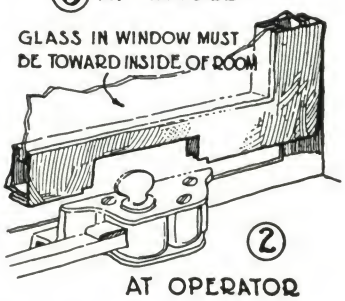
ON FIXED UNITS HOLES MUST BE PROVIDED IN SILL BAR IN FIELD FOR A SUPPORTING CLIP ON VENTILATED UNITS. OPERATOR & SUPPORTING CLIPS HOLD WINTER WINDOW AT SILL.



(3) AT HANDLE

ATTACHING WINDOW

1-ATTACH CLIPS PER NOTE ABOVE
2-WITH VENTILATOR & STAY CLOSED SET WINDOW BACK OF OPERATOR HOUSING WITH NOTCH OVER STAY BR'KT.
3-ADJUST WINDOW SO HOLE IN BAFFLE PLATE SLIPS OVER LIFTED CASEMENT HANDLE. PUSH INTO PLACE



AT OPERATOR

CONSTRUCTION

THE WINTER WINDOW IN ALL CASES COVERS THE ENTIRE CASEMENT UNIT WHETHER FIXED TYPE OR VENTED WITH FIXED SIDELIGHTS OR TRANSOMS.

FRAME IS A $\frac{3}{8}$"x1" SPECIAL ROLLED SECTION OF #25 GA. ZINC.

WEATHER STRIP ROLLED FROM #31 GA. SPRING BRONZE. IT IS ATTACHED AS AN INTEGRAL PART OF FRAME, AND PROVIDES CONTINUOUS WEATHER-TIGHT CONTACT WITH CASEMENT.

MUNTINS ARE ROLLED FROM #25 GA. ZINC

ALL JOINTS ARE SOLDERED

WINDOW IS FINISHED IN OXIDIZED BRONZE, AND IS GLAZED WITH SINGLE STRENGTH GLASS CAULKED IN PLACE BY MANUFACTURER

CLIPS ARE OF #20 GA. SPRING STEEL.

Fenestra 1930

FENWROUGHT WINTER WINDOWS

PATENTS APPLIED FOR

Plate No A-209

Continued on next page

"FENWROUGHT" CASEMENTS

Solid section steel casements similar to Screened Fenwrought, but without Fenestra flat screens. Fenestra Chamberlin Roll Screens or any other accepted method of screening may be used. For full sized sections and installation details see Screened Fenwrought Casements.

SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory and need not be included in specifications.

GENERAL

Casements shall be Fenestra Fenwrought as manufactured by the Detroit Steel Products Company.

MATERIAL

(Note:—Same as the Material Specifications for Screened Fenwrought Casements except that Fenestra Screens are not provided.)

CONSTRUCTION

(Note:—Same as the Construction Specifications for Screened Fenwrought Casements, except that frame bars at swing leaf jambs are prepared for attachment of Fenestra Chamberlin Roll Screens.)

ATTACHED HARDWARE

(Note:—Attach at the factory.)

SIDE HINGES:

(Note:—Same as Side Hinge Specifications for Screened Fenwrought Casements.)

TOP HINGES—Top hung swing leaves in transoms shall be hung on heavy steel hinges with bronze pins.

LOCKING HANDLE BRACKETS — Ornamental locking handle brackets shall be cut from special, solid rolled steel sections welded to the swing leaf stiles.

OPERATOR PROVISIONS—Provide three countersunk holes standardized as to size and location in the bottom rail of the casement frame for the attachment of operator. Provide tapped holes in the bottom rails of all swing leaves for operator attachment.

(Note:—Provide only when optional operator is used.)

STRIKES—All handles shall lock against bronze strikes attached to the frames.

DETACHED HARDWARE

All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

LOCKING HANDLES shall be of ornamental design, built to produce a cam action and shall be: (1) Standard, No. 198 malleable iron with dull black, rust-resisting finish. (2) Optional, No. 198 in oxidized bronze. (3) Optional, No. 699 (bronze only).

(Note:—Bronze at added cost over iron.)

Handles shall be attached to handle brackets by bronze hexagonal headed bolts, tap-screwed into steel, spring, friction clevises to insure constant and even tension and prevent rattle.

OPERATORS—For Side Hung Swing Leaves:

(1) STANDARD:

(Note:—Friction Hinges and no operator are standard.)

(2) OPTIONAL: Sliding Stay (malleable iron with dull black, rust-resisting finish) No. 612, or steel peg and stay with dull black, rust-resisting finish, stay plate and stay bracket) No. 208.

(3) OPTIONAL: Thumb Screw Stay (dull black, rust-resisting finish, bronze friction plate, guide and thumb screw) No. 203, or all bronze, No. 203-B.

(4) OPTIONAL: Gear Type Underscreen (malleable iron with black, rust-resisting finish or oxidized bronze) No. 385.

(Note:—Nos. 2, 3 and 4 at extra cost over standard and in bronze at slightly added cost over iron.)

For Top Hung Transom sash provide "Standard" Peg and Stay Operator, No. 747, iron with dull black, rust-resisting finish.

(Note:—In bronze, Part No. 1034, at added cost.)

MASTIC

(Note:—Same as the Mastic Specifications for Screened Fenwrought Casements.)

ERECTION

(Note:—Same as the Erection Specifications for Screened Fenwrought Casements.)

PAINTING

(Note:—Same as the Painting Specifications for Screened Fenwrought Casements.)

GLASS AND GLAZING

(Note:—Same as the Glass and Glazing Specifications for Screened Fenwrought Casements.)

SCREENING—SHADING

(Note:—Fenestra flat screens are not furnished, but Fenestra Chamberlin Roll Screen or any other accepted method of screening may be used. Shade and drapery brackets should be attached to the building construction.)

UNDERWRITERS

(Note:—Under certain conditions and limitations these windows can be supplied with Underwriters' Label.)

Continued on next page

FENESTRA CHAMBERLIN SCREENS

All screens shall be Fenestra Chamberlin Roll Screens. Provide regular weight, No. 32 gauge, 16-mesh bronze wire cloth with 5-strand reinforced, double selvage edges.

(Note:—Finer mesh supplied at extra cost.)

Provide a screen roller of not less than No. 20 gauge welded round steel tubing tinned for rust protection, mounted on a ¼″ round, rolled steel axle by means of specially designed Doehler die cast non-ferrous alloy bearings.



Supply, attached to each roller, one best quality coil spring of No. 16 gauge steel wire tinned for rust protection and extending the full width of the roller.

Each roller to be housed in a No. 24 gauge electro-plated, cold rolled steel case with end caps so designed as to form a flush end surface.

Provide screen guides formed from not less than No. 24 gauge, electro-plated, cold rolled steel, for attachment to standard swing leaf jambs. All guides to be so designed that screen cloth feeds back into place without damage if accidentally pulled out. Face of each guide to be not less than 1″ in width to provide a wide lap on the screen cloth. Each guide to have a vertical extension to permit adjustment. Provide a keeper at the lower end of each guide for engaging the automatic latch on the sill operating bar.

Provide, at the lower edge of the screen cloth, an operating bar not less than No. 24 gauge electro-plated, cold rolled steel, made in a two-piece interlocking construction and designed for the attachment of felt cushion strips.

Each end of each operating bar to be provided with a visible, positive, automatic catch for holding the screen in a closed position and tight against the window stool.

Each end of operating bar to be provided with a non-binding, spring-cushioned, sliding guide to permit easy operation of the screen.

Provide cushion strips of felt, properly attached to the operating bar to protect window stool and provide tight contact between screen and stool when screen is in a closed position.

Guides, roll case, operating bar and all exposed parts to be plated an oxidized copper color and lacquered. Screen wire to be antique bronze finish.

Provide bolts and nuts in sufficient quantity and proper sizes to attach screens in accordance with provisions made by the window manufacturer.

All screens to be so designed as to be rewirable when necessary.

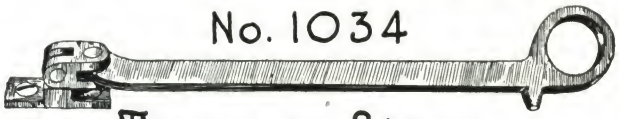


Fenwrought and Fencraft Casements in a Colonial House, Saddle River, N. J.
Aymar Embury II, Architect, New York City

Continued on next page

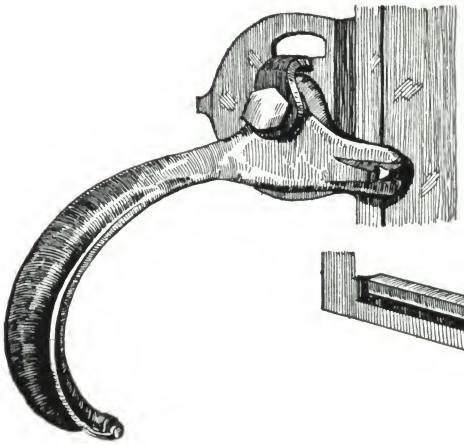


No. 747

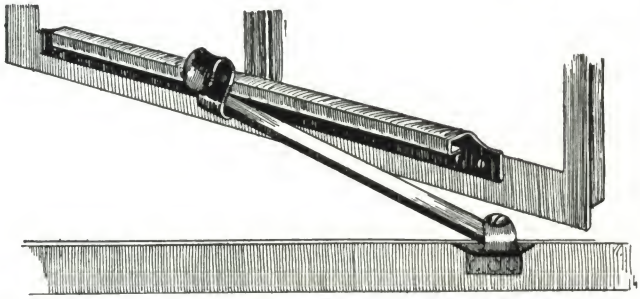


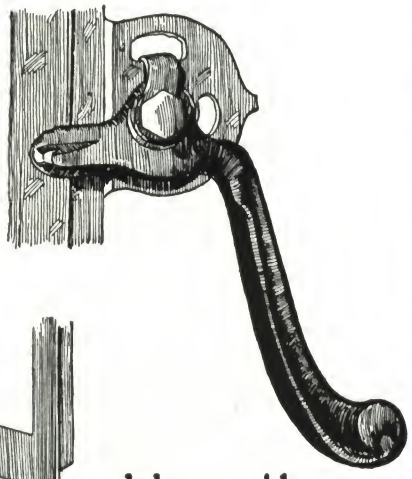
No. 1034

Transom Stays



Handle
No. 699





Handle
No. 198

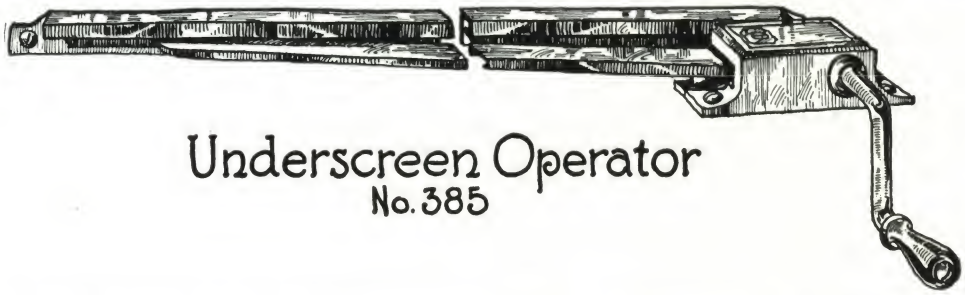
Sliding Stay No. 612





Peg & Stay No. 208

Friction Stay No. 203



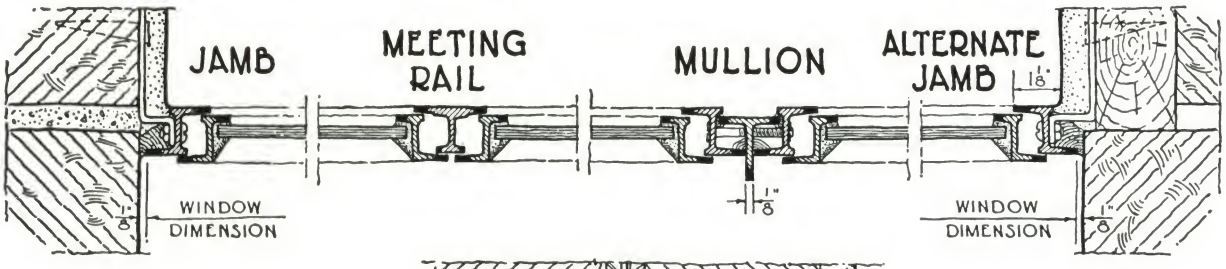
Underscreen Operator
No. 385

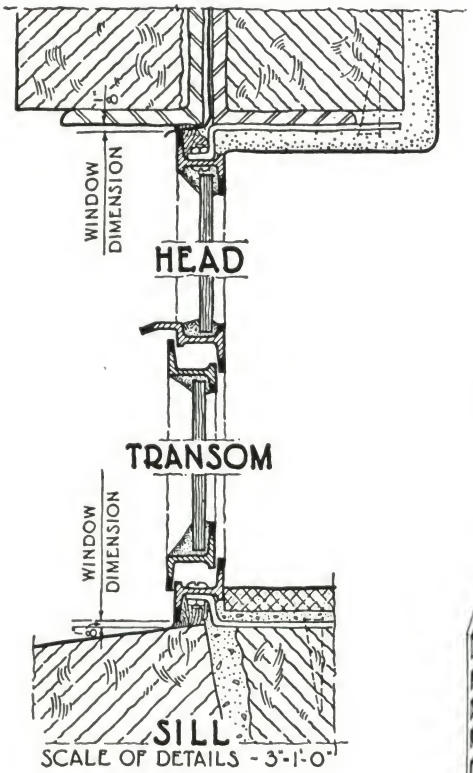
Fenestra 1930

FENWROUGHT CASEMENTS
HARDWARE.

Plate No A-101

Continued on next page







SET ALL CASEMENTS IN MASTIC CEMENT WHERE THEY COME IN CONTACT WITH BUILDING WORK



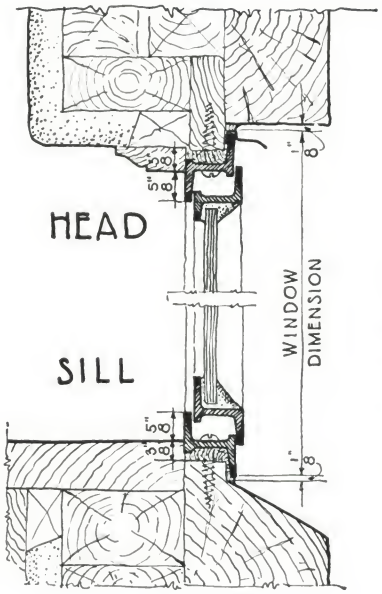
BEAUX-ARTS APARTMENTS
NEW YORK CITY
FIRM OF KENNETH M. MURCHISON; & RAYMOND HOOD, GODLEY & FOUILHOUX
ARCHITECTS

Fenestra 1930

FENWROUGHT CASEMENTS
SOLID BRICK INSTALLATION

Plate No A-103

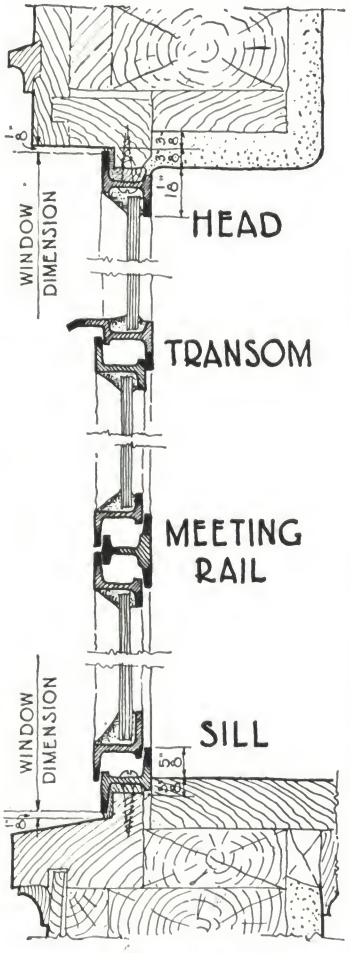
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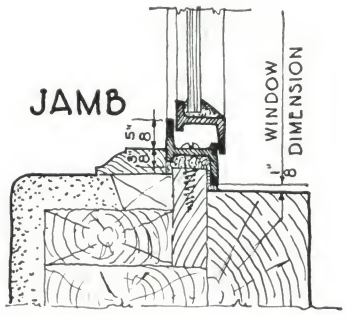


SCALE OF DETAILS -3"-1'-0"



CHAS. W. WALKER RES - HEMPSTEAD, L.I., N.Y.
GEORGE R. THOMPSON - ARCHITECT.





HALF TIMBER

NOTE
SET ALL CASEMENTS IN MASTIC CEMENT WHERE THEY COME IN CONTACT WITH BUILDING WORK

FRAME



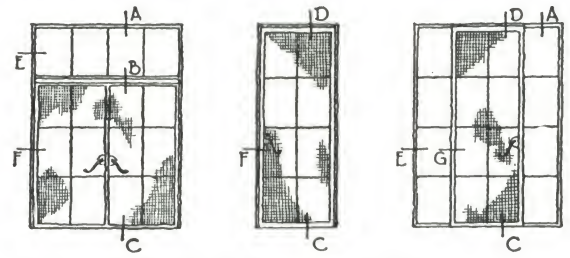
BROADMOOR COUNTRY CLUB BUILDING
CLARENCE KING ARCHITECT SHREVEPORT LA.

Fenestra 1930

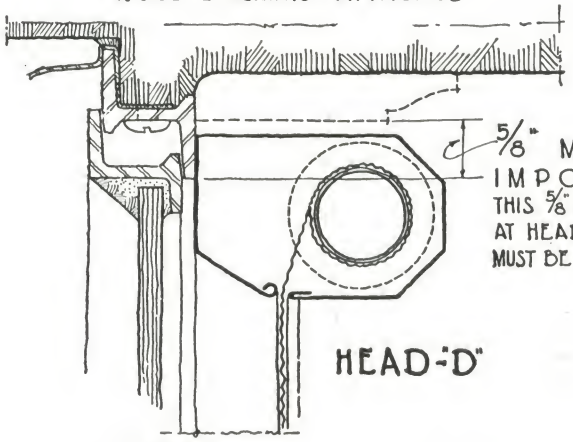
FENWROUGHT CASEMENTS
HALF TIMBER & FRAME INSTALLATION

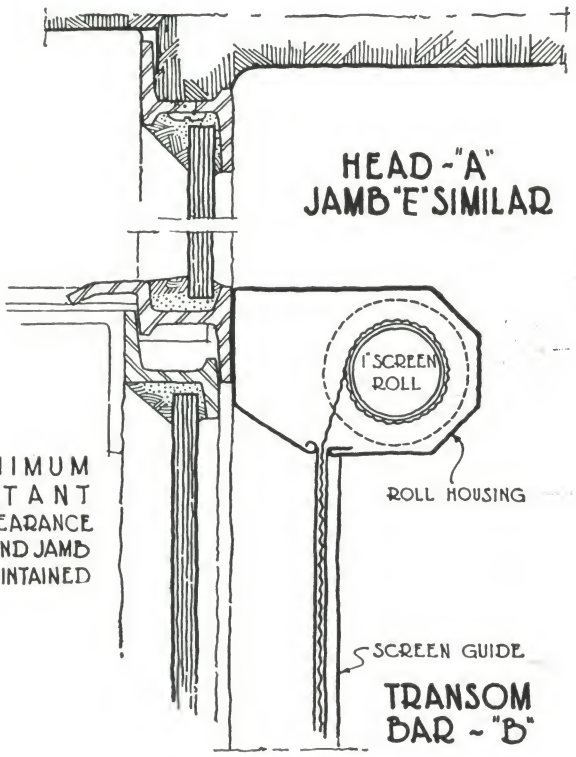
Plate No A-102

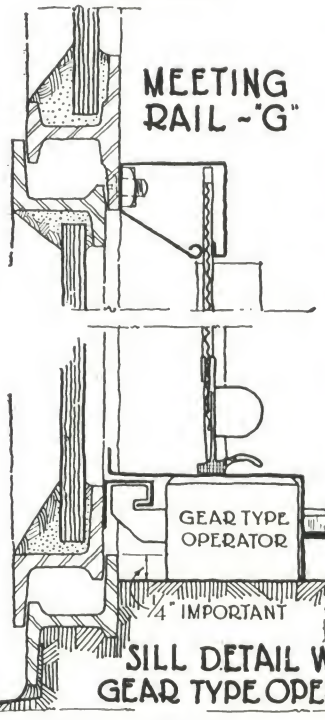
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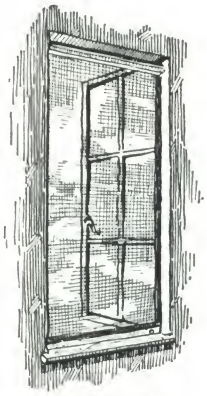


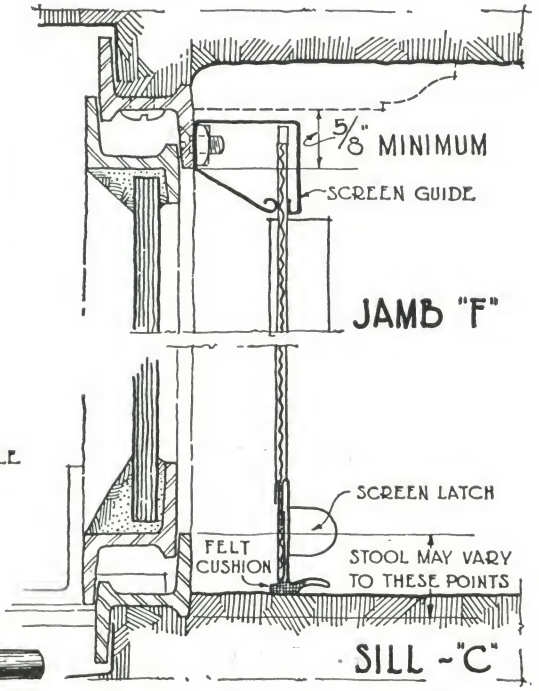
TYPICAL UNITS SHOWING ROLL-SCREENS ATTACHED











Fenestra 1930

FENESTRA CHAMBERLIN SCREEN CONSTRUCTION DETAILS

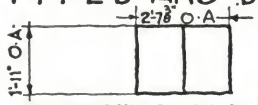
Plate No A-104

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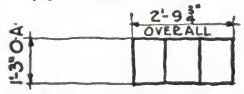
FENESTRA "BASEMENT" WINDOWS

Sold Exclusively Through Dealers

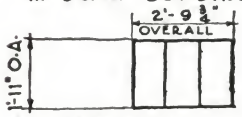
TYPES AND SIZES



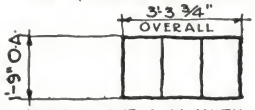
IN CONCRETE BLOCK CONSTRUTCTION FITS OPENING TWO BLOCKS WIDE BY THREE BLOCKS HIGH WITH A TROWELED SILL



FOR HOUSES WITH LOW GRADE LINE WORKS OUT EXCEPTIONALLY WELL IN BRICK CONSTRUCTION



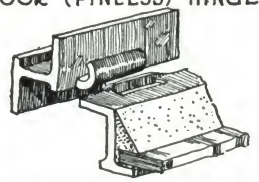
FOR HOUSES WITH A HIGHER GRADE LINE WORKS OUT WELL IN BRICK OR CONCRETE BLOCKS



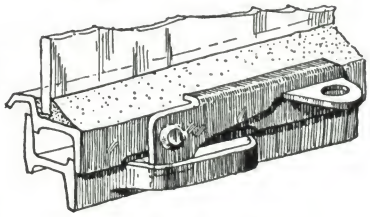
WORKS OUT WELL WITH EITHER BRICK OR CONCRETE BLOCK AND IS THE WINDOW MOST USED IN THE AVERAGE TYPE OF CONSTRUCTION



HOOK (PINLESS) HINGE

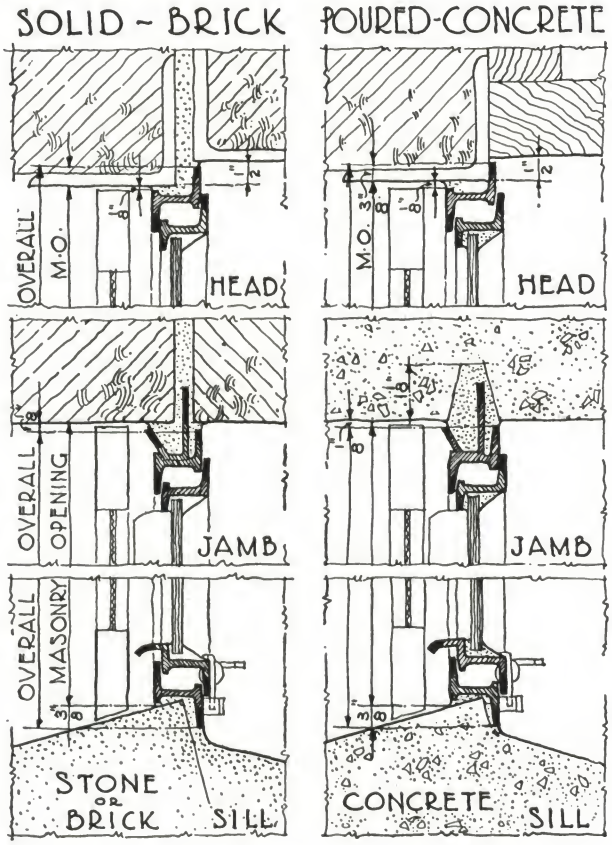


HINGE WITH SASH UNATTACHED



CAM ACTING LOCK AT THE SILL

Cam action lock at sill. Hinges of substantial hook design make sash easily removable. Sill and jambs of frame in one continuous piece mitered and welded at corners. Jamb fins, spot welded to frame provide solid anchorage.



FENESTRA "UTILITY" WINDOWS

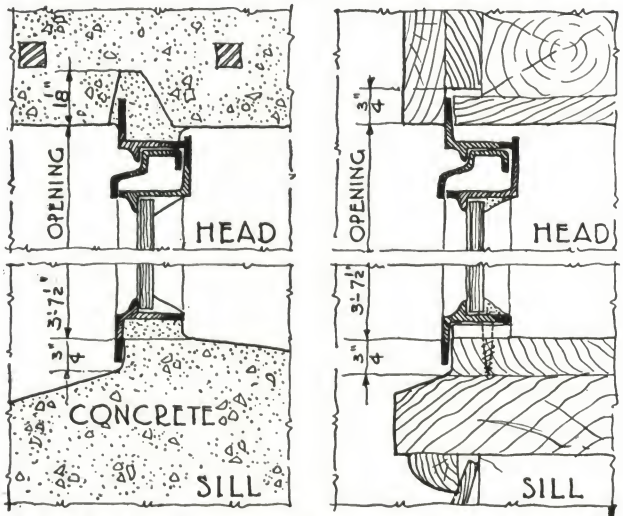
The Fenestra Utility Window is designed for small buildings, such as garages, and for basements high above the grade line.

It is made in one size only, 3'4" x 3'7".

Ventilator is one-light high of the projected-in type, equipped with iron spring catch at head.



ELEVATION OF WINDOWS INSTALLED IN CONCRETE BLOCK AND FRAME CONSTRUCTION



INSTALLATION - DETAILS.
SCALE 3" = 1'-0"

Continued on next page

Fenestra

STEEL WINDOWS FOR INDUSTRIAL BUILDINGS

MEMBER SOLID SECTION STEEL WINDOW INDUSTRY

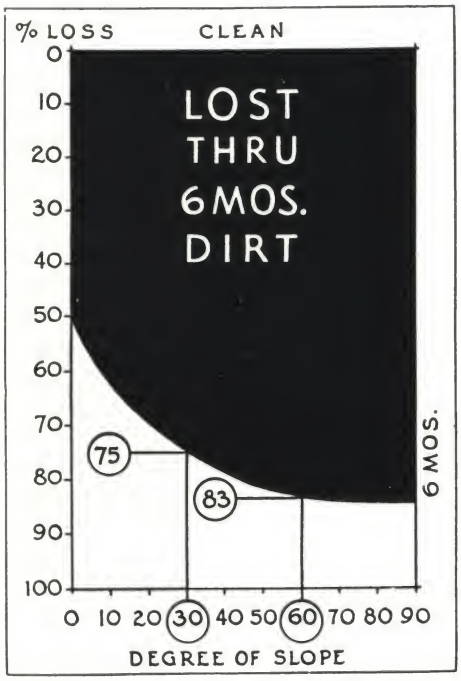
Factories: Detroit, Michigan; Cleveland, Ohio and Oakland, California
General Offices: 2250 East Grand Boulevard, Detroit, Michigan
Local Offices in 217 Cities

DEPARTMENT OF ENGINEERING RESEARCH

DESIGNERS of industrial buildings often write us regarding problems of daylighting or ventilation. To answer such inquiries adequately, we have established a Department of Engineering Research which operates in connection with the Department of Engineering Research at the University of Michigan.

Laboratory work and field surveys over a period of years have developed certain principles, through the application of which it is possible to determine *in advance of construction* just what the daylighting or ventilating characteristics of any building will be.

Frequently it is possible for this department to make suggestions in the design of window lay-out to provide better daylighting and more effective ventilation. This service is absolutely free and implies no obligation whatever. For any one who desires it, our Research Engineers will do their best to predetermine the daylighting and airation (natural ventilation) characteristics of any building. In this way we hope to contribute to the improvement of industrial construction, as we have done in the past.



Typical chart showing loss of daylighting through failure to wash the factory windows for six months. Vertical windows, 50% loss; Sloping windows, 75% loss; Skylights, 83% loss

Consideration of daylighting and airation may be secured by consultation with the nearest Fenestra office or by writing the Home Office at Detroit. For those who wish a non-technical presentation of the findings of this department, two booklets are available: "Industrial Daylighting by the Fenestra Method" and "Industrial Airation by the Fenestra Method." Either or both are free on request.

Continued on next page

FENESTRA PIVOTED WINDOWS

SPECIFICATIONS

Notes are explanatory only and need not be included in the specifications.

GENERAL

HORIZONTALLY PIVOTED WINDOWS shall be Fenestra as manufactured by the Detroit Steel Products Company.

MATERIAL

All sections shall be especially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

All frame members shall be special angle sections.

MUNTINS shall be especially formed T sections.

MULLIONS AND TRANSOM BARS shall be standard Fenestra, hot rolled, solid steel T sections.

(Note:—Use mullions where two or more windows are used side by side in the same opening. Use transom bars where two or more windows are used one above another. Horizontal structural mullions are not furnished by the window manufacturer.)

CONSTRUCTION

FRAMES AND VENTILATORS shall be mortise and tenon, air hammer riveted at all corners. Provide continuous two-point, flat-contact weathering between ventilators and frames.

MUNTINS shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase their strength at the point of intersection. Joints at frames shall be mortise and tenon, air hammer riveted.

(Note:—All structural steel is furnished by others. Include in the steel specifications all punching to accommodate clips. Where masonry will interfere with installation of clips at time windows are erected, provide that all clip bolts be included and attached by steel contractor.)

ATTACHED HARDWARE

(Note:—Attach at the factory.)

All ventilators shall be horizontally pivoted and supported by external adjustable, special solid rolled steel butts, double machine riveted through window bars and weathering.

(Note:—Butts are set 2" above center unless otherwise specified. They may be set 4" below top of ventilator. If desired, so specify.)

All butts shall have 5/8" solid steel bolts equipped with washers and nuts; each pin shouldered to insure constant, free and easy ventilator operation.

All ventilators shall be provided with solid rolled steel Z bar brackets, triple machine riveted to ventilator sill for attachment of operating hardware.

DETACHED HARDWARE

Provide malleable iron cam latches and rolled steel stay bars or malleable iron latches, chain, chain catches and pulley brackets.

(Note:—For group operation of ventilators see Fenestra Mechanical Operating Devices.)

ERECTION

(Note:—Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with standard Fenestra installation details so that windows may be erected in prepared openings.)

(Note:—Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the mason contractor after the windows are erected.)

All windows shall be erected in prepared openings by the Fenestra Construction Company under a separate contract.

All windows shall be set plumb and true, properly aligned and securely anchored before glazing.

Standard Fenestra sill anchors (2 for windows up to 6'6" wide; 4 for windows over 6'6" wide) shall be used: if the ventilator comes to the sill of the window; if the window is over 5'0" wide; in all multiple unit openings where the mullions are not anchored into the sills.

PAINTING

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

(Note:—Include in the Painting Specifications that all windows should be given one additional coat after erection but before glazing. Further painting should be deferred until at least three weeks after glazing, to allow putty to set.)

(Note:—Where desired, Fenestra Construction Company, at reasonable added cost, will do field painting after erection. If desired, so specify including specification of paint and its application.)

GLASS AND GLAZING

(Note:—Include in the Glazing Specifications that glass sizes are to be either 12" x 18" or 14" x 20" but ventilator lights which abut on top, sides, or bottom of the ventilator must be trimmed 1" along the abutting edge.)

Glass shall be 1/4" rough wire, 1/4" factory ribbed, 1/8" factory ribbed, double strength.

(Note:—1/4" glass is recommended. Single strength glass is not recommended.)

Putty shall be a high grade of steel window putty.

(Note:—Ordinary wood sash putty must not be used.)

All windows shall be glazed from the inside, all glass being set in a bed of putty and secured by copper plated, steel spring glazing clips furnished by the window manufacturer. (4 clips to each fixed light; 6 clips to each ventilator light.) Face putty shall be applied in a neat, clean-cut smooth manner.

(Note:—Do not paint until putty has thoroughly hardened.)

SCREENS

(Note:—Screens are not furnished by the window manufacturer but special metal screens may be had so arranged that the upper half of the screen is outside the ventilator, the lower half, inside.)

UNDERWRITERS

(Note:—Under certain conditions and limitations these windows can be supplied with Underwriters' Label.)

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PIVOTED WINDOW FITTINGS AND HARDWARE



Horizontal Bar with Nick Cut Out



Vertical Bar Punched for Joint



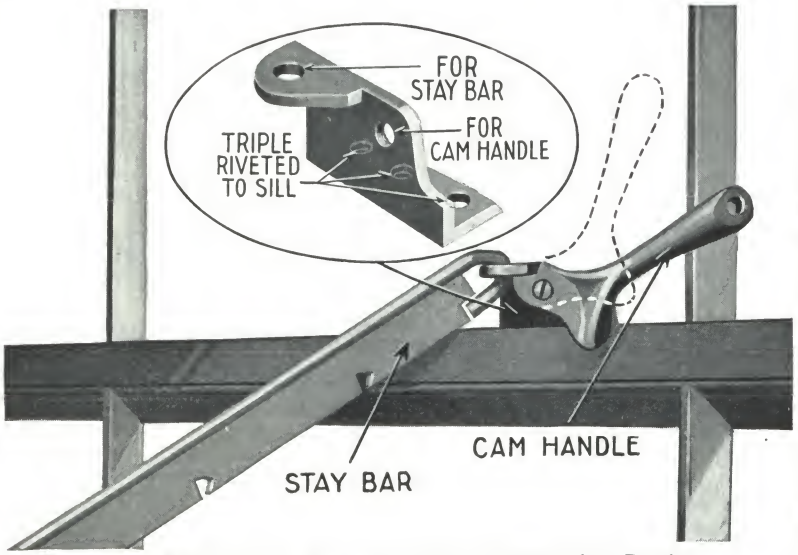
The Completed Fenestra Joint



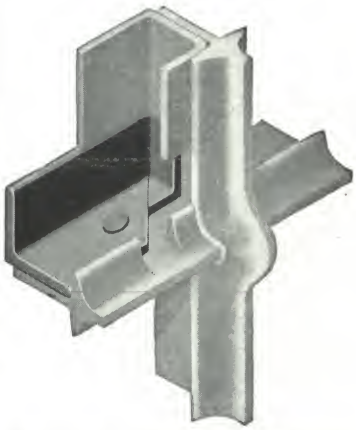
Spring Latch, Chain and Pulley at Head of Ventilator



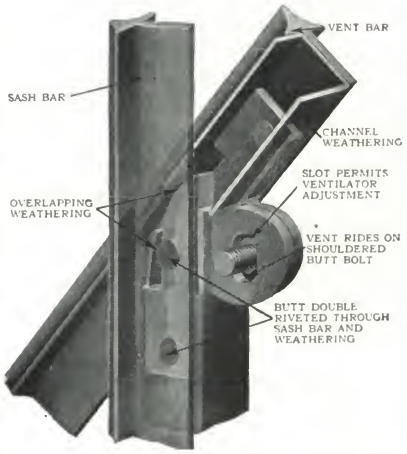
Vertical Bar Expanded to Receive Horizontal Bar



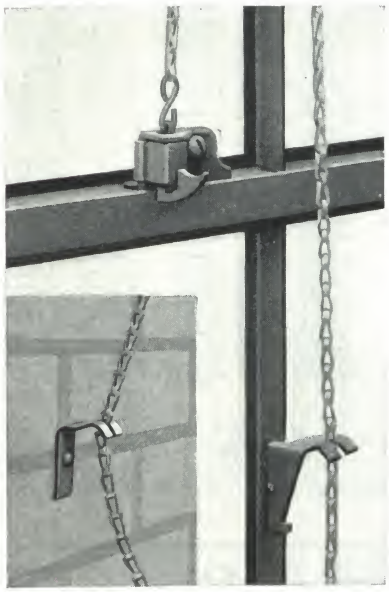
Cam Handle, Stay Bar and Triple Riveted Z-bar Bracket



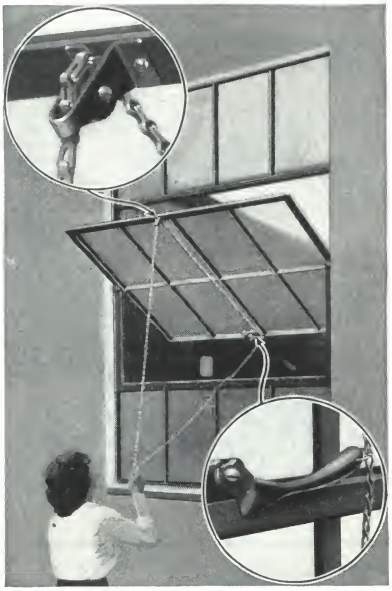
Weathering Member at Ventilator Sill, Mitered to Guide Water from Building



External, Adjustable, Fenestra Steel Butt

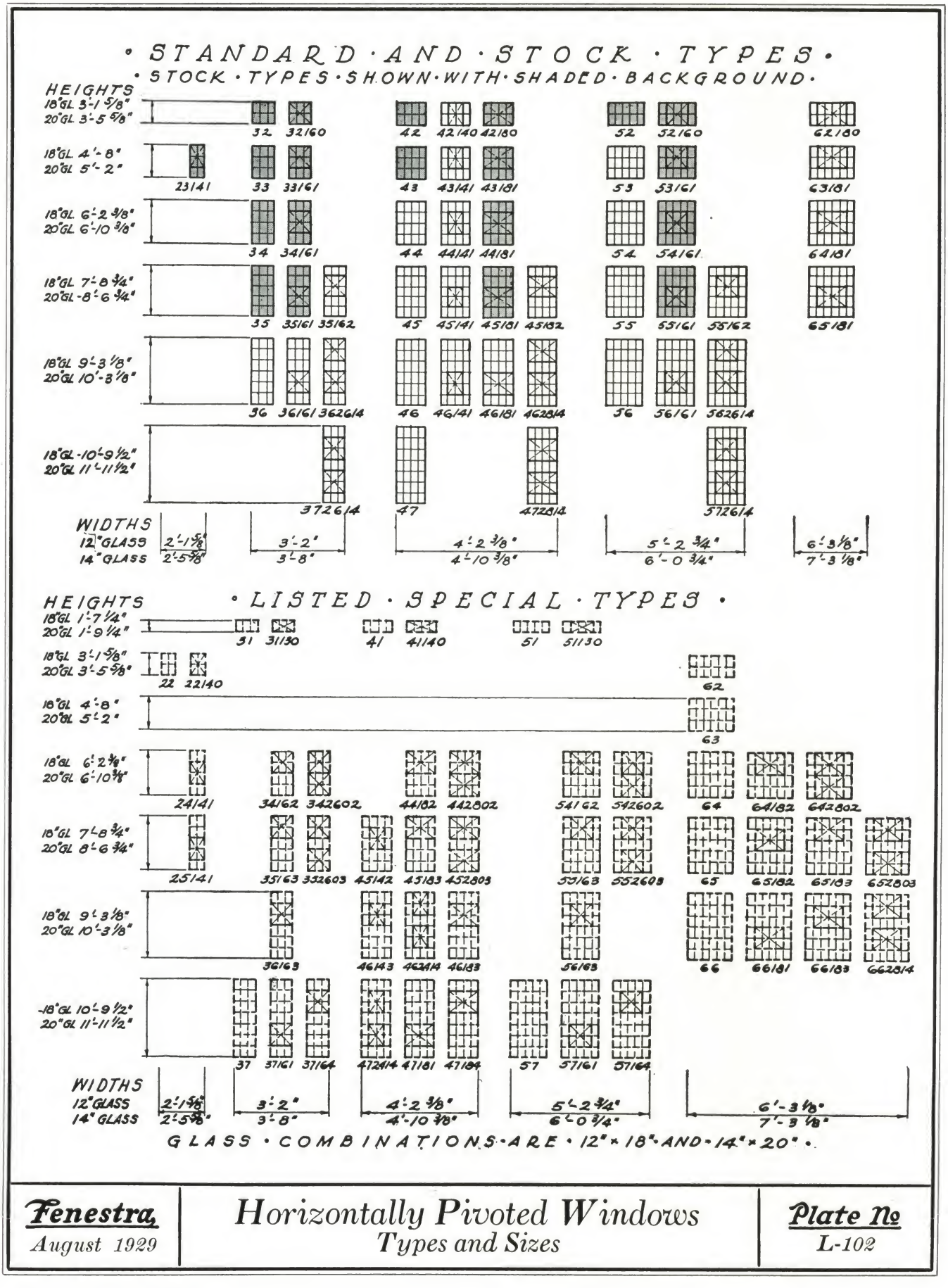


Spring Latch at Sill, Chain Cleats and Chain Passing up over Head Pulley



Cam Handle at Sill with Endless Chain Passing over Pulley at Head

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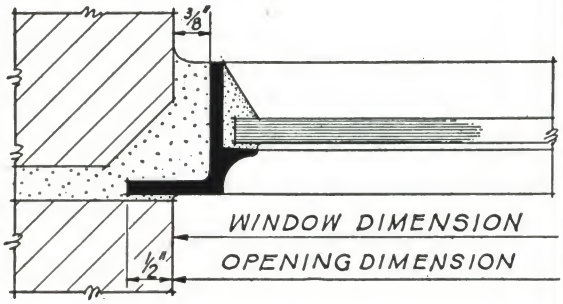
Fenestra, August 1929	Horizontally Pivoted Windows Types and Sizes	Plate No L-102

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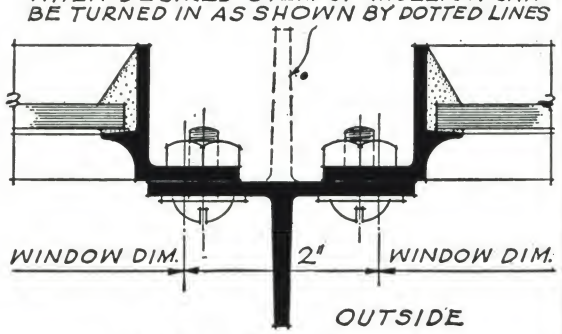
SYMMETRICAL COMBINATIONS

OPENING DIMENSIONS				NO. UNITS IN OPENING	NO. LIGHTS IN OPENING	ARRANGEMENT OF UNITS IN OPENING. FIGURES INDICATE THE NUMBER OF LIGHTS IN WIDTH OF EACH UNIT.
18" HEIGHTS		20" HEIGHTS				
PANES	DIM.	PANES	DIM.			
2	3'-1 5/8"	2	3'-5 5/8"			
3	4'-8"	3	5'-2"			
4	6'-2 3/8"	4	6'-10 3/8"			
5	7'-8 1/4"	5	8'-6 3/4"			
6	9'-3 1/8"	6	10'-3 1/8"			
7	10'-9 1/2"	7	11'-11 1/2"			
12" WIDTHS		14" WIDTHS				
* 2'-1 5/8"		* 2'-5 5/8"		1	2	2
3'-2"		3'-8"		1	3	3
4'-2 3/8"		4'-10 3/8"		1	4	4
4'-5 1/4"		5'-1 1/4"		2	4	2,2
5'-2 3/4"		6'-0 3/4"		1	5	5
6'-3 1/8"		7'-3 1/8"		1	6	6
6'-6"		7'-6"		2	6	3,3
8'-6 3/4"		9'-10 3/4"		2	8	4,4
9'-10"		11'-4"		3	9	3,3,3
10'-7 1/2"		12'-3 1/2"		2	10	5,5
10'-10 3/8"		12'-6 3/8"		3	10	3,4,3
11'-10 3/4"		13'-8 3/4"		3	11	3,5,3
11'-10 3/4"		13'-8 3/4"		3	11	4,3,4
12'-8 1/4"		14'-8 1/4"		2	12	6,6
12'-11 1/8"		14'-11 1/8"		3	12	4,4,4
13'-2"		15'-2"		4	12	3,3,3,3
13'-11 1/2"		16'-1 1/2"		3	13	4,5,4
13'-11 1/2"		16'-1 1/2"		3	13	5,3,5
14'-11 7/8"		17'-3 7/8"		3	14	4,6,4
14'-11 7/8"		17'-3 7/8"		3	14	5,4,5
15'-2 3/4"		17'-6 3/4"		4	14	3,4,4,3
16'-0 1/4"		18'-6 1/4"		3	15	5,5,5
16'-0 1/4"		18'-6 1/4"		3	15	6,3,6
16'-6"		19'-0"		5	15	3,3,3,3,3
17'-0 5/8"		19'-8 5/8"		3	16	5,6,5
17'-0 5/8"		19'-8 5/8"		3	16	6,4,6
17'-3 1/2"		19'-11 1/2"		4	16	4,4,4,4
17'-3 1/2"		19'-11 1/2"		4	16	3,5,5,3
17'-6 3/8"		20'-2 3/8"		5	16	3,3,4,3,3
18'-1"		20'-11"		3	17	6,5,6
18'-6 3/4"		21'-4 3/4"		5	17	3,4,3,4,3
19'-1 3/8"		22'-1 3/8"		3	18	6,6,6
19'-4 1/4"		22'-4 1/4"		4	18	3,6,6,3
19'-4 1/4"		22'-4 1/4"		4	18	4,5,5,4
19'-7 1/8"		22'-7 1/8"		5	18	3,4,4,4,3
20'-7 1/2"		23'-9 1/2"		5	19	3,5,3,5,3
21'-5"		24'-9"		4	20	5,5,5,5
21'-5"		24'-9"		4	20	4,6,6,4
21'-7 7/8"		24'-11 7/8"		5	20	4,4,4,4,4
21'-10 3/4"		25'-2 3/4"		6	20	3,3,4,4,3,3

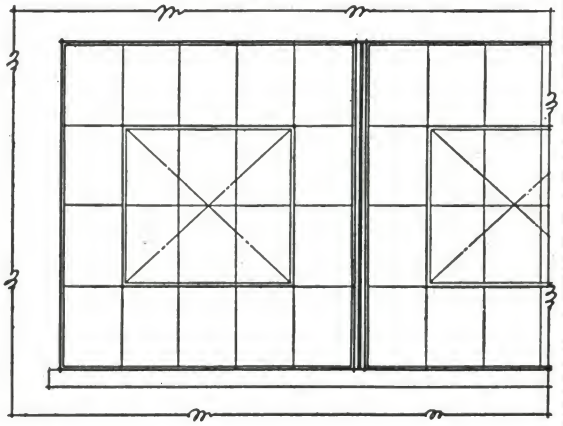
* TWO LIGHT WIDE UNITS ARE FURNISHED IN THREE LIGHT HEIGHTS ONLY

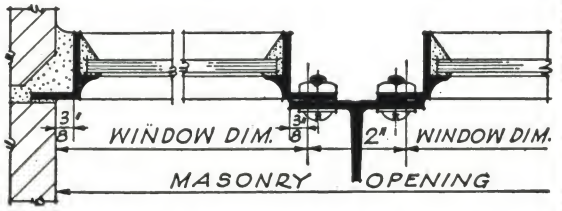


WHEN DESIRED STEM OF MULLION CAN BE TURNED IN AS SHOWN BY DOTTED LINES



SCALE: HALF FULL SIZE





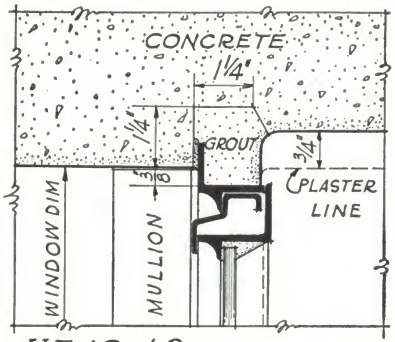
TYPICAL COMBINATION

SCALE: 3" = 1'-0"

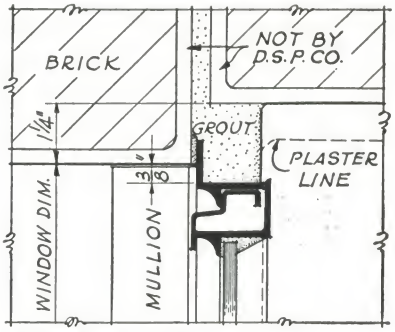
NOTE:- IN FIGURING OPENING SIZES FOR COMBINED UNITS, ADD TOGETHER THE WINDOW DIMENSIONS PLUS 2" FOR EACH VERTICAL MULLION. STANDARD COMBINATIONS ARE GIVEN IN THE TABLE. WHEN USING TABLE ALWAYS COMBINE 18" HEIGHTS WITH 12" WIDTHS AND 20" HEIGHTS WITH 14" WIDTHS.

Fenestra, August 1929	Horizontally Pivoted Windows Standard Combinations	Plate No. L-103

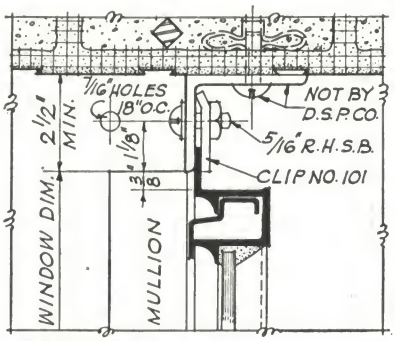
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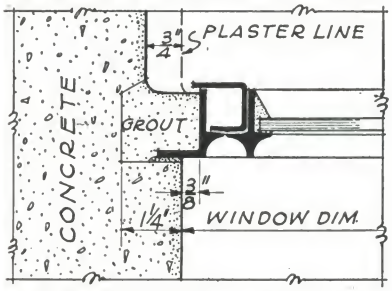
"HEAD-1-B" REBATE IN THE SOFFIT PERMITS INSTALLATION OF WINDOWS AFTER WALL IS BUILT.



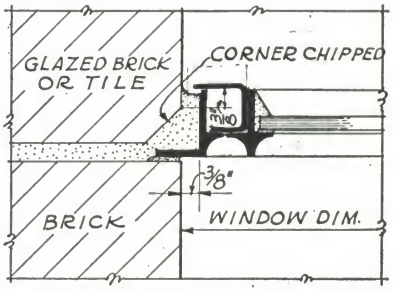
"HEAD-4-A" ANGLE SHOULD ALWAYS BE OFFSET AS SHOWN



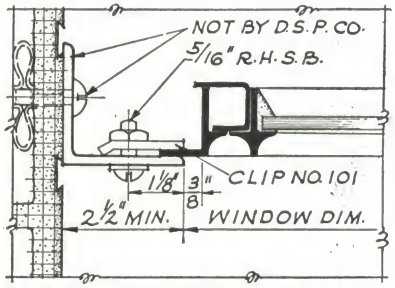
"HEAD" 7-A" STEEL ANGLE FRAME IN TILE OPENINGS.



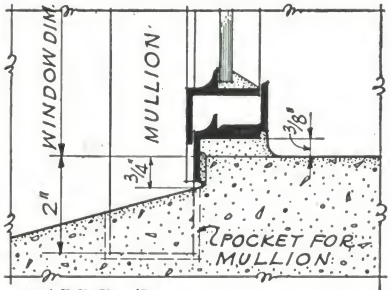
"JAMB-2-A" FOR SINGLE OR MULTIPLE UNIT OPENINGS



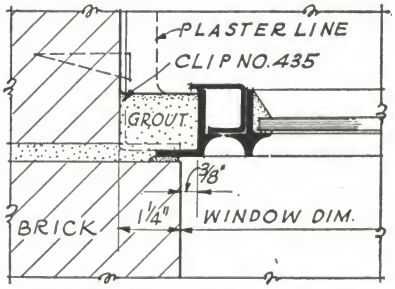
"JAMB-5" FOR MULTIPLE UNIT OPENINGS ONLY



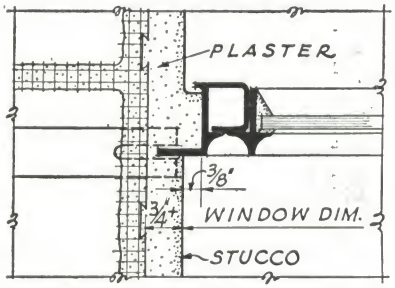
"JAMB-8-A" STEEL ANGLE FRAME IN TILE OPENINGS.



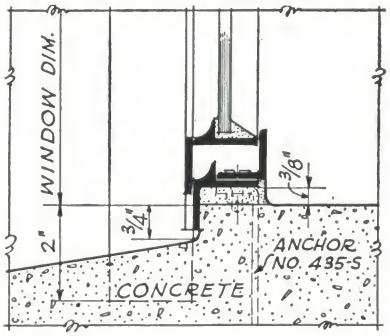
"SILL-3" PRECAST CONCRETE MAY ALSO BE USED FOR BRICK OR TILE CONSTRUCTION"



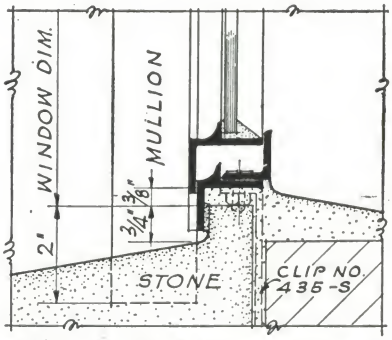
"JAMB-5-A" FOR SINGLE OR MULTIPLE UNIT OPENINGS.



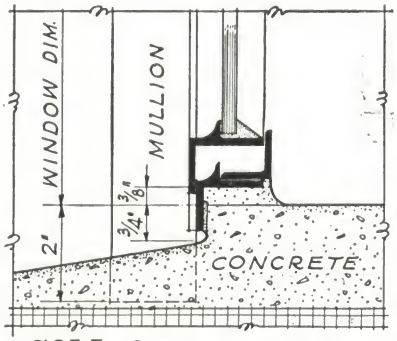
"JAMB-8-B" WITH SPLIT CLIP FURNISHED BY D.S.P. CO.



"SILL-3-A" POURED CONCRETE ANCHOR CLIP FURNISHED BY D.S.P.CO.



"SILL-6-A" CUT STONE. AS ALTERNATES USE DETAILS 3 OR 3A.



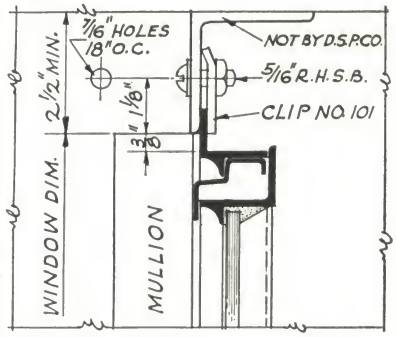
"SILL-9" CONCRETE SILL. POURED AFTER WINDOW IS SET

"CONCRETE" "BRICK" "TILE"

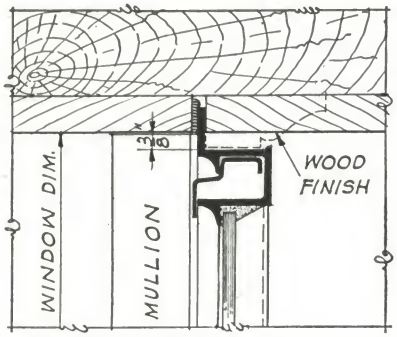
"SCALE: 3" = 1'-0"

Fenestra, August 1929	Horizontally Pivoted Windows Installation Details	Plate No. L-104

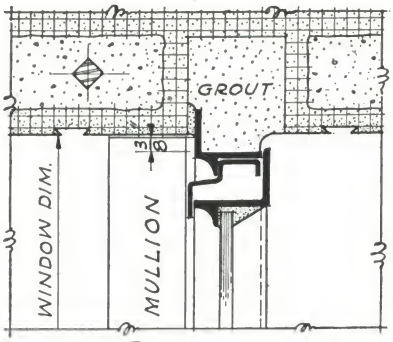
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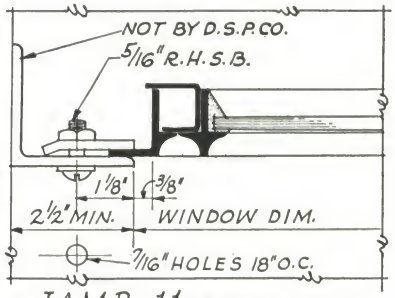
▵HEAD-10▵ STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.



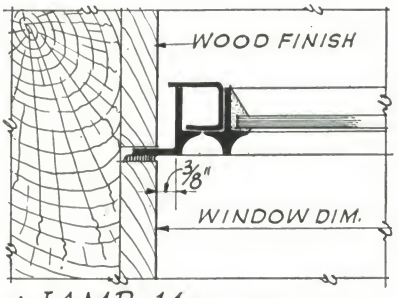
▵HEAD-13▵ DOTTED LINES SHOW ALTERNATE FINISH.▵



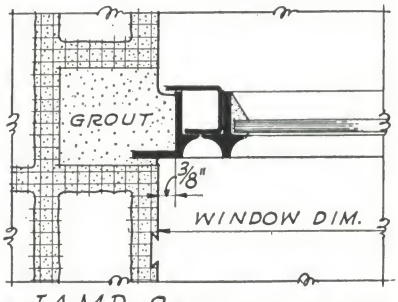
▵HEAD-7▵ FOR TILE LINTEL WITH STEEL WINDOW RAGGLE AS SHOWN



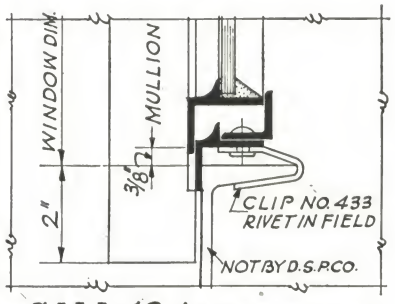
▵JAMB-11▵ STEEL ANGLE
CLIP & BOLT FURNISHED BY D.S.P.CO.



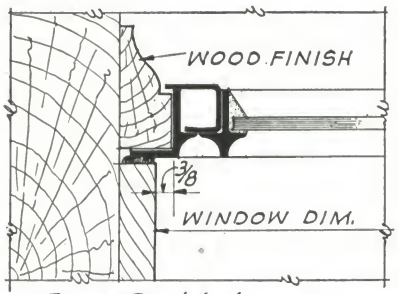
▵JAMB-14▵ PLAIN TRIM.



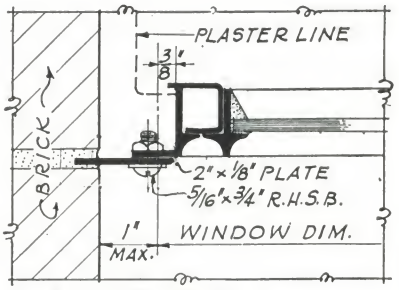
▵JAMB-8▵ FOR TILE WITH STEEL WINDOW RAGGLE AS SHOWN.



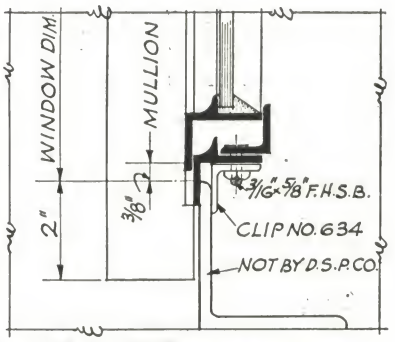
▵SILL-12-A▵ STEEL CHANNEL
CLIP & RIVET FURNISHED BY D.S.P.CO.



▵JAMB-14-A▵ MOLDING FINISH ALTERNATE FOR JAMB-14

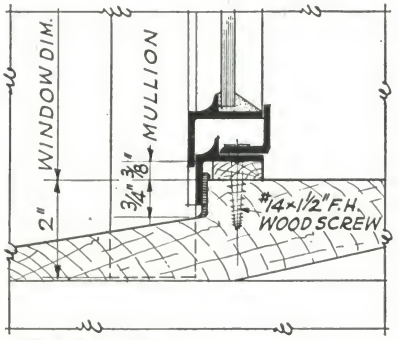


▵JAMB-5-B▵ DETAIL USING JAMB PLATE▵



▵SILL-12-B▵ STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.

▵STEEL▵



▵SILL-15▵ WOOD APRON & SILL.

▵WOOD▵

▵SCALE: 3" = 1'-0"▵

▵MISCELLANEOUS▵

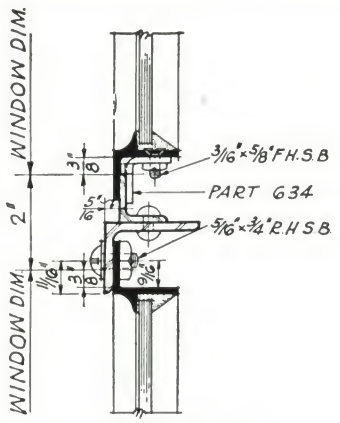
THE MULLIONS SHOWN WITH THESE DETAILS HAVE THE STEM TURNED OUT. IT IS ADVISABLE TO DO THIS AS GREATER STIFFNESS IS SECURED.

WITH STEEL WORK THIS IS ESSENTIAL IN ORDER TO AVOID NOTCHING OF THE STEEL OR A SPECIAL CUT-OFF OF MULLIONS.

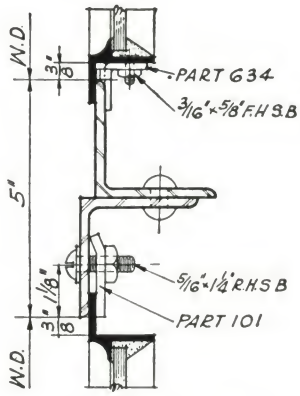
ANCHORING MULLIONS AT SILL AS SHOWN IS RECOMMENDED.

Fenestra, August 1929	Horizontally Pivoted Windows Installation Details	Plate No. L-105

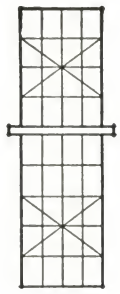
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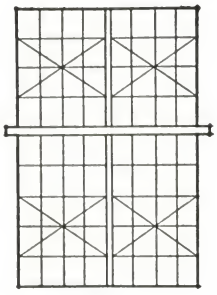
• TYPE - 1 •



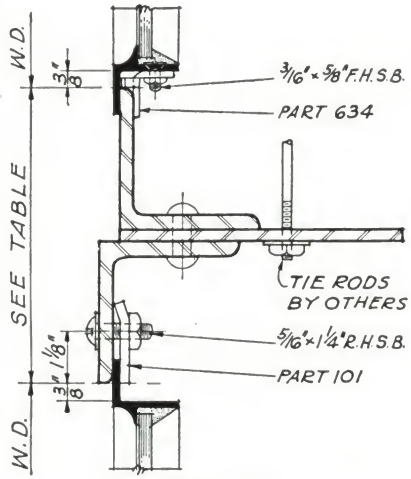
• TYPE - 2 •



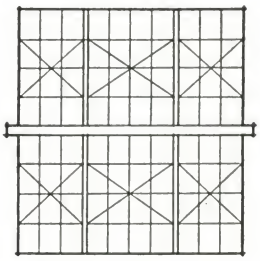
• TYPICAL OPENING • TYPE NO. 1



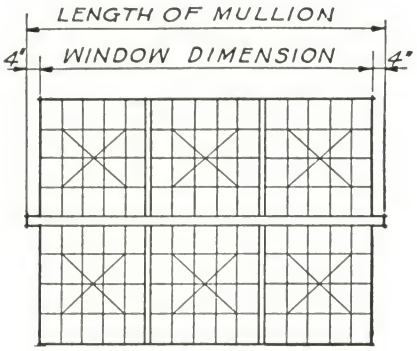
• TYPICAL • OPENING • TYPE • NO. 2 •



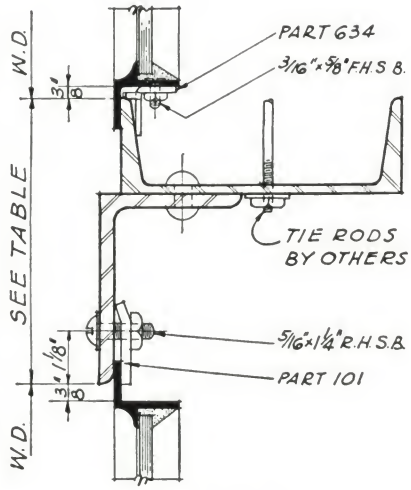
• TYPE - 3 •



• TYPICAL • OPENING • TYPES • NO. 3 & 4 •



• TYPICAL • OPENING • TYPES • NO. 3 & 4 •



• TYPE - 4 •

• DETAILS • SCALE. 3" = 1'-0" •

• TABLE • OF • HORIZONTAL • • MULLION • SIZES •

LIGHTS WIDE	MULL. TYPE NO.	• ANGLES • REQ'D	• ANGLES • • SIZE •	PLATE OR CHANNEL	ESTIMATED WEIGHT OF MULL PER FT.	BETWEEN WINDOW DIMENS.
SINGLE UNIT OPENINGS	1	1	1" x 1" x 1/8"	NONE	3.0 LBS	2"
		1	2" x 1 1/2" x 3/16"			
• 12' x 18" SIZE GLASS •						
3 TO 9	2	2	2 1/2" x 2 1/2" x 3/16"	NONE	6.5 LBS	5"
10 TO 13	3	2	2 1/2" x 2 1/2" x 3/16"	6" x 1/4" PLT.	11.5 LBS.	5 1/4"
10 TO 13	4	1	3 1/2" x 2 1/2" x 1/4"	4" CHANNEL	10.5 LBS	5 1/4"
14 TO 18	3	2	3" x 3" x 5/16"	6" x 1/4" PLT.	17.5 LBS.	6 1/8"
14 TO 18	4	1	4" x 3" x 5/16"	6" CHANNEL	15.5 LBS.	6 1/8"
• 14" x 20" SIZE GLASS •						
3 TO 8	2	2	2 1/2" x 2 1/2" x 3/16"	NONE	6.5 LBS.	5"
9 TO 11	3	2	2 1/2" x 2 1/2" x 3/16"	6" x 1/4" PLT	11.5 LBS	5 1/4"
9 TO 11	4	1	3 1/2" x 2 1/2" x 1/4"	4" CHANNEL	10.5 LBS	5 1/4"
12 TO 16	3	2	3" x 3" x 5/16"	6" x 1/4" PLT.	17.5 LBS.	6 1/8"
12 TO 16	4	1	4" x 3" x 5/16"	6" CHANNEL	15.5 LBS	6 1/8"

TIE RODS SHOULD SUPPORT HOR. MULLION IN OPNGS. OVER 10'-0"

• SCALE 3" = 1'-0" •

Fenestra August 1929

Horizontally Pivoted Windows
Horizontal Mullion Details

Plate No. L-107

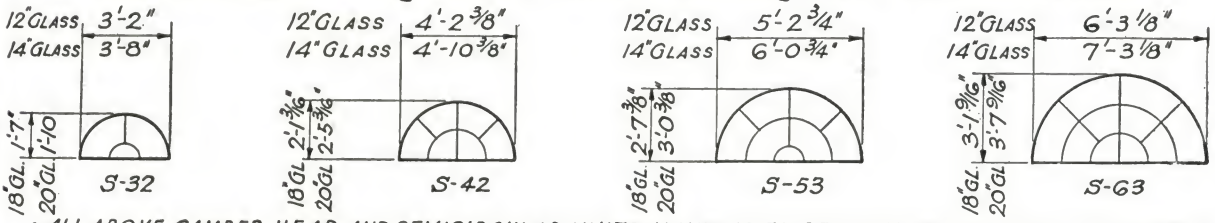
Continued on next page

CAMBER HEAD UNITS ONE PANE HIGH



	12"×18"	14"×20"
C-31	3'-2" – W.D. –	3'-8"
	1'-6 1/8" – A –	1'-8 1/8"
	1'-1" – B –	1'-2 1/4"
	3'-2" – R –	3'-8"
C-41	4'-2 3/8" – W.D. –	4'-10 3/8"
	1'-6 1/8" – A –	1'-8 1/8"
	-11 3/8" – B –	1'-0 5/16"
	4'-2 3/8" – R –	4'-10 3/8"
C-51	5'-2 3/4" – W.D. –	6'-0 3/4"
	1'-6 1/8" – A –	1'-8 1/8"
	-9 1/16" – B –	-10 3/8"
	5'-2 3/4" – R –	6'-0 3/4"
C-61	6'-3 1/8" – W.D. –	7'-3 1/8"
	1'-6 1/8" – A –	1'-8 1/8"
	-8 1/16" – B –	-8 7/16"
	6'-3 1/8" – R –	7'-3 1/8"

SEMICIRCULAR UNITS NOT OVER SIX PANES WIDE



	12"GLASS	14"GLASS	18"GL.	20"GL.
S-32	3'-2"	3'-8"	1'-7"	1'-10"
S-42	4'-2 3/8"	4'-10 3/8"	2'-1 3/16"	2'-5 3/16"
S-53	5'-2 3/4"	6'-0 3/4"	2'-7 3/8"	3'-0 3/8"
S-63	6'-3 1/8"	7'-3 1/8"	3'-1 9/16"	3'-7 9/16"

• ALL ABOVE CAMBER HEAD AND SEMICIRCULAR UNITS HAVE NO. 70 SECTION AT SILL FOR ATTACHMENT TO TOP OF SINGLE SQUARE HEAD UNIT, OR FOR INDIVIDUAL INSTALLATION • SEE FIG.-1-BELOW•

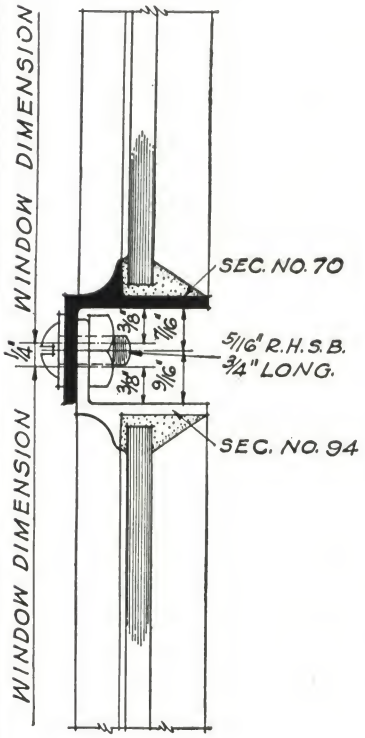


FIG.-1

SECTION THRU UNIT UP TO AND INCLUDING SIX PANES IN WIDTH.

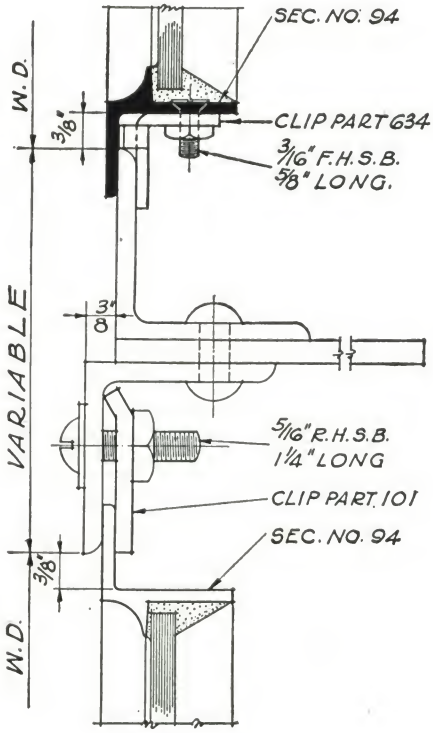
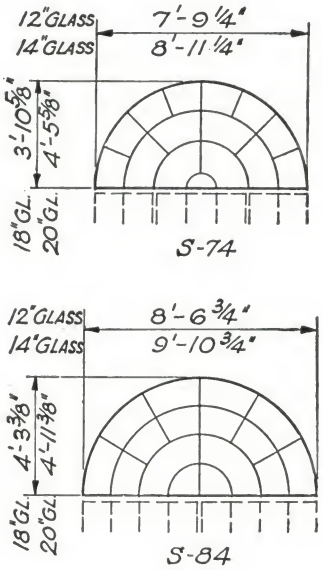


FIG.-2

SECTION THRU UNIT OVER SIX PANES IN WIDTH.

SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE



	12"GLASS	14"GLASS	18"GL.	20"GL.
S-74	7'-9 1/4"	8'-11 1/4"	3'-10 5/8"	4'-5 5/8"
S-84	8'-6 3/4"	9'-10 3/4"	4'-3 3/8"	4'-11 3/8"

SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE HAVE NO. 94 SECTION AT SILL FOR ATTACHMENT TO MULTIPLE UNIT OPENING WITH STRUCTURAL HORIZONTAL MULLION, OR FOR INDIVIDUAL INSTALLATION. SEE FIG. 2

•DETAILS•SCALE: HALF•FULL•SIZE•

Fenestra August 1929 | Horizontally Pivoted Windows — Camber and Semi-Circular Heads | **Plate No** L-109

Continued on next page

FENESTRA PROJECTED WINDOWS

COMMERCIAL TYPE—SPECIFICATIONS

For nomenclature of individual types refer to standard drawings or price sheets obtainable from local Fenestra representatives.

Notes are explanatory or advisory only and need not be included in specifications.

GENERAL

Windows shall be Fenestra Commercial Projected as manufactured by Detroit Steel Products Company.

MATERIAL—CONSTRUCTION

(Note:—Same as these specifications for Fenestra Horizontally Pivoted Windows.)

ATTACHED HARDWARE

(Note:—Attach at the factory.)

Ventilators shall swing out from the bottom while sliding down from the top or swing in from the top while sliding up from the bottom, as indicated. The *open-out* ventilators shall be so constructed that by tilting them slightly beyond the horizontal they may be conveniently washed from inside the building. The *open-in* ventilators shall tilt to 90°.

(Note:—Specify swing-out, swing-in or both as required.)

Each ventilator shall be accurately balanced on two supporting arms of solid spring steel attached to the ventilator with bronze shoulder pivots, equipped with bronze washers. Connections between supporting arms and window frame shall be made by malleable iron brackets rigidly supported on the horizontal frame members or muntins and double riveted to the vertical frame members or muntins with arms attached by bronze shoulder pivots.

Each ventilator shall be equipped with two channel shaped bronze friction shoes sliding vertically in the ventilator jambs and so constructed that through galvanized compression springs uniform tension is secured. Shoes shall be accurately gauged and located and solidly riveted in place to assure proper, constant pressure at the jambs.

Each *open-out* ventilator shall be equipped with two shouldered, alignment control bronze springs riveted to the channel jambs.

(Note:—The shoulders of these springs are so designed and located as to limit the downward travel of the friction shoes and stop all open ventilators in uniform alignment of approximately 60 degrees. When it is desired to open the ventilator at a greater angle or reverse for washing, light pressure on the springs depresses the shoulders and allows the friction shoes to slide past. As the ventilator is returned to a closed position, the action of the spring is automatic.)

Each *open-in* ventilator shall be equipped with a solid steel stop which prevents its opening farther than 90°.

DETACHED HARDWARE

All hardware shall be (malleable iron) (bronze).

(Note:—Bronze at added cost over iron.)

Locking and Operating Devices.

(Note:—Where ventilators are screened, special flat type handles may be secured at added cost, which will permit the screen to set 1" from the face of the window instead of 2" necessary with standard handles.)

(1) *For open-out ventilators within reach from floor—* Malleable iron cam handle attached to Z bar bracket by bolt and nut, Part 150.

(2) *For open-out ventilators beyond reach from floor—* Riveted malleable iron pole hook ring at head of ventilator, Part 151, malleable iron cam handle, Part 150.

(3) *For open-in ventilators within reach from floor—* Riveted malleable iron spring latch with finger ring handle at head of ventilator, Part 147.

(4) *For open-in ventilators beyond reach from floor—* Riveted malleable iron spring latch with endless chain, Part 146, at head of ventilator. Riveted iron chain guide, Part 149, at sill, or riveted malleable iron spring latch with pole hook ring handle, Part 147, at head.

ERECTION—PAINTING—GLAZING

(Note:—Same as these specifications for Horizontally Pivoted Windows.)

PROVISIONS FOR SCREENS

(Note:—Include in the Carpentry Specifications the necessary clauses covering wood trim required in conjunction with screens. Space between inside screen and window must not be less than 2" to clear standard hardware. If special flat type handles are used, 1" clearance only is required. On account of roller, rolling screens require 2½" clearance.

For *open-in ventilators* provide permanent brackets for removable screen supports.

SCREENS AND SHADES

(Note:—On open-out ventilators, metal side hinged or vertical sliding screens may be used as desired. Rolling screens up to 6'0" wide may be used where entire window is covered. On open-in ventilators, metal (removable) (fixed) outside screens may be used.)

(Note:—Where desired the window manufacturer will furnish, at reasonable added cost, removable tubular steel frame, rewirable screens (baked enameled finish) with No. 16 mesh bronze screen cloth. These screens are well constructed and furnished completely adapted to and fitting the ventilator opening.)

(Note:—All shades must be located at least 2" from the inside face of the window for hardware clearance.)

(Note:—Shade bracket clips, designed to attach by drilling and tapping two small holes at the top of each jamb section, are supplied at slight added cost. These clips are of sufficient depth to bring the shade bracket in the proper position and are slotted to accommodate any standard shade bracket. Shade clips cannot be used satisfactorily with rolling screens, but shade brackets may be attached to the under side of screen box.)

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ARCHITECTURAL TYPE—SPECIFICATIONS

ARCHITECTURAL PROJECTED WINDOWS are similar to Commercial Projected types in general construction and operation, but differ chiefly in the following particulars:

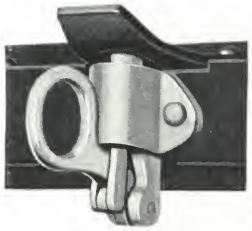
FRAME MEMBERS are unequal leg channel sections.

Standard types vary from 3′0″ wide to 5′0″ wide including 3′6″, 4′0″, and 4′6″. Standard heights vary from 4′6″ to 9′0″ and include 5′0″, 5′6″, 6′0″, 6′6″, 7′0″, 7′6″, 8′0″, and 8′6″.

TRANSOM BARS are solid rolled steel Z bars and angles or structural angles and channels.

CAM HANDLE brackets are of malleable iron triple riveted to the ventilators.

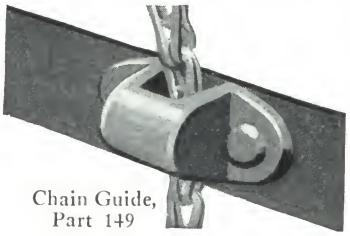
Hardware is of the same general design as that used on Commercial Projected Windows but is standardized in bronze with oxidized finish and includes Handles No. 114 and 212. Glass is held by glazing angles, neatly mitered at the corners.



Spring Latch with Ring, Part 147



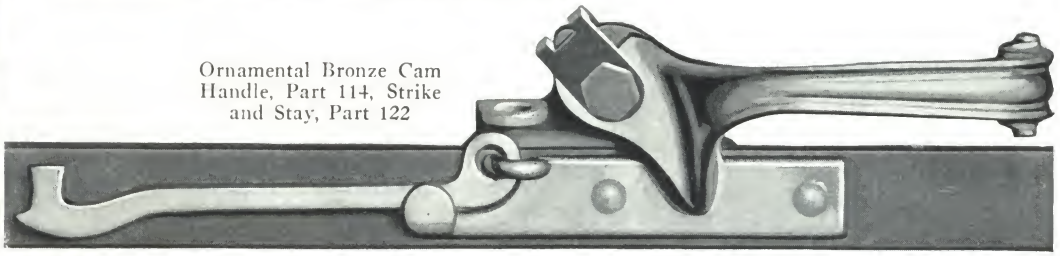
Cam Handle, Part 150, and Strike



Chain Guide, Part 149



Bronze Spring Alignment Stop

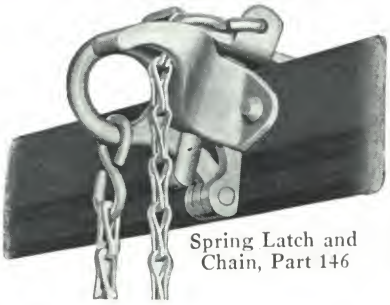


Ornamental Bronze Cam Handle, Part 114, Strike and Stay, Part 122

COMMERCIAL PROJECTED WINDOWS
Symmetrical Combined Widths

12″x18″ Glass	14″x20″ Glass	Units Wide	Lights Wide	No. of Units and Lights per Unit
2′ 1⅝″	2′ 5⅝″	1	2	2
3′ 2″	3′ 8″	1	3	3
4′ 2⅜″	4′ 10⅜″	1	4	4
4′ 5¼″	5′ 1¼″	2	4	2, 2
5′ 2¾″	6′ 0¾″	1	5	5
6′ 6″	7′ 6″	2	6	3, 3
8′ 6¾″	9′ 10¾″	2	8	4, 4
9′ 10″	11′ 4″	3	9	3, 3, 3
10′ 7½″	12′ 3½″	2	10	5, 5
10′ 10⅜″	12′ 6⅜″	3	10	3, 4, 3
11′ 10¾″	13′ 8¾″	3	11	3, 5, 3
12′ 11⅛″	14′ 11⅛″	3	12	4, 4, 4
13′ 11½″	16′ 1½″	3	13	4, 5, 4
13′ 11½″	16′ 1½″	3	13	5, 3, 5
14′ 11⅞″	17′ 3⅞″	3	14	5, 4, 5
15′ 2¾″	17′ 6¾″	4	14	3, 4, 4, 3
16′ 0¼″	18′ 6¼″	3	15	5, 5, 5
17′ 3½″	19′ 11½″	4	16	4, 4, 4, 4
19′ 4¼″	22′ 4¼″	4	18	4, 5, 5, 4
20′ 7½″	23′ 9½″	5	19	5, 3, 3, 3, 5
21′ 5″	24′ 9″	4	20	5, 5, 5, 5

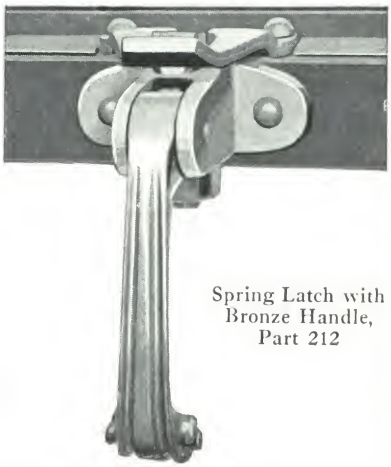
Combine width dimensions in Col. 1 with 12″ x 18″ glass height only.
Combine width dimensions in Col. 2 with 14″ x 20″ glass heights only.



Spring Latch and Chain, Part 146



Bronze Sliding Friction Shoe



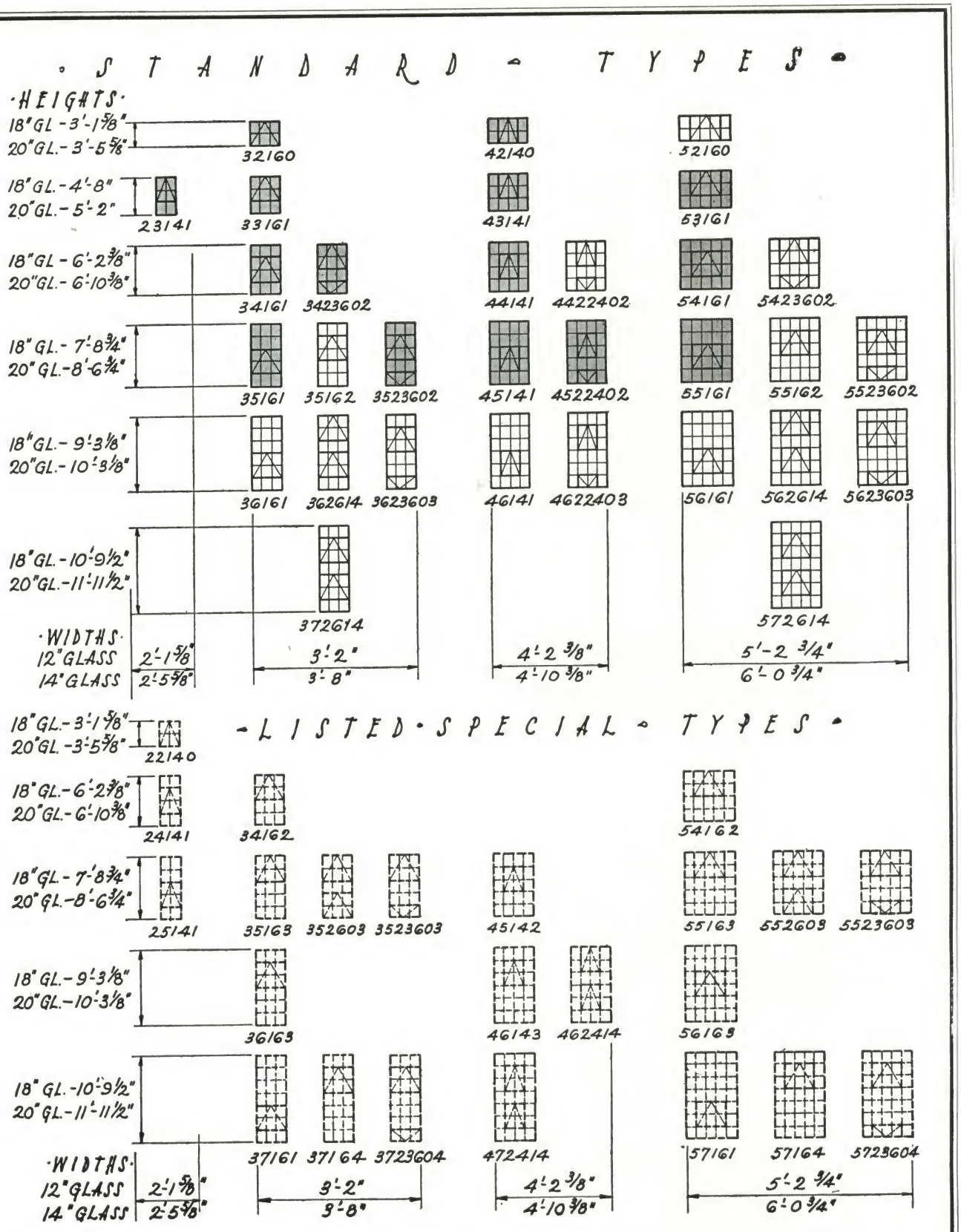
Spring Latch with Bronze Handle, Part 212



Pole Ring, Part 151

PROJECTED WINDOW HARDWARE

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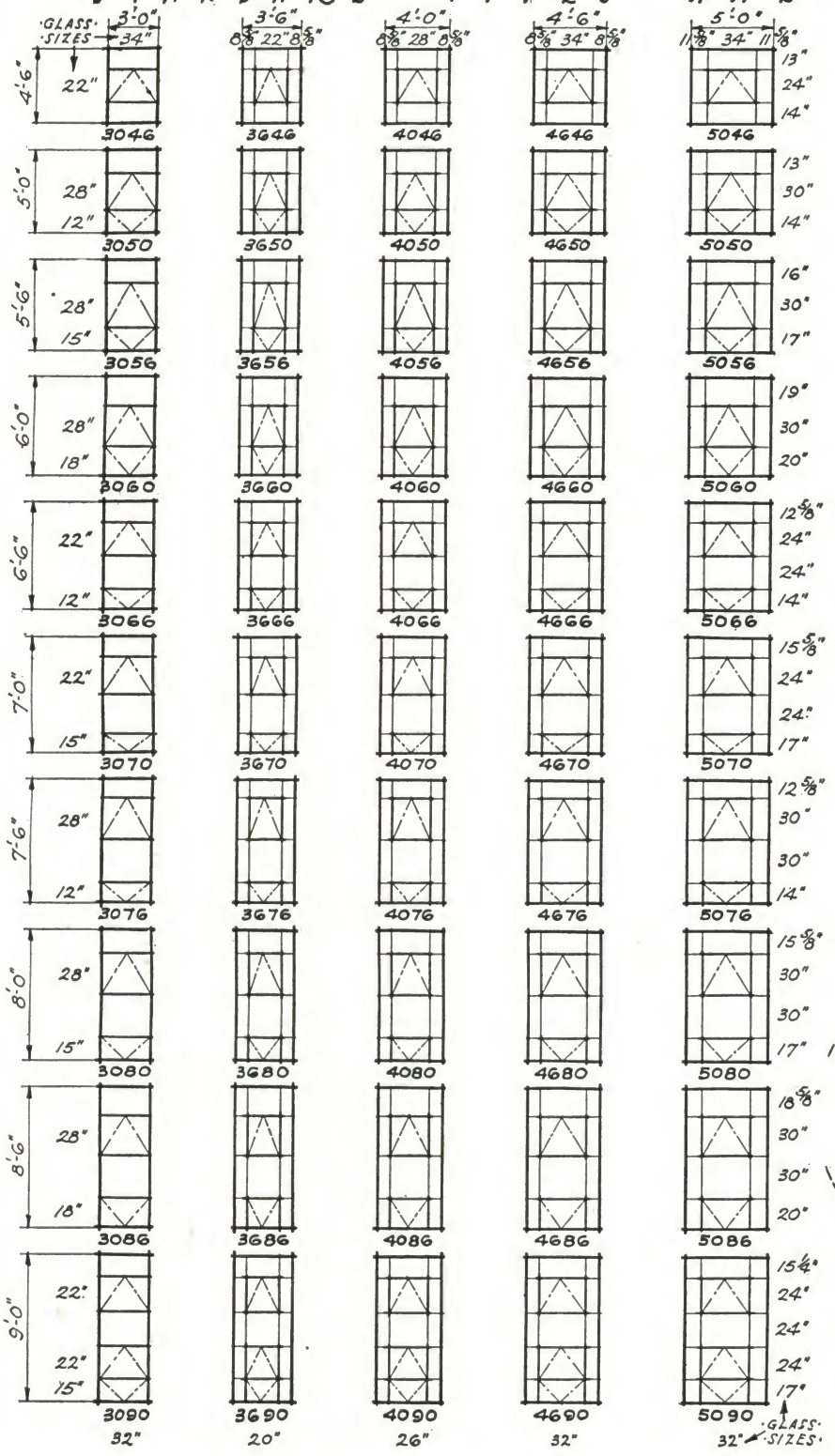
Fenestra
August 1929

Commercial Projected Windows
Types and Sizes

Plate No
G-301

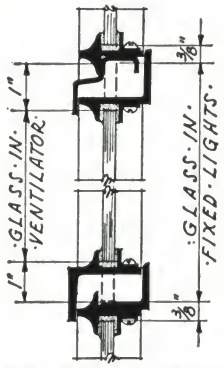
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• STANDARD • TYPES AND • SIZES •

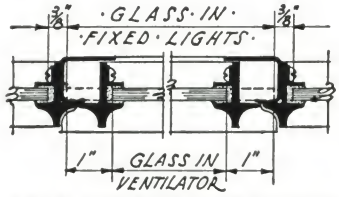


DIMENSIONS SHOWN ARE WINDOW & OPENING SIZES FOR SINGLE UNITS TWO OR MORE UNITS MAY BE COMBINED IN AN OPENING BY MEANS OF MULLIONS SEE DETAILS & TABLE ON PLATE - G-202

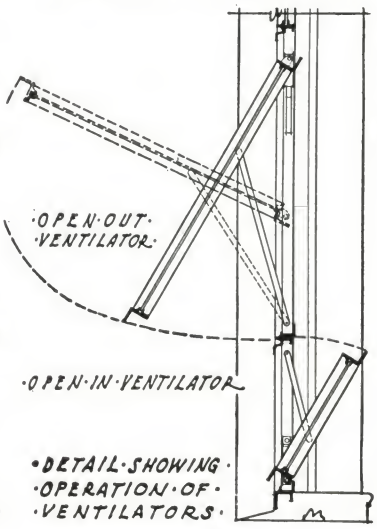
GLASS SIZES SHOWN ABOVE AND TO THE RIGHT OF TYPES ARE FOR FIXED LIGHTS. THOSE SHOWN BELOW AND TO THE LEFT OF TYPES ARE FOR VENTILATORS ONLY. SECTIONS BELOW SHOW RELATION OF GLASS IN FIXED AND VENTILATOR LIGHTS.



• VERTICAL SECTION •



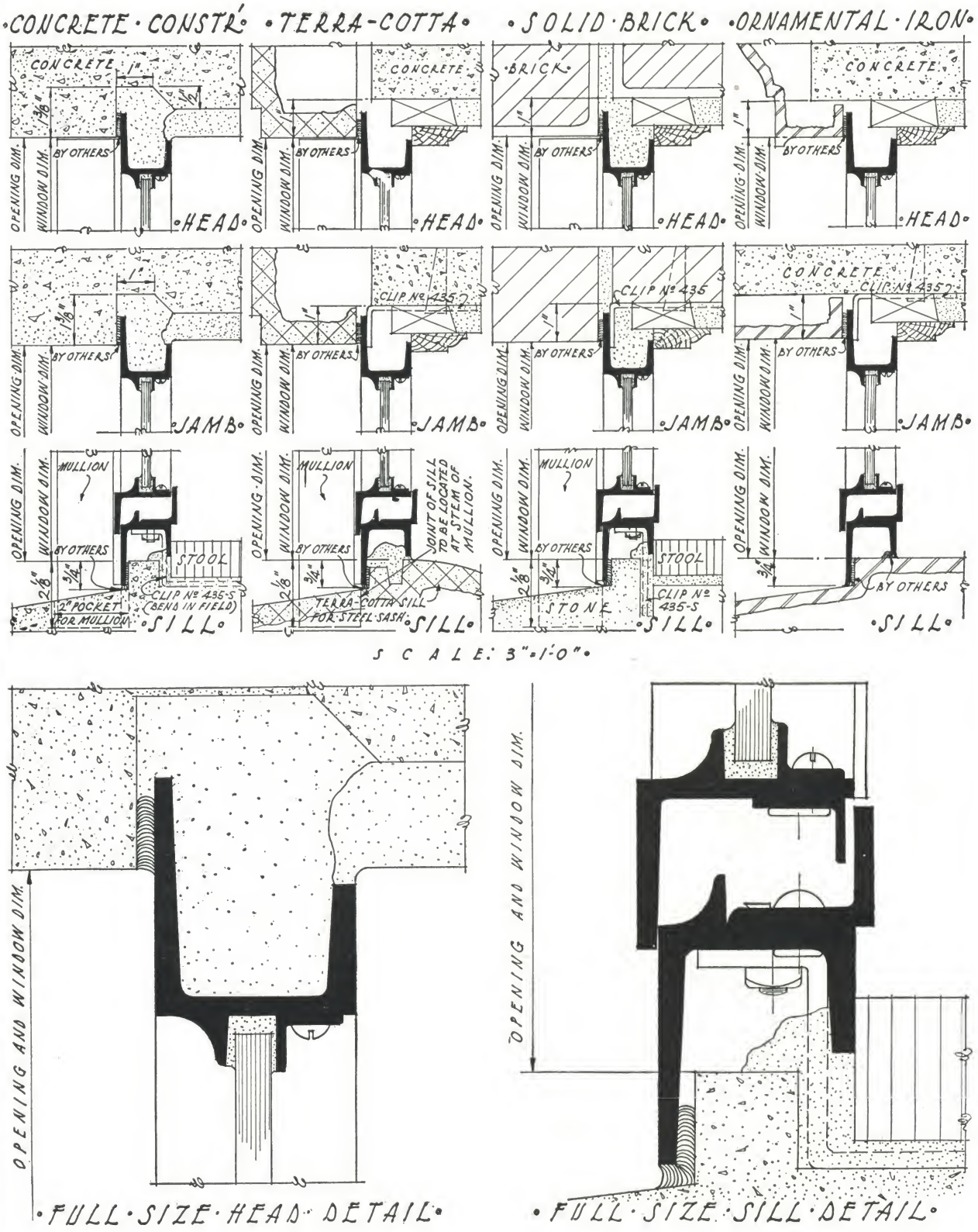
• HORIZONTAL SECTION •



• DETAIL SHOWING OPERATION OF VENTILATORS •

Fenestra, August 1929	Architectural Projected Windows Types and Sizes	Plate No G-201

Continued on next page



Fenestra, August 1929	Architectural Projected Windows Installation Details	Plate Nº G-203

Continued on next page

CONTINUOUS WINDOWS

SPECIFICATIONS

Notes are explanatory or advisory only and need not be included in the specifications.

(Note:—Intermediate structural vertical members should be provided approximately 8′ to 12′ apart.)

(Note:—Structural Steel Girts, at heads and sills of Continuous Windows, are not furnished by the window manufacturer, and should be provided for in the Structural Steel Specifications.)

(Note:—Sheet metal flashing at heads, sills, and ends of runs is not furnished by the window manufacturer, and should be provided for in the Roofing and Sheet Metal Specifications.)

GENERAL

CONTINUOUS TOP HUNG WINDOWS shall be *Fenestra* as manufactured by Detroit Steel Products Company.

(Note:—Fenestra Continuous Windows are particularly designed for use in monitor and sawtooth roof construction where the plane of the windows is on a slope. They may be used in vertical planes where necessary.)

(Note:—Standard units of Continuous Windows measure 20′ in length (dimension points equal the clear opening.) We recommend for the economical arrangement of operator arms that unnits vary on multiples of 4′ (8′, 12′, 16′). Smaller units may be used if necessary, in widths varying in multiples of 2′ (8′, 10′, 12′, 14′, 16′, 18′.)

MATERIAL

All sections shall be especially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles. HEAD AND END JAMB MEMBERS shall be special angles. MUNTINS shall be special T's 1⅜″ deep.

SILLS shall be special design sections with a long downstanding leg bent at the end to make close contact with the building construction.

CONSTRUCTION

All members of the window shall be accurately fitted and rigidly riveted at the joints to form standard panel units. Panels shall be joined, end to end midway between T muntins, by splice plates bolted to head and sill members.

(Note:—Panels are joined at the time of erection.)

At the ends of all swing sections next the building construction there shall be provided stationary 1′ panels.

Between the ends of swing sections there shall be provided stationary 2′ panels.

The joint between ends of swing sections and stationary end sections (and stationary intermediate sections) shall be covered and protected by a specially formed, 14-gauge, steel channel with one leg secured to the end angle of the swing section and designed to overlap the end angle of the stationary section.

Where so indicated, provide 2′ wide storm panels secured to stationary end (and intermediate) panels by a steel plate and to the sill by sill clips. Panels shall underlap the swing window section and shall be provided at sill with a formed continuous drip board, set over the sill flashing.

ATTACHED HARDWARE

(Note:—Attach at the factory.)

All CONTINUOUS WINDOWS shall be top hung on heavy malleable iron butts, with ⅜″ brass pins, spaced 4′ apart on centers. Butts shall be rigidly riveted to the head angle and furnished with bolts for attachment to the building girts.

ERECTION

All CONTINUOUS WINDOWS shall be erected by the Fenestra Construction Company, under a separate contract.

All windows shall be erected in a thoroughly workmanlike manner ready for glazing.

PAINTING

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

(Note:—The following should be provided for in the Painting Specifications:

"One additional coat of paint should be applied after erection but before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.")

(Note:—Where desired, the Fenestra Construction Company at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.)

GLASS AND GLAZING

Glass shall be ¼″ rough wire glass.

Putty shall be a high grade of steel window putty.

(Note:—Ordinary wood sash putty must not be used.)

All CONTINUOUS WINDOWS shall be glazed from the outside. All glass shall be set in a heavy bed of putty and secured at muntins and end angles by angle clips secured with bolts. Face putty shall be applied at sills in a neat, clean-cut, smooth manner.

(Note:—Do not paint until putty has thoroughly hardened.)

CONTINUOUS FIXED WINDOWS

(Note:—The Specification for Continuous Fixed Windows is the same as that for Continuous Top Hung Windows except that all window units are stationary (no swing sections). Heavy steel angle clips bolted to the window head and the building girts are substituted for the butts. Steel sill clips, furnished with the window and shipped flat, are bolted to the sill of the window and bent around the steel sill girt to rigidly secure the window in position at the bottom.)

CONTINUOUS BOTTOM HUNG WINDOWS

(Note:—In general the specification for Continuous Bottom Hung Windows is the same as that for Continuous Top Hung Windows except in the following particulars:

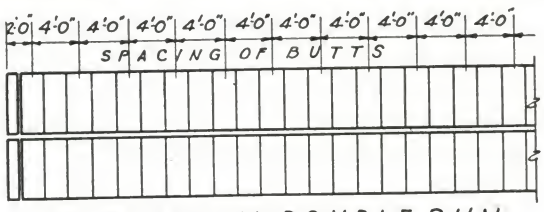
[a] The head section is a special T.

[b] The sill section is a special angle designed to take the butts attached to a special girt.

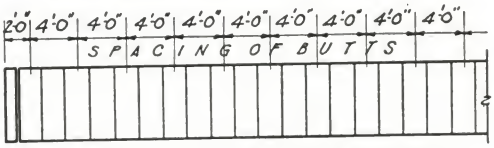
[c] The weathering caps are attached, with the legs out, to the fixed end or intermediate panels instead of to the swing sections.

[d] The windows are glazed on the inside with face putty at both head and sill.)

Continued on next page



ELEVATION-DOUBLE RUN



ELEVATION-SINGLE RUN

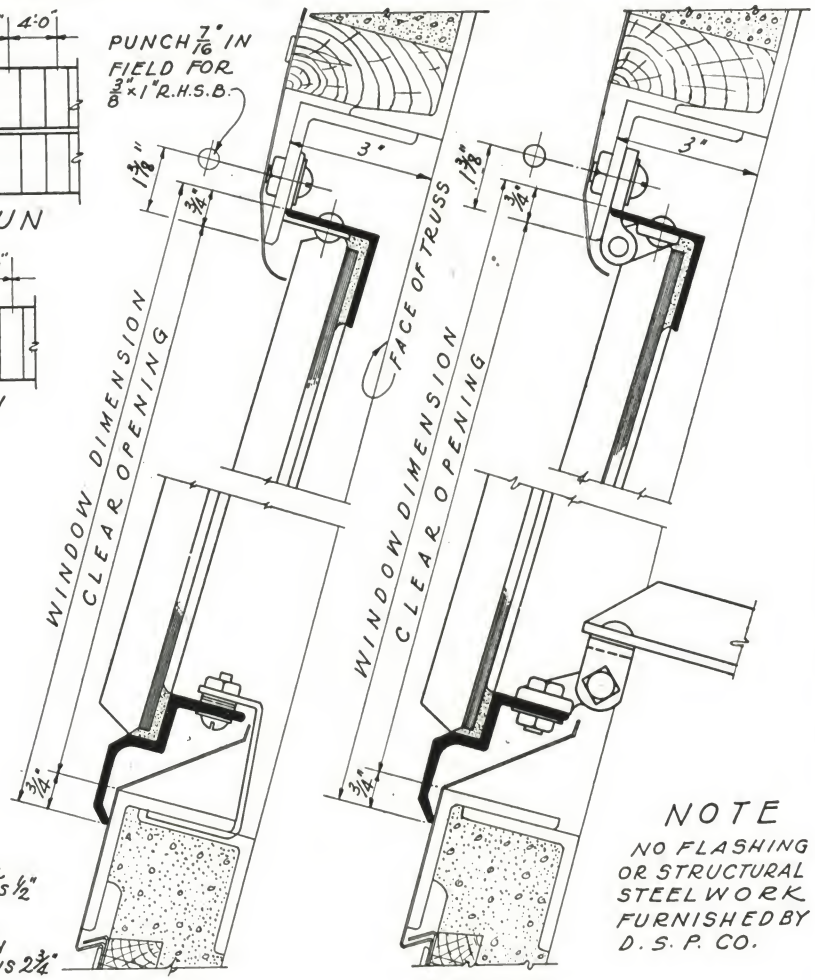
WINDOW HEIGHT	GLASS WIDTH	GLASS HEIGHT
3'-0"	23 1/2"	2'-9 1/4"
4'-0"	23 1/2"	3'-9 1/4"
5'-0"	23 1/2"	4'-9 1/4"
6'-0"	23 1/2"	5'-9 1/4"

TABLE OF WINDOW DIMENSIONS AND CLEAR OPENINGS.	
WINDOW-D.	CLEAR O.
3'-0"	2'-10 1/2"
4'-0"	3'-10 1/2"
5'-0"	4'-10 1/2"
6'-0"	5'-10 1/2"

GLASS SIZES

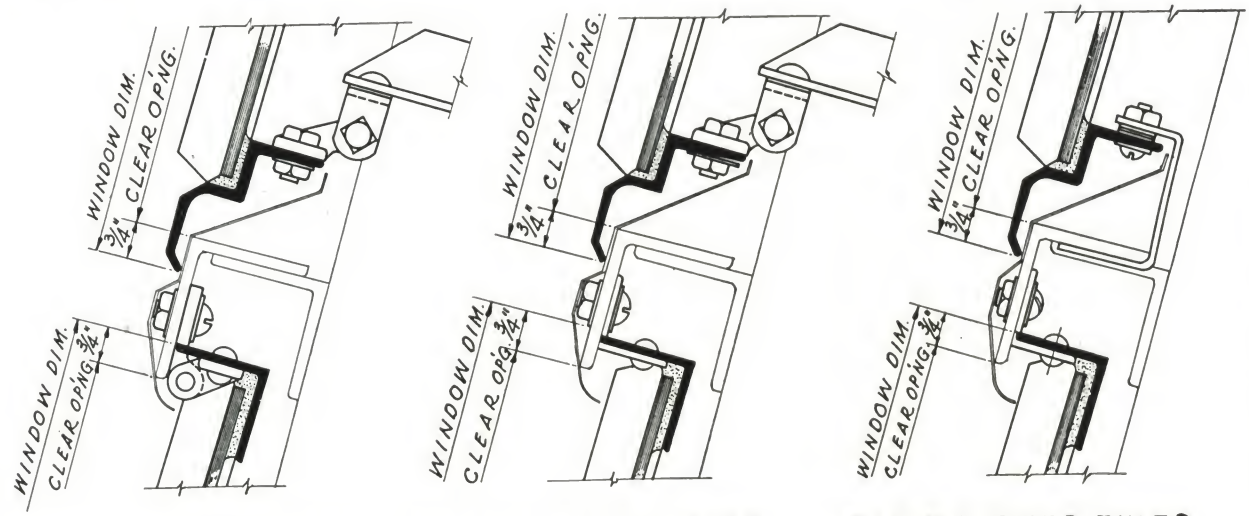
WIDTH EQUALS BAR CENTERS MINUS 1/2"

HEIGHT EQUALS SASH DIMENSION MINUS 2 3/4"



NOTE

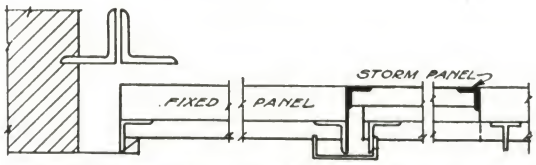
NO FLASHING OR STRUCTURAL STEEL WORK FURNISHED BY D.S.P. CO.



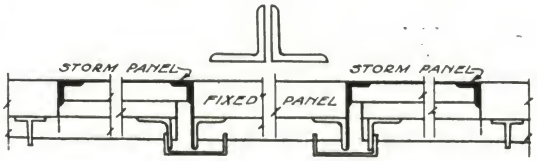
SCALE: 3"=1'-0"

Fenestra, August 1929	Continuous Windows, Top Hung Typical Cross Sections	Plate No P-102

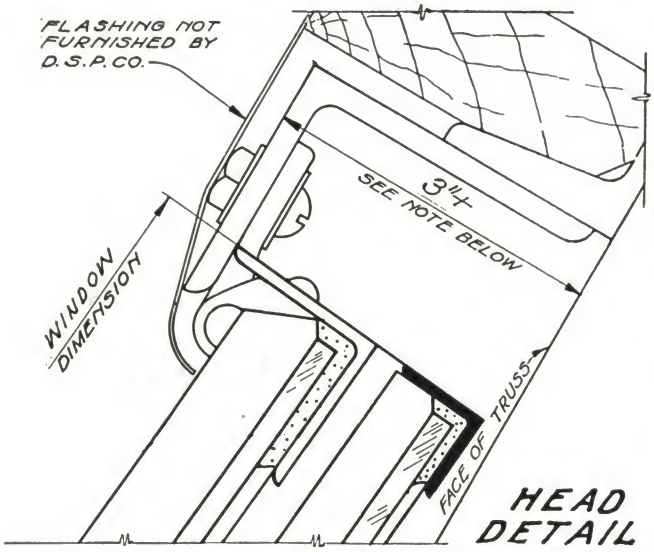
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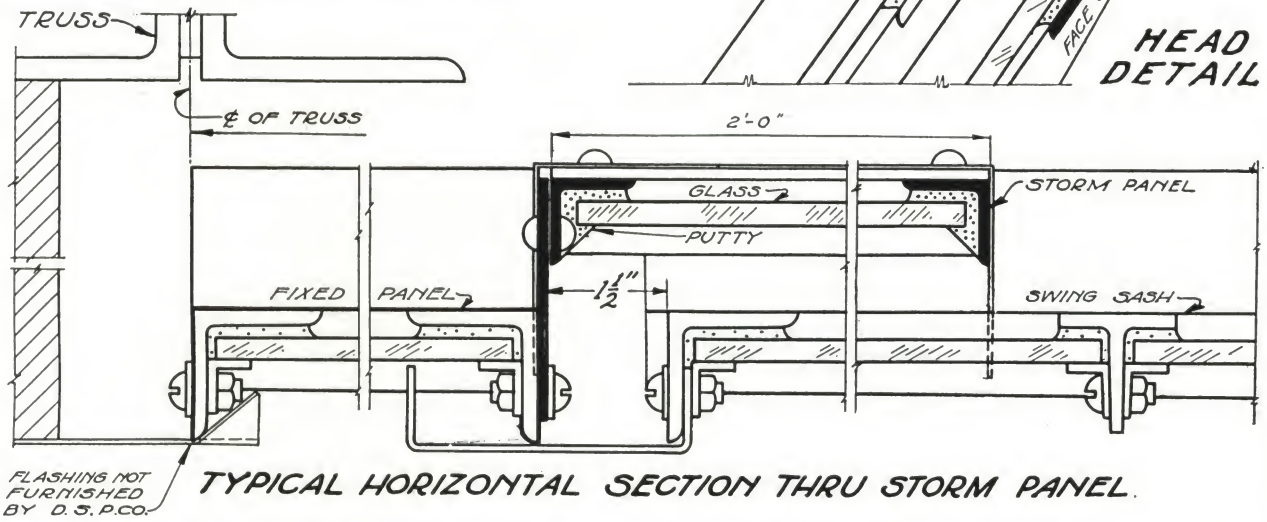
TYPICAL DETAIL AT END OF SWING RUN



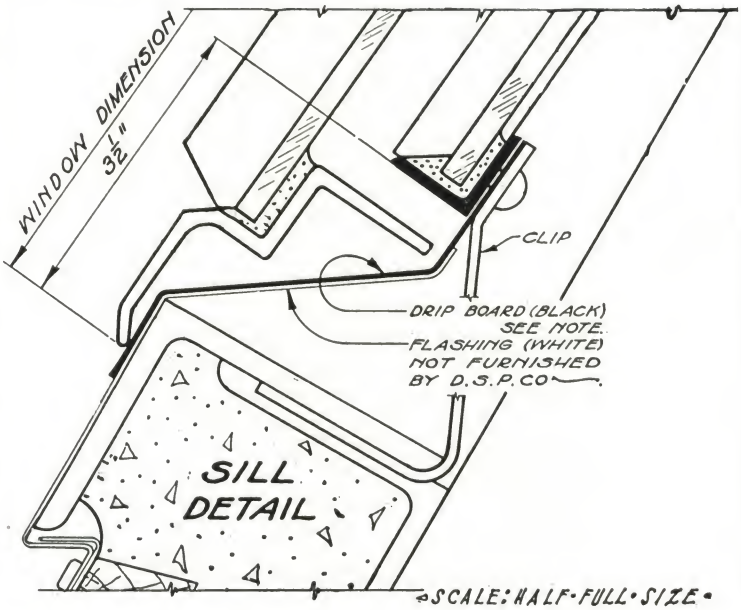
TYPICAL DETAIL BETWEEN SWING RUNS



HEAD DETAIL



TYPICAL HORIZONTAL SECTION THRU STORM PANEL.



NOTE

Storm panels can be used only with top hung windows. They are recommended only for windows 30° or less off the vertical.

When panels are used in front of vertical steel members or diagonal bracing a clear distance of not under 4 in. must be used.

A drip board (shown in black at sill) is furnished as part of panel. This drip should not be confused with flashing at sill which is not furnished by Detroit Steel Products Company.

The height of glass in panel is equal to window dimension minus 4 in. The glass width is 1 ft. 11½ in.

Fenestra *August 1929*	*Continuous Windows, Top Hung* *Storm and End Panels*	**Plate No** *P-104*

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FENESTRA OPERATING DEVICES

SO many different conditions are encountered in designing Fenestra operators that the following descriptions and limits should be regarded as explanatory and advisory only.

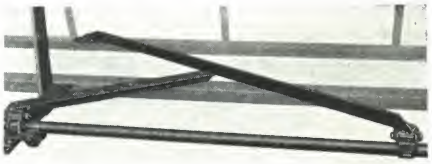
Fenestra operators are not sold as separate products but only as methods of mechanically opening and closing Fenestra windows. All Fenestra operators are erected by our own erection department, the Fenestra Construction Company, which supplies the necessary support brackets for both power and transmission lines, lines the operator plumb and true and leaves it in good working order.

All operating equipment, especially electrically controlled equipment, needs occasional inspection and lubrication. Provision should be made for reaching powers or motors without undue inconvenience.

CONTINUOUS OPERATOR

Designed to operate one or several continuous windows in line (top hung or bottom hung) in either vertical or sloping planes. Unusually heavy construction and extreme care in assembly give this operator unusual strength and reliability. The power is applied through straight line motion levers. Since the leverage increases faster than the load, the operation becomes continuously easier as the windows open. This is an exclusive Fenestra principle.





Above—The Fenestra Continuous Power. Right—Continuous Lever Arm Assembly

Power is a case-hardened, machine cut, high carbon steel worm operating a special alloy, non-ferrous bronze worm gear with straight face, machine cut teeth and extra heavy hub and rim. Worm and worm shaft are turned down from a solid steel bar. Worm and gear are oil encased in an oil-tight box. Worm shaft is provided with ball thrust bearing.

Worm gear fits over a 1″ square steel shaft which drives a high carbon steel, heat-treated pinion in mesh with high carbon steel rack, carrying machine cut teeth. Worm gear and pinion are broached out to fit the shaft with the permanence and reliability of a single piece. Rack is suspended from hangers rigidly clamped to the transmission line, thus transmitting power in a horizontal direction. A steel stop clutch, rigidly attached to the worm shaft, operates to cut off the power as the window is closed.

Power transmission line is 1″ wrought iron pipe in 20′ lengths joined by solid steel plugs with a drive fit riveted in two directions. Operating arms are steel angles,



Continuous Operator on a Run of Continuous Top Hung Sash

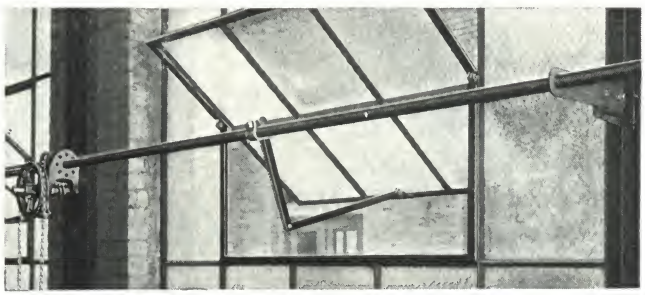
one arm twice as long as the other. One end of the short arm is pivoted to the center of the long arm, the other end attached by a universal pivot to a housing on the operator support. One end of the long arm is attached to the window and the other end is clamped through a universal joint to the transmission line. Operating arms are spaced approximately 10′ on centers.

Power is operated: (a) By chain and chain wheel, the hub of the latter being broached to fit the flattened end of the worm shaft and secured by a set screw and cotter pin. (b) By electrical power unit operating through a sprocket and chain as in Rack and Pinion operator.

Power may be located near either end of the run, not closer than 20′ to the end. For limits of operation see a Fenestra representative, as numerous factors such as arrangement of windows, their height and the degree of opening, must be considered.

WORM AND GEAR OPERATOR

Designed for ventilators horizontally pivoted 2″ above center. May be used with top pivoted ventilators. Power consists of a machine cut, cast iron worm, equipped



Worm and gear power, power line and operating arm

with ball thrust bearings, operating a cast iron segmental worm gear assembled in a steel housing. Hub of the gear reamed to fit power transmission line and rotate it on the gear axis. Power line is of 1″ black wrought iron pipe

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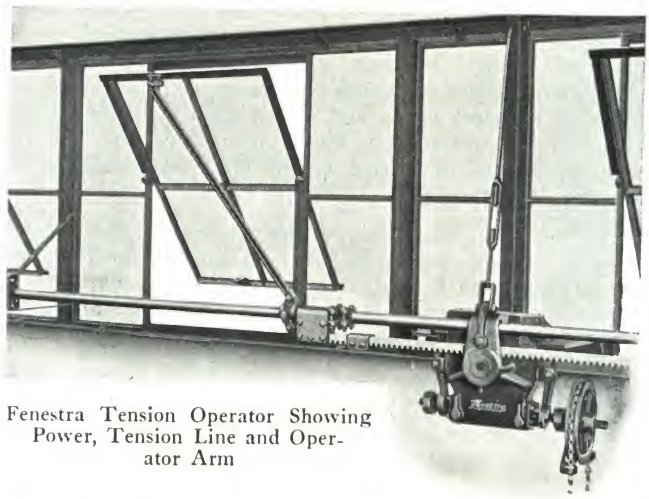
made continuous by steel plugs with a drive fit in two directions. Adjustable steel operating arms are rigidly clamped to the transmission line and attached to the ventilators by steel brackets.

Power is operated: (a) By a chain passing over a chain wheel which is broached to accurately fit the flattened end of the worm shaft and secured by a set screw and cotter pin. (b) By a 1″ black wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box.

Power may be vertical or inclined, located at either end or at any intermediate point. Operator limited to 12 single 2-pane high vents in a single run and 40′ on either side of the power. Multiple runs limited to 9 single 2-pane high vents and 20′ on either side of the power. Miter gears limited to 9 single 2-pane high vents each.

TENSION OPERATOR

Designed to operate long runs of horizontally pivoted ventilators. In general construction and design Tension operator is similar to Continuous operator. Power and transmission lines are the same, except that each power is equipped with a double stop so that all movement is



Fenestra Tension Operator Showing Power, Tension Line and Operator Arm

stopped and power cut off both when the vents are closed and when they are fully open.

Operating arms are adjustable, straight, steel channels rigidly attached to the tension line by malleable iron and steel swivel clamps. Arms attach to the vents by steel pivot hinges.

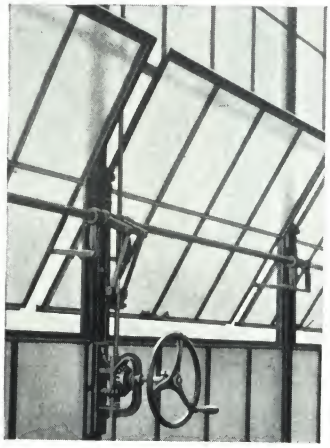
Power may be attached at either end of the run not closer to the end than 20′. Operator limited (single power) to 300′.

SCREW TYPE OPERATOR

Designed for use in high openings, such as power house bays, filled entirely with windows and structural mullions. May be used with ventilators pivoted 2″ above center or 4″ down from the top. Lies close to the windows, out of the way of cranes. May be concealed in the walls, if desired, at extra cost.

Two types of power are available: (a) Open bevel gears, manually operated by a hand wheel. Power to be assembled in an open cast iron case. (b) Electrical power with gears assembled and oil encased in a dust-proof gear box. Power to be connected either directly through a universal joint or by sprocket and chain drive.

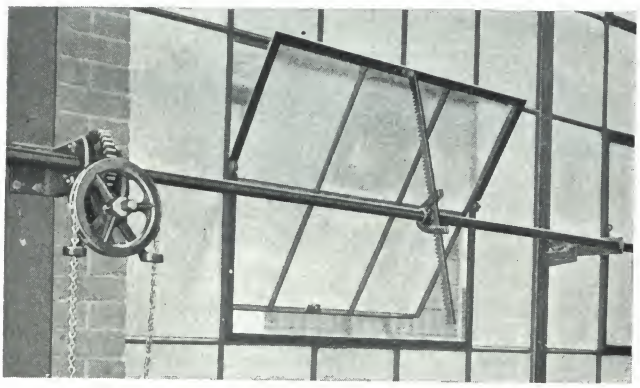
Either power operates a ¾″ vertical, threaded steel shaft upward or downward. To this shaft are connected heavy, cast iron cross heads, which operate cast iron rocker arms, which in turn are connected to the transmission line. Transmission line is 1″ wrought iron pipe with drive fitted steel plugs and rotates to operate pivoted lever arms (two to each vent), which connect with the ventilator jamb bars. Power may be located at either end of the run or at any intermediate point. Operator limited (single power) to 20 2-pane high vents pivoted 4″ from top or 50 2-pane high vents pivoted 2″ above center. One row of fixed lights at the sill of the window usually is required to permit clearance of power.



Screw Type Operator

RACK AND PINION OPERATOR

Designed for ventilators pivoted 4″ from the top or with vents pivoted 2″ above center. Three types of power are available: (a) Light power: 32 to 1 reduction. Cut steel worm equipped with ball thrust bearings, operating a cast iron worm gear assembled in a steel housing. (b) Heavy power: 45 to 1 reduction. Machine cut steel worm equipped with ball thrust



Rack and Pinion Operation of Pivoted Ventilators

bearings operating a semi-steel worm gear assembled and oil encased in a dust-proof gear box. (c) Electrical power: 71 to 1 reduction. Machine cut steel worm equipped with ball thrust bearings operating a semi-steel worm gear assembled and oil encased in a dust-proof gear box.

Power line is 1″ wrought iron pipe to which pinions are rigidly attached. Operating arms are straight steel

Continued on next page

racks attached to vents and clamped in mesh with the pinions.

Light and heavy powers may be operated (a) by chain and chain wheel or (b) by crank and miter gear (similar to worm and gear operators). Electrical power is operated by a cast iron sprocket wheel keyed to the worm shaft and motor driven through a chain drive. The electrical equipment is mounted directly beneath and joined to the power gear case forming one complete power unit.

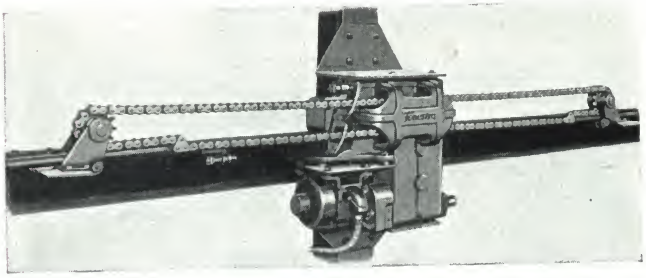
Power may be either vertical or inclined, located at either end of the run or at any intermediate point. Light and heavy operators in single runs limited to 80′ and 12 horizontally pivoted vents on either side or 40′ and 6 top pivoted vents on either side. Double runs limited to half that of single runs. Electrical powers in single runs limited to 300′ for horizontally pivoted vents or 150′ for top pivoted vents. In double runs, electrical powers are limited to 150′ for horizontally pivoted vents and 75′ for top pivoted vents.

SUPER-POWER OPERATOR

For exceptionally large industrial buildings where unusual operating service is desired on long runs of continuous top hung windows, we are prepared to supply the Fenestra super-power which, in connection with continuous operator transmission line and lever arms, will handle conveniently top hung continuous windows in runs up to 600′.

The utmost care has been used both in workmanship and materials to produce a device that combines smooth, even, efficient action with superlative strength and durability.

The power consists of a heavy, double, spur gear reduction of especially heat-treated alloy steel and a case-hardened steel worm engaging a heavy, special alloy,



The Fenestra Super-power

non-ferrous bronze worm gear. Shafts for all spur gears are of heat-treated alloy steel with generously proportioned bearings. The worm shaft has, in addition, combination radial and thrust bearings of ball bearing type. The entire mechanism is enclosed in an accurately machined oil-tight case.

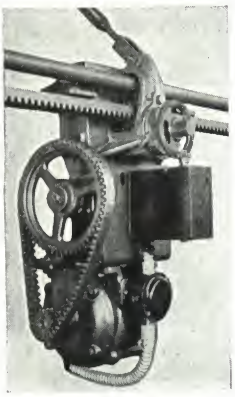
The power is usually located in the center of the run, operating a transmission line on either side through a heavy, continuous, roller type, chain drive. The motor is direct connected to the power by means of spur gears.

Conditions demanding the use of this super equipment are unusual. We strongly recommend consultation with Fenestra engineers who will be glad to make suggestions without obligation.

ELECTRICAL EQUIPMENT

The following specifications cover the electrical equipment for Fenestra operating devices:

All mechanical operators, electrically controlled, shall be provided by the operator manufacturer, with complete electrical equipment, as hereinafter specified. The operator manufacturer shall provide complete wiring diagrams.



Continuous Power Electrically Controlled

Motors shall be of type best adapted to the power equipment, of high torque and ample horsepower.

(Note:—Motors operating on 220-volt or 440-volt, 60-cycle, 3-phase, alternating current are recommended. Direct current motors are not carried in stock, but if alternating current is not available a special motor for 230-volt, direct current, can be supplied.)

(Note:—Specify current furnished.)

Motors shall be connected to power by means of sprockets and chains, or direct connected through universal joints as best adapted to power requirements. Standard magnetic reversing switches shall be enclosed in steel boxes and so designed that the movement of the ventilator, either in opening or closing, may be stopped or started at any point by manipulation of push buttons.

Limit switches shall be positive in action and rigidly attached to the power to form an integral part of the power unit. All limit switches shall be enclosed, yet accessible for adjustment so as to positively limit the motion of the ventilator in either direction.

Push button stations "open," "close" and "stop" shall be of rugged construction to withstand hard usage. Buttons shall be recessed in cover so that they cannot be accidentally operated.

(Note:—The following provisions should be made in the Electrical Specifications:

The electrical contractor shall install magnetic reversing switches and push button stations and shall furnish and install safety type line switches. He shall also furnish all conduit, fittings and wire and do all wiring in accordance with the wiring diagram between the electrical equipment furnished by the window operator manufacturer and that furnished by himself.

All materials and workmanship shall meet the requirements of the National Electric Code and all Local and State Inspection Bureaus.

Conduit shall be galvanized or black enameled. Wire shall be rubber covered N. E. C. Exposed conduit shall be run in a systematic, sightly manner, parallel with structural features of the building and rigidly and neatly secured. Where walls are plastered, conduit shall be concealed.

The electrical contractor shall carry fire, workmen's compensation, and public liability insurance. He shall guarantee his work for a period of one year after completion. Defect in the work and material furnished by him, developing during the above named period, shall be promptly and satisfactorily made good at his expense.)

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AIRPLANE HANGAR DOORS

SPECIFICATIONS

(Note:—Practical limits are determined largely by shipping facilities, height of tunnels, width of bridges, etc.)

GENERAL

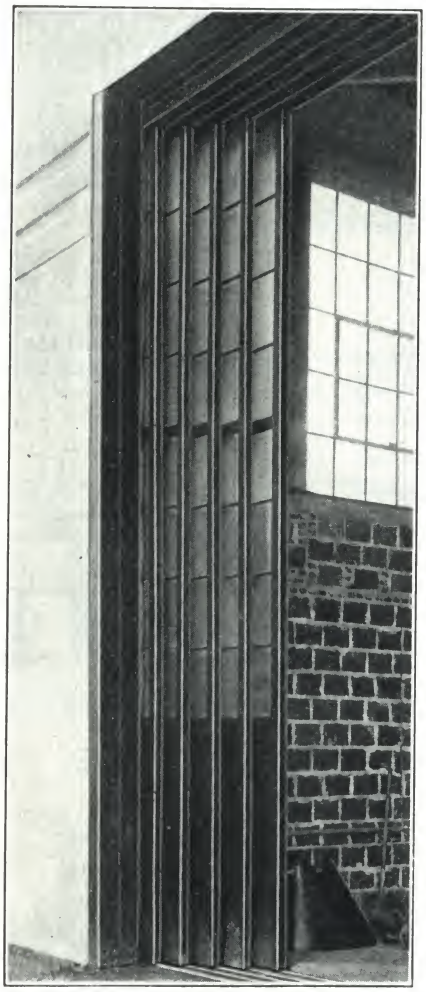
All doors shall be Fenestra Airplane Hangar Doors as manufactured by the Detroit Steel Products Company.

MATERIAL

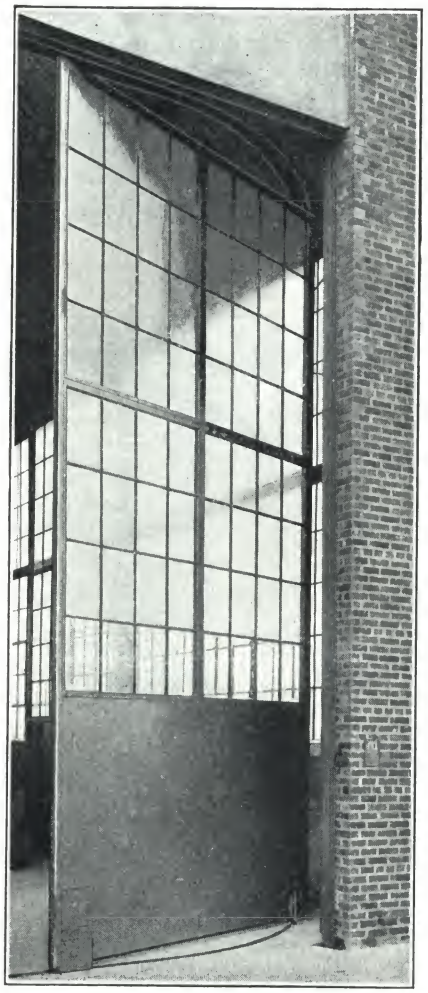
(Note:—All framing to be included with the Miscellaneous Structural Steel or Ornamental Iron or under other specification divisions.)

Upper part of doors shall be provided with glass panels constructed of solid rolled steel frame sections and muntin bars of 1⅜" depth. Lower panels shall consist of solid 13-gauge steel plates.

All door stiles and rails shall be made of (2½"x2½") (3"x3½") (4"x 2½") steel tubing. Rails shall be solidly welded to stiles at all junctions. Weathering between doors on adjacent tracks shall consist of rubber strips, secured by continuous metal retainers to the stile of one door, making contact weathering against the stile of adjacent door. Weathering between doors on the same track shall be of steel.



Fenestra "Straight Side" Hangar Doors



Fenestra "Round the Corner" Hangar Doors

CONSTRUCTION

Frames of glass panels shall be mortise and tenon, air hammer riveted, and welded at all corners. Muntins shall be continuous from bottom to top and from side to side, so interlocked at intersections as to increase the rigidity and strength—joints at frames shall be mortise and tenon, air hammer riveted. Solid panels shall be secured to tube frame.

(Note:—Where glazing angles are specified all glass shall be secured with glazing angles mitered at corners. Angles shall be secured with machine screws tapped to frame, and with machine screws and nuts to muntins.)

All doors shall rest on double flanged, malleable iron wheels so designed as to roll on steel tracks carrying the entire weight of the doors. Each wheel shall be mounted by housings and plates, and equipped with roller or swivel ball bearings and Alemite lubricated.

Bronze bushed malleable iron rollers shall be attached to the head rail of each door, to serve as guides and reduce friction, and minimize the transverse load on structural steel members.

(Note:—Hinged pilot doors supplied as specified.)

Unless otherwise specified a swing door, to fold back against the wall, will be furnished at each end of the door opening, to provide track clearance for curved track type doors.

ATTACHED HARDWARE

Suitable locking hardware, such as friction bolts, cremone bolts, etc., shall be supplied for each door.

ERECTION

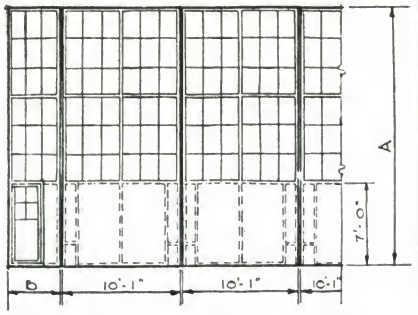
All doors shall be erected by the Fenestra Construction Company under a separate contract.

PAINTING—GLAZING

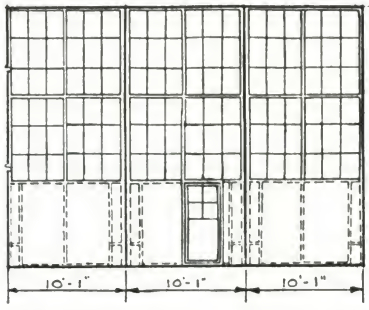
(Note:—Same as Painting and Glazing Specifications for Horizontally Pivoted Windows.)

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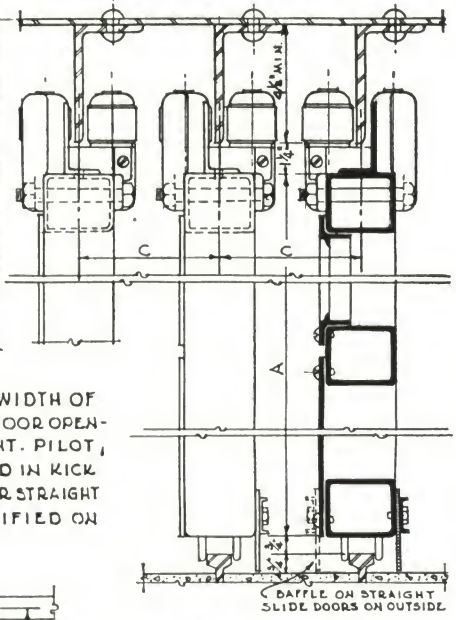
TYPES AND SIZES ~ DETAILS OF CONSTRUCTION



TYPICAL ROUND THE CORNER



TYPICAL STRAIGHT SLIDE

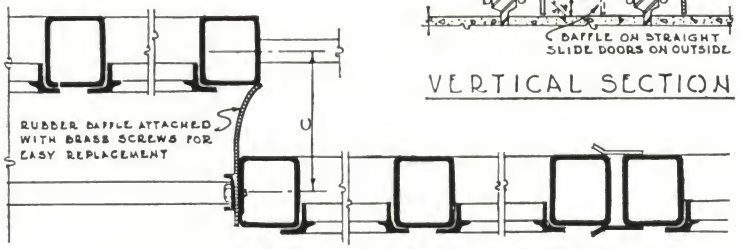


VERTICAL SECTION

NOTE

FOR DIMENSION "B" - WIDTH OF END SWING DOORS - SEE DOOR OPENING TABLE AT LOWER RIGHT. PILOT DOORS WILL BE FURNISHED IN KICK PLATE OF ANY END SWING OR STRAIGHT SLIDE DOOR WHEN SPECIFIED ON ORDER.

TABLE OF STANDARD SIZES ALL ROLLING DOORS ARE 10'-1" WIDE		
HEIGHT OF DOOR (DIM. "A")	SIZE OF TUBE	TRACK SPACING DIM. "C"
16'-0"	2½" x 2½"	5¼"
18'-0"	2½" x 2½"	5¼"
18'-0"	3" x 2½"	6"
20'-0"	3" x 2½"	6"
22'-0"	3" x 2½"	6"
22'-0"	4" x 2½"	7"
25'-0"	4" x 2½"	7"
28'-0"	4" x 2½"	7"



TYPICAL HORIZONTAL SECTION.

TYPICAL DOOR OPENINGS



MULTIPLE TRACK SYSTEM

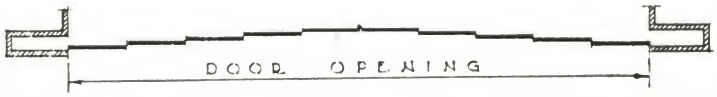


ROUND THE CORNER DOORS

SINGLE TRACK SYSTEM



OUTSIDE SLIDING ~ SHOWING TWO DOORS PER TRACK



INSIDE SLIDING ~ SHOWING ONE DOOR PER TRACK

PATENTS PENDING

	DOOR OPENING	NO. OF 10'-1" ROLLING DOORS	NO. OF TRACKS	DIM. "B" - END SWING DOOR 2 REQ'D.
ROUND THE CORNER DOORS	50'-0"	4	1	4'-8"
	60'-0"	5	1	4'-8"
	70'-0"	6	2	4'-8"
	80'-0"	7	2	4'-8"
	80'-0"	7	1	4'-6"
	90'-0"	8	2	4'-8"
	90'-0"	8	1	4'-6"
	100'-0"	9	2	4'-8"
	100'-0"	9	1	4'-6"
	110'-0"	10	2	4'-6"
	120'-0"	11	3	4'-6"
	130'-0"	12	3	4'-6"
	140'-0"	13	3	4'-6"
	150'-0"	14	3	4'-6"
	160'-0"	15	3	4'-6"

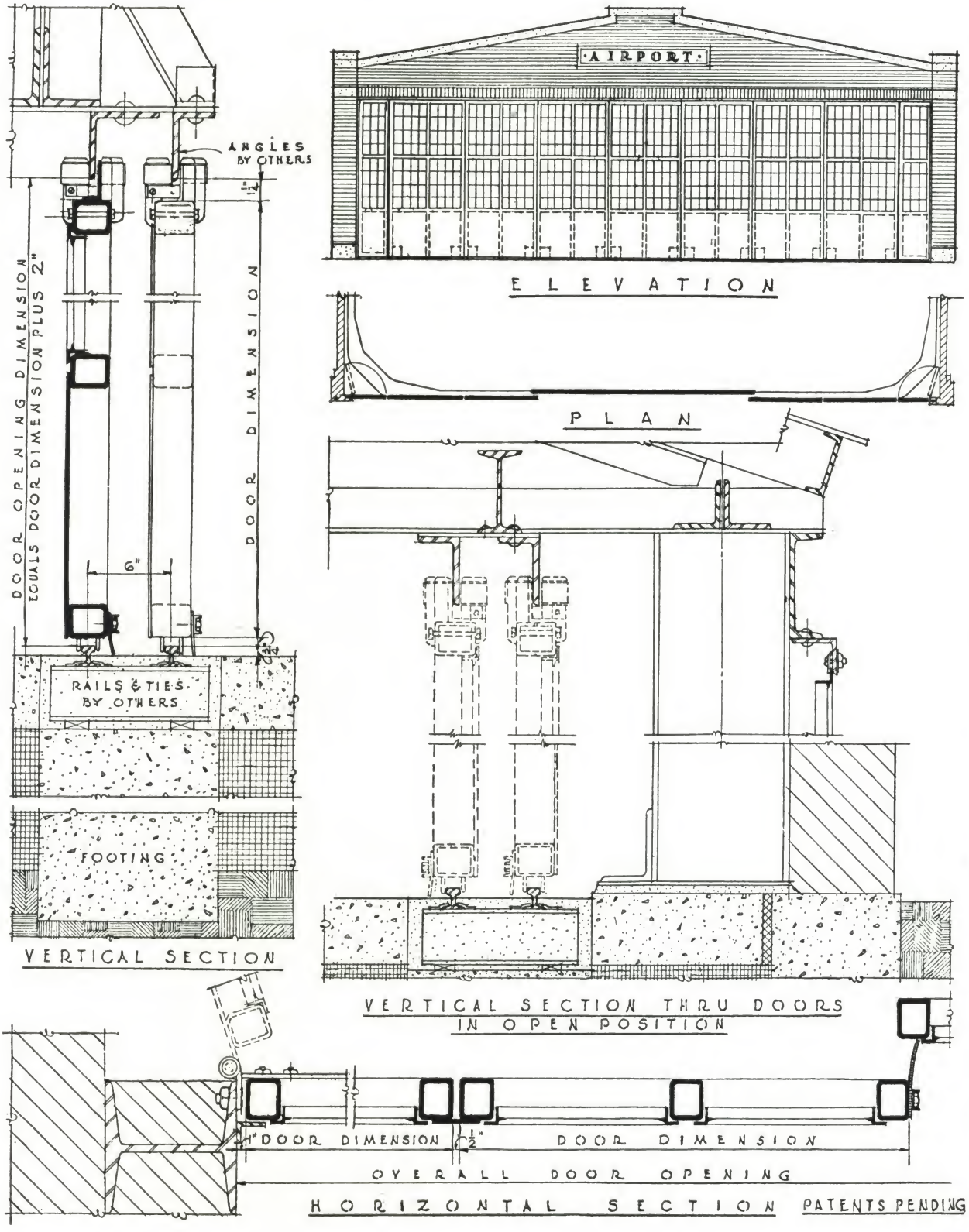
	DOOR OPENING	NO OF DOORS IN OPENING	NO. OF TRACKS	DOORS PER TRACK
STRAIGHT SLIDE DOORS	50'-0"	5	3	1
	60'-0"	6	3	1
	70'-0"	7	4	1
	80'-0"	8	2	2
	80'-0"	8	4	1
	90'-0"	9	3	2
	90'-0"	9	5	1
	100'-0"	10	3	2
	100'-0"	10	5	1
	110'-0"	11	3	2
	120'-0"	12	3	2
	130'-0"	13	4	2
	140'-0"	14	4	2
	150'-0"	15	4	2
	160'-0"	16	4	2

Fenestra *August 1929*

Airplane Hangar Doors
Types and Sizes

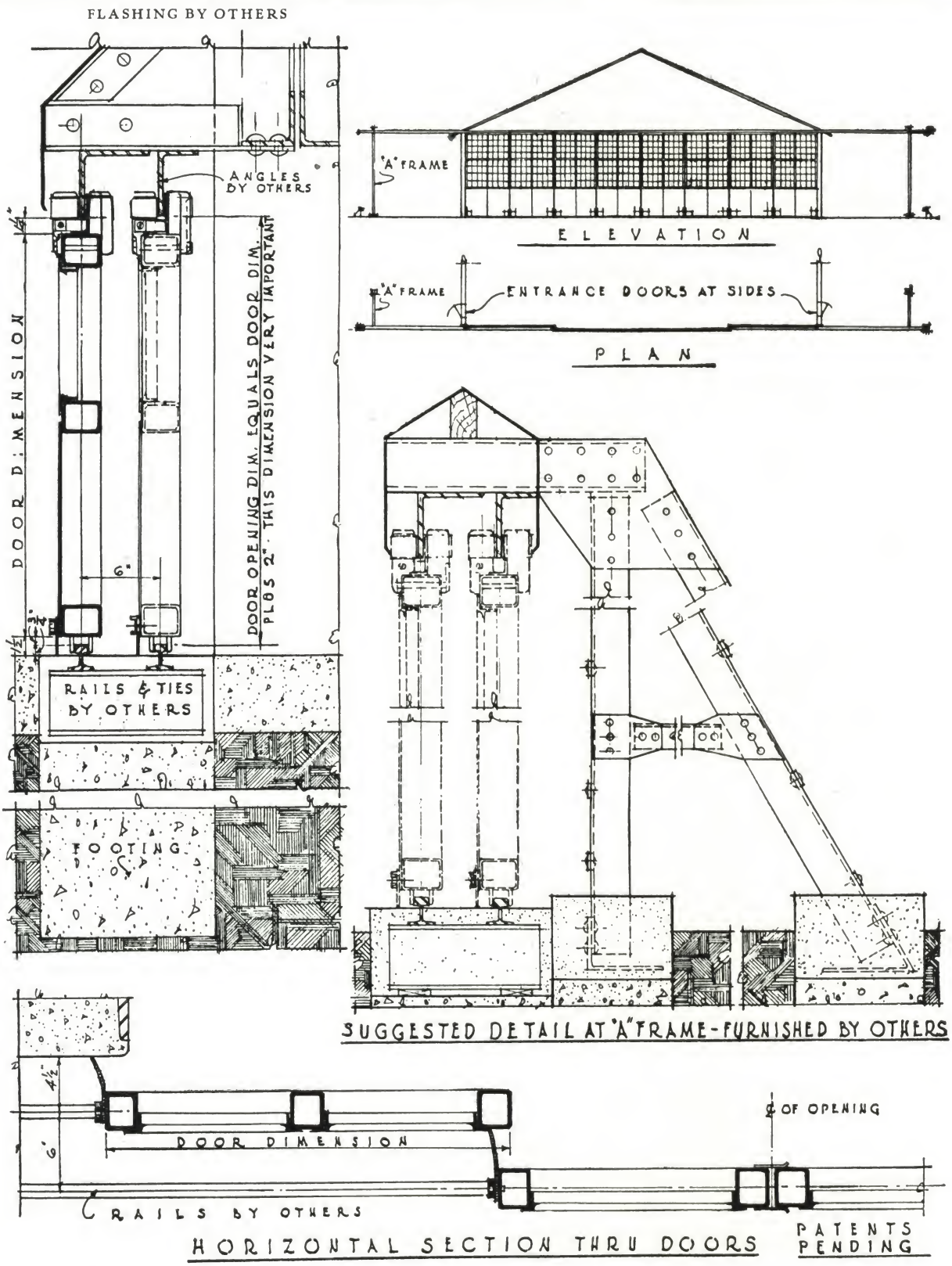
Plate No *Y-122*

Continued on next page



Fenestra *August 1929*	*Airplane Hangar Doors* *Span Truss Construction*	***Plate No*** *Y-124*

Continued on next page



Fenestra *August 1929*	*Airplane Hangar Doors* *A-Frame Construction*	**Plate No** *Y-125*

Continued on next page

FENESTRA ROLLED STEEL DOORS

Fenestra Rolled Steel Doors are designed in types which swing, slide, fold, roll, lift or pivot. They may be operated either manually or electrically.

Doors designed especially for airplane hangars are shown on preceding pages. Industrial and commercial doors shown here are intended for use in warehouses, mills, garages, round houses, car shops, power houses, piers, freight depots, fire stations, factories, grain elevators, police stations and similar structures.

In addition to standard type doors, Fenestra engineers are equipped to solve almost any kind of unusual door problem. Where openings of unusual size are encountered, or peculiar methods of operation are necessary Fenestra engineers will be glad to make suggestions and layouts without cost or obligation.

As the oldest and largest manufacturer of steel windows in America, Detroit Steel Products Company has a reputation for quality material and accurate assembly. The same precision methods used in the manufacture of Fenestra doors insures durability and satisfaction, even under the hardest usage.

Since door frames, in all cases, should be installed when the building is erected to insure proper anchorage, while the doors themselves should be installed after the building is completed, we strongly recommend that door frames be included in the Structural Steel or Ornamental Iron Specifications, including slotted sliding door thresholds and track supports where required. Frames should be made to the exact dimensions given by the door manufacturer and erected plumb and true.

Where particularly desired, 4″ channel frames for swing doors only, will be furnished with the doors at added cost.

INDUSTRIAL DOORS



Single Swing Door



Double Swing Doors

Fenestra Industrial Doors are manufactured in both tubular and channel types, single or double units, to either slide or swing. Stiles and rails are heavy rectangular tubing or heavy rolled steel channels as specified. Intermediate sections are specially designed, solid rolled steel. Panel frame members are equal leg channels or angles. Solid panels are 13-gauge steel. Closures, guides and meeting rail astragals are heavy steel plates.

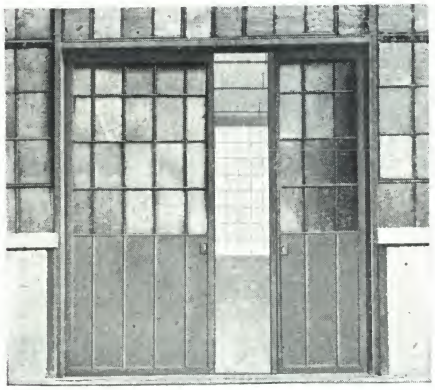
Tubular stiles and rails are mitered and welded at corners. Panel frames are attached by countersunk machine screws. Channel stiles and rails are butted together over solid corner castings, through-riveted and riveted also to the panel frames. Stiles are reinforced at the butts by heavy steel plates.

Panel frames are assembled in a manner similar to fixed industrial windows.

Glass is set in putty and secured by mitered glazing angles attached to the frames by machine screws. Where necessary, stiles are tapped to receive hardware which is applied at time of erection.

Swinging tubular doors are equipped with 6″ x 4½″ butts; channel doors with 4½″ x 4½″ butts. Both types have nonrising, loose butt pins.

All swinging single doors are equipped with standard, bronze faced, mortise cylinder locks, or Japanned iron Tee latches and strikes. Both single and double swinging doors are equipped with malleable iron or bronze handles and bronze faced cylinders and escutcheons. Inactive leaves of double swinging doors have standard top and bottom steel shot bolts, top bolt chain operated.



Double Sliding Doors

Sliding doors are equipped with combination flush and projecting iron handles, one to each door, solidly riveted to the panels; also hinged hasps and staples. They hang from standard steel tracks on adjustable roller bearing trucks and track brackets.

Special hardware such as master keyed locks, standard fire exit panic bolts, door checks, etc., may be had at extra cost, if specified in advance.

Continued on next page

FENESTRA VERTICAL LIFT DOORS

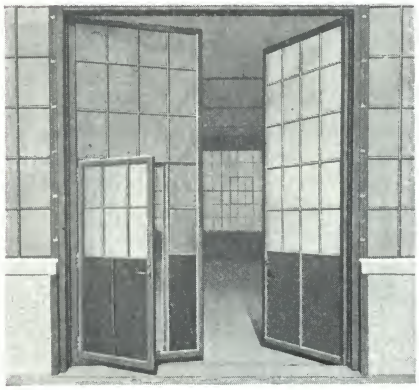
Fenestra Vertical Lift Doors are used chiefly where the arrangement or location of the door opening makes a swinging or a sliding door inadvisable. They conserve floor area which may be necessary for aisle or storage space inside or platform space outside. On the other hand, they necessitate head room above the opening equal to at least one-half the door height. When designed with two leaves, the lower slides upward inside the upper and both leaves clear the head of the door when open. If designed with one leaf, head room equal to the full height of the door is demanded.



Vertical Lift Doors

The photograph shows one of twenty single leaf, Vertical Lift Fenestra Doors in the plant of the Detroit Seamless Steel Tube Co. These doors were operated by a worm and gear device connected by means of a steel shaft to pulleys over which the doors were balanced against counterweights.

PIER AND WAREHOUSE DOORS



Warehouse Doors with Pilot Door

Both swinging and sliding types are entirely suitable for piers, warehouses and shipping or receiving sheds. Stock types can be shipped immediately from warehouse. Special types are designed to any practical width or height. Swing doors may be equipped with pilot doors if desired. Sliding doors may be arranged with any number of leaves to the opening.



Fenestra Rolling Pier Doors

FENESTRA GARAGE DOORS

For public garages, bus terminals and motor repair shops, Fenestra doors, either double swinging or accordion type, supply a wide, high opening with ample clearance for cars or trucks. Either type may be arranged to open in or out, manually operated or electrically connected to a push button station.

Of tubular construction and heavily reinforced, these doors are built for hard and constant usage. When equipped with specially designed, quick acting operator mechanism, they are peculiarly adapted to fire and police stations.



Garage Doors

Doors of similar design, but of unusual height to accommodate trolley poles, are recommended for electric railway car barns.



In a Car Barn

FENESTRA ACCORDION DOORS

Fenestra Accordion Doors are designed for roundhouses and buildings of that nature that require extra large door openings. Fenestra Accordion Doors are similar in appearance and construction to the Airplane Hangar Doors, but are suspended by trolley hangers which hold the doors true to line and guide them as they are opened.



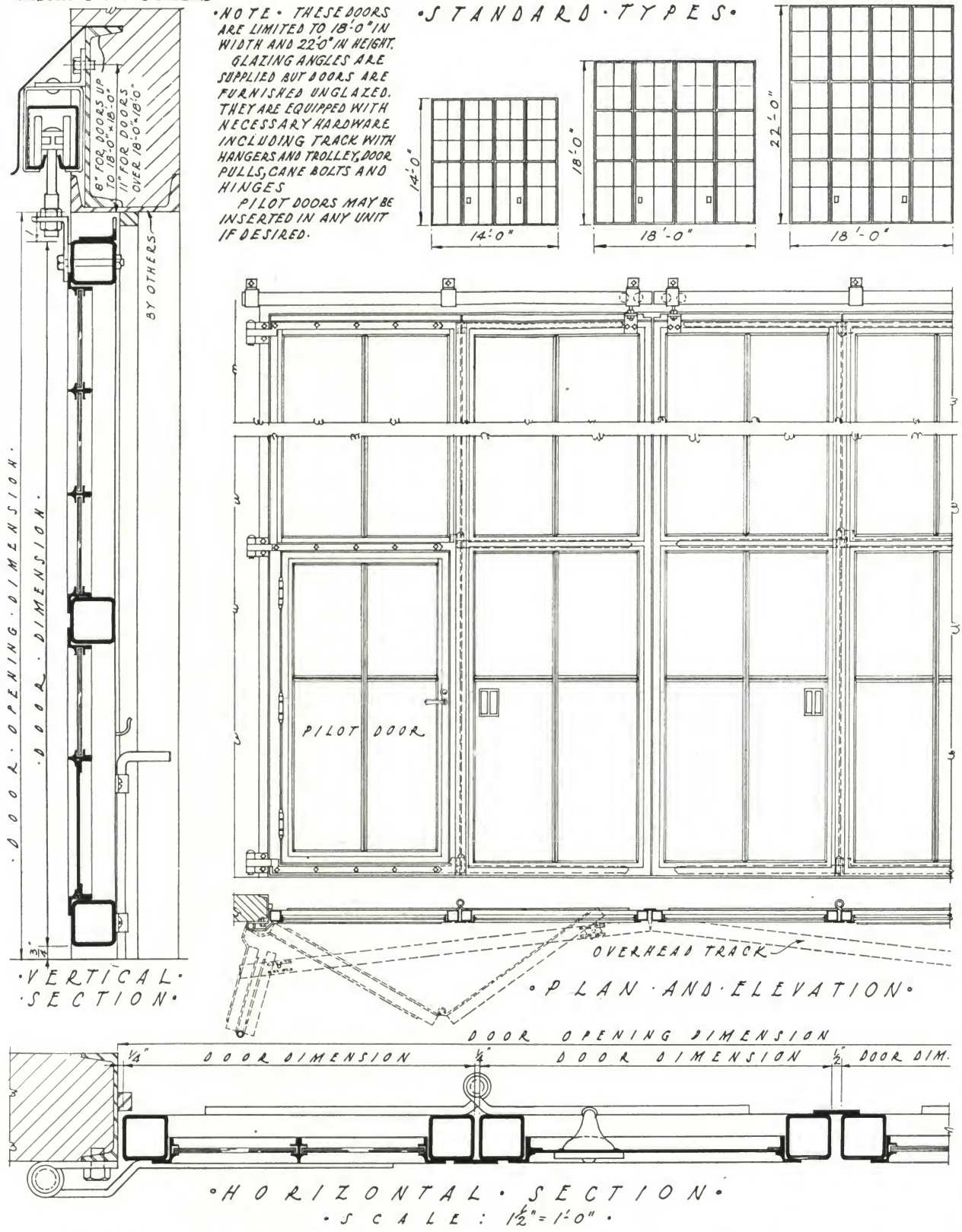
Accordion Doors

The jamb hinges consist of straps made of heavy steel. The double eye pintle has a large steel pin. Pilot doors can be installed where desired and are constructed of 2½ x 2½ in. tubular trim. Pilot doors are equipped with cylinder locks while main doors are fitted with hasp and staple so they can be locked with padlock. On small openings, doors may be made of channel type construction, and channel type pilot doors are used.



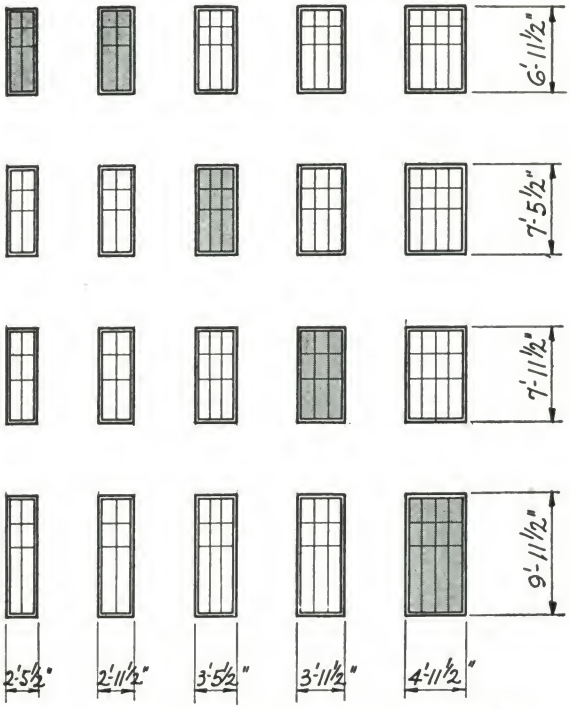
Roundhouse Doors

Continued on next page



Fenestra *August 1929*	*Accordion Doors* *Elevations and Details*	**Plate No** *Y-301*

Continued on next page

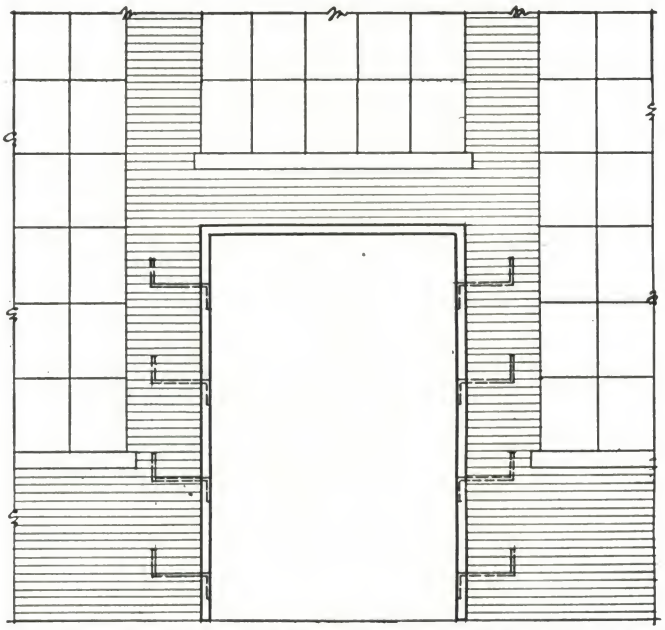


STANDARD AND STOCK TYPES

TYPES SHOWN SHADED ARE CARRIED IN STOCK

NOTE - THE ABOVE UNITS WILL BE MADE WITH CHANNEL TRIM AND CAN BE USED FOR EITHER SWING OR SLIDING DOORS.

DIMENSIONS SHOWN ARE OVERALL DOOR SIZES WITH OPENING CLEARANCES DEDUCTED. FOR CLEARANCES SEE PLATE NO. V-102.

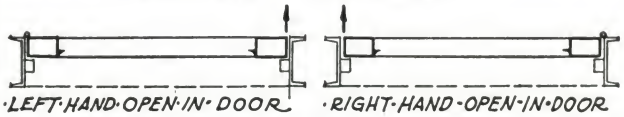


ELEVATION OF TYPICAL DOOR FRAME

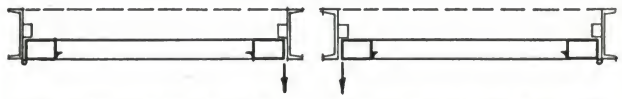
NOTE - STANDARD DOOR FRAMES FOR SWING DOORS ONLY ARE MADE OF 4" STRUCTURAL STEEL CHANNEL AND ARE EQUIPPED WITH HEAVY ZEE ANCHORS ON EACH SIDE SPACED ABOUT 2'-0" ON CENTERS TO ANCHOR FRAME INTO THE MASONRY. HOLES IN FRAME FOR HINGES ARE DRILLED AND TAPPED IN SHOP TO MATCH DOORS.

FRAMES FOR SINGLE DOORS ARE SHIPPED ASSEMBLED, USING AN ANGLE TIE ACROSS THE BOTTOM. FRAMES FOR DOUBLE DOORS ARE SHIPPED KNOCKED DOWN AND MUST BE BOLTED TOGETHER IN FIELD.

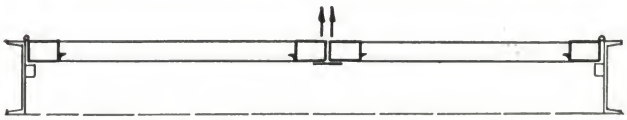
SWING DOORS



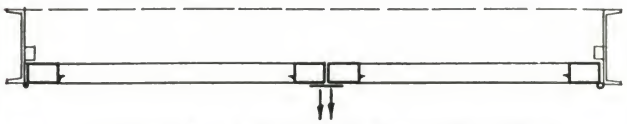
LEFT HAND OPEN IN DOOR — RIGHT HAND OPEN IN DOOR



LEFT HAND OPEN OUT DOOR — RIGHT HAND OPEN OUT DOOR

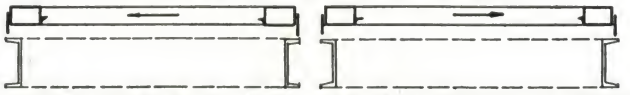


DOUBLE SWING OPEN IN DOOR

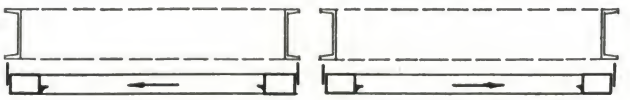


DOUBLE SWING OPEN OUT DOOR

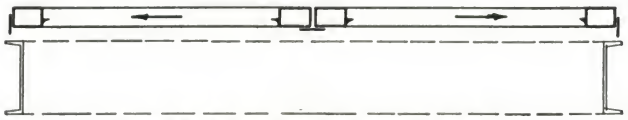
SLIDING DOORS



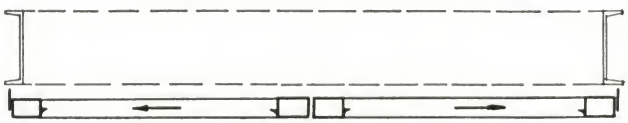
INSIDE SLIDING DOOR LEFT — INSIDE SLIDING DOOR RIGHT



OUTSIDE SLIDING DOOR LEFT — OUTSIDE SLIDING DOOR RIGHT



DOUBLE INSIDE SLIDING DOOR

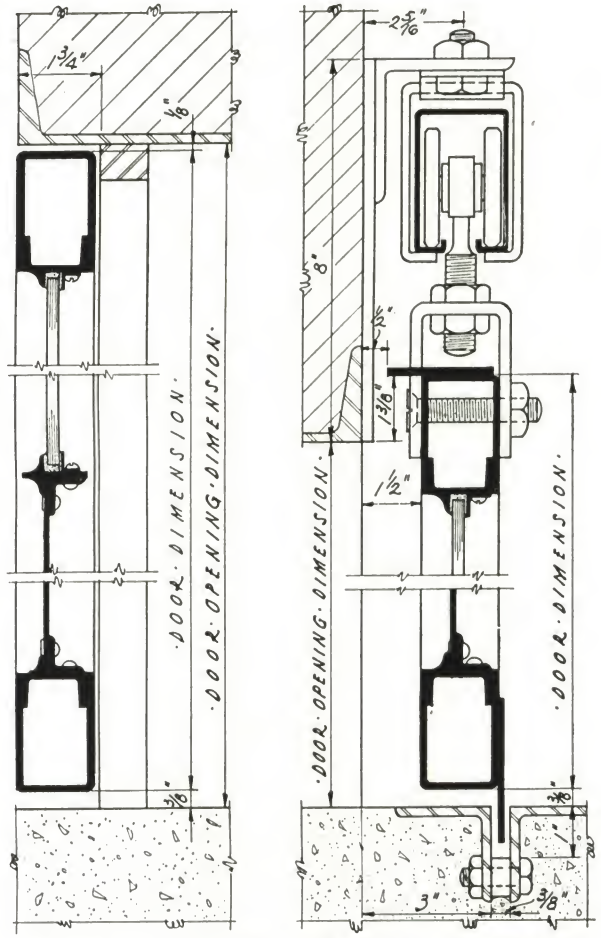


DOUBLE OUTSIDE SLIDING DOOR

DESIGNATION OF DOORS

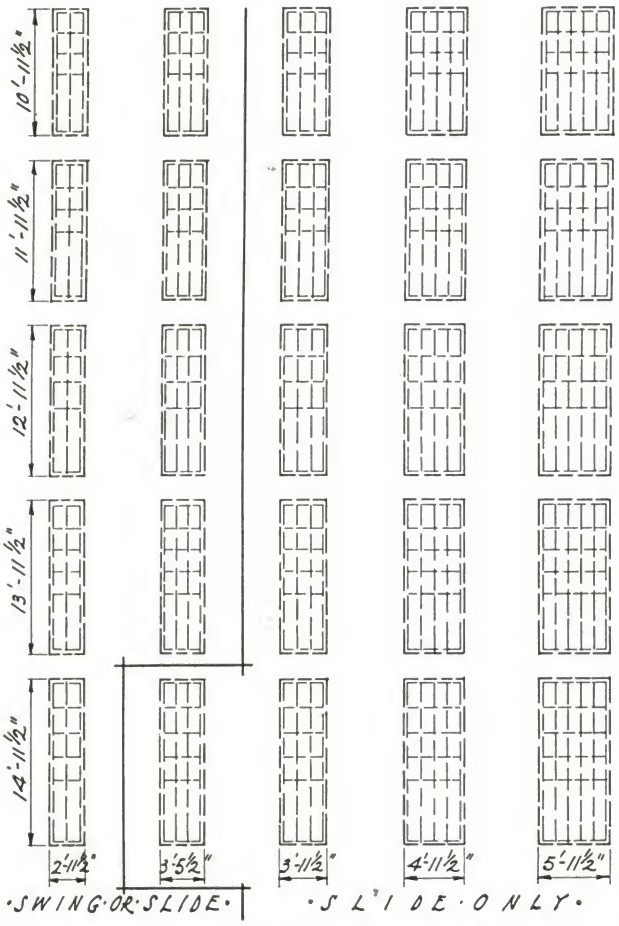
Fenestra August 1929	Swinging and Sliding Doors Types, Sizes and Handing	Plate No Y-401

Continued on next page



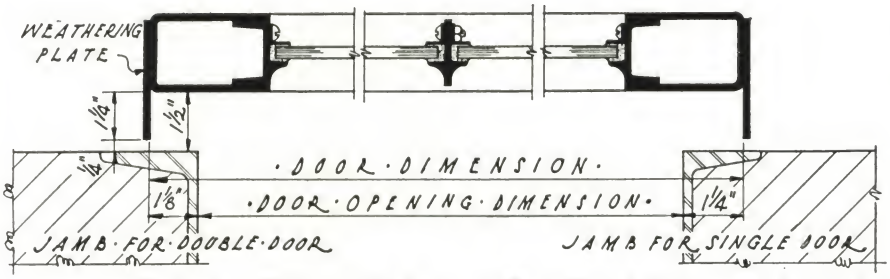
·VERTICAL SECTION· ·SWING DOOR·

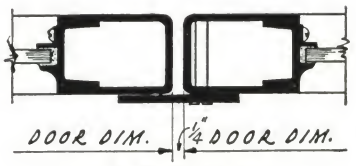
·VERTICAL·SECTION· ·SLIDING·DOOR·



·SWING·OR·SLIDE· ·SLIDE ONLY·

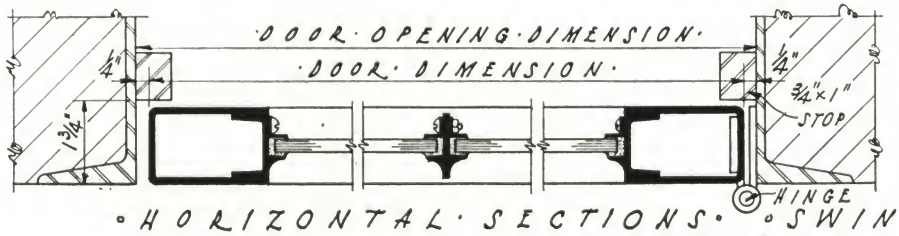
·LISTED·SPECIAL·TYPES·

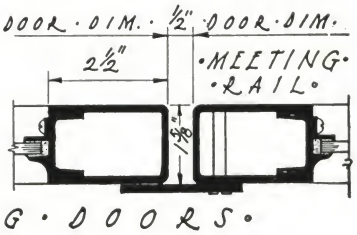




·MEETING· ·RAIL·

·HORIZONTAL·SECTIONS· ·SLIDING·DOORS·



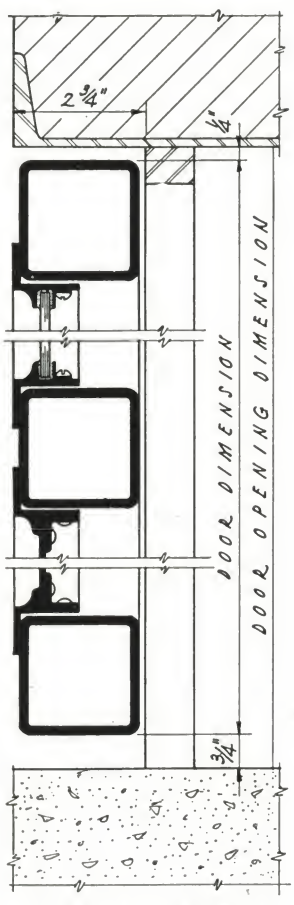


·HORIZONTAL·SECTIONS· ·SWING·DOORS·

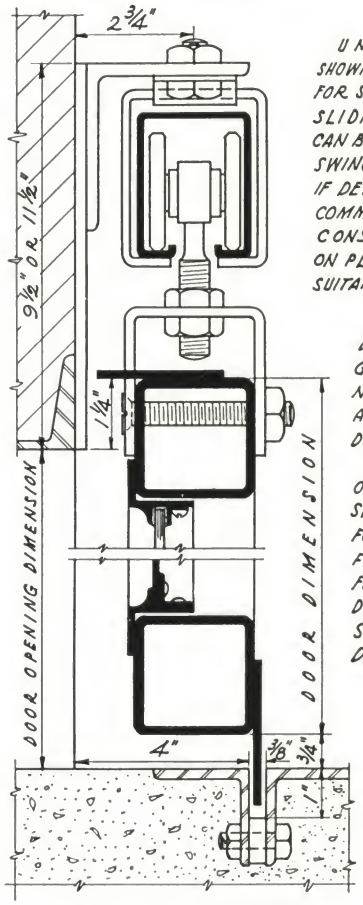
·SCALE: 3"-1'-0"·

Fenestra *August 1929*	*Swinging and Sliding Doors* *Typical Channel Doors*	***Plate No*** *Y-402*

Continued on next page



•VERTICAL·SECTION·
·SWING·DOOR·

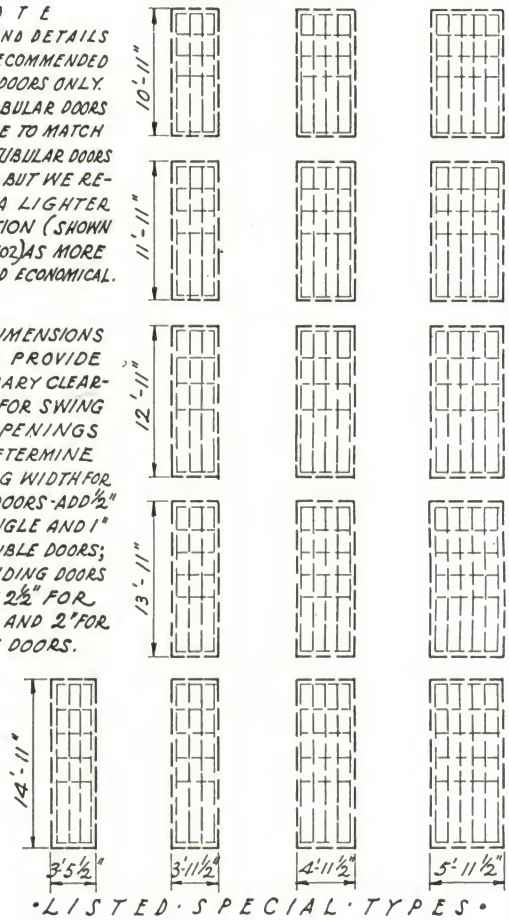


·VERTICAL·SECTION·
·SLIDING·DOOR·

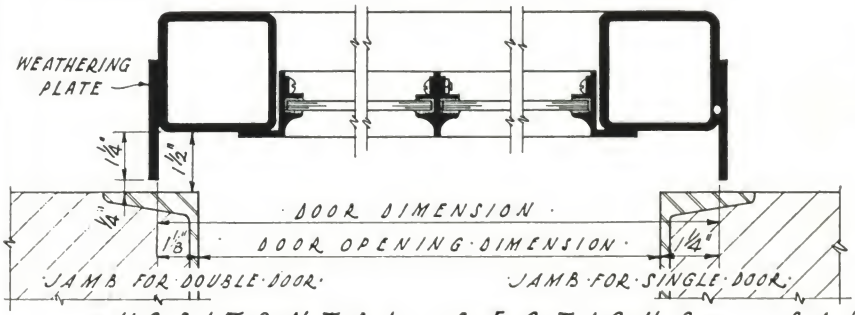
NOTE

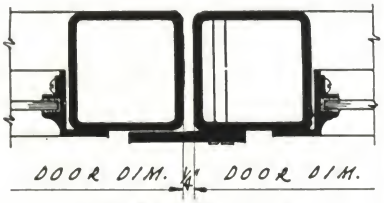
UNITS AND DETAILS SHOWN ARE RECOMMENDED FOR SWING DOORS ONLY. SLIDING TUBULAR DOORS CAN BE MADE TO MATCH SWINGING TUBULAR DOORS IF DESIRED BUT WE RECOMMEND A LIGHTER CONSTRUCTION (SHOWN ON PLATE V-102) AS MORE SUITABLE AND ECONOMICAL.

DOOR DIMENSIONS GIVEN PROVIDE NECESSARY CLEARANCES FOR SWING DOOR OPENINGS TO DETERMINE OPENING WIDTH FOR SWING DOORS · ADD ½" FOR SINGLE AND 1" FOR DOUBLE DOORS; FOR SLIDING DOORS DEDUCT 2½" FOR SINGLE AND 2" FOR DOUBLE DOORS.



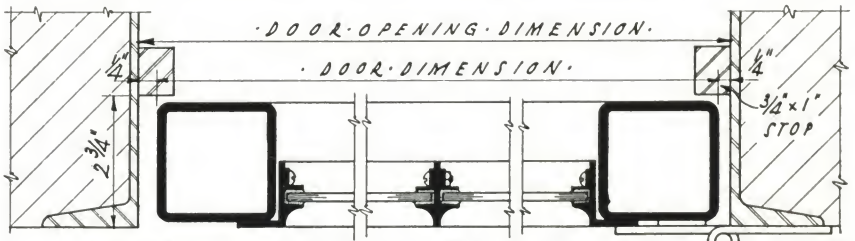
·LISTED·SPECIAL·TYPES·

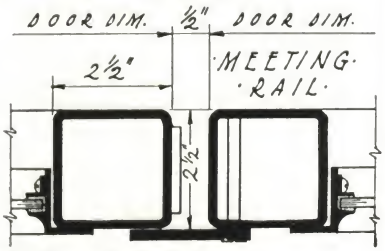




·MEETING·
·RAIL·

·HORIZONTAL·SECTIONS· ·SLIDING··DOORS·





·HORIZONTAL·SECTIONS· ·SWING·DOORS·

·SCALE: 3"-1'-0"

Fenestra *August 1929*	*Swinging and Sliding Doors* *Typical Tubular Doors*	**Plate No** *Y-403*

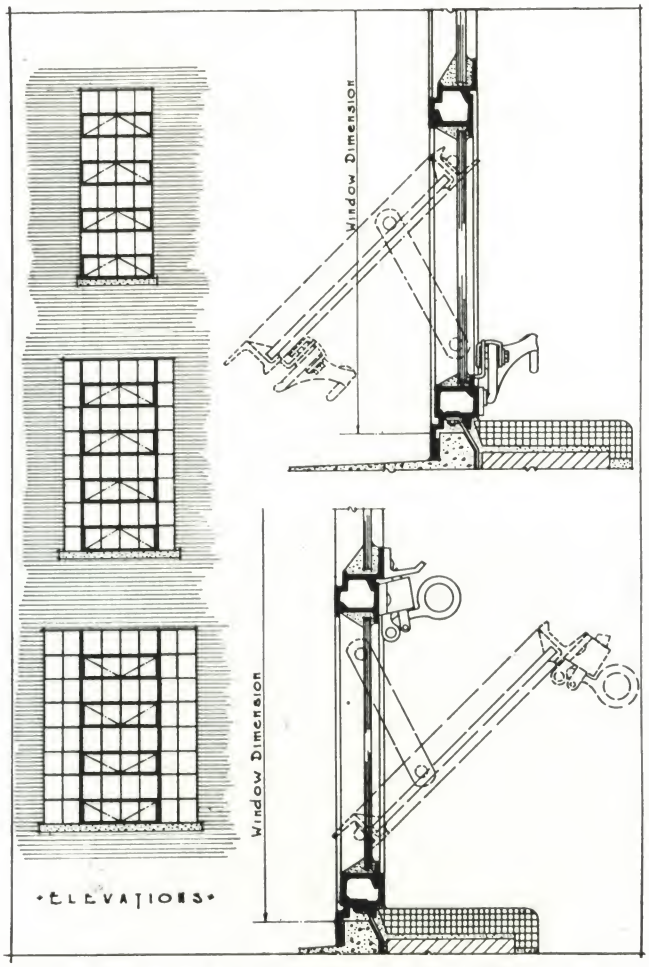
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FENESTRA DETENTION WINDOWS

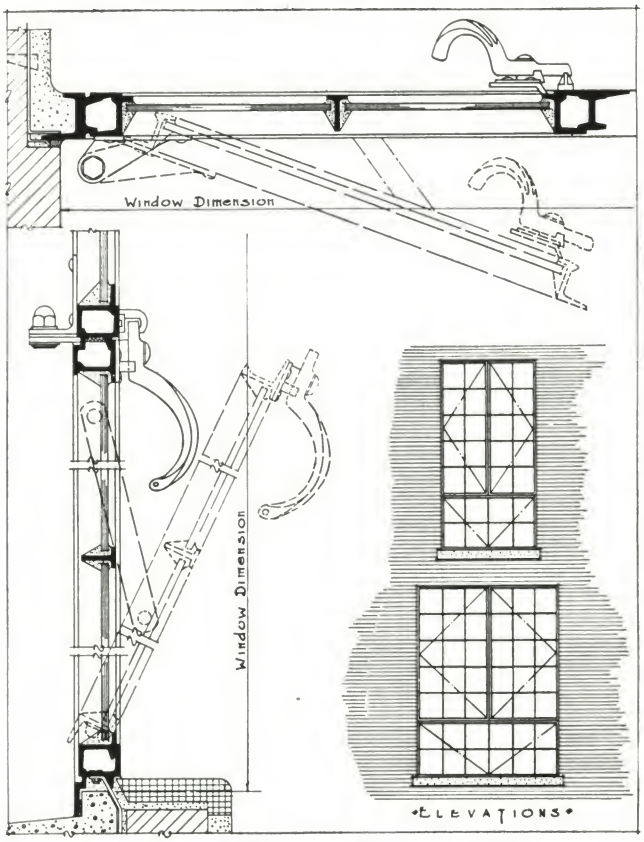
Fenestra Detention Windows are designed to act as combination steel windows and steel gratings in prisons, asylums, hospitals and reform schools. While they are not offered as substitutes for prison bars in all cases, they do insure a very large measure of restraint coupled with the advantages of a weather-tight, fire-resisting window.

Fenestra Detention Windows are designed in a number of different types with swing leaves or ventilators opening out or opening in, but all types embody the use of comparatively small glass lights, usually about 6″ by 9″. Fenestra Fenmark Windows are available for detention purposes with both swing leaves and sill ventilators limited as to opening. The width of the aperatures is restricted by means of steel arms, held by screws. For washing, these screws may be released by means of a specially designed wrench.

Fenestra Projected Fenmark Windows may be used with ventilators either one pane high or two panes high and operated either individually by hand or mechanically in banks. Ventilators may be arranged to open either in or out and it is possible to have some ventilators opening in and some opening out in the same unit. Any of these ventilators may be provided with stops to limit the degree of opening or they may be locked shut to be opened only by means of a special key.

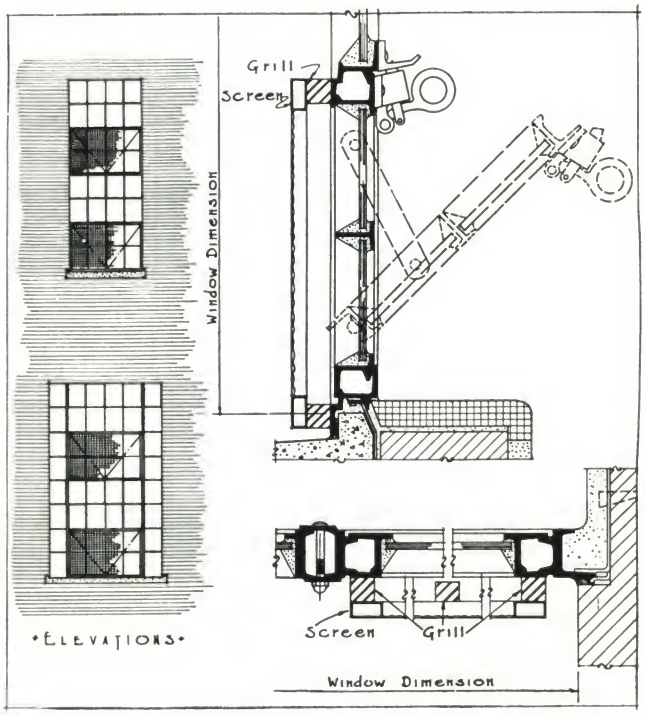


Projected Fenmark with Ventilators Opening Either In or Out



Fenestra Fenmark Windows with Restricted Opening

When two pane high ventilators are used, it is usually necessary to provide a type which embodies a steel grill



Projected Fenmark Windows with Grill and Screen

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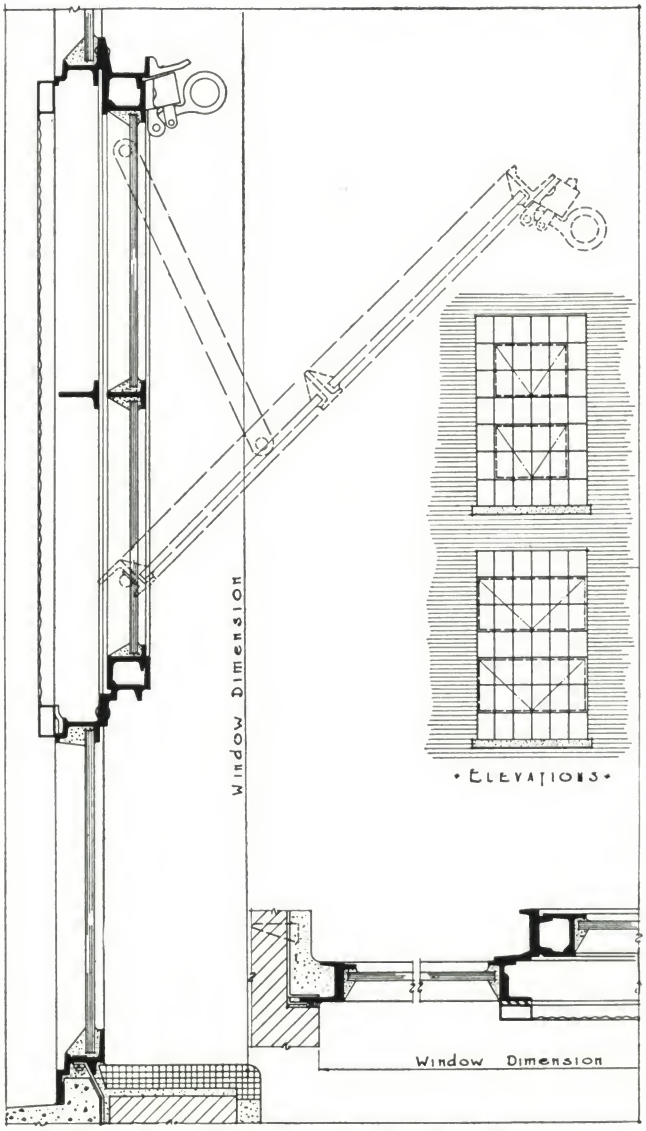
on the outside. If desired, this grill may be combined with a screen so that the restriction is less apparent.

Still another Fenestra Projected Fenmark type is designed with a two pane, open in ventilator attached inside a fixed window. In this case, the portion of the window immediately in front of the ventilator remains unglazed and acts as a steel grill.

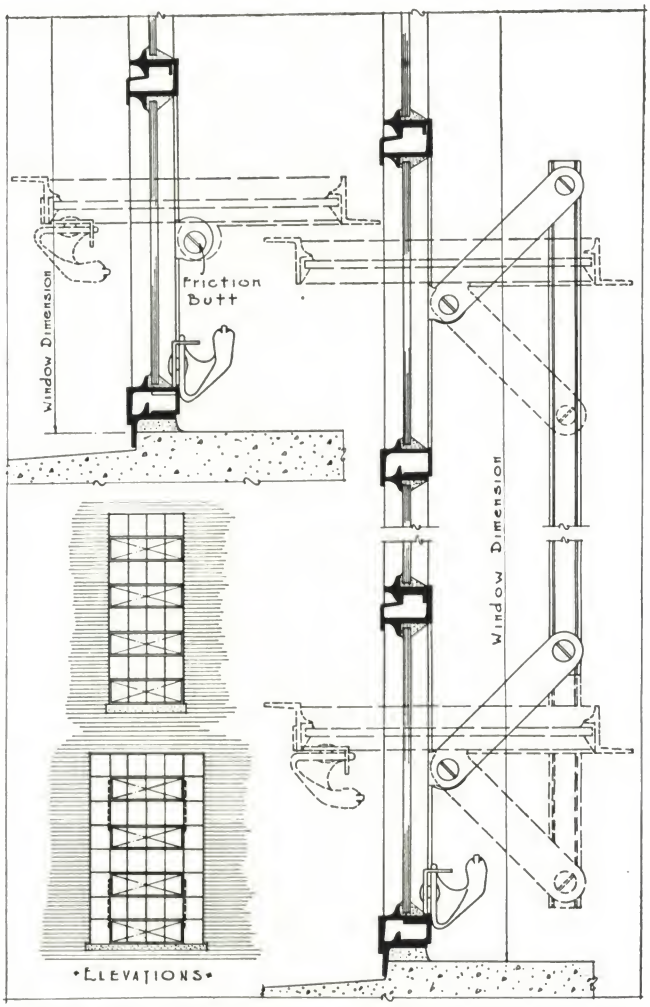
Fenestra Horizontally Pivoted Windows one pane high may be used with ventilators operated either by hand or mechanically. Upper ventilators may be operated simultaneously with lower ventilators by the use of extension butts and connecting bars. Large ventilators may be provided with stops to limit the extent of their opening or they may be locked shut and opened only by means of special keys.

Horizontally Pivoted Windows may also be provided with friction butts located at the center, each ventilator being individually operated by hand.

Frequently, Fenestra fixed light units are used unglazed and set into the walls as gratings outside movable wood windows. Glazed fixed panels of Fenestra are also set into movable wood sash.



Projected Fenmark with Open-In Ventilator Attached to Fixed Sash



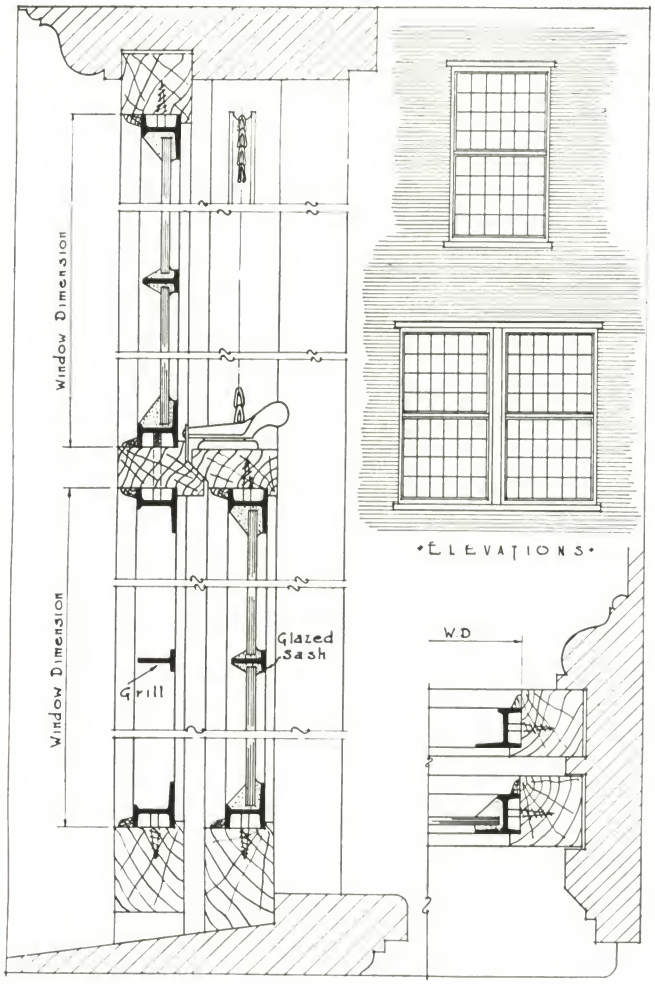
Horizontally Pivoted Fenestra with Friction Butts and same with Connecting Arms

Since no types or sizes of Fenestra Detention Windows have been standardized, a wide variety of window and ventilator arrangements is possible to suit the needs of practically any type of institution. Fenestra Sales Engineers will be glad to co-operate with architects and designers in selecting the most efficient types.



Detroit House of Correction—All Ventilators Operated in Unison by One Operator

Continued on next page



Fixed Panels of Fenestra Used with Movable Wood Frames

TYPICAL DETENTION INSTALLATIONS

South Highland Infirmary, Birmingham, Ala.
State Prison Farm, Raiford, Fla.
State Reformatory, Anamosa, Ia.
Illinois State Penitentiary, Lockport, Ill.
E. Indiana Hospital for Insane, Richmond, Ind.
Kansas State Hospital, Osawatonie, Kan.
Central State Hospital, Lakeland, Ky.
Onondaga County Penitentiary, Jamesville, N. Y.
Utica State Hospital, Mary, New York
Erie County Penitentiary, Wende, N. Y.
Wingdale Prison, Wingdale, N. Y.
U. S. Veterans' Hospital, Perrysville, Md.
Detroit House of Correction, Detroit, Mich.
Michigan Sanitarium, Howell, Mich.
Michigan State Prison, Jackson, Mich.
Michigan Home for Feeble Minded, Lapeer, Mich.
Saginaw Hospital, Saginaw, Mich.
Michigan Insane Asylum, Traverse City, Mich.
State Reformatory, St. Cloud, Minn.
Oklahoma State Reformatory, Granite, Okla
E. Oregon Insane Asylum, Pendleton, Ore.
Industrial Schools for Girls, Salem, Ore.
Oregon State Asylum, Salem, Ore.
Eastern State Penitentiary, Greaterford, Pa.
State Institute for Feeble Minded, Polk, Pa.
State Hospital for Insane, Columbia, S. C.
Central Hospital for Insane, Nashville, Tenn.
Texas State Insane Asylum, Austin, Tex.
Wisconsin State Prison, Waupun, Wis.
Northern Insane Hospital, Norlum, Wash.
U. S. Penitentiary, McNeil's Island, Wash.
State Penitentiary, Walla Walla, Wash.
Coquitam Asylum, Vancouver, B. C., Canada



Erie County Pentitentiary, Wende, N. Y.—Each Horizontal Row of One-pane-high Ventilators Is Opened and Closed by a Mechanical Operator



Fenestra

BLUE BOOK OF STEEL WINDOWS



WELDED
Solid Steel Windows

Local Representative

FEDERAL STEEL SASH COMPANY

Waukesha, Wisconsin

FEDERAL STEEL SASH COMPANY

Manufacturers of Electric Arc Welded Solid Section Steel Windows and Tubular Doors

WAUKESHA, WIS.

CHICAGO OFFICE, 228 No. La Salle Street
DALLAS OFFICE, 607 Thomas Building
INDIANAPOLIS OFFICE, 333 No. Pennsylvania Street
KANSAS CITY OFFICE, 601 Commerce Building
MILWAUKEE OFFICE, 633 No. Water Street
MOLINE OFFICE, State Trust Building

Member Solid Section Steel Window Industry

Experience and Facilities

The FEDERAL STEEL SASH COMPANY has been continuously in business during a period of over nine years in specialized manufacturing and marketing of electric arc welded solid section steel windows and tubular steel doors.

The superiority of the product, due to advanced engineering design and modern methods of manufacture, has met with ready acceptance and the preference of discriminating architects, engineers and builders.

The factory, covering an area of over 100,000 sq. ft. and fully equipped with the most modern machine tools and arc welders, has a capacity in excess of 5,000,000 sq. ft. of windows annually.

TRADE-MARK

Scope of This Catalogue

This catalogue gives complete specification data and details of sizes and design of Federal products. Standard practice of the Department of Commerce, as recommended for the Solid Section Steel Window Industry, has been followed.

That the greatest economy may be effected, consultation with local representatives is recommended in the selection of types of product best adapted to the particular condition while the plans and specifications are in course of preparation, thus obviating the possible necessity of changes.

Designing and Engineering Service

A thoroughly experienced Designing and Engineering Department is maintained at the home office, which is at all times available to the architects and engineers for the solution of problems involving steel window and door installations.

Erection Service

The company is prepared to contract for the erection and field painting of Federal products where it is desirable to centralize the responsibility for the complete installation. While the erection of Federal products, due to the rigidity and strength resulting from their welded construction, is greatly simplified, the highest economy will be effected only where the field work is handled by specially trained and thoroughly experienced erectors.

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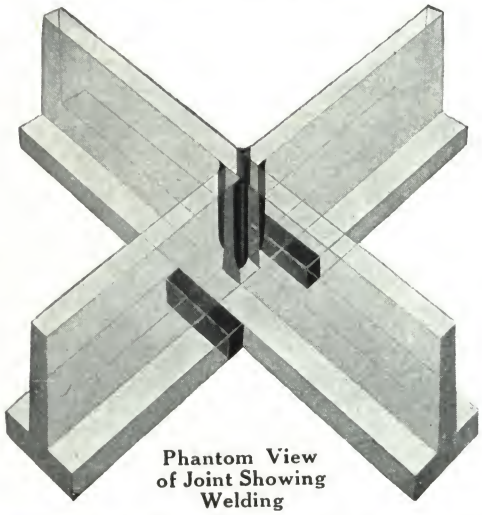
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OUTSTANDING FEDERAL FEATURES

Electric Arc Welded Construction

While the discussion below applies more particularly to the horizontally pivoted window, the same underlying features of design and construction hold good in all Federal products.

When steel windows were first introduced, the designers were faced with the problem of making a joint between the various members, similar to the joints in wood sash, which could be economically produced with the facilities then available. Some form of interlocked, mitered, dovetailed or tongue and slot joint was used, in which it was necessary to cut away a portion of the section of each of the members to be joined. As a result, the actual or effective depth of the mechanically jointed section was less at the joint by the amount of the cutout than the overall depth, and as the strength at the weakest point had to be sufficient to withstand the stresses to which the window would be subjected, the members as designed were of necessity heavier between the joints than was required, with the result that extra weight was added to the member without adding anything to the strength or stiffness of the window. This is the old proposition of the chain and its weak link. **Just as no chain is stronger than its weakest link, no window member is stronger than its weakest point.**



Phantom View of Joint Showing Welding

In addition to the disadvantage of having to increase the weight of the members without any compensating increase in strength or stiffness, there was a further pronounced disadvantage inherent in interlocked, mitered, dovetailed or tongue and slot joints, namely, that after the window was assembled it would rack out of shape in handling, shipping and erecting. This instability of construction arose from the fact that the only way in which these joints could be held in place was by hammering or pressing the members together.

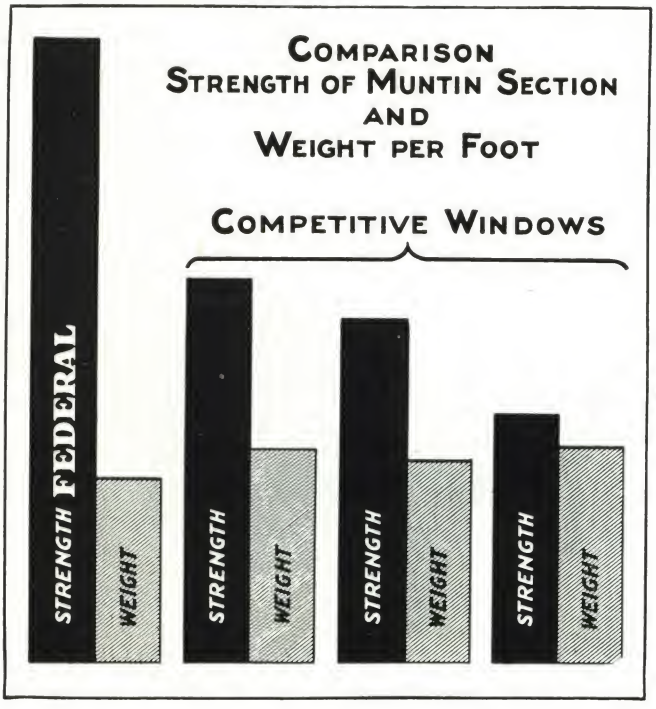
The inability to make a rigid mechanical joint not only increases the difficulty and cost of erection, but what is more, important — makes difficult a properly weathered and easily operating ventilator.

It was not until the development of **electric arc welding** as a manufacturing process that a method of making connections was available which would eliminate the excess weight and the instability inherent in mechanically formed joints. The use of the electric arc is today so general in industry and construction as to require no argument to prove its practicability.

Federal engineers, in designing Federal Electric Arc Welded Products, were enabled to take advantage of this most modern method of joining materials and to design **a window with sections and joints in which the gross section of the member is utilized to the full for strength and stiffness, in which all excess weight is eliminated and in which every joint and connection is absolutely rigid and stable,** a window which it is not possible to rack or distort in handling, shipping and erection.

There is in the minds of some the impression that because something is heavy it must be inherently strong. This impression is, of course, to anyone acquainted with engineering principles, absurd, as it is well recognized that **mere weight does not in itself mean strength,** but that it is the proper distribution of the metal in the section and the proper design of the section itself for the purpose for which it is intended that are the essential factors. It is evident that any metal used in excess of that required to produce the given result can add no useful strength and is to all intents and purposes merely excess weight.

In order to visualize the relation between the weight per foot and the strength of the muntin section used in horizontally pivoted windows as determined by the condition at the joint after fabrication, the chart shown herewith has been prepared. **It will be evident from an examination of this chart that the Federal muntin section, while the lightest section in weight per foot, is also the strongest.** A study of this chart together with an examination of the types of construction used on competitive windows will demonstrate that Federal engineers have been able to utilize material to its full value, and why the claim of superiority of design and construction for Federal products over the design and construction of any competitive window is well founded.



Materials

All sections are open hearth solid steel, hot rolled or cold drawn, of special Federal design.



Distorted Joint, Showing the Remarkable Strength of the Weld



The Muntin Joint Note the Smooth Exterior Surface

Continued on next page

Federal Manufacturing Methods

The raw material is cut to length and the ends formed for the welded connection in one operation. Where members are built up of two or more sections they are **electric spot welded** together while firmly held in jigs to assure accurate dimensions of the built-up members.

Preparatory to electric arc welding the joints, the individual members are assembled on welding tables. These tables consist of rigid heavy structural steel frames with accurately machined surfaces. On these frames are bolted the welding pads with their clamps and guides. The individual members are clamped in the guides with their exterior faces against the welding pads and while thus firmly held in position each connection is **electric arc welded.** This method insures absolute squareness and accuracy of dimension and a product which is to all intent and purpose one solid piece. The design of the welding tables, and the method of assembling and welding on the tables, are protected by United States patents Nos. 1648409 and 1648416.

A comparison of methods used in manufacturing Federal Windows with those used in the manufacture of competitive windows will show several points of superiority in the Federal method. **There are no cutouts or notches in any Federal members** to permit of the joining together of two members at the joint, and **there is no distortion, spreading or stretching of the material in Federal construction,** as is the case in a number of other makes of windows. The use of the electric arc for forming connections fills up all spaces between members and leaves **a smooth, unbroken surface at the Federal connection** as compared to the overlapped surface or butted edges common to connections in competitive windows.

After welding, the products are removed from the welding table and the face of each weld is ground to a smooth surface. All excess material and roughness at the welds on the interior is removed by chipping with an air hammer. This operation not only cleans each weld, but subjects each individual weld to a severe shock test, so that in this operation **every weld made on Federal products is individually tested for strength.**

Ventilators are then fitted and hardware attached, after which the product is again inspected, is painted and is then ready for shipment.

Double Contact Weathering of Window Ventilators

Federal window ventilators are constructed to provide **continuous double contact weathering** around all four sides of the ventilators. All ventilators are accurately fitted at the shop, and since Federal windows are rigid and cannot be distorted in handling, shipment or erection, the window when erected will be in a satisfactory weathering condition.

The shop fitting of Federal horizontally pivoted ventilators, combined with the Federal close pivot construction and the lever action of Federal draw-tight ventilator operators, produces a pivoted window which is both rain and wind tight.

Tests which have been made by reputable engineers in a careful and scientific manner to determine the leakage through ventilators on horizontally pivoted steel windows demonstrate the superiority of Federal construction over that used in competitive windows. Comparing the result of tests on five other windows to the result on Federal, the nearest competitive window had a leakage of 39.5% in excess of Federal, while the maximum leakage was 143.0% of Federal, and the average for the five windows was 105.8% in excess of Federal, or over twice the leakage through the Federal ventilator.



The Weld Produces a Joint as Strong as the Section

Note failure of the section, the weld being intact

No Corrosion of Joints

There are no overlapped surfaces or butt contacts on Federal steel windows, and consequently there are no points at which moisture can enter and set up corrosion. The flush exterior surface of Federal windows, free from all projections and ledges, avoids the collection of dirt and moisture. **There are no open joints.** All surfaces are accessible for painting.

Rust Prevention

As Federal windows are absolutely rigid and there are no open, overlapped or butt joints, and all surfaces are smooth and accessible, it is possible to **hot dip galvanize** Federal windows or to **plate with any protective metal covering** with the assurance that the protective covering will not be injured due to movement between the window members while being handled, shipped or erected.

Federal Close Pivot

The Federal pivot for horizontally pivoted windows projects but ⅝ in. from the window frame. **It consists of two substantial pressed steel leaves joined with a sturdy bronze pin.** The use of a bronze pin prevents rusting and insures at all times a free acting ventilator. The very small projection of this pivot materially lessens the chance of injury during shipment, handling and erecting.

Federal Draw-Tight Push Bars

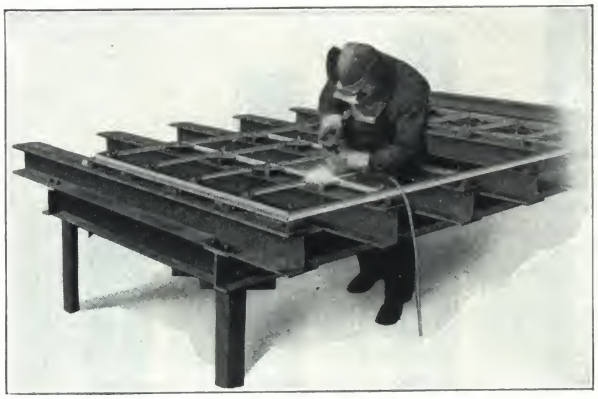
The horizontally pivoted ventilator push bar is attached to the bottom of the ventilator at one side of the center with a **heavy pressed metal hinge,** which gives a universal joint to the bar. When the ventilator is closed the push bar folds back, parallel to the face of the window, against a strike plate which is bolted to the fixed portion of the window at the center. At the side of the ventilator opposite the hinge is a locking clip bolted to the ventilator. The hinge, strike plate and locking clip are so located that when the push bar is in its locking position, the bar presses against the center strike plate, thus drawing the ventilator into tight weathering contact and at the same time locking it against opening.

Federal Commercial and Architectural Projected Window Bronze Friction Guides

As the smooth operation of projected ventilators depends upon the friction guide, the proper design of this feature is of importance. The Federal bronze friction guide is designed to eliminate the scraping action of the ordinary bronze shoe used on competitive windows. A guide angle is provided on each jamb of the ventilator opening, which serves to hold the ventilator in its proper location at any degree of opening. **A bronze yoke, which has a hardened steel ball,** slides on this guide angle. The friction which holds the ventilator in any desired position is obtained by the pressure of a spring in the friction guide forcing the steel ball against the edge of the guide angle. In this way rubbing or scraping of the friction guide against the sides of the ventilator opening is eliminated and a smooth and positive acting ventilator adjustment is obtained.



Double Contact Weathering All Four Sides of the Ventilators



Specially Designed Welding Tables Insure Accurate Dimensions and Absolute Squareness



Pressed Steel Hinge with Brass Pin

Continued on next page

WINDOW INFORMATION

Window Designations

Horizontally Pivoted and Commercial Projected Windows are designated by a series of numbers—these designations being standard in the industry. The first digit is the number of lights in width, the second, the number of lights in height, and the following digits indicate the number of ventilators, the number of panes in each ventilator and the location of each ventilator with reference to the sill of the window. Thus, a window four lights wide and five lights high, with one eight light ventilator located one light up from the sill, will be designated as a 45181. Similarly, a window five lights wide and seven lights high, with two six light ventilators, one located one light up from the sill and the second located four lights up from the sill, will be designated as a 572614. See Plates A1, A2 and B1.

Architectural Projected Windows are designated by numbers which indicate the width and the height of the unit, but do not indicate the arrangement of the ventilators. Thus, an architectural projected window 3 ft. 0 in. in width by 8 ft. 6 in. in height would be designated as 3086. See Plate E1.

Continuous Windows, Operators and *Industrial* and *Airplane Hangar Doors* do not have standard designation.

Graphic designations of window ventilators and of industrial doors, standard in the industry, are shown on the various plates.

Window and Door Dimensions

Windows, except continuous windows, and industrial doors have dimensions which are standard to the industry. The window and door dimensions are the clear opening measurements and are not the overall or out to out dimensions of the unit.

Dimensions for continuous windows are special to each installation.

Prepared Openings

The best practice consists in preparing the openings so that windows may be erected after the walls are up. Clearance must be provided in accordance with the installation details shown on the Plates. Windows are not designed as structural members and are not intended to be subjected to loads resulting from settlement of the building. Window manufacturers do not undertake the preparation of openings as a part of the work of installing windows. See Plate A8.

Glazing and Putty

Glass Sizes for horizontally pivoted and commercial projected windows are two standard sizes—12/18 and 14/20. Sizes of the panes in the ventilators differ from those in the fixed portions of the window. Glass sizes for all panes are shown on Plate A7. Panes for curved heads are of special size and must be cut to fit in the field.

Glass sizes for architectural projected windows are shown on Plate E1.

Glass sizes for continuous windows are special and cannot be determined until after approval of the window design.

Glass sizes for window portions of both industrial and airplane hangar doors are, generally speaking, special and must be cut to meet each individual case.

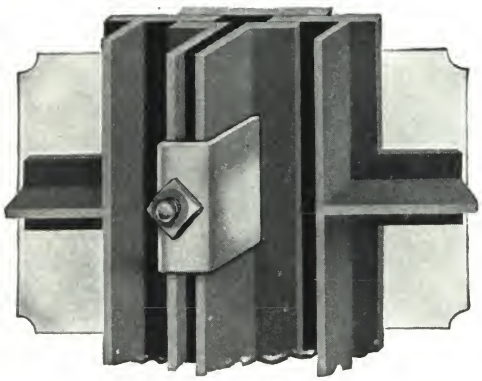
Glazing—Horizontally pivoted and commercial projected windows use copper coated spring wire glazing clips, which are furnished by the window manufacturer, except for underwriters' labeled and glazing angle windows, which have continuous glazing angles bolted to the window members.

Continuous windows use short glazing angles bolted to the window muntins.

Architectural projected windows use continuous glazing angles bolted to the window members, unless specified for spring wire clip glazing. It is not advisable to glaze ventilator panes in architectural projected windows with spring wire glazing clips, as the size of the pane and the weight of the glass makes this method unsafe.

Window portions of doors are glazed with continuous glazing angles in the same manner as underwriters' labeled and glazing angle windows.

Putty—Steel windows must be glazed with litharge or standard glazier's putty. Ordinary commercial putty, as used on wood sash, must never be used in glazing steel windows.



Adjustable Mullion

Standards

Certain types of horizontally pivoted windows are carried in stock at factory and warehouses. These are shown as solid line tinted units on Plate A1-A2. Units shown as solid line but without tinting are shipped from factory only. Listed special types, shown as dotted line, are not carried in stock. Curved head windows shown on Plate A3 are not carried in stock.

Commercial projected windows, standard and listed special types, are shown on Plate B1. They are not carried in stock.

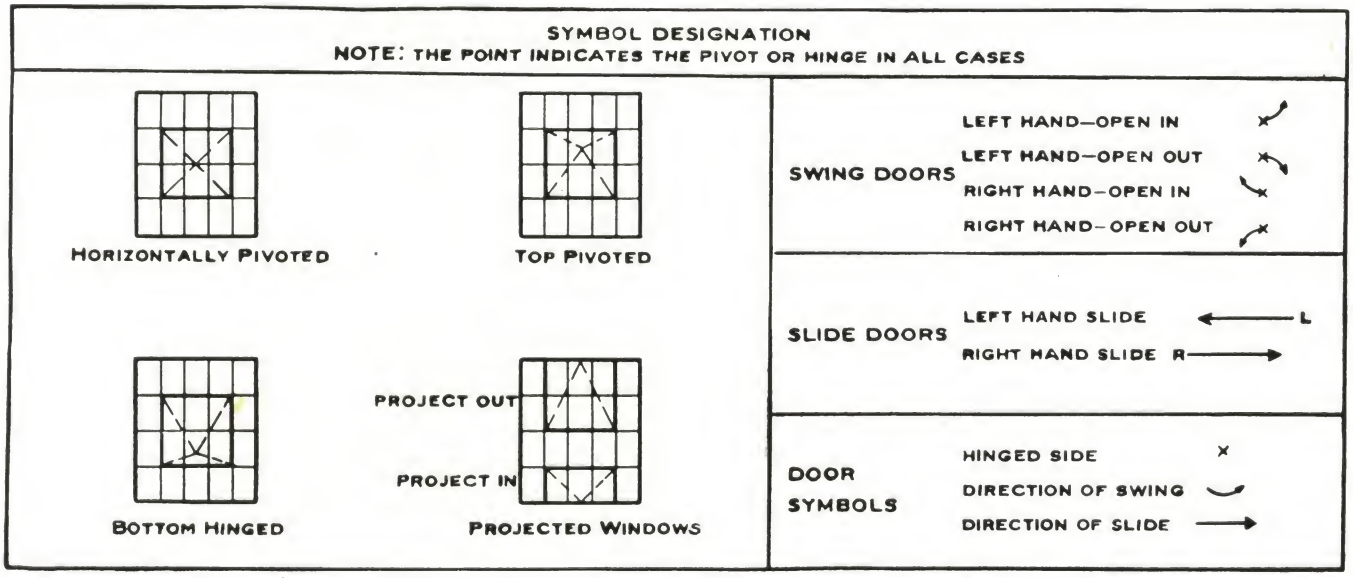
Continuous windows are made to meet the requirements of each individual structure and are not carried in stock.

Architectural projected windows, standard and listed special sizes shown on Plate E1, are not carried in stock.

Industrial doors, standard and listed special sizes shown on Plate F1, are not carried in stock.

Airplane hangar doors are not carried in stock.

Underwriters' Labeled Windows—Horizontally pivoted and commercial projected windows can be furnished with Underwriters' Laboratories, Inc., label, within the limitations for such windows imposed by the laboratories. Continuous windows, architectural projected windows and industrial and airplane hangar doors cannot be furnished with underwriters' label. See Plate A6.



Continued on next page

(A) PIVOTED WINDOWS—Specifications

Note: *Notes are explanatory or advisory only and should not be included in the specifications.*

(A1) Work Included

Note: *List and locate all pivoted windows either in schedules on plans or here to assure accuracy in estimates.*

(A2) General

Pivoted windows shall be Federal electric arc welded windows, manufactured by FEDERAL STEEL SASH COMPANY, Waukesha, Wisconsin, or equivalent, meeting fully this company's standard of quality.

(A3) Shop Drawings

Furnish in *(duplicate) (triplicate)* for approval of the architect, complete shop drawings of all work, showing accurately all details of location, hardware and installation.

(A4) Materials

(A4a) Sections—All sections shall be open hearth solid steel, hot rolled or cold drawn, of special Federal design. Frame and muntin sections shall be 1¼ in. in depth.

(A4b) Vertical Mullions—Vertical mullions shall consist of an exterior plate, two interior angles, cadmium plated U-clips and bolts. For windows 7 lights high and over, mullions shall consist of an exterior plate, two interior channels, clips and bolts.

(A4c) Horizontal Mullions—Horizontal mullions shall be FEDERAL STEEL SASH COMPANY standard.

Note: *See Plate A3.*

Note: *Horizontal mullions should be furnished under structural steel specifications.*

(A5) Construction

(A5a) Fabrication—All joints and connections shall be full electric arc welded.

(A5b) Frames—Frame members shall be continuous from head to sill and jamb to jamb, mitered at corners and electric arc welded.

(A5c) Muntins—Horizontal muntin bars shall be continuous from jamb to jamb. Vertical muntins shall be cut to fit horizontal muntins and frames and electric arc welded thereto.

(A5d) Weathering—Ventilators shall have double contact weathering continuous around all four sides.

(A5e) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide Federal universal adjustable vertical mullions. All mullions shall extend 2 in. into sills for anchorage.

(A5f) Horizontal Mullions—Where two or more windows are placed one above another in the same opening, provide Federal standard horizontal mullions. In masonry provide at least 4-in. bearing at each end and in structural steel openings arrange for proper attachment.

(A5g) Clips—Furnish all necessary clips and bolts for attaching windows to structural steel.

Note: *Include in steel specifications all punching to accommodate clips.*

(A5h) Masonry Anchors—Furnish where called for: masonry anchors and bolts for attachment.

(A6) Hardware

Note: *All hardware on pivoted windows is attached at factory. Specify type required. See illustration Plate A5.*

(A6a) Horizontally Pivoted Ventilators shall be pivoted 2 in. above center line on heavy pressed metal, close knuckle, steel hinges with bronze pins. Hinges shall be bolted and locked through ventilator and frame members.

(A6b) Top Pivoted Ventilators—Pivoted 4 in. down from the head of the ventilator to swing out, shall be furnished where called for on plans. The same pivot shall be used as for horizontally pivoted ventilators.

(A6c) Bottom Hinged Swing In Ventilators—Furnish where called for on plans; bottom hinged ventilators to swing in. Each bottom hinged ventilator shall be provided with two slotted steel stay arms to permit opening to approximately 45°. Two heavy pressed metal butt hinges with bronze pin shall be attached to each ventilator. Leaves shall be electric arc welded to both ventilator and frame, except where windows are hot galvanized or rust proofed, when they shall be bolted. Provide each ventilator with spring catch and pole ring attached at head.

(A6d) Push Bars—Provide notched steel angle push bars so attached to a pressed steel hinge bolted off center to the ventilator bottom rail as to give free universal movement. Provide a pressed steel strike plate bolted to fixed portion of window and pressed steel locking clip on ventilator.

Note: *Use only for manual operation within reach.*

(A6e) Cam Latches, Rollers and Chain—Provide malleable iron cam latches with bronze pin bolted at center of ventilator bottom rail; cadmium plated steel roller, bolted to center of ventilator head; chain fastener *(No. 106) (No. 107)*; and sufficient endless galvanized steel chain for operation.

Note: *Use No. 106 chain fastener (attached to window) where sill is not more than 6 ft. from floor; No. 107 (attached to wall) where sill is over 6 ft. from floor.*

(A6f) Spring Catches—Provide steel spring catches with bronze tongues and pole rings and pressed steel keepers bolted at center of ventilator head and frame. Provide sufficient galvanized steel chain for operation.

Note: *Use where adapted in lieu of push bar or cam latch and roller.*

(A6g) Underwriters Labeled Windows—Where called for on plans furnish windows to Underwriters' Laboratories, Inc., requirements. Each underwriters' window shall have attached Underwriters' Laboratories label.

Note: *See (A12) page 10.*

(A7) Mechanical Operators

Note: *Specifications for mechanical operators are given on Federal Page 19. Where specified, provision is made at shop for attaching operator arm to ventilator.*

(A8) Painting

(A8a) All windows shall be given one dip-coat of gray mineral paint by the manufacturer before shipment.

Note: *Provide for the following in the painting specification: One field coat of paint should be applied after erection before glazing. The application of one or more additional coats should be deferred until at least three weeks after glazing to allow putty to set.*

(A8b) After erection and before glazing, all windows shall be given one coat of paint in the field. Paint shall be *(specify)*.

Note: *Where windows are erected by* FEDERAL STEEL SASH COMPANY, *it will do field painting where specified. (See Page 1.)*

(A9) Hot Galvanizing or Rust Proofing

Note: *See page 3.*

All windows shall be *(hot dip galvanized) (cadmium plated) (other rust proof coated)* after fabrication.

Note: *Do not paint for at least one year.*

(A10) Erection

Note: *Include in masonry specifications that all masonry openings shall be accurately prepared in accordance with Federal installation details. (See Page 4.)*

Note: *Include in masonry specifications that all mortar grouting, mastic, pointing, etc., shall be done by the masonry contractor after windows have been erected.*

(A10a) All windows shall be erected by FEDERAL STEEL SASH COMPANY in openings prepared by others.

Note: *See Page 1.*

(A10b) All windows shall be set plumb and true in perfect alignment and securely anchored before glazing.

(A10c) Apply all unattached hardware in accordance with the manufacturer's directions.

(A11) Glass and Glazing

Note: *Include the following in the Glazing Specifications.*

Note: *See Page 4.*

(A11a) Glass—Glass shall be *(¼ in. rough wire) (¼ in. factory ribbed) (⅛ in. factory ribbed) (double strength grade A) (double strength grade B).*

(A11b) Putty—Putty shall be high grade steel window putty.

Note: *See Page 4.*

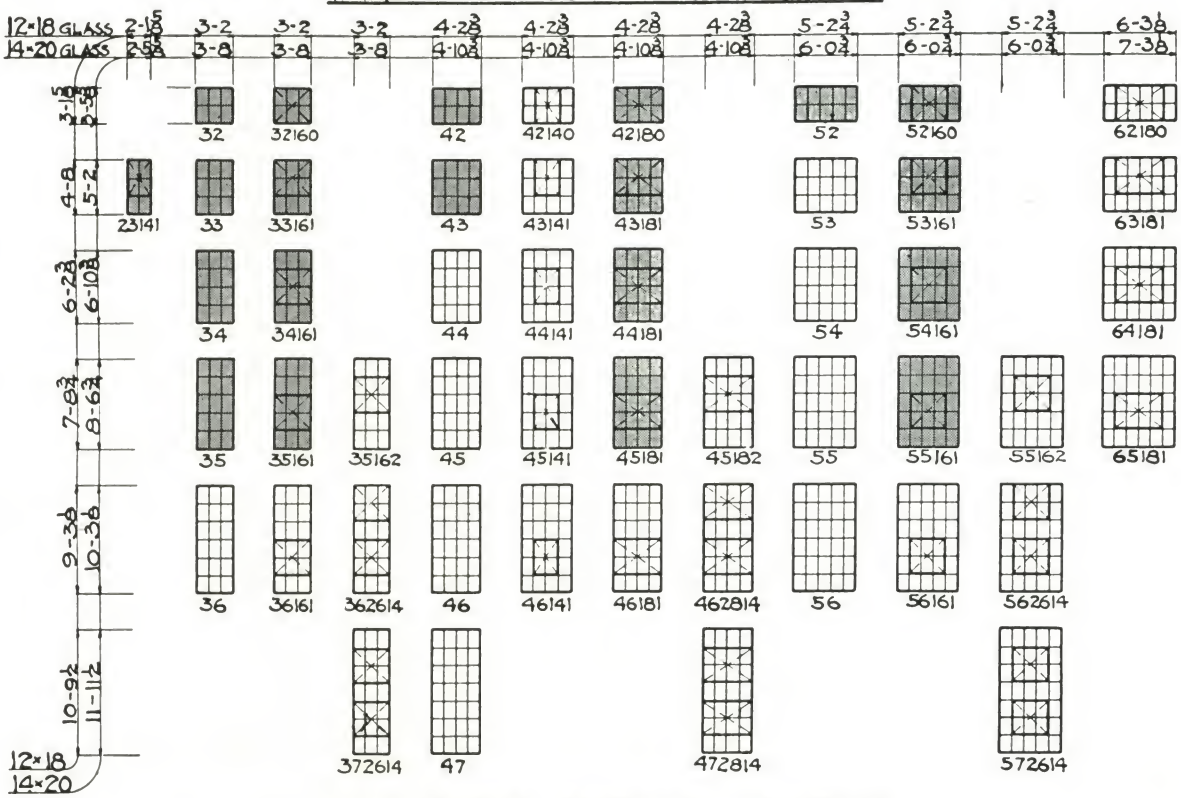
(A11c) Glazing—All horizontally pivoted *(top pivoted or bottom hinged)* windows shall be glazed from the inside. Bed all glass in putty and secure with steel spring wire glazing clips furnished by window manufacturer. Face putty shall be applied in a neat, smooth manner.

Note: *Do not paint until putty has set—see Plate A8.*

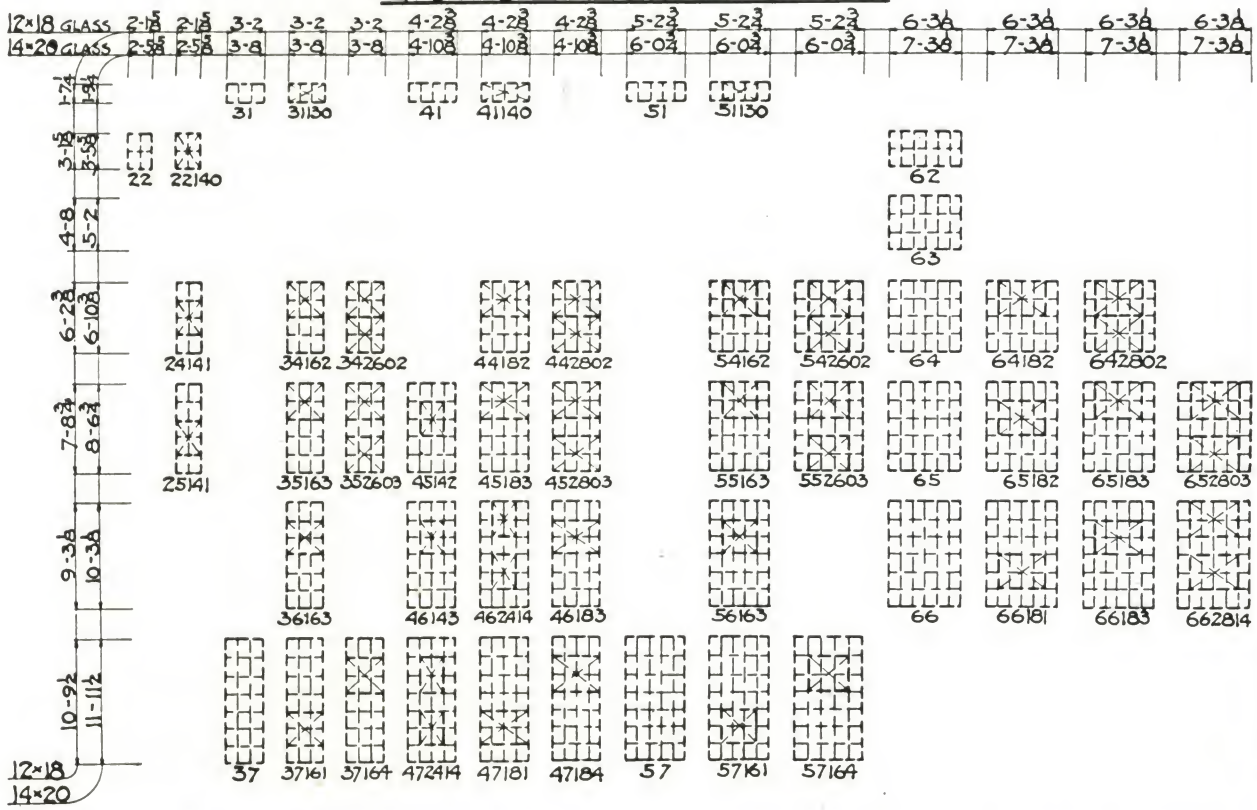
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STANDARD AND STOCK TYPES

WAREHOUSE STOCK UNITS ARE TINTED

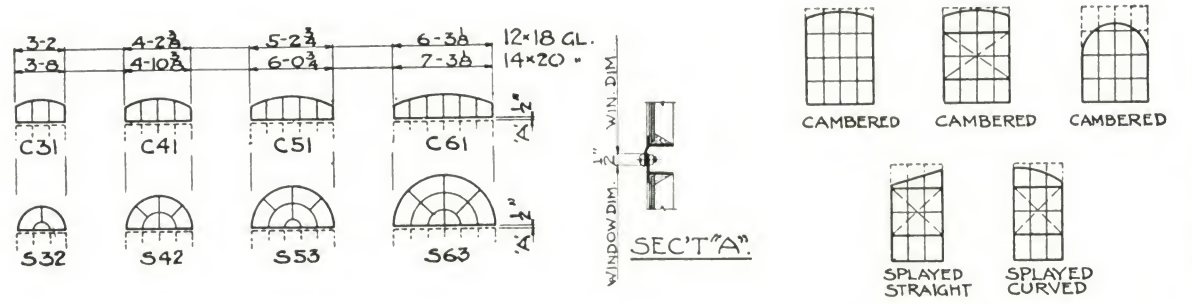


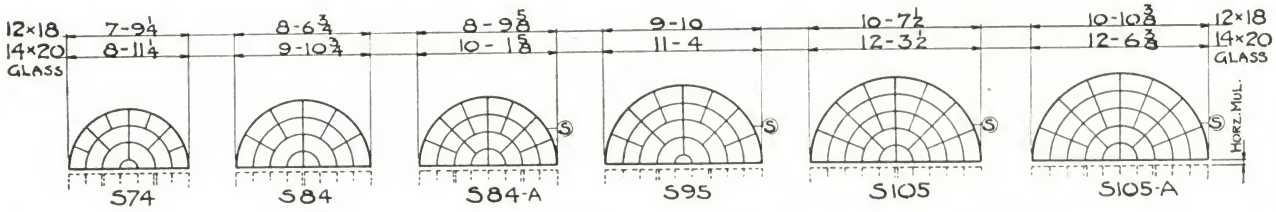
LISTED SPECIAL TYPES



FEDERAL *September 1930*	HORIZONTALLY PIVOTED WINDOWS *Types and Sizes*	PLATE NO. A1—A2

Continued on next page





CURVED HEADS

Ⓢ UNITS MARKED THUS ARE SPECIAL

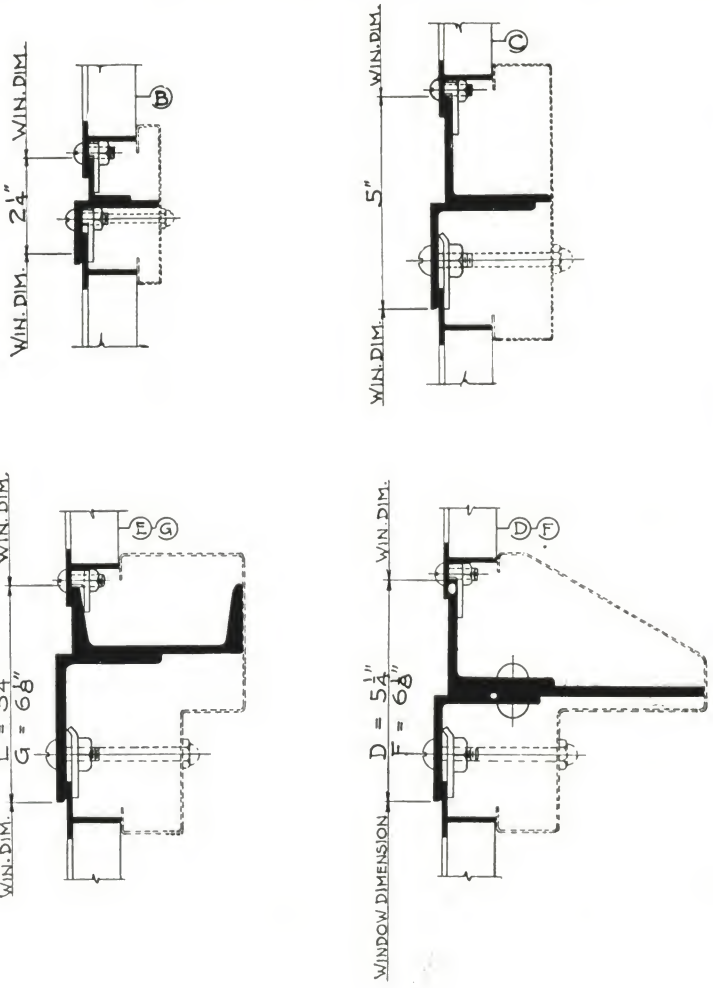


TABLE OF HORIZONTAL MULLIONS				
12×18	GLASS SIZE			14×20
TOTAL Nº LIGHTS WIDE	VERTICAL DISTANCE BETWEEN UNIT DIMENSIONS	SIZE OF MATERIAL		TOTAL Nº LIGHTS WIDE
3 TO 6 INCL.	24"	1-L 2×1 1/2×3/16 1-L 1×1×1/8	B	3 TO 6 INCL.
3 TO 9 INCL.	5"	2-LS 2 1/2×2 1/2×3/16	C	3 TO 8 INCL.
10 TO 13 INCL.	5 1/4"	2-LS 2 1/2×2 1/2×3/16 1-PL 6×1/4	D	9 TO 11 INCL.
10 TO 13 INCL.	5 1/4"	1-4" CHANNEL 1-L 3 1/2×2 1/2×1/4	E	9 TO 11 INCL.
14 TO 18 INCL.	6 7/8"	2-LS 3×3×5/16 1-PL 6×1/4	F	12 TO 16 INCL.
14 TO 18 INCL.	6 7/8"	1-6" CHANNEL 1-L 4×3×5/16	G	12 TO 16 INCL.

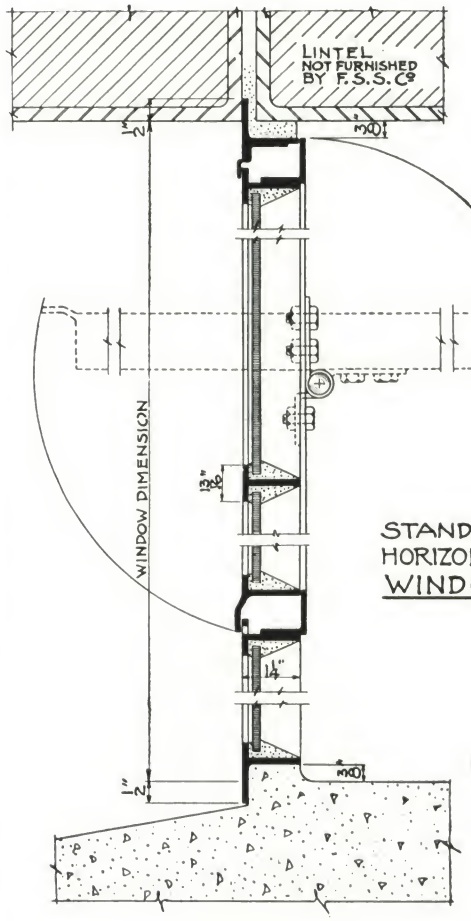
NOTE:
DOTTED LINES INDICATE METHOD OF FITTING COVER PLATES TO HORIZONTAL MULLIONS

FEDERAL *September 1930*

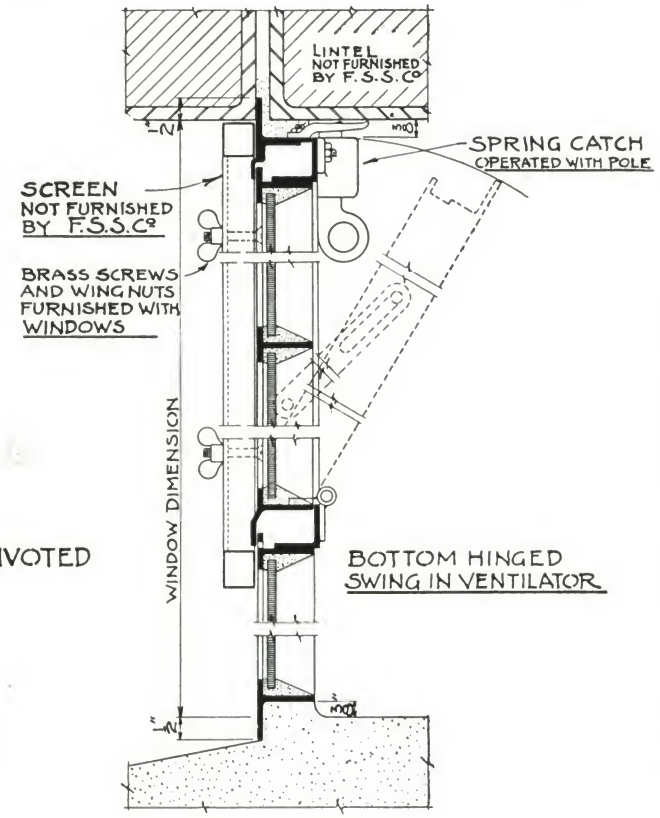
HORIZONTALLY PIVOTED WINDOWS
Curved Heads—Horizontal Mullions

PLATE NO. A3

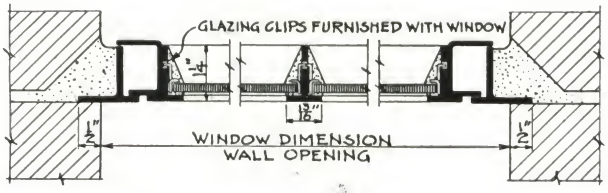
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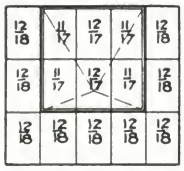


STANDARD
HORIZONTALLY PIVOTED
WINDOWS

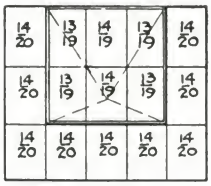


BOTTOM HINGED
SWING IN VENTILATOR



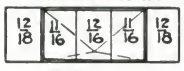


12×18 GLASS

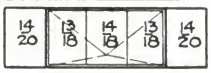


14×20 GLASS

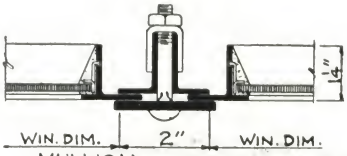
BOTTOM HINGED SWING IN VENTILATORS
SAME GLASS SIZES FOR HORIZONTALLY PIVOTED



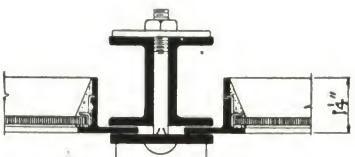
12×18 GLASS



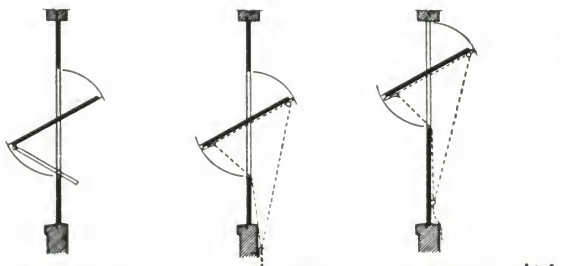
14×20 GLASS



MULLION 6-LIGHT HIGH OR LESS
ADJUSTABLE 13/16" TO 2 1/8"



MULLION - 7 AND 8 LIGHT HIGH
ADJUSTABLE 13/16" TO 2 1/8"



PUSH BAR
FOR VENTILATORS
WITHIN REACH

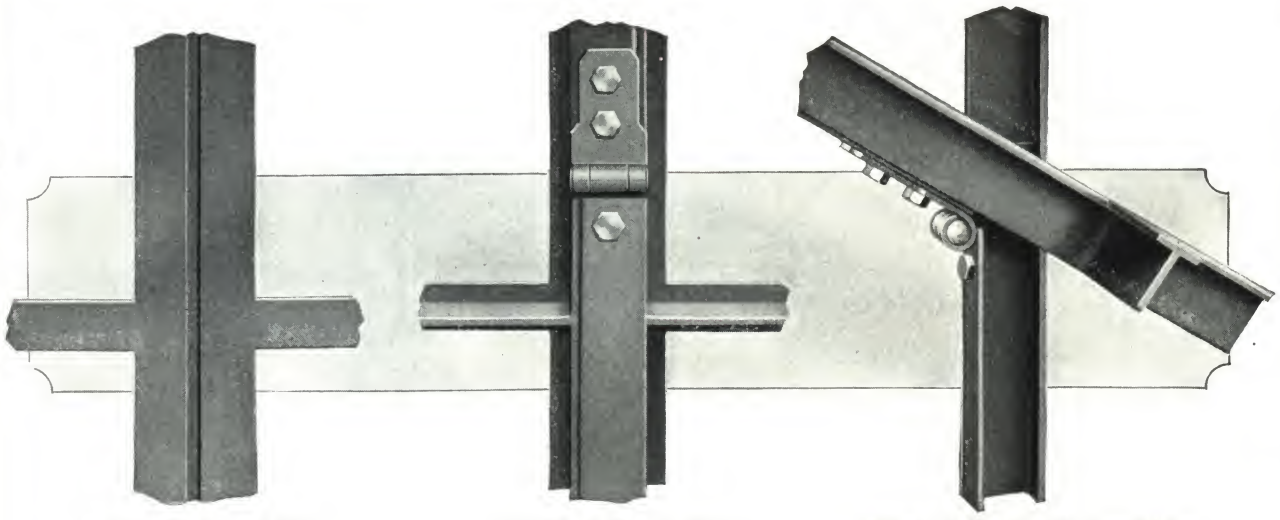
CHAIN FASTENER Nº107
SILL 6'-FT OR MORE
FROM FLOOR

CHAIN FASTENER Nº106
SILL NOT MORE THAN
6'-FT FROM FLOOR

CAM HANDLE - CHAIN & ROLLER

FEDERAL *September 1930*	HORIZONTALLY PIVOTED WINDOWS *Typical Details*	PLATE NO. A4

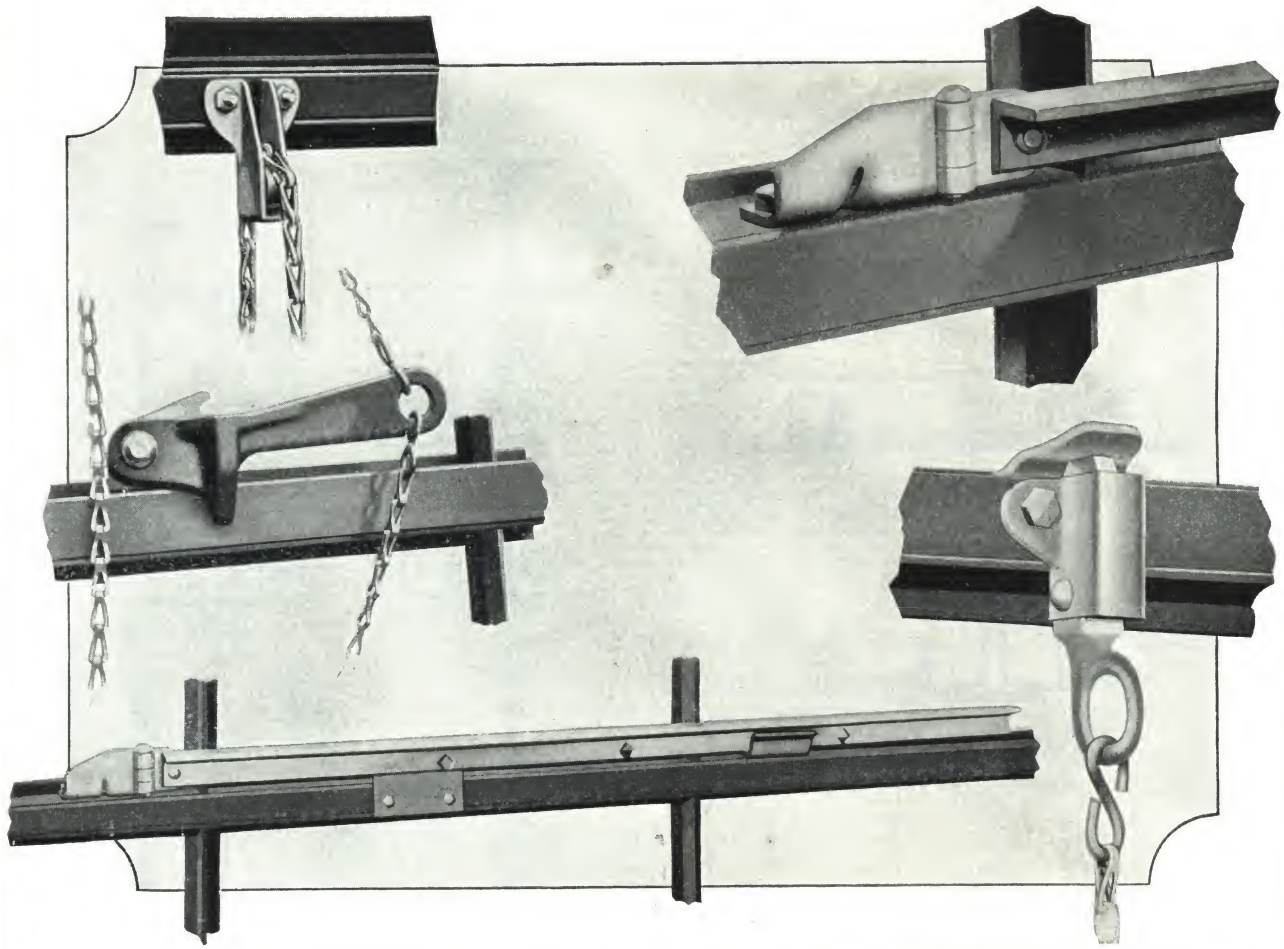
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Exterior View of Pivot

Interior View of Pivot

View of Pivot with Ventilator Partly Open



Cam latch at ventilator sill and chain roller at head for manual operation of ventilators, the sills of which are not within reach from the floor.

Spring catch is used where specified at top of ventilator.

Standard Federal Push Bar for manual operation of ventilators, the sills of which are within reach from the floor. See enlarged detail of hinge and pin attachment forming universal joint. The Federal Push Bar has a lever draw tight action over a center plate.

FEDERAL *September 1930*	HORIZONTALLY PIVOTED WINDOWS *Hardware*	PLATE NO. A5

Continued on next page

(A12) UNDERWRITERS' LABELED WINDOWS

Note: *The following requirements are those established by the Underwriters' Laboratories, Inc. effecting solid steel horizontally pivoted windows.*

(A12a) Single Units

Single units cannot exceed 7x12 ft. in size, either dimension being height or width.

(A12b) Multiple Units

Window openings over 7 ft. wide but not exceeding 12 ft. high can be filled by using permissible units combined with underwriters' mullions.

Window openings over 12 ft. in height must have horizontal mullions approved by the Underwriters' Laboratories, Inc.

(A12c) Glass and Glazing

Single panes of glass cannot exceed 300 sq. in. in area. All glass must be retained by steel glazing angles.

(A12d) Ventilators

There is no restriction on the number or location of ventilators in a single unit or in a combination of units.

(A12e) Hardware

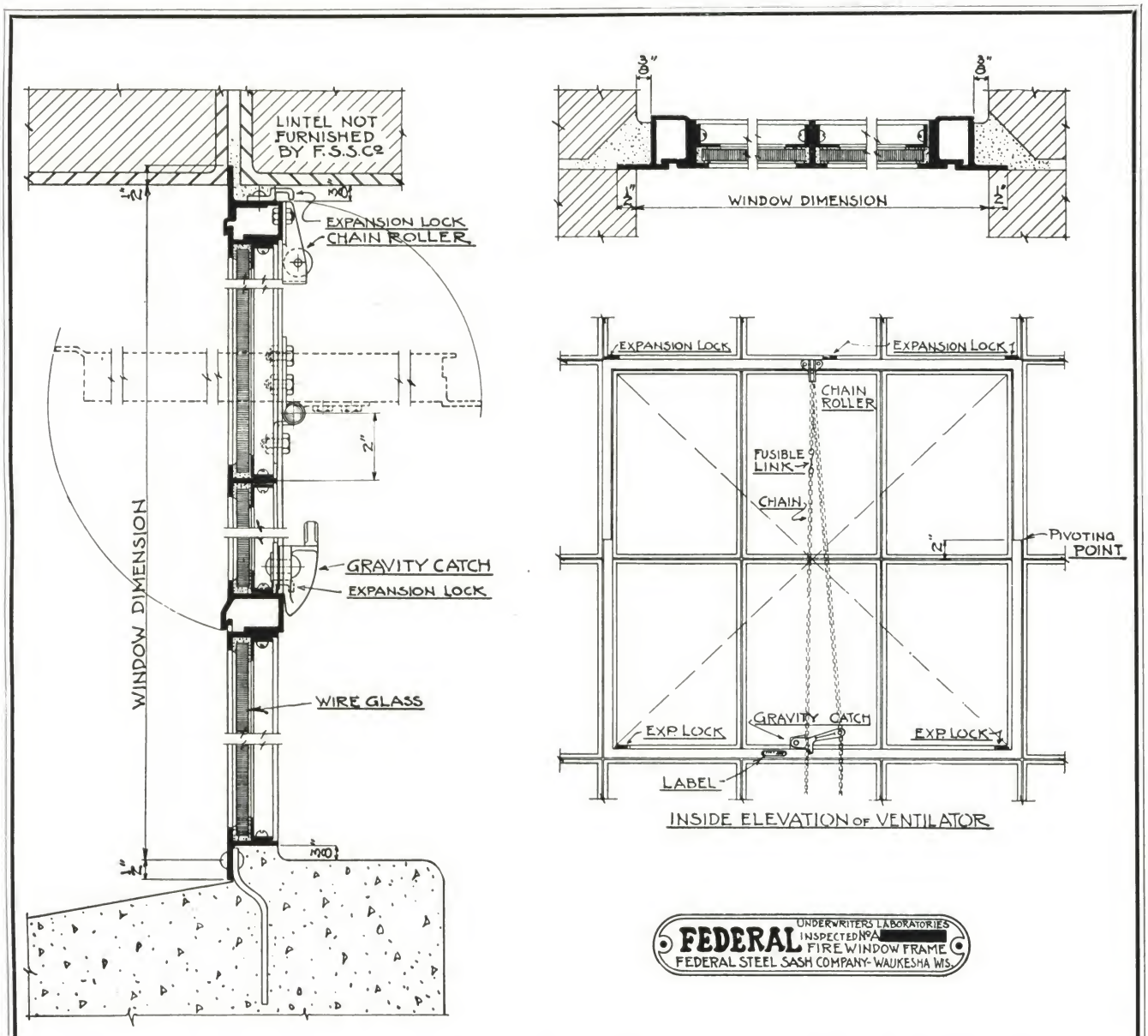
Gravity lock and chain rollers are customarily required; however, push bar operators may be used where local building ordinances permit.

(A12f) Labels

Each unit must be provided with manufacturer's name plate and Underwriters' Laboratories, Inc. label.

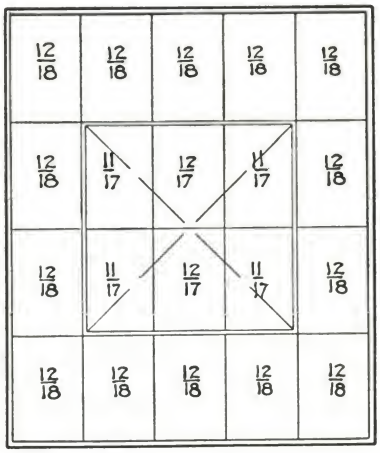
(A12g) Specifications

All underwriters' horizontally pivoted windows shall fulfill all requirements of the Underwriters' Laboratories, Inc. and shall be provided with underwriters' labels.

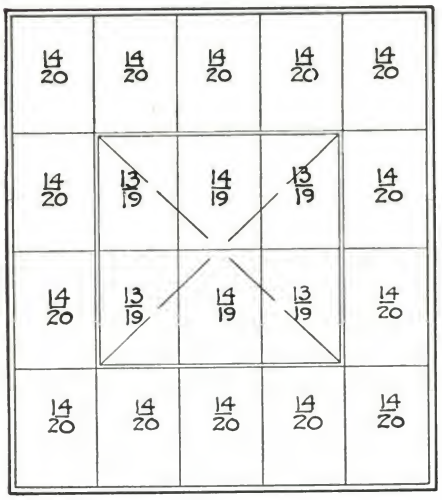


FEDERAL *September 1930*	HORIZONTALLY PIVOTED WINDOWS *To Fulfill Underwriters' Requirements*	PLATE NO. A6

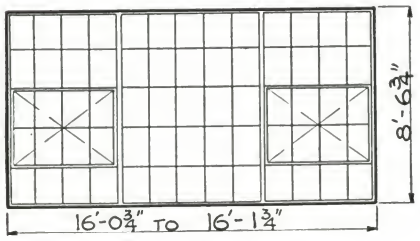
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54161 - 12×18 GLASS



54161 - 14×20 GLASS



COMPUTING WALL OPENING
1-UNIT 45181 - 14/20 = 4-10⅜
1-MULLION BAR = 2 (1⅝ TO 2⅛)
1-UNIT 55 - 14/20 = 6-0¾
1-MULLION BAR = 2 (1⅝ TO 2⅛)
1-UNIT 45181 14/20 = 4-10⅜
TOTAL 16-1½ (16-0¾ TO 16-1¾)

TABLE OF SYMMETRICAL COMBINATIONS

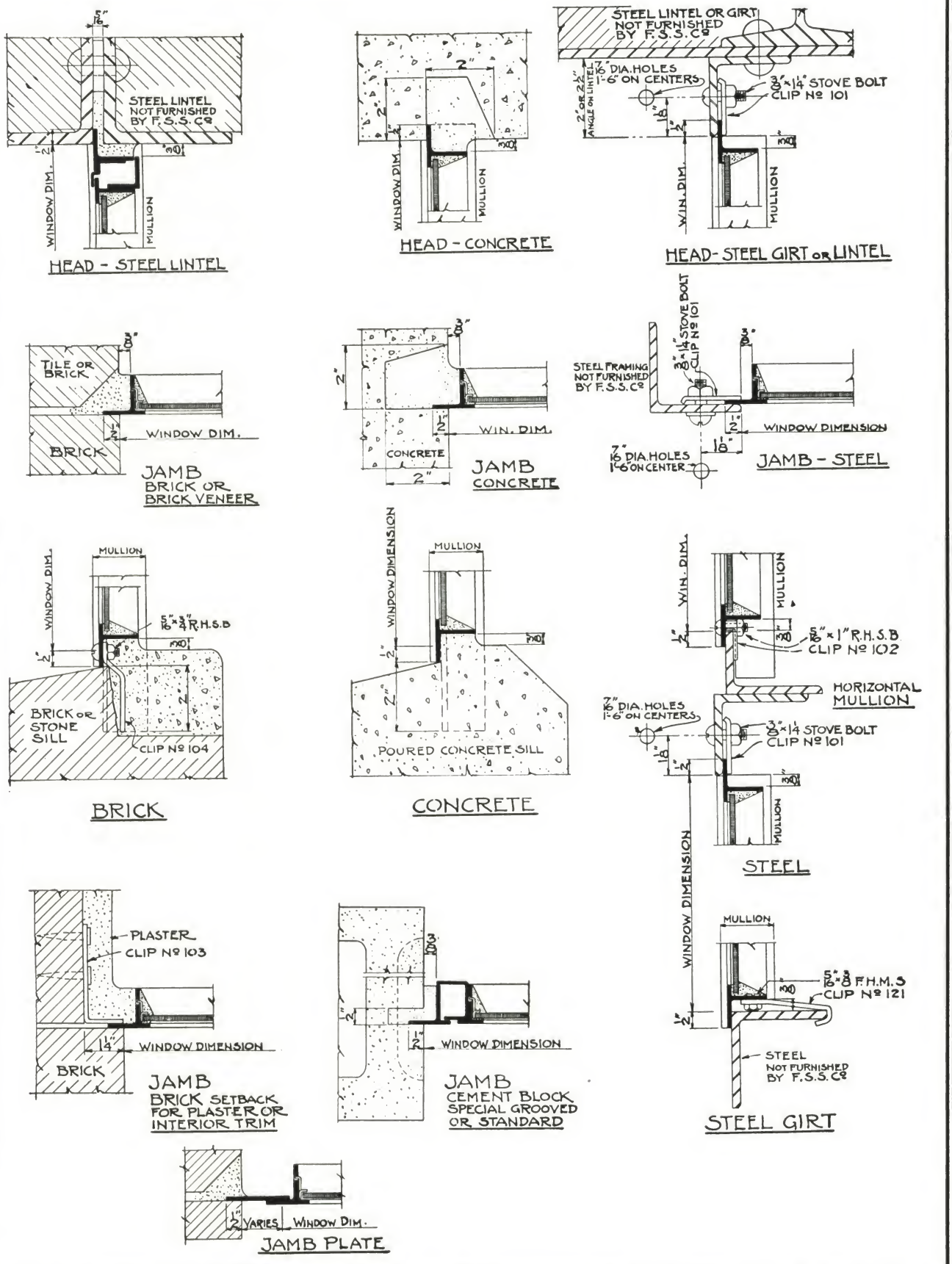
12×18 Height of Opening	Lights High	14×20 Height of Opening	Number of Lights in Width of Opening	Number of Units To Fill Opening	Number of Lights in Each Unit and Number Units to Fill Opening
1'-7¼"	1	1'-9¼"			
3'-1⅝"	2	3'-5⅝"			
4'-8"	3	5'-2"			
6'-2⅜"	4	6'-10⅜"			
7'-8¾"	5	8'-6¾"			
9'-3⅛"	6	10'-3⅛"			
10'-9½"	7	11'-11½"			
Width of Opening					
12×18	14×20				
2'-1⅝"	2'-5⅝"		2	1	2
3'-2"	3'-8"		3	1	3
4'-2⅜"	4'-10⅜"		4	1	4
4'-5¼"	5'-1¼"		4	2	2, 2
5'-2¾"	6'-0¾"		5	1	5
6'-3⅛"	7'-3⅛"		6	1	6
6'-6"	7'-6"		6	2	3, 3
7'-6⅜"	8'-8⅜"		7	2	4, 3
8'-6¾"	9'-10¾"		8	2	4, 4
9'-10"	11'-4"		9	3	3, 3, 3
10'-7½"	12'-3½"		10	2	5, 5
10'-10⅜"	12'-6⅜"		10	3	3, 4, 3
11'-10¾"	13'-8¾"		11	3	3, 5, 3
11'-10¾"	13'-8¾"		11	3	4, 3, 4
12'-8¼"	14'-8¼"		12	2	6, 6
12'-11⅛"	14'-11⅛"		12	3	4, 4, 4
13'-2"	15'-2"		12	4	3, 3, 3, 3
13'-11½"	16'-1½"		13	3	4, 5, 4
13'-11½"	16'-1½"		13	3	5, 3, 5
14'-11⅞"	17'-3⅞"		14	3	4, 6, 4
14'-11⅞"	17'-3⅞"		14	3	5, 4, 5
15'-2¾"	17'-6¾"		14	4	3, 4, 4, 3
16'-0¼"	18'-6¼"		15	3	5, 5, 5
16'-0¼"	18'-6¼"		15	3	6, 3, 6
16'-6"	19'-0"		15	5	3, 3, 3, 3, 3
17'-0⅝"	19'-8⅝"		16	3	5, 6, 5
17'-0⅝"	19'-8⅝"		16	3	6, 4, 6
17'-3½"	19'-11½"		16	4	4, 4, 4, 4
17'-3½"	19'-11½"		16	4	3, 5, 5, 3
17'-6⅜"	20'-2⅜"		16	5	3, 3, 4, 3, 3
18'-1"	20'-11"		17	3	6, 5, 6
18'-6¾"	21'-4¾"		17	5	3, 4, 3, 4, 3
19'-1⅜"	22'-1⅜"		18	3	6, 6, 6
19'-4¼"	22'-4¼"		18	4	3, 6, 6, 3
19'-4¼"	22'-4¼"		18	4	4, 5, 5, 4
19'-7⅛"	22'-7⅛"		18	5	3, 4, 4, 4, 3
20'-7½"	23'-9½"		19	5	3, 5, 3, 5, 3
21'-5"	24'-9"		20	4	5, 5, 5, 5
21'-5"	24'-9"		20	4	4, 6, 6, 4
21'-7⅞"	24'-11⅞"		20	5	4, 4, 4, 4, 4
21'-10¾"	25'-2¾"		20	6	3, 3, 4, 4, 3, 3

FEDERAL *September 1930*

HORIZONTALLY PIVOTED WINDOWS
Symmetrical Combinations

PLATE NO. A7

Continued on next page



FEDERAL *September 1930*	**HORIZONTALLY PIVOTED WINDOWS** *Installation Details—Prepared Openings*	PLATE NO. **A8**

Continued on next page

(B) COMMERCIAL PROJECTED WINDOWS—Specifications

Note: Notes are explanatory or advisory only and should not be included in the specifications.

(B1) Work Included

Note: List and locate all commercial projected windows either in schedules on plans or here to assure accuracy in estimates.

(B2) General

Commercial projected windows shall be Federal electric arc welded windows, manufactured by FEDERAL STEEL SASH COMPANY, Waukesha, Wisconsin, or equivalent, meeting fully this company's standard of quality.

(B3) Shop Drawings

Furnish in *(duplicate) (triplicate)* for approval of the architect, complete shop drawings of all work, showing accurately all details of location, hardware and installation.

(B4) Materials

(B4a) Sections—All sections shall be open hearth solid steel, hot rolled or cold drawn, of special Federal design. Frame and muntin sections shall be 1¼ in. in depth.

(B4b) Vertical Mullions—Vertical mullions shall consist of an exterior plate, two interior angles, cadmium plated U-clips and bolts. For windows 7 lights high and over, mullions shall consist of an exterior plate, two interior channels, clips and bolts.

(B4c) Horizontal Mullions—Horizontal mullions shall be FEDERAL STEEL SASH COMPANY standard.

Note: See Plate A3.

Note: Horizontal mullions should be furnished under structural steel specifications.

(B4d) Mullion Covers—Mullion covers shall be of pressed steel.

(B5) Construction

(B5a) Fabrication—All joints and connections shall be full electric arc welded.

(B5b) Frames—Frame members shall be continuous from head to sill and jamb to jamb, mitered at corners and electric arc welded.

(B5c) Muntins—Horizontal muntin bars shall be continuous from jamb to jamb. Vertical muntins shall be cut to fit horizontal muntins and frames and electric arc welded thereto.

(B5d) Weathering—Ventilators shall have double contact weathering continuous around all four sides.

(B5e) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide Federal universal adjustable vertical mullions. All mullions shall extend 2 in. into sills for anchorage.

(B5f) Horizontal Mullions—Where two or more windows are placed one above another in the same opening, provide Federal standard horizontal mullions. In masonry provide at least 4-in. bearing at each end and in structural steel openings arrange for proper attachment.

(B5g) Mullion Covers—Provide mullion covers for *(vertical) (horizontal)* mullions where called for on plans.

(B5h) Clips—Furnish all necessary clips and bolts for attaching windows to structural steel.

Note: Include in steel specifications all punching to accommodate clips.

(B5i) Masonry Anchors—Furnish where called for: masonry anchors and bolts for attachment.

(B6) Operation and Hardware

(B6a) Ventilator Operation—Ventilators shall swing out from the sill and down from the head or vice versa, as indicated on the plans.

(B6b) Stay Arms and Friction Guides—Each ventilator shall be balanced on two supporting steel arms with ends pivoted on both ventilator and frame.

Friction guides shall be single point contact with spring actuated bronze swiveling yoke carrying a hardened steel contact ball operating on a steel guide angle.

(B6c) Hardware

Note: Malleable iron hardware is attached at factory. Bronze hardware is shipped separate.

(1) ***For Swing-out Ventilators***—Provide *(malleable iron) (bronze)* pole ring at head; pressed steel bracket; and *(malleable iron) (bronze)* cam handle.

(2) ***For Swing-in Ventilators***—Provide *(malleable iron) (bronze)* spring latch and keeper at ventilator head.

(B6d) Shade Brackets

Note: All shades must be located at least 2 in. from the inside face of window to clear hardware. Shades cannot be satisfactorily installed where ventilators project in from the head.

Provide at top window jamb sections shade bracket clips to receive shade brackets furnished and applied by others after windows have been erected.

Note: Where windows are erected by FEDERAL STEEL SASH COMPANY, *it will attach shade bracket clips.*

(B7) Painting

(B7a) All windows shall be given one dip-coat of gray mineral paint by the manufacturer before shipment.

Note: Provide for the following in the painting specification: One field coat of paint should be applied after erection and before glazing. The application of one or more additional coats should be deferred until at least three weeks after glazing to allow putty to set.

(B7b) After erection and before glazing, all windows shall be given one coat of paint in the field. Paint shall be *(specify)*.

Note: Where windows are erected by FEDERAL STEEL SASH COMPANY, *it will do field painting where specified.* *(See Page 1.)*

(B8) Hot Galvanizing or Rust Proofing

Note: See Page 3.

All windows shall be *(hot dip galvanized) (cadmium plated) (other rust proof coated)* after fabrication.

Note: Do not paint for at least one year.

(B9) Erection

Note: Include in masonry specifications that all masonry openings shall be accurately prepared in accordance with Federal installation details. *(See Page 4.)*

Note: Include in masonry specifications that all mortar grouting, mastic, pointing, etc., shall be done by the masonry contractor after windows have been erected.

(B9a) All windows shall be erected by FEDERAL STEEL SASH COMPANY in openings prepared by others.

Note: See Page 1.

(B9b) All windows shall be set plumb and true in perfect alignment and securely anchored before glazing.

(B9c) Apply all unattached hardware in accordance with the manufacturer's directions.

(B10) Glass and Glazing

Note: Include the following in the Glazing Specification.

Note: See Page 4.

(B10a) Glass—Glass shall be *(¼ in. rough wire) (¼ in. factory ribbed) (⅛ in. factory ribbed) (double strength grade A) (double strength grade B).*

(B10b) Putty—Putty shall be high grade steel window putty.

Note: See Page 4.

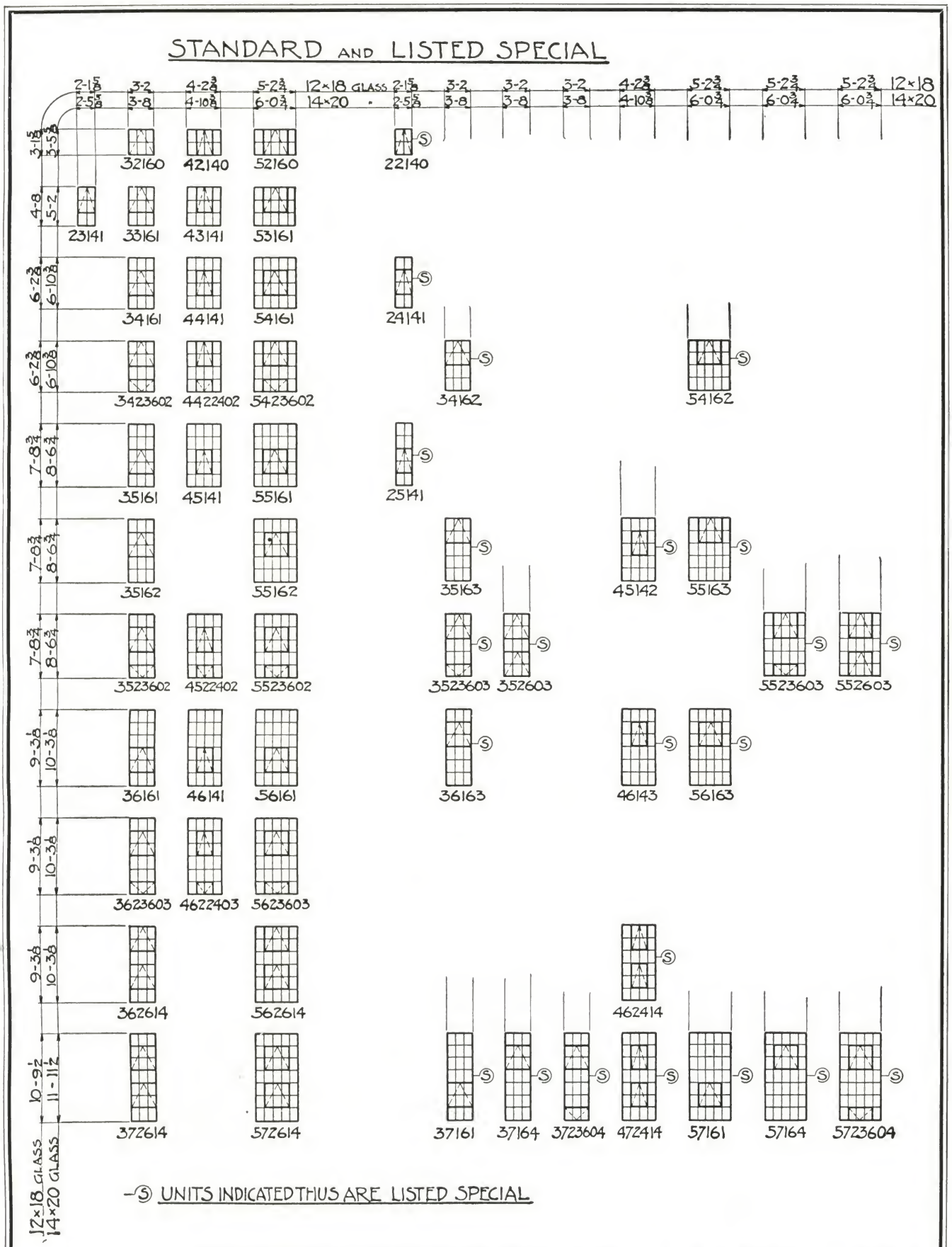
(B10c) Glazing—All commercial projected windows shall be glazed from the inside. Bed all glass in putty and secure with steel spring wire glazing clips furnished by window manufacturer. Face putty shall be applied in a neat, smooth manner.

Note: Do not paint until putty has set—see (A8).

(B11) Underwriters' Labeled Windows

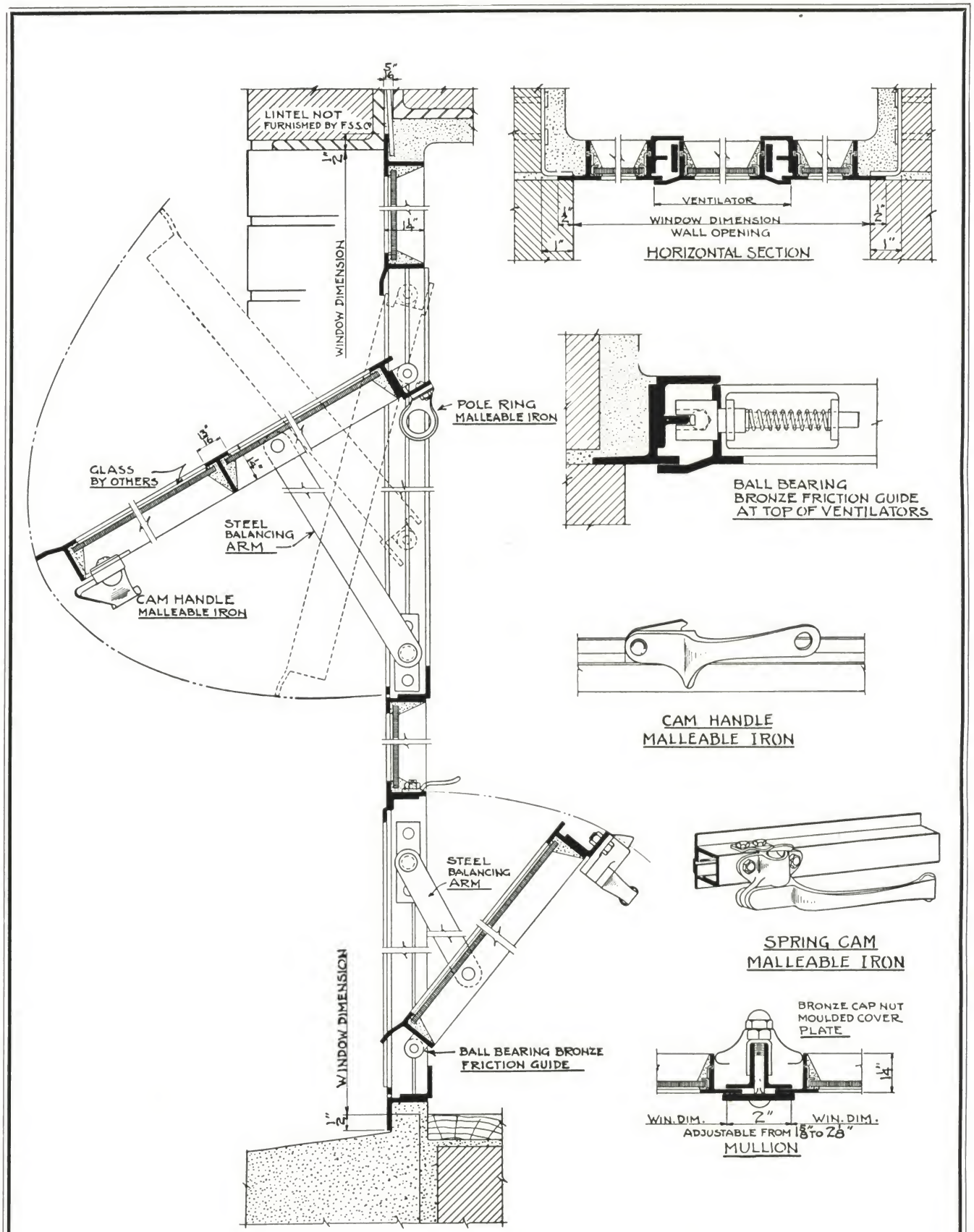
Note: Commercial projected windows fulfilling Underwriters' Laboratories, Inc., requirements can be furnished, provided all ventilators swing out from the sill and down from the head. The Laboratories will not label a ventilator which swings in from the head and up from the sill. Requirements and specifications for Underwriters' Labeled commercial projected windows are given on Page 11 for pivoted windows.

Continued on next page



FEDERAL *September 1930*	COMMERCIAL PROJECTED WINDOWS *Types and Sizes*	PLATE NO. B1

Continued on next page



FEDERAL *September 1930*	COMMERCIAL PROJECTED WINDOWS *Typical Details*	PLATE NO. B2

Continued on next page

(C) CONTINUOUS TOP HUNG WINDOWS—Specifications

Note: *Notes are explanatory or advisory only and should not be included in the specifications.*
Note: *Structural steel girts, at heads and sills are not furnished by the window manufacturer. These should be provided for under the Structural Steel Specifications. All punching for window butts or clips should be done in the field by the window erector to avoid inaccuracies usually attendant when the punching is done by the structural steel fabricator. See (C10c.)*
Note: *Sheet metal flashings at heads, sills and ends of runs are not furnished by the window manufacturer. These should be provided for under the Roofing and Sheet Metal Specifications.*

(C1) Work Included

Note: *Locate and show cross sections of all continuous top hung windows on plans and specify whether swing or stationary.*

(C2) General

Continuous top hung windows shall be Federal electric arc welded windows, manufactured by FEDERAL STEEL SASH COMPANY, Waukesha, Wisconsin, or equivalent meeting fully this company's standard of quality.

Note: *Continuous windows are generally used in monitor and saw-tooth roof construction, but sometimes in side wall construction. Continuous windows should not be set on a slope exceeding 30° from the vertical. They provide an easily and rapidly operated continuous window opening.*
Note: *Windows should not exceed 6 ft. in height. Difficulties in handling, shipping, erecting and glazing make heights in excess of 6 ft. undesirable.*
Note: *Panels should not exceed 16 ft. in length.*

(C3) Shop Drawings

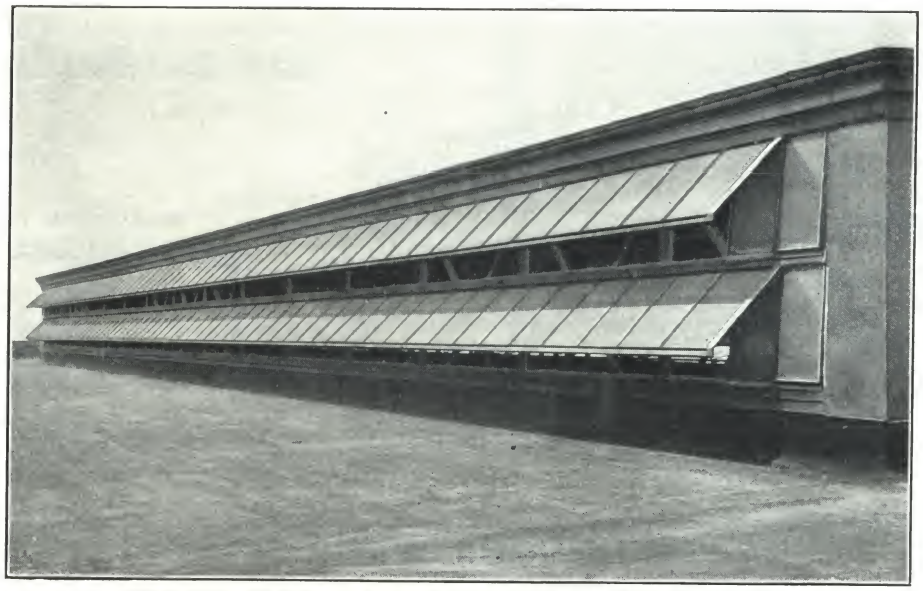
Furnish in *(duplicate) (triplicate)* for approval of architect, complete shop drawings of all work, showing accurately all dimensions and details of location, installation, operator attachment, hardware and glass sizes.

(C4) Material

(C4a) Sections—All sections shall be open hearth solid steel, hot rolled or cold drawn, of special Federal design. Panel head and end members shall be angles. Muntins shall be 1¼ x ⅝ tees. Sills shall be heavy channel sections equipped with glass stop.

(C5) Construction

(C5a) Fabrication—All joints and connections shall be full electric arc welded.
(C5b) Window Panels—Panels shall be joined end to end by bolting end angles back to back.
(C5c) Muntins—Muntins shall be spaced 2 ft. 0 in. on center.
(C5d) Expansion Joints—Provide expansion joints where necessary to compensate for expansion and contraction.
(C5e) Storm Panels—Where called for on plans, provide storm panels. Storm panels shall be secured to head and sill with steel clips and shall underlap the swing section and shall be provided at the sill with a continuous drip set over the sill flashing.



Top Hung Windows, Sewage Disposal Plant, Milwaukee, Wis.

(C6) Hardware

Note: *Fittings for attaching operators to top hung swing windows are furnished by the window manufacturer and shipped with operator equipment.*
(C6a) Butts and Clips—All swing windows shall be hinged on heavy malleable iron butts with bronze pins spaced 4 ft. on centers. Butts shall be bolted to window head and the building girts.
Fixed windows shall be attached to building with heavy angle clips at head and with suitable straps at sill.

(C7) Mechanical Operators

Note: *Specifications for mechanical operators are given on Page 19. Where specified provision is made on swing windows for operator attachment.*

(C8) Painting

(C8a) All windows shall be given one coat of gray mineral paint by the manufacturer before shipment.
Note: *Provide for the following in the Painting Specifications: One field coat of paint shall be applied after erection but before glazing. The application of one or more additional coats should be deferred until at least three weeks after glazing to allow putty to set.*
(C8b) After erection and before glazing, all windows shall be given one coat of paint in the field. Paint shall be *(specify)*.
Note: *Where windows are erected by* FEDERAL STEEL SASH COMPANY, *it will do field painting where specified. (See Page 1.)*

(C9) Hot Galvanizing or Rust Proofing

Note: *See Page 3.*
All windows shall be *(hot-dip galvanized), (cadmium plated) (other rust proof coated)*, after fabrication.
Note: *Do not paint for at least one year.*

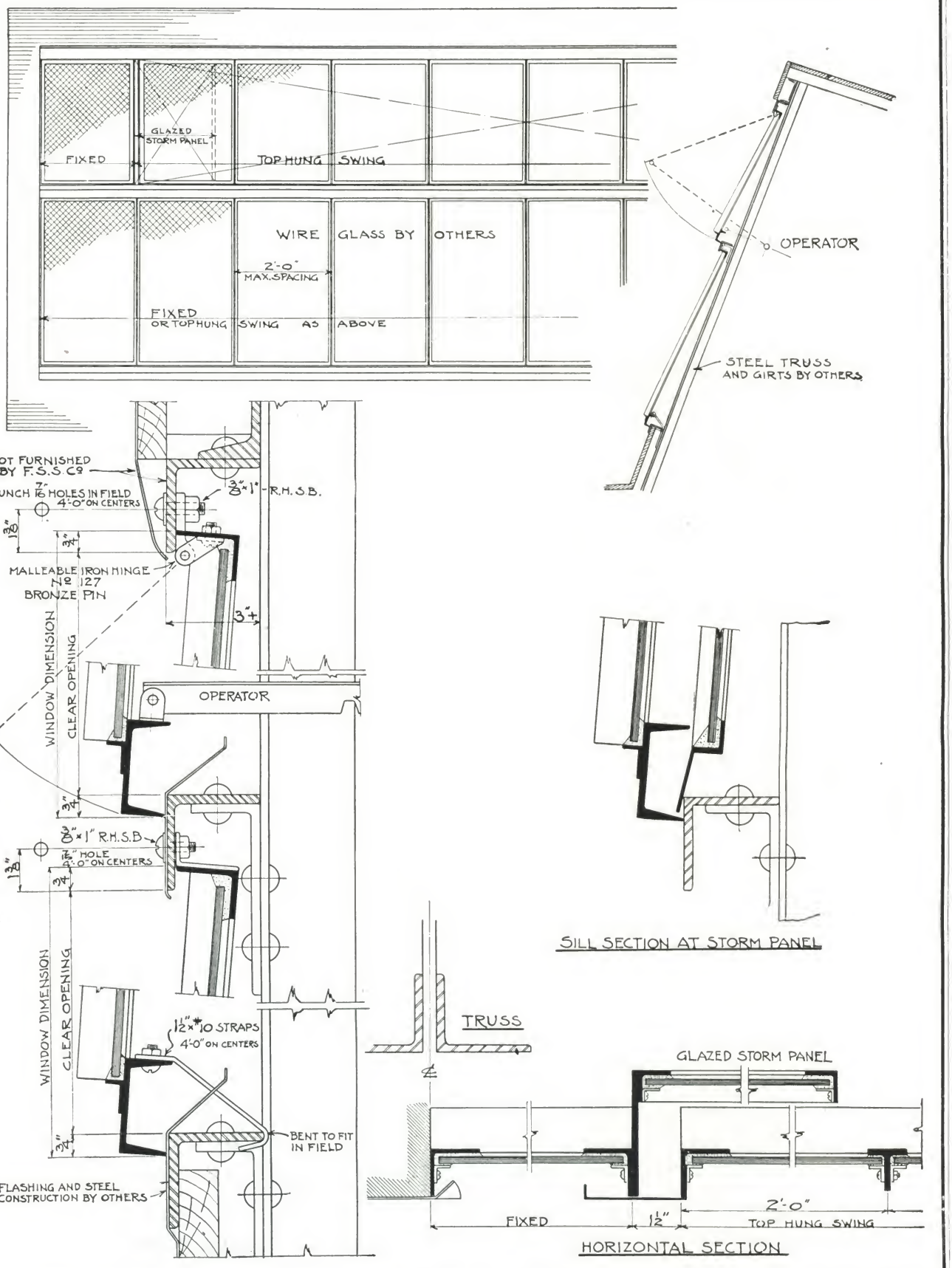
(C10) Erection

(C10a) All windows shall be erected by FEDERAL STEEL SASH COMPANY.
(C10b) Where operators are used in connection with continuous swing windows, operators shall be erected with the windows and before glazing.
Note: *See Page 1.*
(C10c) All holes in structural steel for attachment of continuous window butts, clips, etc., shall be punched in the field by the window erector.
Note: *Due to inaccuracies in structural work, field punching is recommended as the best practice.*
(C10d) All windows shall be erected in a workmanlike manner and properly weathered at head, sill and jambs.

(C11) Glass and Glazing

(C11a) Glass—Glass shall be ¼ in. rough wire glass.
(C11b) Putty—Putty shall be high grade steel window putty.
Note: *See Page 4.*
(C11c) Glazing—Continuous windows shall be glazed from the outside. Bed all glass in putty and secure at vertical muntins and panel ends with steel angle clips bolted through window members. Face putty at sill only in a neat, smooth manner.
Note: *Do not paint until putty has set. See (C8).*

Continued on next page



FEDERAL *September 1930*	CONTINUOUS WINDOWS *Typical Details*	PLATE NO. C1

Continued on next page

(D) MECHANICAL OPERATING DEVICES—General

Operators furnished with Federal windows are of two general types—one the torsion type, which uses a revolving shaft, and the other the tension type, in which the shaft moves in a horizontal direction. Descriptions of the various operators furnished are given below.

These operators have been used for many years and they have proven their thorough practicability—FEDERAL STEEL SASH COMPANY responsibility covering operating devices as fully as it covers Federal windows.

The design of each individual building, the uses to which the building is put, the manufacturing processes involved, together with the limitations applying to each particular operator, must all be given consideration in the selection of the proper operator to be used. While the selection of the operator is not a complicated problem with those familiar with all the elements, we strongly recommend consultation before the selection and specification of this equipment.

In locating and installing mechanical operating devices, attention should be paid to the accessibility and convenience of location of the controls both for operation and for inspection and lubrication.

(D1) Description

(D1a) Operator A—Worm and Gear—Torsion Type

This operator is used most generally for horizontally pivoted, top pivoted and bottom hinged ventilators. It consists of a horizontal pipe shaft supported by roller-bearing brackets with adjustable steel legs which carry forged steel lever arms and steel connecting links for operating the ventilators. The shaft is rotated by means of an irreversible worm and gear power. The movement of the operating levers depends on the torsion of the shaft, and the ventilators are locked in any position.

Operation may be by means of a hand chain or by a vertical shaft with control located within convenient distance from the floor. The hand wheel in vertical shaft operation may be placed horizontally or vertically and where placed vertically may have either an open or enclosed gear box.

Idlers and universal joints are used to effect necessary changes in direction of operator chains or vertical shafting. Idlers are also used to support operator chains over long spans where the sag of the chain would be objectionable, and to anchor the chain at its lower end where the weight of the chain would be sufficient to cause it to pull out over the supporting idlers.

Multiple runs of ventilators, consisting of runs placed one above the other, can be operated from one control.

(D1b) Screw Type Group Control Operator—Worm and Gear—Torsion Type

This operator is very similar in design to Operator A. The difference is in the method of operating the vertical shaft, which in this operator is equipped with a hand wheel and screw by means of which the vertical shaft is raised or lowered.

It is used primarily for operating multiple horizontally pivoted ventilators in large unit openings.

This operator may, if desired, be equipped with electrical control and motor drive. For details of motor drive see (D1e).

(D1c) Operator B—Rack and Pinion—Torsion Type

This operator is used generally in operating horizontally pivoted, top pivoted and bottom hinged ventilators and, within the limits of its capacity, for top hung swing continuous windows. It is a torsion type operator, but differs from operator A in that the movement of the ventilator is obtained by toothed steel racks which work over pinions on the horizontal shaft instead of by means of the lever arms and connecting links used in operator A. The torsion on the horizontal shaft in this operator is reduced to the minimum and is constant, with the result that the lifting power is very great, and extremely long lines or large bays of pivoted window ventilators can be handled by this operator.

The operator consists of horizontal shaft supported by roller bearing brackets with adjustable steel legs. The racks are rolled steel and are furnished either straight or curved as desired. Curved racks are usually used where the projection of the rack into the building in the closed position of the ventilator would be objectionable.

Control may be either by hand chain or by vertical shaft equipped with either a horizontal or vertical hand wheel, the latter with either open or enclosed gear box, as noted under operator A above.

Idlers and universal joints are used to change the direction of the operator chains or of the vertical shafts in the same manner as explained for operator A above.

Electrical control and motor drive can be furnished with this operator. For details of electrical control and motor drive see (D1e).

(D1d) Tension Type Operator for Pivoted Windows

This operator differs from operators A and B in that the movement of the ventilators is accomplished by a horizontal movement of the shaft as distinguished from the rotary movement in operators A and B. It is used for horizontally pivoted, top pivoted or bottom hinged ventilators where exceptionally long runs of ventilators must be operated from one control.

The horizontal pipe shaft is supported by roller bearing brackets and travels in a horizontal direction. Lifting arms are attached to the horizontal shaft by a swivel clamp and to each ventilator by a hinged joint.

Power consists of a worm and gear set which operates a pinion engaging a rack attached to the shaft. The worm and gear set are enclosed in an oil tight box and run in oil. A positive action clutch acts as a limit stop when ventilators are in full open or closed position.

Either hand chain or electrical control and motor drive are used on this operator. Vertical shaft operation cannot be furnished. Where hand chain control is used, idlers are furnished to provide for change in direction of chain and for the other purposes already noted under operator A above.

Electrical control and motor drive are similar to the electrical control and motor drive used on tension operator C. See (D1e).

(D1e) Operator C—Tension Type

This operator is used only for continuous top hung swing windows. It is a tension type operator, the movement of the window being obtained through a horizontal movement of the shaft. This operator is used where the load is heavy and the conditions of operation severe and will handle longer and higher runs of continuous windows than will operator B.

The operator consists of a horizontal shaft supported by brackets, each bracket carrying two pipe rollers with brass bearings. Lifting arms of heavy steel sections, consist of two long members attached to a crosshead on the horizontal shaft and to the window, and of two short members attached to the center of the long members and to the shaft bracket. Brass washers are used throughout.

Power consists of a worm and gear set enclosed in an oil tight box and running in oil, which engages through a pinion with a heavy rack attached to the horizontal shaft. The power is always located at or near one end of the shaft so that as the window is opened by means of the horizontal movement in the shaft, the shaft itself is in tension. A positive action clutch is provided which acts as a limit stop when windows are in full open or closed position.

Operation may be either by hand chain, which is useful only where the load is not so great as to make manual operation laborious, or by electrical control and motor drive. Where hand chain operation is used, idlers are provided to effect change in direction of operator chain and for the other purposes noted under operator A above.

Electrical control and motor drive furnished on this operator, which is the same as furnished on other operators noted above, consists of a motor, a worm and gear drive, a magnetic reversing switch and control. Motor drive is compact, efficient, and proof against careless handling. The worm and gear unit consists of a hardened steel worm and a bronze gear, both machine cut and running in oil in an oil tight box. The motor is designed for a high starting torque. The speed reduction is obtained through a worm and gear set and silent chain operating over cut sprockets.

The control consists of an enclosed magnetic reversing switch with thermal overload relay and three-button operating switch. Buttons marked "Open" and "Close" will operate the window to its full open or to its tight closed position. Button at any position between extreme open or extreme closed. Two enclosed single pole limit switches are used in the secondary circuit of the control, which automatically open the circuit when the window reaches the extreme open or closed position, thus preventing damage through over travel of the operator. When the direction of the travel of the windof is automatically stopped, the motor is reversed and will operate only in the opposite direction, preventing damage to the operating device and window because of over run in either direction.

The three-button operating switch can be located in any desired position for convenient operation. Wiring and conduits between the switch and the motor are not included with the motor power and control, as the location of the operating switch is, in all cases, special and must suit the condition of each particular installation.

Continued on next page

(D2) SPECIFICATIONS

Note: *Notes are explanatory or advisory only and should not be included in the specifications.*

(D2a) Work Included

Note: *Locate on plans each operator and control and the ventilators to be operated by each. For each operator indicate method of operation—either hand chain, vertical shaft or motor drive.*

(D2b) General

All operators shall be Federal operator (A) (B) (screw type) (tension type for pivoted window ventilators) (C) as furnished by FEDERAL STEEL SASH COMPANY, Waukesha, Wisconsin, or equivalent, fully meeting this company's standard of quality.

(D2c) Shop Drawings

Furnish in (duplicate) (triplicate) for approval of architect, complete shop drawings of all operators showing accurately all details of location, installation and position of power and control.

(D2d) Limits

Individual operators shall be limited to length of shaft or number of ventilators or lengths of windows as indicated below:

Operator A—40 ft. each side of power.

Screw type operator—50 horizontally pivoted, or 20 top pivoted or bottom hinged ventilators.

Tension operator for pivoted windows—300 ft. of horizontal shaft per power.

Operator B (1) For horizontally pivoted ventilators—80 ft. of horizontal shaft on each side of power.

(2) Top pivoted or bottom hinged ventilators—40 ft. of horizontal shaft on each side of power.

(3) Continuous windows:

Note: *Limits are determined by the height of the window, the degree of opening desired and the position from the vertical.*

Operator C—

Note: *Limits are determined by the height of the window, the degree of opening desired and the position from the vertical. Motor driven operators can handle longer runs than manual power operators.*

(D2e) Electrical Control and Motor Drive

Note: *Specify in Electrical Specifications that electrical contractor shall furnish and install safety type line switches, wire, conduit and fittings and do all wiring between control and motor in accordance with wiring diagram furnished by window manufacturer.*

Window manufacturer shall furnish only motor, sprocket, chain, magnetic reversing switch, limit switch, individual push button station and wiring diagram.

(D2f) Painting

(D2g1) All operators are painted one coat of mineral paint by the manufacturer before shipment.

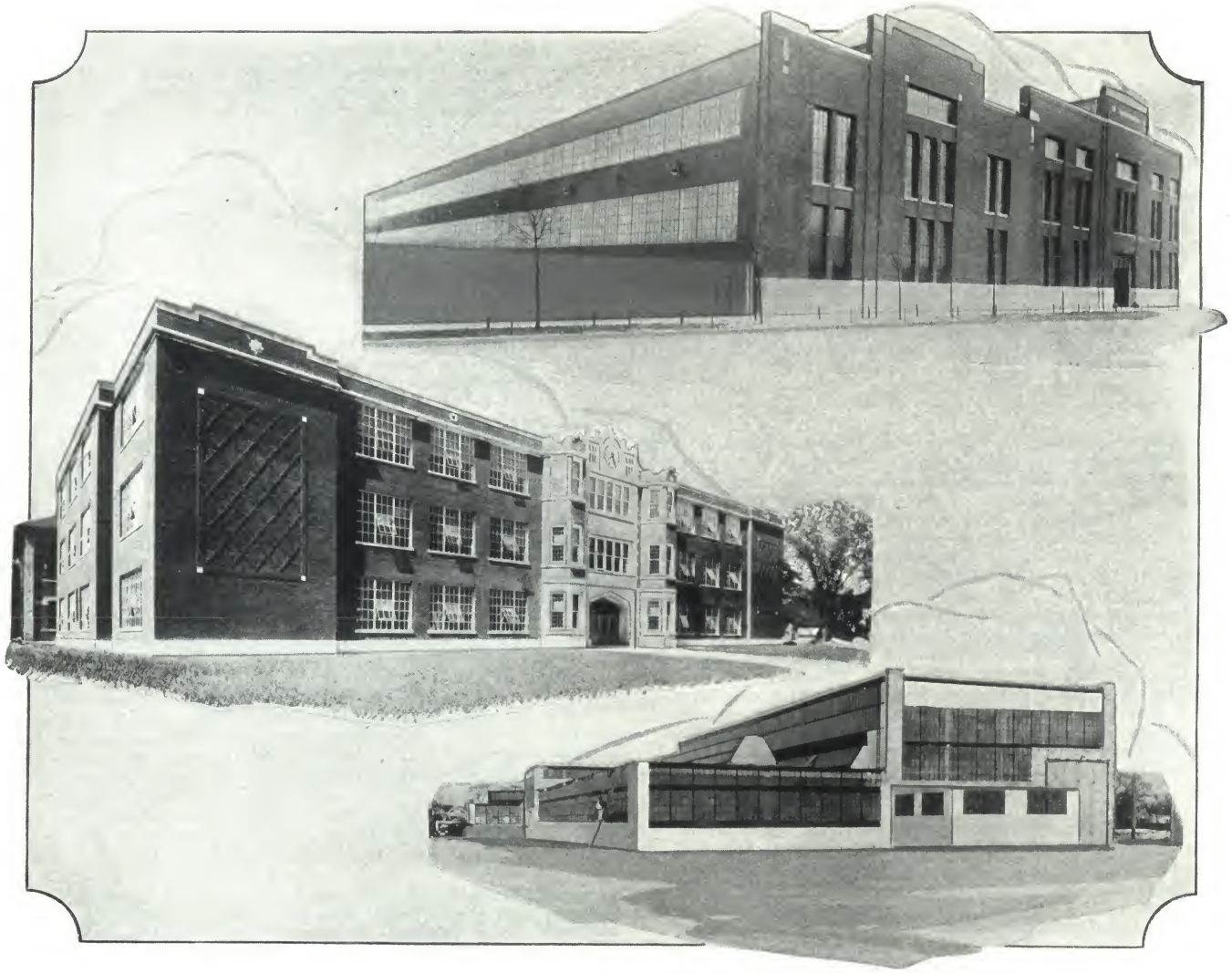
(D2g2) After erection all operators shall be given one coat of paint in the field. Paint shall be *(specify)*.

Note: *Where operators are erected by* FEDERAL STEEL SASH COMPANY, *it will do painting where specified.* *(See Page 1.)*

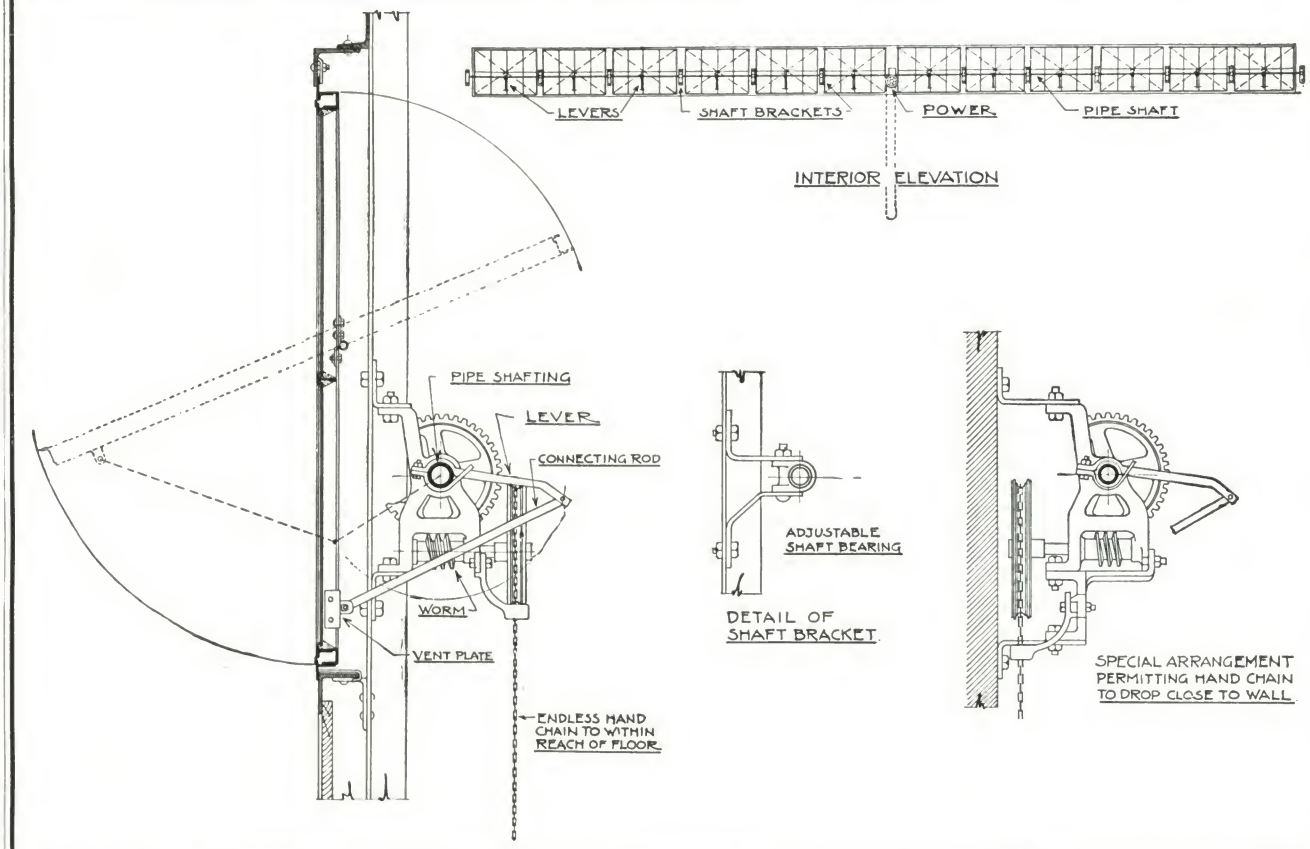
(D2g) Erection

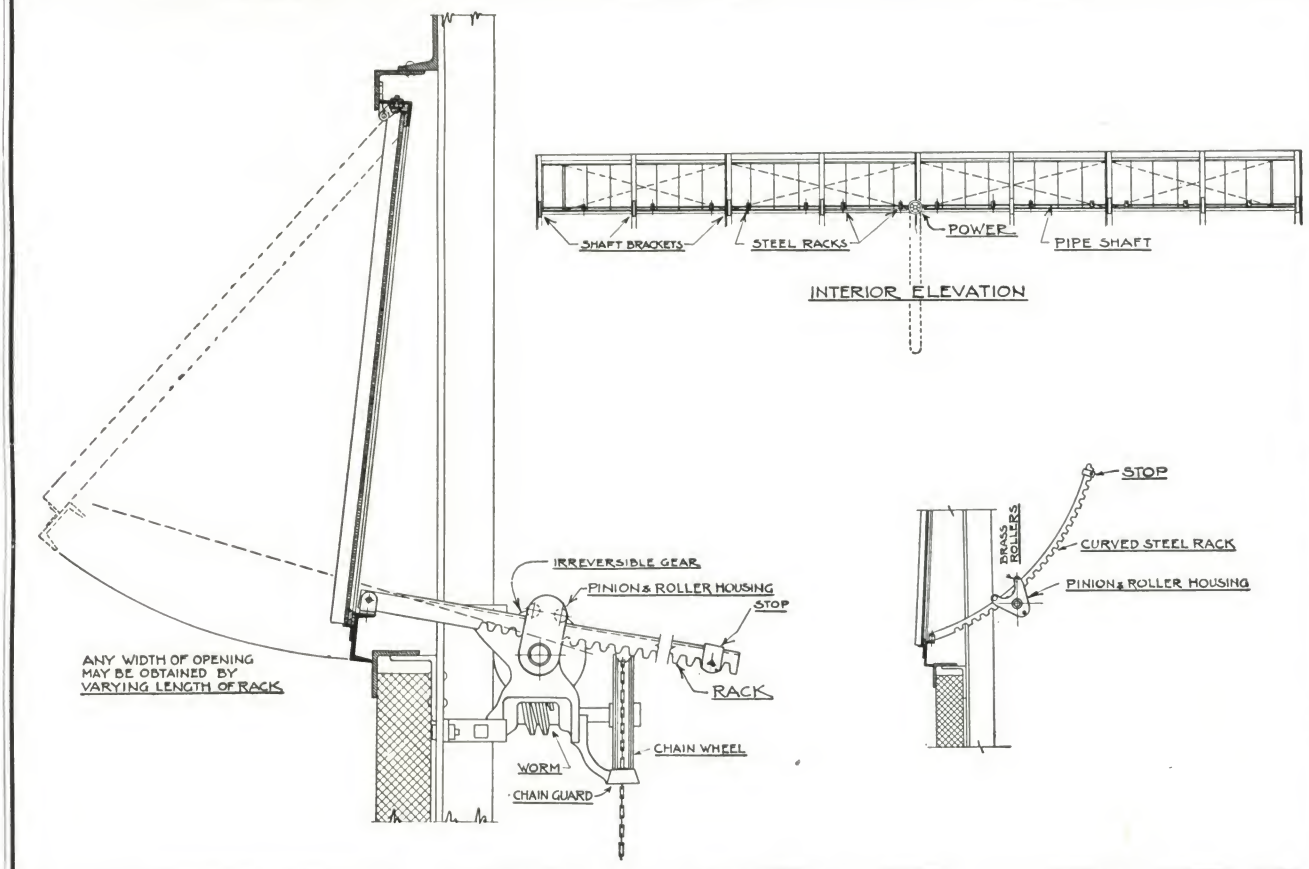
All operators shall be erected by the window manufacturer before windows are glazed.

Note: *See Page 1.*



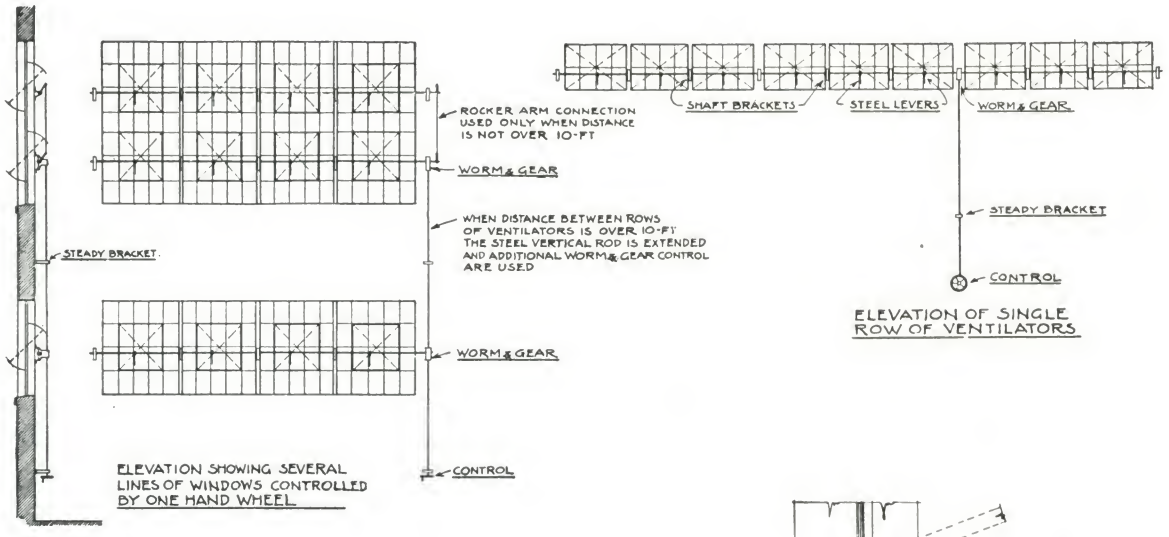
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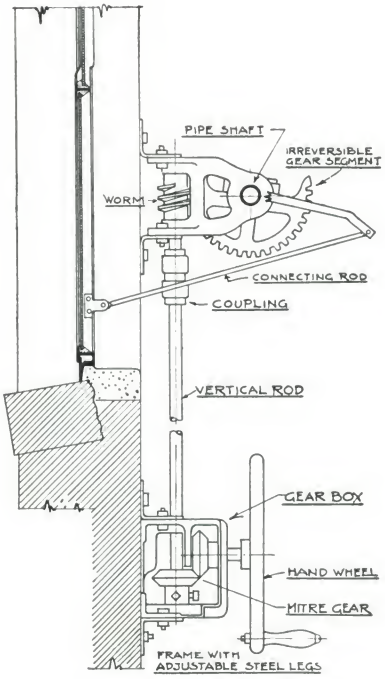


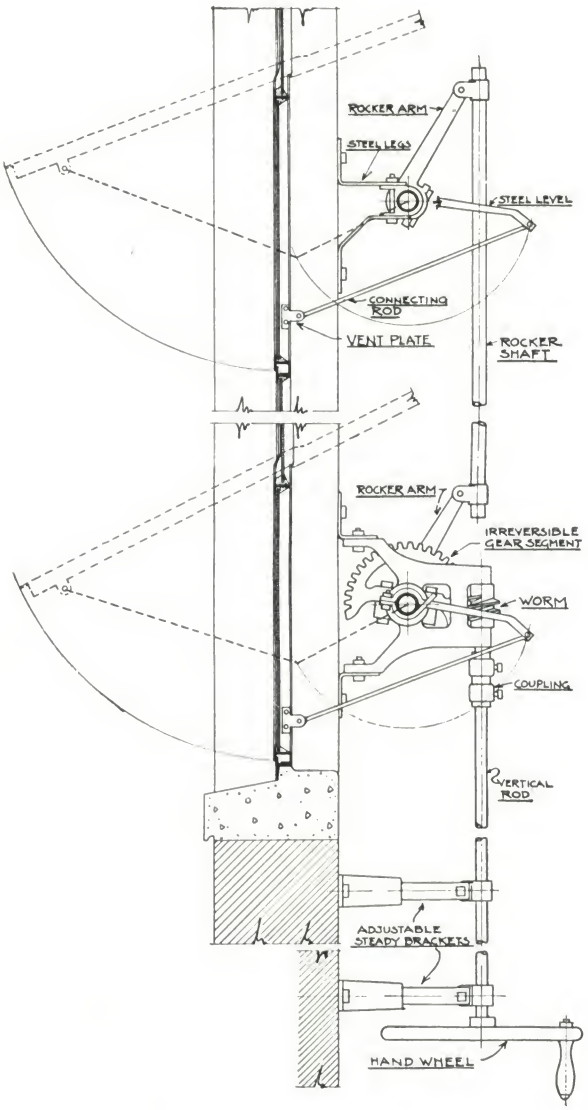


FEDERAL *September 1930*	MECHANICAL OPERATORS *Operator A Above—Operator B Below*	PLATE NO. D1—D3

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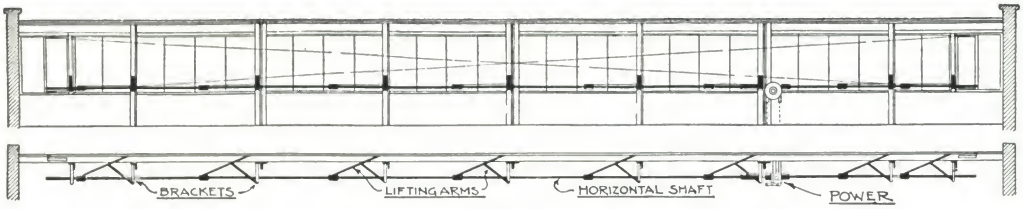




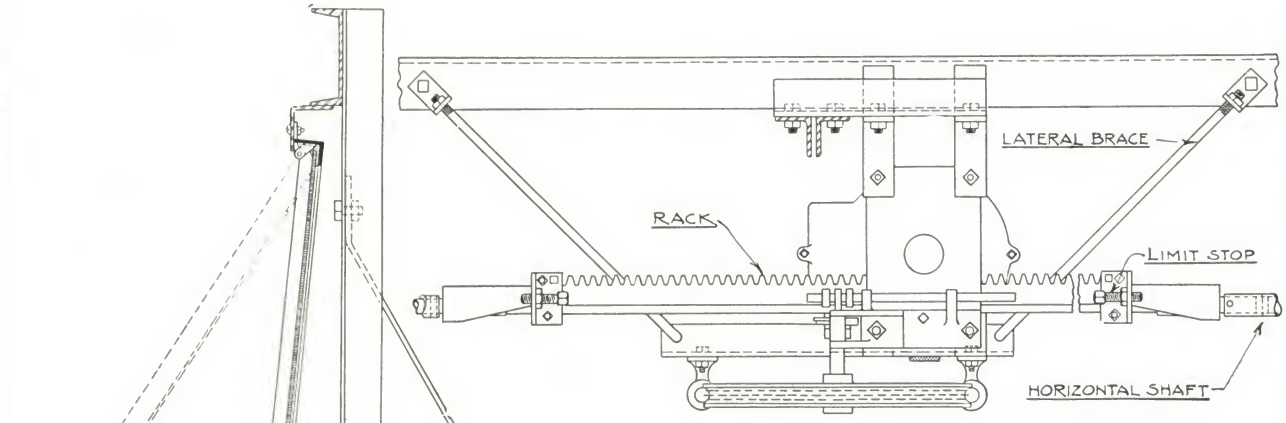


FEDERAL *September 1930*	MECHANICAL OPERATORS *Operator A*	PLATE NO. D2

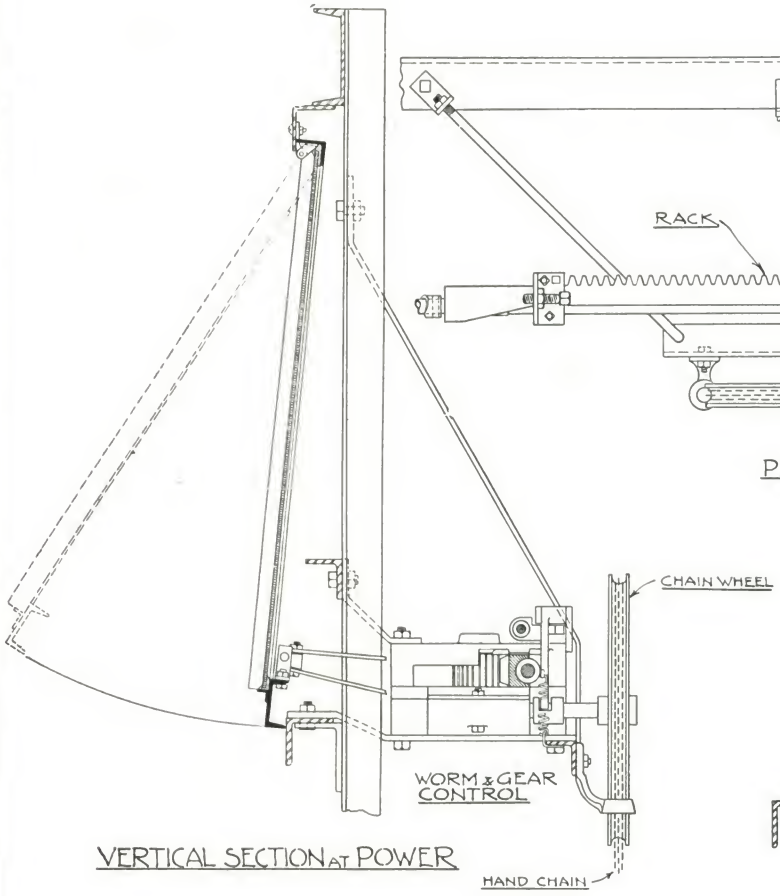
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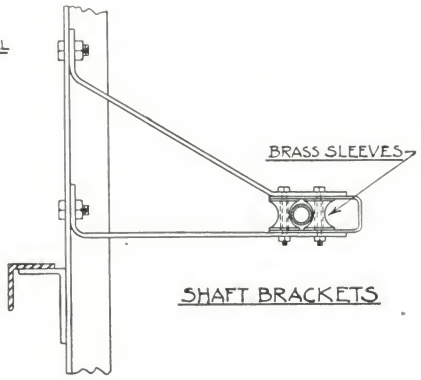
INTERIOR ELEVATION & PLAN VIEW



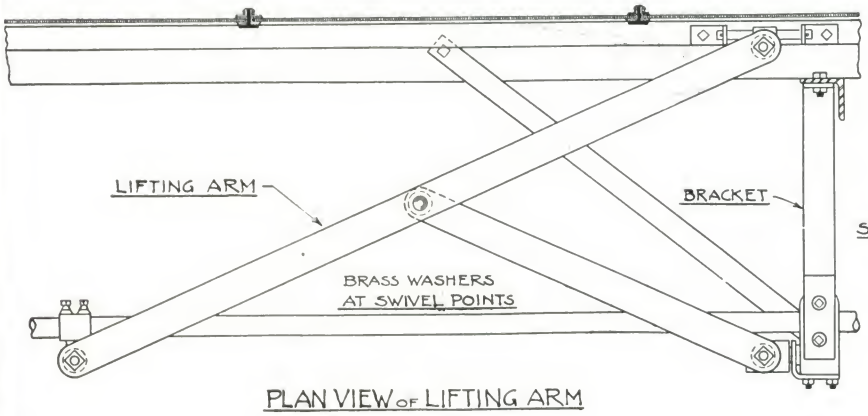
PLAN VIEW OF POWER



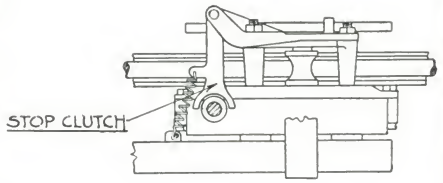
VERTICAL SECTION AT POWER



SHAFT BRACKETS



PLAN VIEW OF LIFTING ARM



ELEVATION OF CONTROL

FEDERAL *September 1930*	MECHANICAL OPERATORS *Operator C*	PLATE NO. D4

Continued on next page

(E) ARCHITECTURAL PROJECTED WINDOWS—Specifications

Note: *Notes are explanatory or advisory only and should not be included in the specifications.*

(E1) Work Included

Note: *List and locate all architectural projected windows either in schedules on plans or here to assure accuracy in estimates.*

(E2) General

Architectural projected windows shall be Federal electric arc welded windows, manufactured by Federal Steel Sash Company, Waukesha, Wisconsin, or equivalent, meeting fully this company's standard of quality.

(E3) Shop Drawings

Furnish in *(duplicate) (triplicate)* for approval of architect, complete shop drawings of all work, showing accurately all details of location, hardware and installation.

(E4) Materials

(E4a) Sections—All sections shall be open hearth solid steel, hot rolled or cold drawn, of special Federal design. Frame and muntin sections shall be 1¼ in. in depth.

(E4b) Vertical Mullions—Vertical mullions shall consist of an exterior plate, two interior angles, cadmium plated U-clips, bolts and pressed steel covers.

(E4c) Horizontal Mullions—Horizontal mullions shall be Federal Steel Sash Company standard equipped with pressed steel covers.

Note: *See Plate A3.*

Note: *Horizontal mullions should be furnished under Structural Steel Specifications.*

(E5) Construction

(E5a) Fabrication—All joints and connections shall be full electric arc welded.

(E5b) Frames—Frame members shall be channel sections, continuous from head to sill and jamb to jamb, mitered at corners and electric arc welded.

(E5c) Muntins—Horizontal muntins shall be continuous from jamb to jamb. Vertical muntins shall be cut to fit horizontal muntins and frames and electric arc welded thereto.

(E5d) Glazing Angles—All lights shall be secured with pressed steel glazing angles neatly mitered at corners and attached with brass screws to window members.

(E5e) Weathering—Ventilators shall have double contact weathering continuous around all four sides.

(E5f) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide Federal vertical mullions with covers. All mullions shall extend 2 in. into sills for anchorage.

(E5g) Horizontal Mullions—Where two or more windows are placed one above the other in the same opening, provide Federal standard horizontal mullions with covers. In masonry provide at least 4 in. bearing at each end and in structural steel openings arrange for proper attachment.

(E5h) Clips—Furnish all necessary clips and bolts for attaching windows to structural steel.

Note: *Include in steel specifications all punching to accommodate clips.*

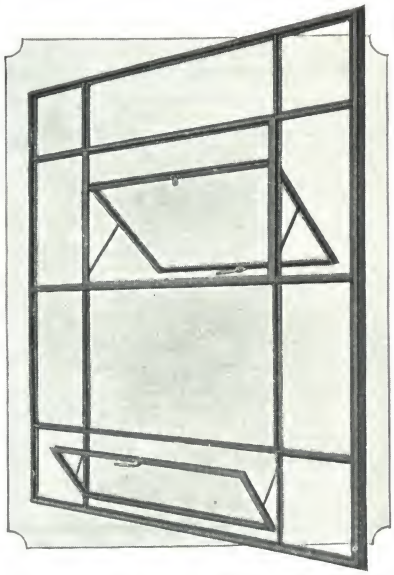
(E5i) Masonry Anchors—Furnish where called for: masonry anchors and bolts for attachment.

(E6) Operation and Hardware

(E6a) Ventilator Operation—Ventilators shall swing out from the sill and down from the head or vice versa, as indicated on the plans.

(E6b) Stay Arms and Friction Guides—Each ventilator shall be provided with two supporting steel arms with ends pivoted on both ventilator and frame.

Friction Guides shall be single point contact with spring actuated bronze swiveling yoke carrying a hardened steel contact ball operating on a steel guide angle.



Architectural Projected Window from the Inside

(E6c) Hardware—

Note: *Malleable iron hardware is attached at factory. Bronze hardware is shipped separate.*

Note: *Bronze hardware is standard. Malleable iron hardware may be substituted if desired.*

(1) ***For Swing-out Ventilators***—Provide *(bronze) (malleable iron)* pole ring at head; bronze bracket, and *(bronze) (malleable iron)* cam handle.

(2) ***For Swing-in Ventilators***—Provide *(bronze) (malleable iron)* spring latch and keeper at ventilator head.

(E6d) Shade Brackets—

Note: *All shades must be located at least 2 in. from the inside face of the window to clear hardware. Shades cannot be satisfactorily installed where ventilators project in from the head.*

Provide at top of window jamb sections shade bracket clips to receive shade brackets furnished and applied by others after windows have been erected.

Note: *Where windows are erected by* Federal Steel Sash Company, *it will attach shade bracket clips.*

(E7) Painting

(E7a) All windows shall be given one dip-coat of gray mineral paint by the manufacturer before shipment.

Note: *Provide for the following in the Painting Specification: One field coat of paint should be applied after erection and before glazing. The application of one or more additional coats should be deferred until at least three weeks after glazing to allow putty to set.*

(E7b) After erection and before glazing, all windows shall be given one coat of paint in the field. Paint shall be *(specify).*

Note: *Where windows are erected by* Federal Steel Sash Company, *it will do field painting where specified. (See Page 1.)*

(E8) Hot Galvanizing or Rust Proofing

Note: *See Page 3.*

All windows shall be *(hot dip galvanized) (cadmium plated) (other rust proof coated)* after fabrication.

Note: *Do not paint for at least one year.*

(E9) Erection

Note: *Include in Masonry Specifications that all masonry openings shall be accurately prepared in accordance with Federal installation details. (See Page 4.)*

Note: *Include in Masonry Specifications that all mortar grouting, mastic, painting, etc., shall be done by the masonry contractor after windows have been erected.*

(E9a) All windows shall be erected by Federal Steel Sash Company in openings prepared by others.

Note: *See Page 1.*

(E9b) All windows shall be set plumb and true in perfect alignment and securely anchored before glazing.

(E9c) Apply all unattached hardware in accordance with the manufacturer's directions.

(E10) Glass and Glazing

Note: *Include the following in the Glazing Specification.*

Note: *See Page 4.*

(E10a) Glass—Glass shall be *(¼ in. plate) (specify).*

(E10b) Putty—Putty shall be high grade steel window putty.

Note: *See Page 4.*

(E10c) Glazing—All architectural projected windows shall be glazed from the inside. Bed all glass in putty and secure with pressed steel glazing angles furnished by window manufacturer.

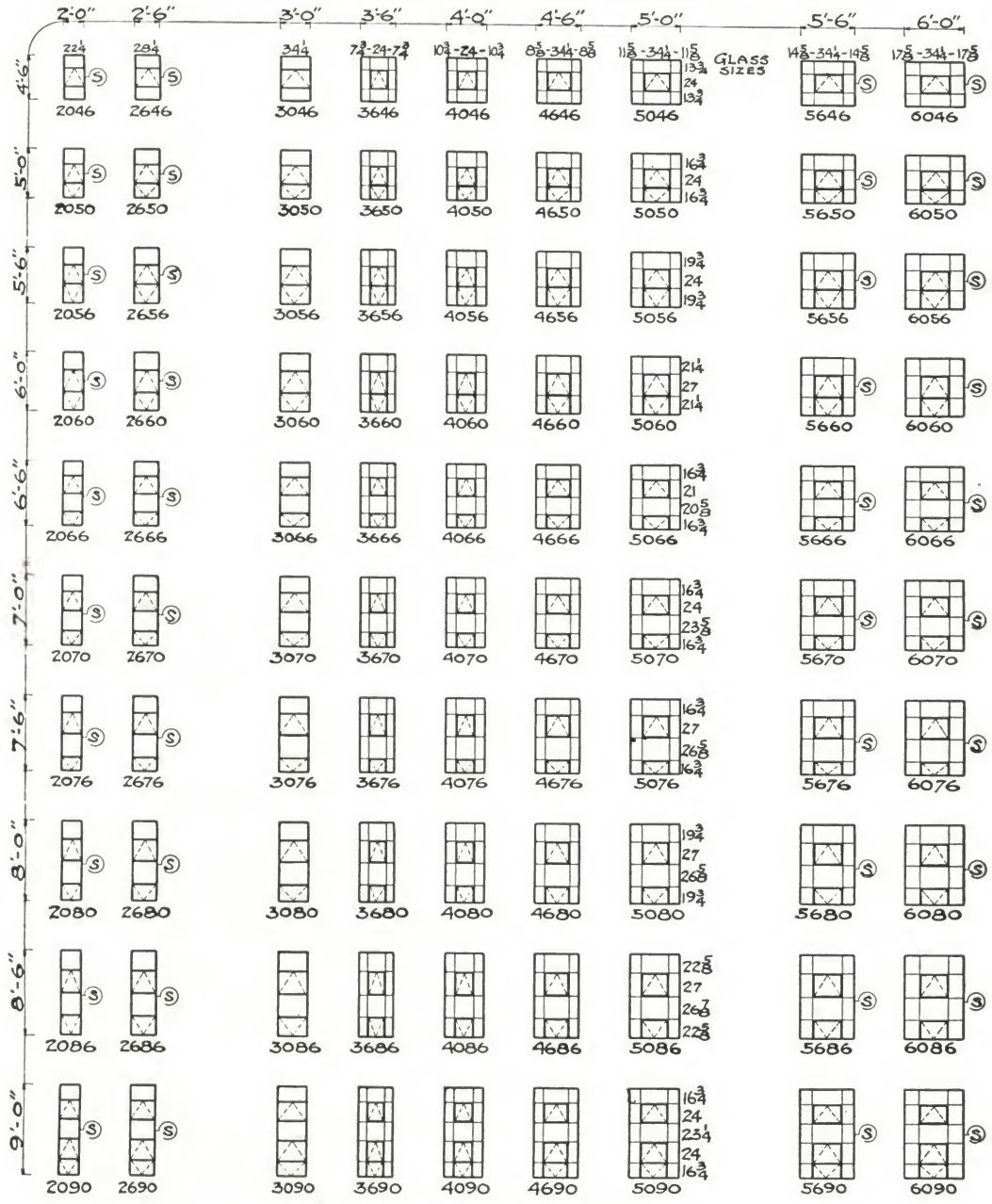
Note: *Do not paint until putty has set—see (A8).*

(E11) Underwriters' Labeled Windows

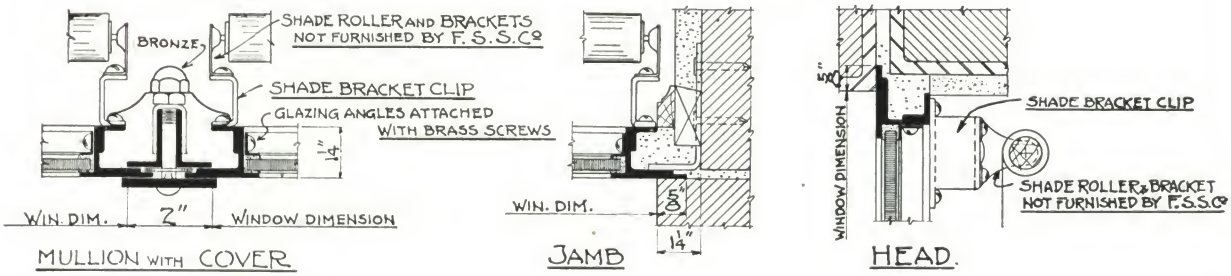
Note: *Architectural projected windows with Underwriters' Laboratories, Inc., label cannot be furnished.*

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STANDARD & LISTED SPECIAL



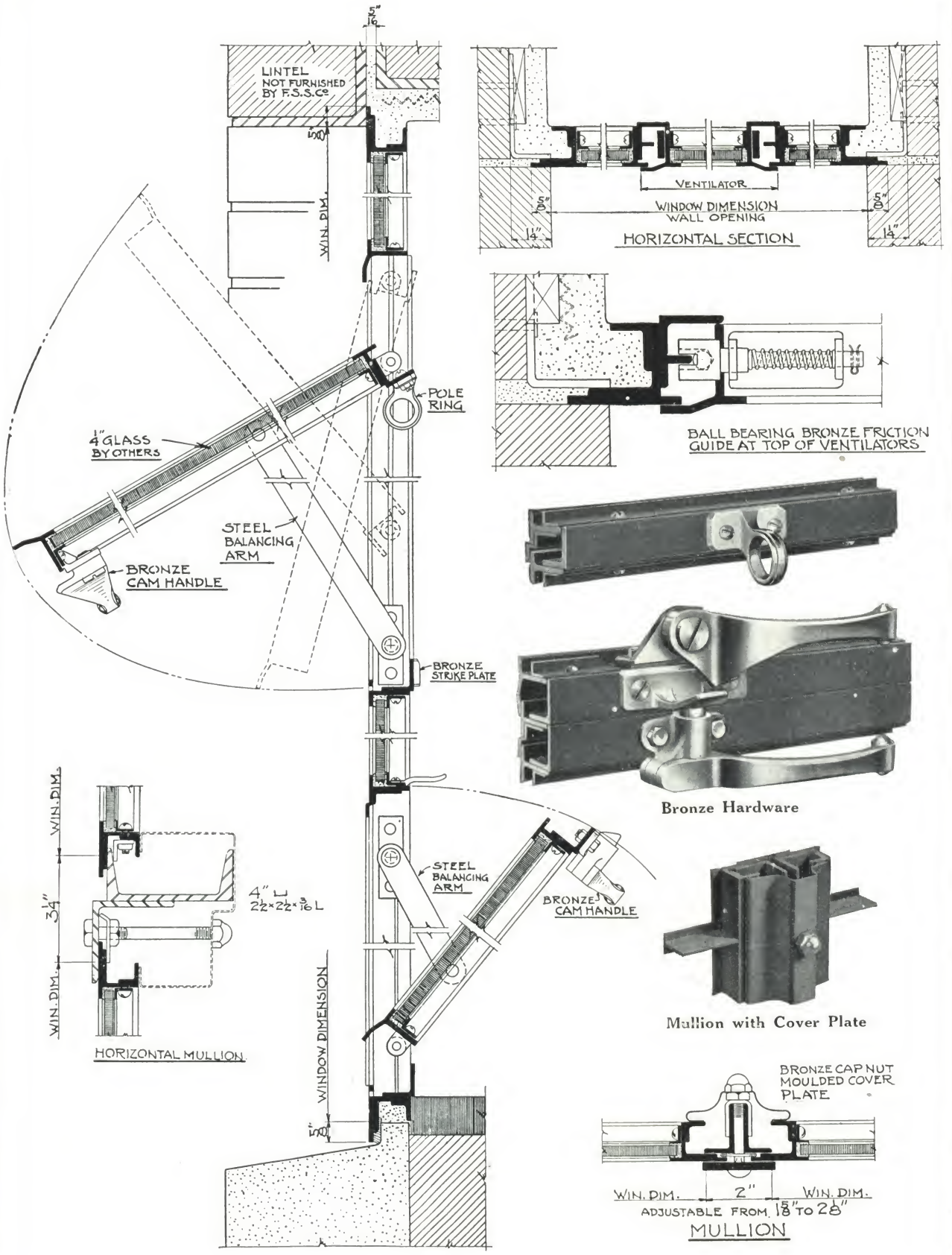
(S) UNITS MARKED THUS ARE SPECIAL



GLASS SIZE IN VENTS:
GLASS SIZE SHOWN ARE FOR FIXED LIGHTS.
DEDUCT 2-INCHES FROM EACH DIMENSION
TO OBTAIN GLASS SIZE FOR VENTILATORS

FEDERAL *September 1930*	ARCHITECTURAL PROJECTED WINDOWS *Types and Sizes*	PLATE NO. E1

Continued on next page



FEDERAL *September 1930*	ARCHITECTURAL PROJECTED WINDOW *Typical Details*	PLATE NO. E2

Continued on next page

(F) SWING AND SLIDE STEEL DOORS—Specifications

Note: Notes are explanatory or advisory only and should not be included in the specifications.

(F1) Work Included

Note: List and locate all swing and slide steel doors in schedules on plans or here to assure accuracy in estimates. For swing doors indicate whether they open in or out and are right or left hand. For slide doors indicate whether they are right or left hand.

(F2) General

All doors shall be Federal electric arc welded doors manufactured by FEDERAL STEEL SASH COMPANY, Waukesha, Wisconsin, or equivalent, meeting fully this company's standard of quality.

(F3) Shop Drawings

Furnish in *(duplicate) (triplicate)* for approval of architect, complete shop drawings of all work showing accurately all details of location, hardware and installation.

(F4) Materials

(F4a) Stiles and Rails—Door stiles and rails shall be cold drawn steel tubing, No. 13 gauge for leaves up to 5x10 ft. and No. 11 gauge for leaves 5x10 ft. and over.

(F4b) Glass Panels—Sections for glass panels shall be open hearth solid steel, hot rolled or cold drawn, of special Federal design and shall be 1¼ in. in depth.

(F4c) Plate Panels—Plate panels shall be No. 14 gauge steel plate. Provide stiffeners where required.

(F4d) Frames—

Note: Door frames should be included with miscellaneous structural steel, as in all cases, frames should be built in when masonry work of the building is erected. Doors, however, should be installed only after the building has been erected. Provide in structural steel specifications that all frames shall be made to exact dimensions furnished by door manufacturer and shall be erected plumb and true and securely anchored. Provide supports for slide door tracks.

Note: Where particularly desired, 4 in. channel frames for swing doors only will be furnished by door manufacturer. If required, specify below.

Where called for on plans, furnish Federal standard 4 in. steel channel swing door frames complete with angle stops and masonry anchors.

(F5) Construction

(F5a) Stiles and Rails—Stiles and rails shall be mitered at corners. Cross rails shall butt between stiles. All joints and connections shall be full electric arc welded.

(F5b) Glass Panels—All joints and connections in glass panels shall be full electric arc welded. Glass panels shall be constructed to the same standards of material and workmanship as provided in Federal pivoted windows. Glazing angles neatly mitered at corner and attached to panel members with brass screws and bolts shall be provided for all panes.

(F5c) Plate Panels—Plate panels shall be flat and free from buckles, and shall be attached to rails and stiles by electric arc stitch welds.

(F5d) Provision for Hardware—Where required, prepare stiles and rails to receive hardware specified.

Note: Hardware is shipped separate and attached to doors after erection.

(F6) Hardware

(F6a) Swing Door Hinges—Swing leaves shall be mounted on heavy *(steel) (bronze) (bronze ball bearings)* butt hinges. The number of butts to each leaf shall be sufficient to properly support the weight of the leaf.

(F6b) Swing Door Top and Bottom Bolts—One leaf of each double swing door shall be equipped with Federal standard spring chain operated top and with foot operated bottom bolt.

(F6c) Slide Door Tracks, Hangers, etc.—Slide doors shall be equipped with Federal standard steel tracks, track brackets, roller bearing trucks and adjustable hangers.

(F6c) Locks and Latches—

Note: Select locks and latches desired from list below: If requirements vary on individual doors of same type, list or locate locks and latches for each door.

Note: Master-keyed cylinders will be furnished in standard keying only. Where special systems of master-keying are required, cylinders must be furnished by others.

(1) Barn door type of latch.
(2) Cylinder lock for swing door with *(iron) (bronze)* handle.
(3) Cylinder for slide doors.
(4) Combined dead bolt and cylinder lock.
(5) Antipanic bolts for swing doors.
  (a) Lever type for single door, inside control, without cylinder lock.
  (b) Bar type for single door, inside control, without cylinder lock.
  (c) Bar type for single door, inside and outside control, with cylinder lock.
  (d) Bar type for double door, inside control, without cylinder lock.
  (e) Bar type for double door, inside and outside control, with cylinder lock.
(6) Door checks for swing doors only. *(Specify make.)*

Note: If hardware other than furnished by FEDERAL STEEL SASH COMPANY *is desired, it must be furnished by others to door manufacturer for proper preparation of stiles and rails and must be such as to fit construction of doors.*

(F7) Painting

(F7a) All doors shall be given one coat of gray mineral paint by the manufacturer before shipment.

Note: Provide for the following in painting specification: One field coat of paint should be applied after erection but before glazing glass panel. The application of one or more additional coats should be deferred until at least three weeks to allow putty to set.

(F7b) After erection and before setting of glass, all windows shall be given one coat of paint in the field. Paint shall be *(specify)*.

Note: Where doors are erected by FEDERAL STEEL SASH COMPANY, *it will do field painting where required.* *(See Page 1.)*

(F8) Erection

(F8a) Doors shall be erected by the manufacturer in openings provided by others.

Note: Where standard channel door frames are furnished by door manufacturer, they shall be set in openings by others.

Note: Door manufacturer shall not be required to do any work in the field to correct inaccuracies or errors in door openings or in frames set by others.

(F8b) Doors shall be erected in a workmanlike manner. Unattached hardware shall be fitted in accordance with manufacturer's directions and doors and hardware left in first class operating condition.

(F9) Glass and Glazing

Note: Include the following in the Glazing Specification:

Note: See Page 4.

(F9a) Glass—Glass shall be *(¼ in. wire glass) (specify)*.

(F9b) Putty—Putty shall be high grade steel window putty.

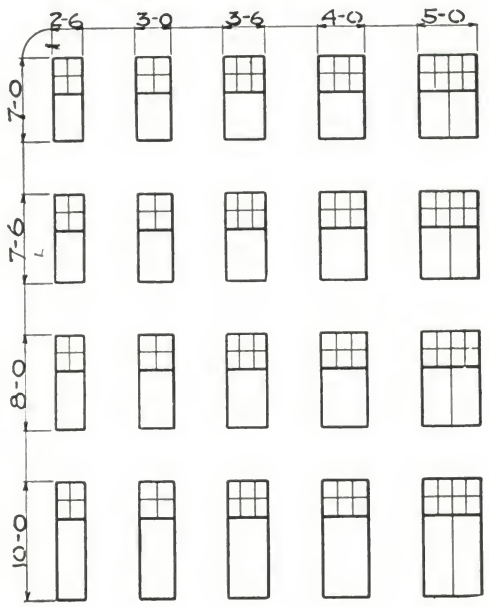
(F9c) Glazing—All glass shall be set in a bed of putty and secured with glazing angles.

(F10) Underwriters' Labeled Doors

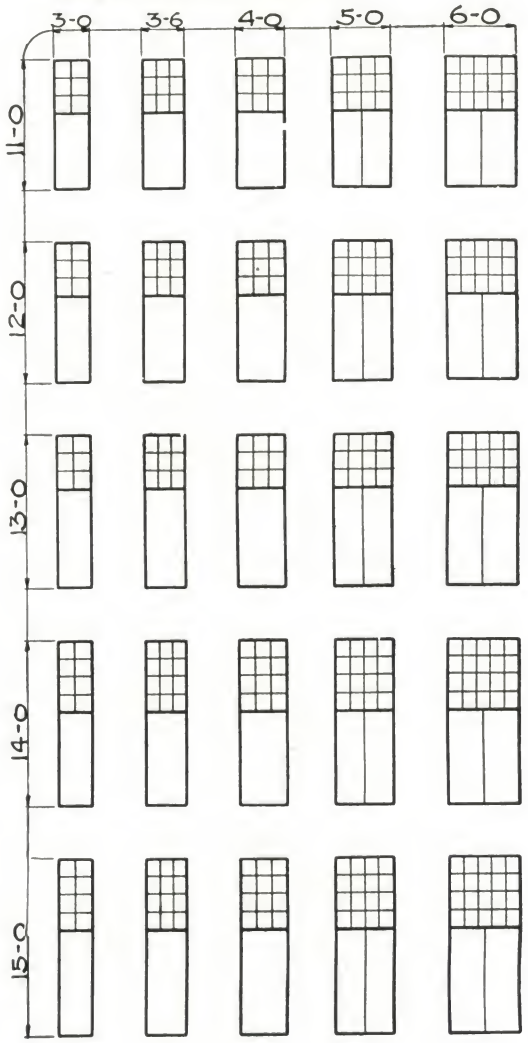
Note: Federal swing and slide doors cannot be furnished with Underwriters' Laboratories, Inc., label.

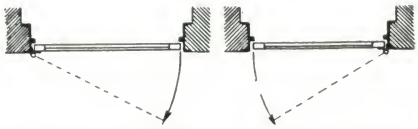
Continued on next page

STANDARD



LISTED SPECIAL





LEFT HAND SWING OUT RIGHT HAND SWING OUT



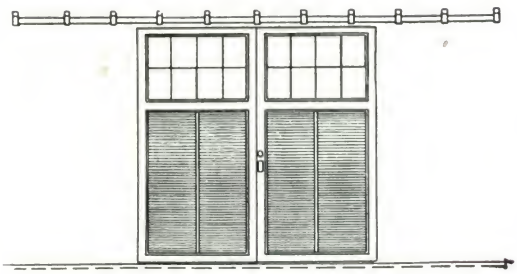
LEFT HAND SWING IN RIGHT HAND SWING IN



RIGHT HAND SLIDE



LEFT HAND SLIDE

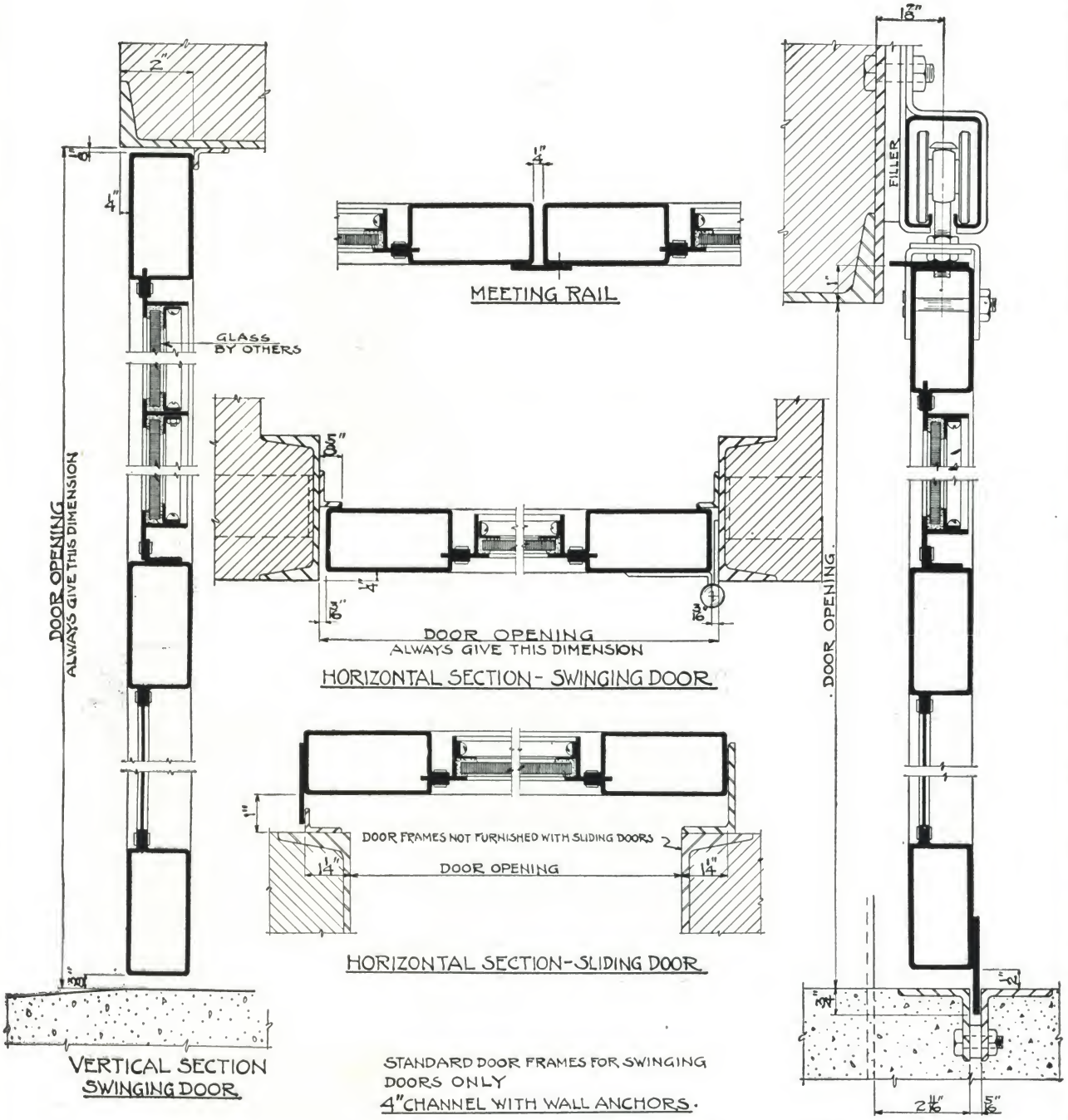


INSIDE ELEVATION DOUBLE SLIDE DOORS

NOTE:
DIMENSIONS GIVEN ARE FOR SWING DOORS ONLY.
DIMENSIONS FOR SLIDE DOORS ARE 3" LESS IN WIDTH AND 12" LESS IN HIGHT THAN DIMENSION GIVEN.
ALL DIMENSIONS ARE INSIDE MEASURMENTS OF FRAME.

FEDERAL *September 1930*	INDUSTRIAL DOORS *Types and Sizes*	PLATE NO. F1

Continued on next page

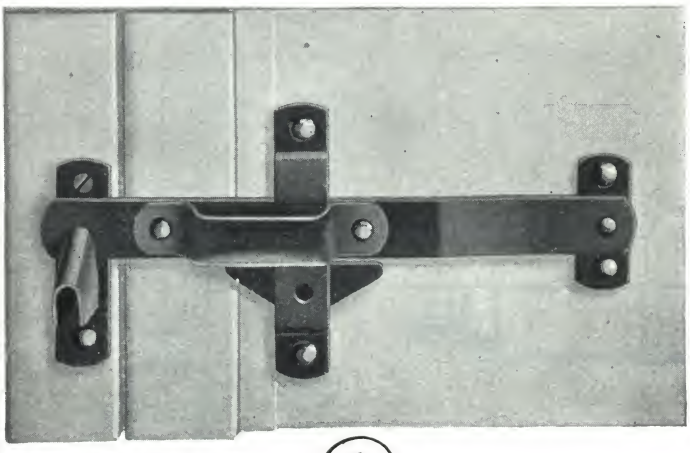


RECOMMENDED DOOR FRAMES

4" CHANNEL	6" CHANNEL	8" CHANNEL
WITH WALL ANCHORS DOOR OPENINGS UP TO 3'-6" x 8'-0" OR 4'-0" x 7'-6"	SINGLE DOOR OPENINGS UP TO 4'-0" x 10'-0" OR 5'-0" x 8'-0" DOUBLE DOOR OPENINGS UP TO 7'-0" x 10'-0"	SINGLE DOOR OPENINGS UP TO 5'-0" x 12'-0" OR 6'-0" x 10'-0" DOUBLE DOOR OPENINGS UP TO 10'-0" x 12'-0"

FEDERAL *September 1930*	**INDUSTRIAL DOORS** *Typical Details*	PLATE NO. F2

Continued on next page



1



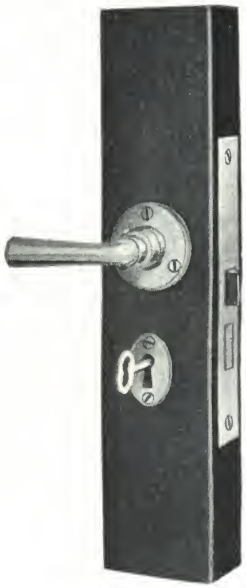
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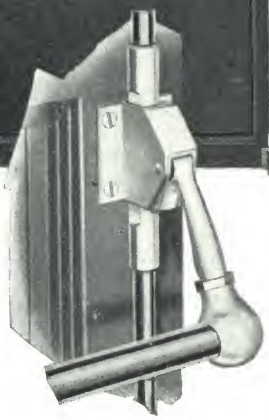
4

5





3





FEDERAL *September 1930*	INDUSTRIAL DOORS *Hardware*	PLATE NO. F3

Continued on next page

(FA) AIRPLANE HANGAR DOORS—Specifications

Note: Notes are explanatory or advisory only and should not be included in the specifications.

(FA1) Work Included

Note: Locate all hangar doors on plans and indicate clearly whether straight slide or round corner type, and if sliding in two directions the point at which the door breaks. Give clear opening dimensions—both width and height.

(FA2) General

Airplane hangar doors shall be Federal electric arc welded doors as manufactured by FEDERAL STEEL SASH COMPANY, Waukesha, Wisconsin, or equivalent, meeting fully this company's standard of quality.

(FA3) Shop Drawings

Furnish in *(duplicate) (triplicate)* for approval of architect, complete shop drawings of all work, showing accurately all details of location, hardware and installation.

(FA4) Materials

Note: Guide angles at the top of doors, track rails for trucks and door frames are not furnished by door manufacturer.

(FA4a) Sections—All sections shall be open hearth solid steel, hot rolled or cold drawn, of special Federal design.

(FA4b) Stiles and Rails—Door stiles and rails shall be *(steel tubing) (4-in structural channels).*

(FA4c) Glass Panels—Sections for glass panels shall be open hearth solid steel, hot rolled or cold drawn, of special Federal design and shall be 1¼ in. in depth.

(FA4d) Plate Panels—Plate panels shall be steel plate. Provide stiffeners where required.

(FA4e) Frames

Note: Door frames are not furnished by door manufacturer and should be included in Structural Steel Specifications.

(FA4f) Hardware—Hardware shall be Allith-Prouty standard airplane hangar door hardware.

(FA5) Construction

(FA5a) Stiles and Rails—Stiles and rails shall be mitered at corners. Cross rails shall butt between stiles. All joints and connections shall be full electric arc welded.

(FA5b) Glass Panels—Horizontal muntins shall be continuous from jamb to jamb. All joints shall be electric arc welded. Glass panels shall be equipped with glazing angles neatly mitered at corners and attached to panel sections with brass screws and bolts.

(FA5c) Plate Panels—Plate panels shall fit between stiles and rails shall be electric arc welded thereto.

(FA5d) Hardware—Doors shall be prepared to receive hardware which shall be installed and attached at time of erection.

(FA6) Hardware

(FA6a) Doors shall be equipped with Allith-Prouty standard airplane hangar door hardware complete, including trucks, cane bolts, cremone bolts and hinges *(on swing doors only)*, provision for attaching of which shall be made by the door manufacturer before shipment from factory.

(FA6b) Pilot Door Hardware—Pilot door hardware shall include hinges and locks and shall be fitted to the doors by the door manufacturer before shipment from the factory, but shall be shipped separate.

(FA6c) Pilot door locks shall be *(specify).* *(See F6c Page 26.)*

(FA7) Painting

(FA7a) All doors shall be given one coat of gray mineral paint by door manufacturer before shipment.

Note: Provide for the following in the Painting Specifications: One field coat of paint should be applied after erection but before glazing of glass panels. The application of one or more additional coats should be deferred until at least three weeks after glass has been set in glass panels to allow putty to set.

(FA7b) After erection all doors should be given one coat of paint in the field by the door manufacturer. Paint shall be *(specify).*

Note: Where doors are erected by FEDERAL STEEL SASH COMPANY, *it will do field painting where specified.* *(See Page 1.)*

(FA8) Erection

(FA8a) All doors shall be erected by the door manufacturer.

Note: See Page 1.

(FA8b) Doors shall be erected in a workmanlike manner. All unattached hardware shall be installed in accordance with the manufacturer's direction and doors and hardware left in first class condition.

(FA9) Glass and Glazing

Note: Include the following in Glazing Specifications:

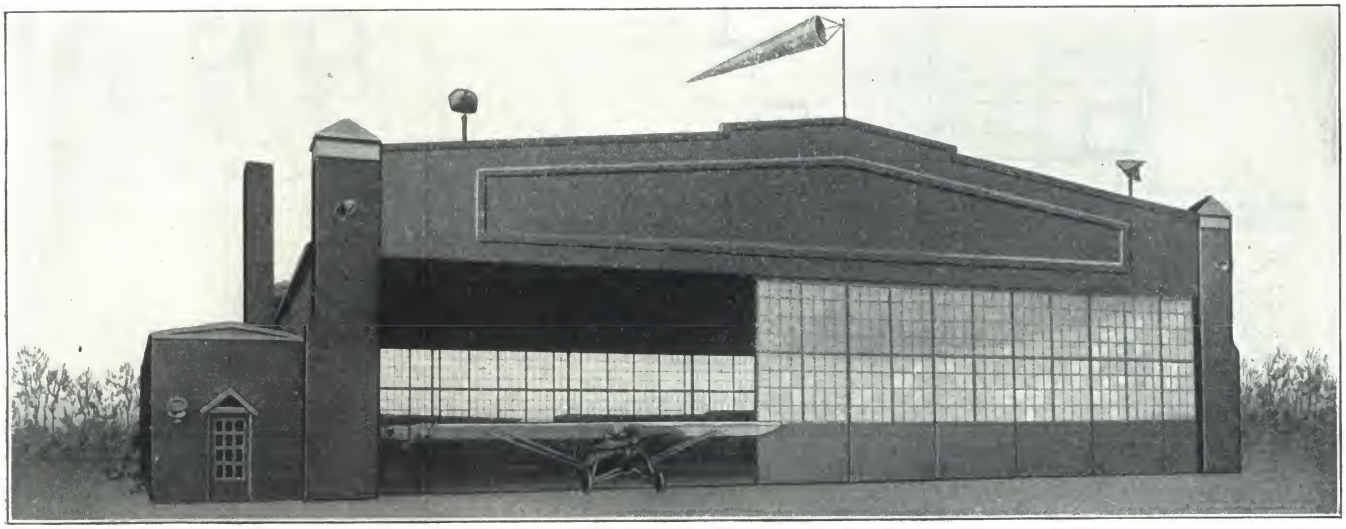
Note: See Page 4.

(FA9a) Glass shall be *(specify).*

(FA9b) Putty—Putty shall be high grade steel window putty.

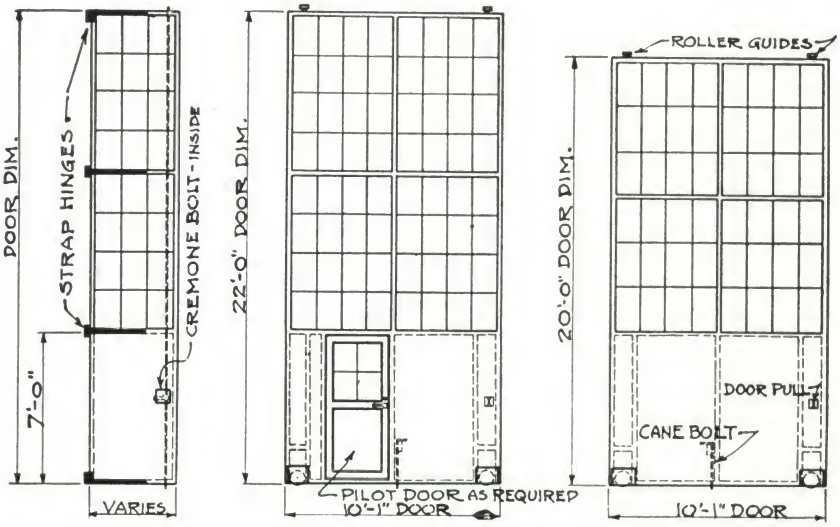
Note: See Page 4.

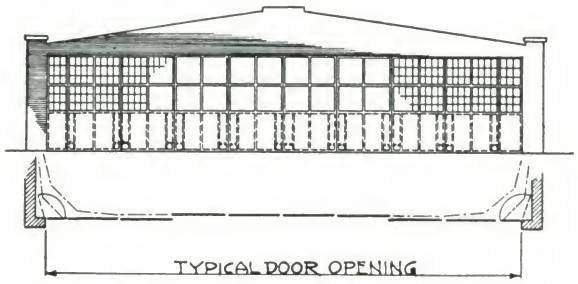
(FA9c) Glazing—All glass shall be set in a bed of putty and secured with glazing angles.



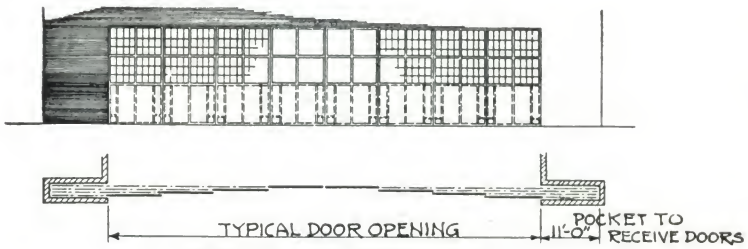
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STANDARD DOOR SIZES

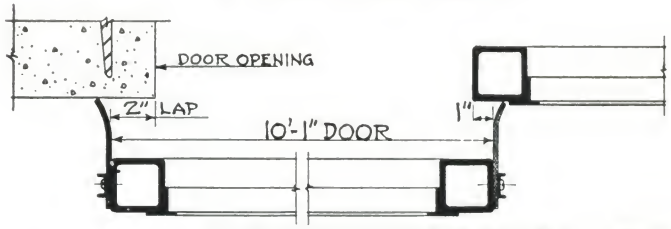




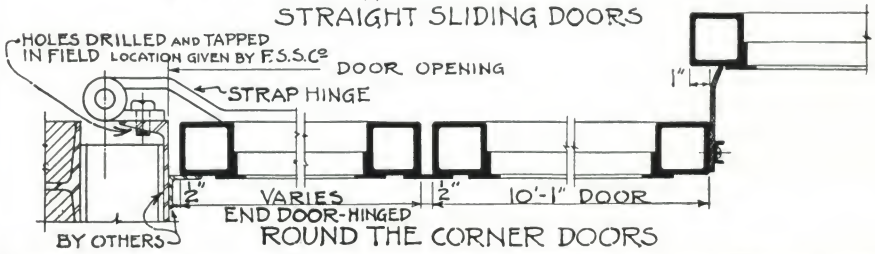
ROUND THE CORNER DOORS



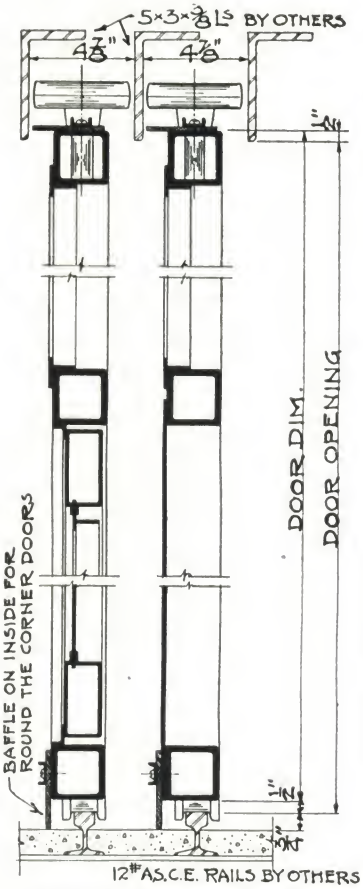
STRAIGHT SLIDING DOORS



STRAIGHT SLIDING DOORS



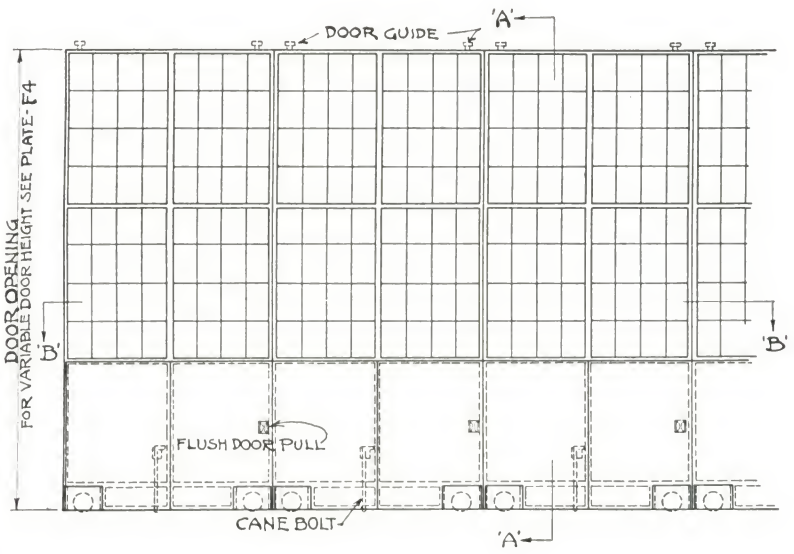
ROUND THE CORNER DOORS



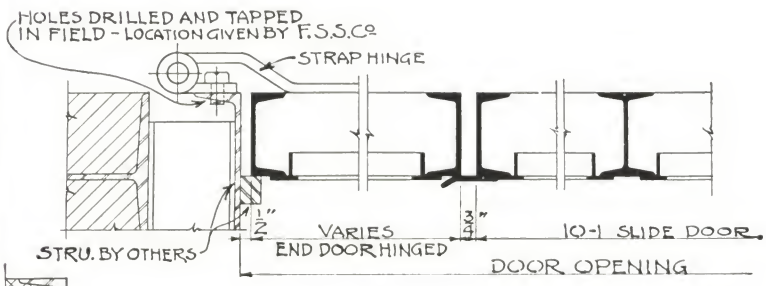
TYPICAL VERTICAL SECTION

FEDERAL. *September 1930*	AIRPLANE HANGAR DOORS *Details*	PLATE NO. F4

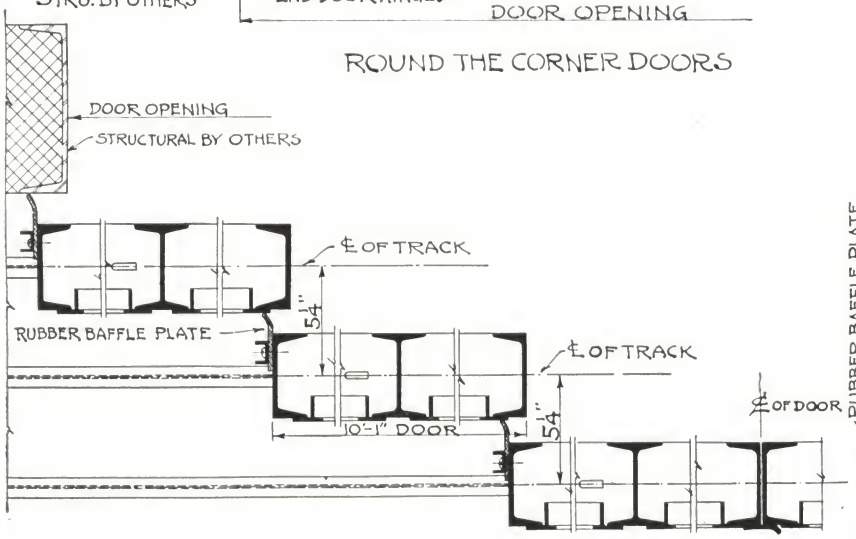
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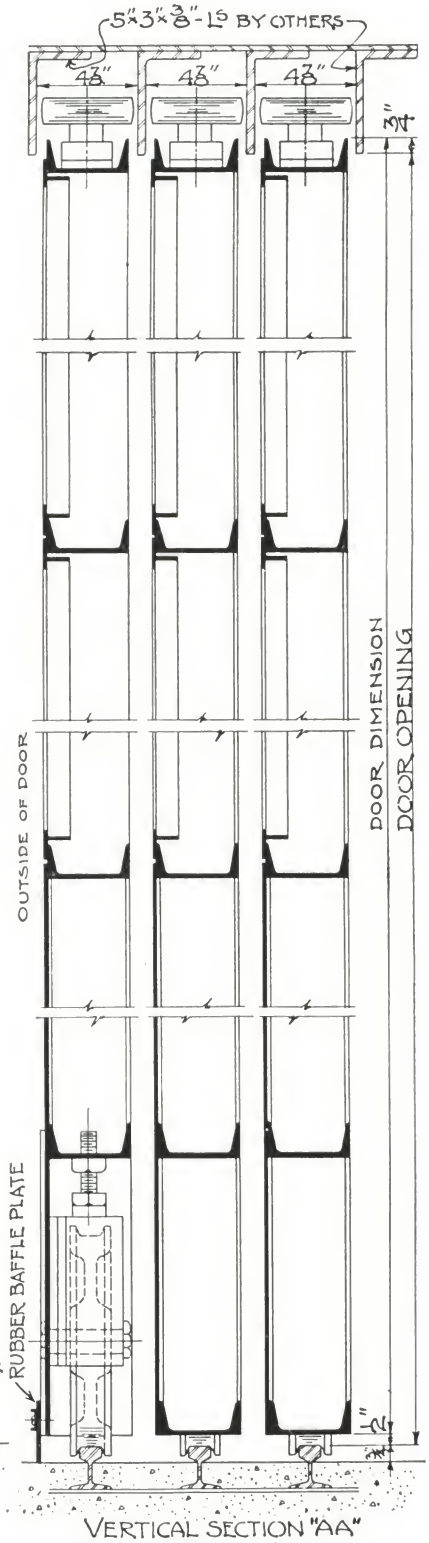
TYPICAL ELEVATION
FOR STRAIGHT SLIDING DOORS
NOTE: FOR PILOT DOORS SEE PLATE-F4-FOR GENERAL ARRANGEMENT



ROUND THE CORNER DOORS



HORIZONTAL SECTION "BB"
— FOR STRAIGHT SLIDING DOORS



VERTICAL SECTION "AA"
FOR STRAIGHT SLIDING DOORS

FEDERAL *September 1930*	AIRPLANE HANGAR DOORS *Details*	PLATE NO. F5



WELDED
Solid Steel Windows

FEDERAL STEEL SASH COMPANY
Waukesha, Wisconsin

WINDOWS

DOUBLE HUNG & CASEMENT

of

ARCHITECTURAL BRONZE
NICKEL SILVER
ALUMINUM
STEEL



GENERAL·BRONZE·CORPORATION

DISTINCTIVE PRODUCTIONS IN·ALL·METALS
LONG ISLAND CITY, N.Y.

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BRONZE ENDURES FOR ALL TIME. A popular concept—trite but true—for Bronze, foremost among the group of non-ferrous (non-rusting) alloys, whose base is copper, employed for architectural and building purposes, has perpetually recorded and preserved civilization's progress and man's art expressions from time immemorial.

Buildings equipped with Bronze work possess certain recognized qualities of dignity, refinement and permanence to a degree obtainable with no other material; qualities which tenants quickly detect and which emphasize the owner's pride of possession. Bronze work, denied proper handling in manufacture, lacks these patrician qualities, thus losing its inherent beauty.

The Bronze Industry,—now embracing production in all non-ferrous metals,—has been revolutionized, during the last quarter of a century. New alloys, new processes and new construction have been so developed that Bronze Work, heretofore deemed economically impossible for any but costly monumental structures, is now available for the better grade buildings of every class; as is evidenced by a constantly increasing demand and use.

Ranking first in importance among these modern developments is the extruded process, which has developed a group of standardized metals known as extruded bronze, extruded nickel, and extruded aluminum. Briefly, the process consists of forging semi-molten billets through steel dies, forming profiled sections of such uniformity and precision that even fine watch mechanism can be made from extruded sections. The physical, structural and accuracy values secured by extrusion are ideally adapted to architectural work.

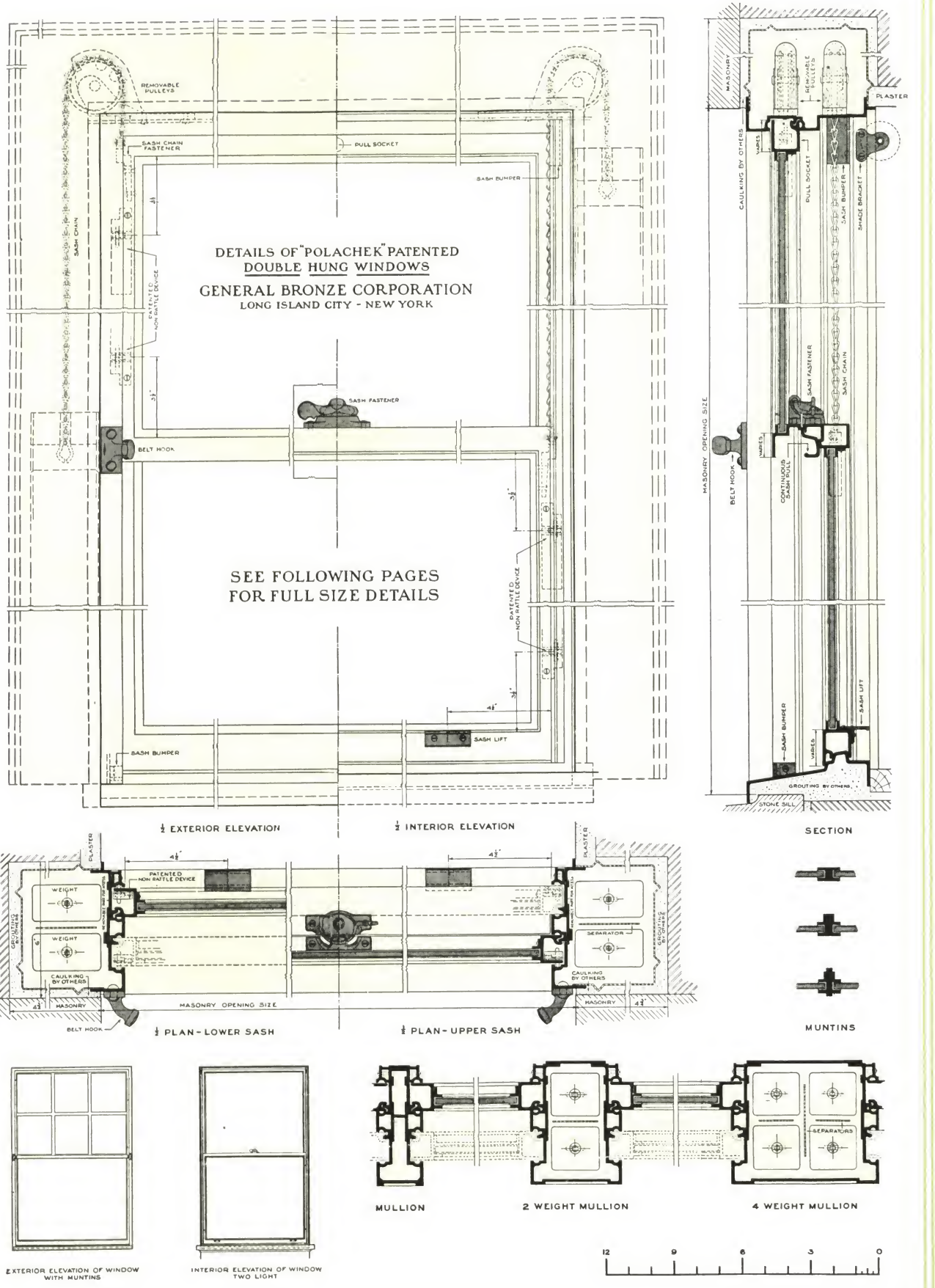
General Bronze Corporation, by extensive engineering study, research and development, has standardized a series of Metal Building Specialties in non-ferrous metals, at the same time preserving those traditional construction methods accepted as worthy of the time-honored qualities of this so-called semi-precious metal.

The windows here presented are fabricated in this construction and by these methods. The advantages gained in mechanical precision, through the use of Extruded Sections, is augmented by the painstaking care of skilled bronze artisans and mechanics in machining, fitting and assembling. Thus constructed, these windows meet every requirement of efficient service, preserve the exacting standards of fine Bronze work and will endure as long as the structures of brick and stone in which they are set.

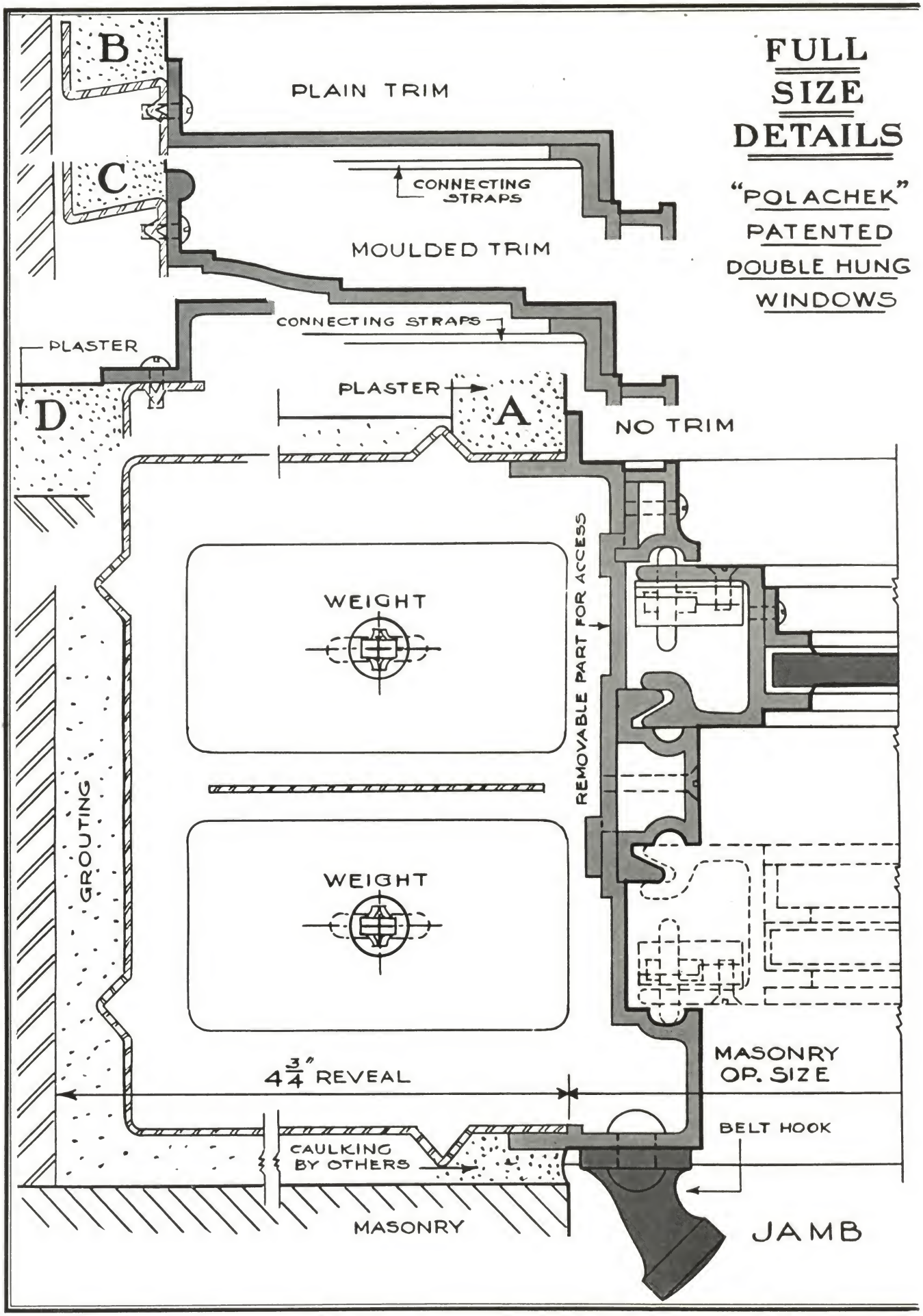
It is the purpose of this brochure to bring to those desiring the best in windows at least a partial knowledge of the excellent qualities of "Polachek" Patented Double Hung and Casement Windows; qualities already appreciated by the architects, owners and builders of many of the most prominent buildings in the United States and abroad, in which they have been used.

Windows made by General Bronze Corporation, according to their exclusive standards, have a background covered by years of fruitful experience in bronze construction and handling, as well as the vast facilities and guarantee of the world's largest architectural and ornamental metal-working organization.

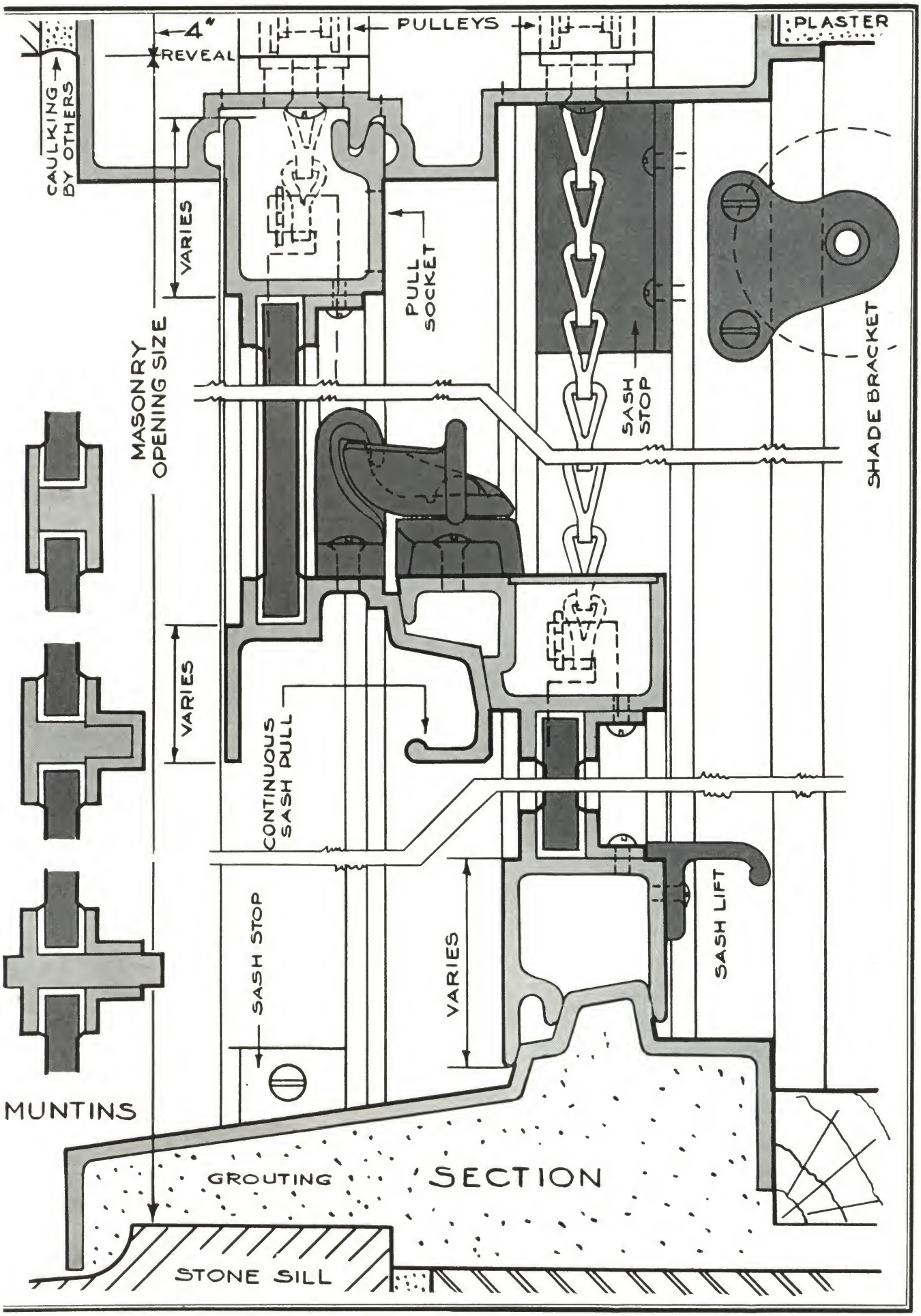
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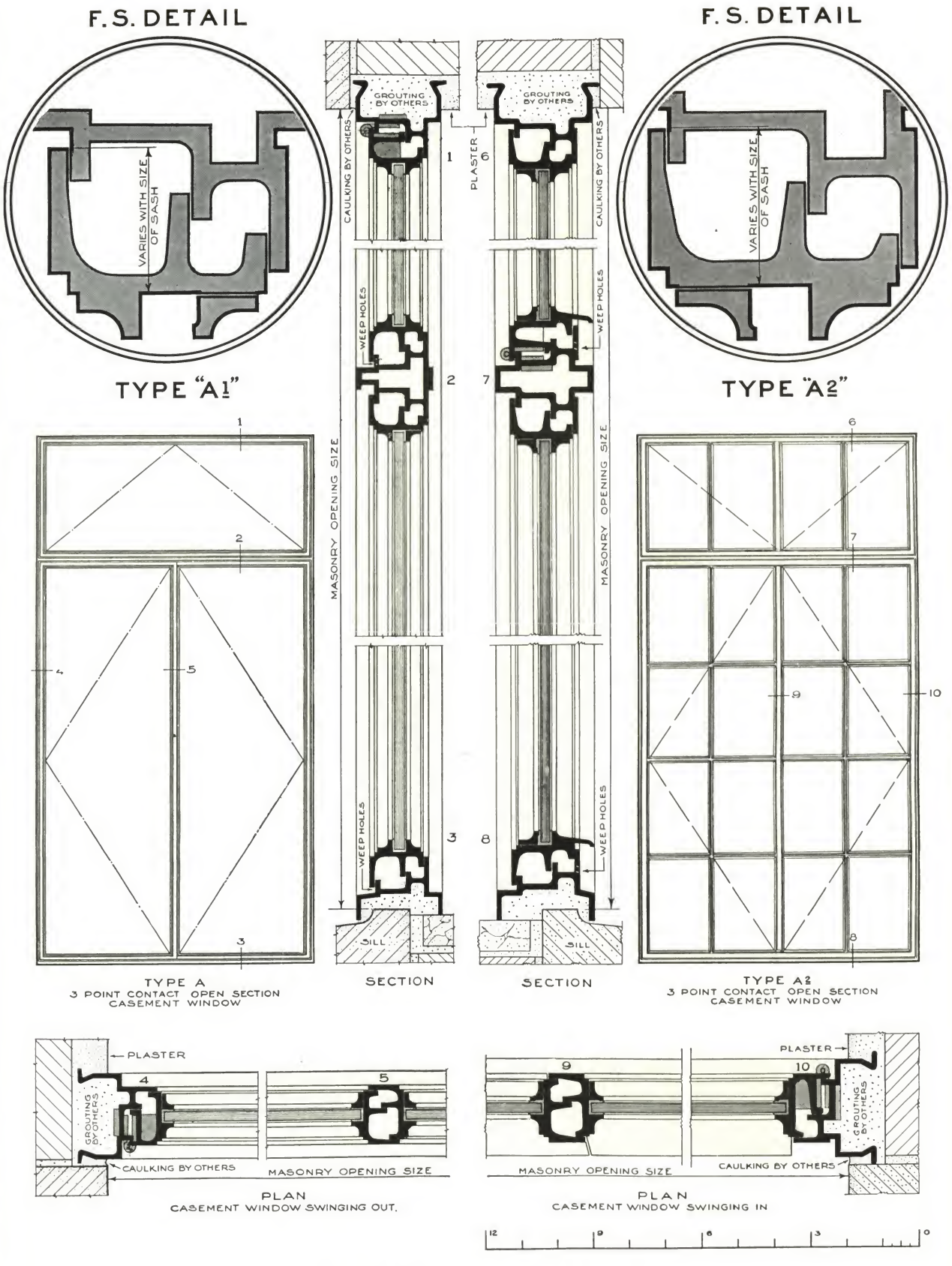
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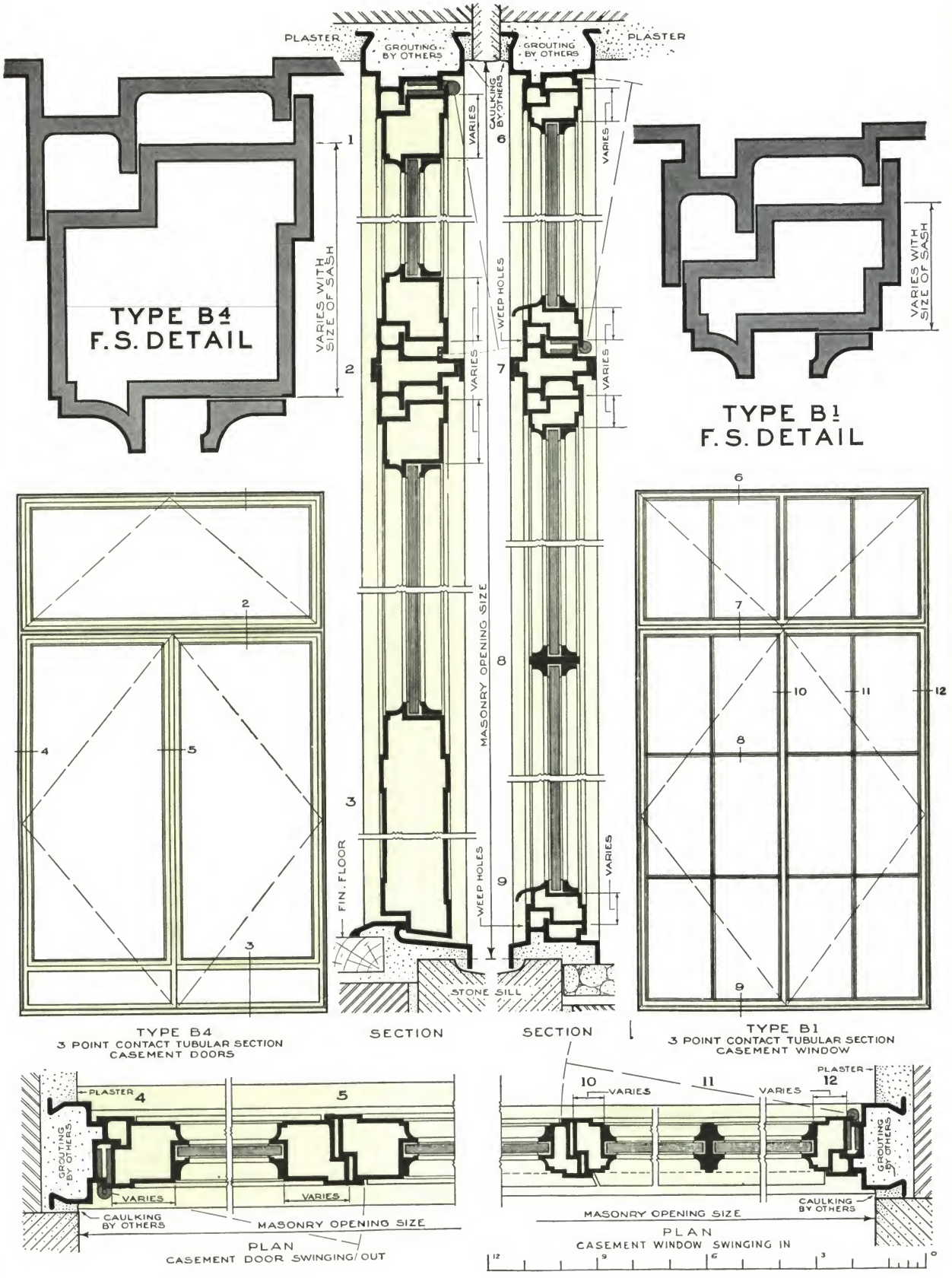


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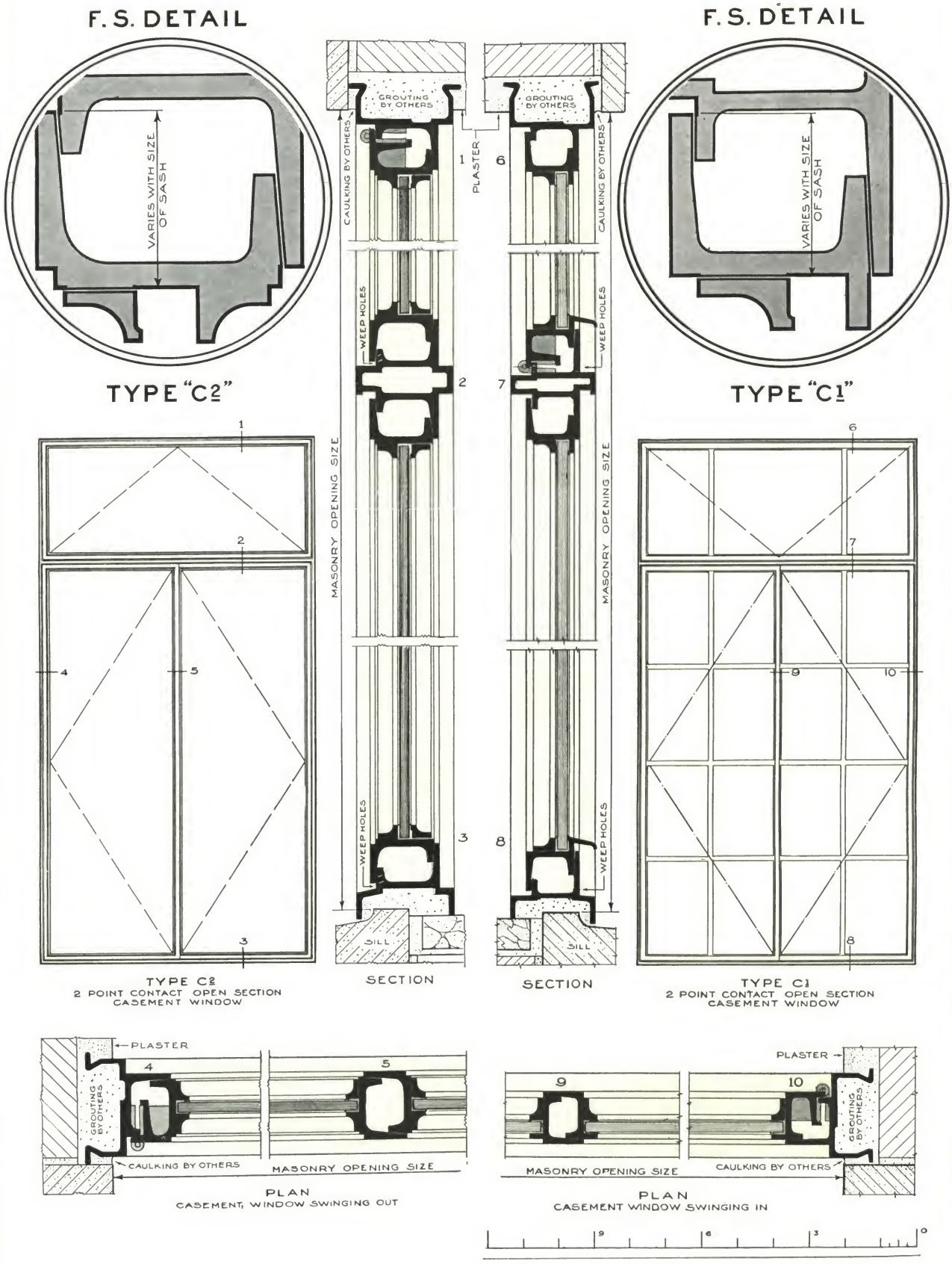
DETAILS OF TYPES A "POLACHEK" CASEMENT WINDOWS

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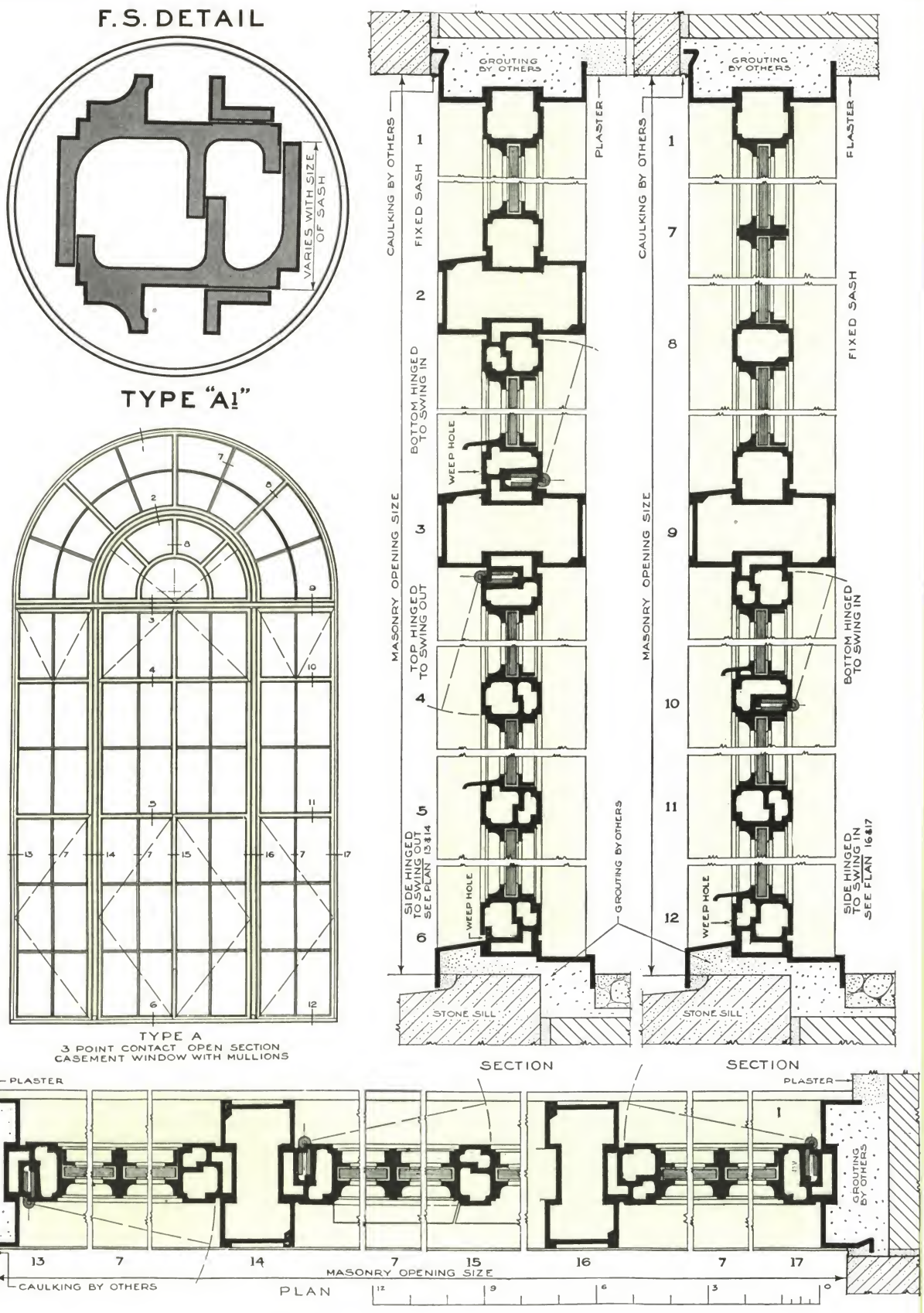
DETAILS OF TYPE B
"POLACHEK"
CASEMENT DOOR AND WINDOW

Continued on next page



DETAILS OF TYPES C "POLACHEK" CASEMENT WINDOWS

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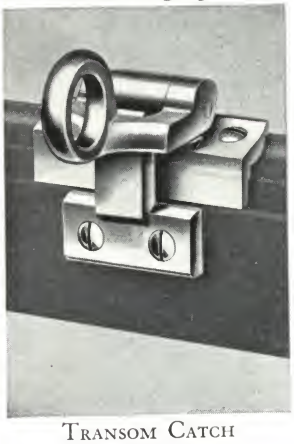


DETAILS OF TYPE A1
"POLACHEK"
CASEMENT WINDOW WITH MULLIONS

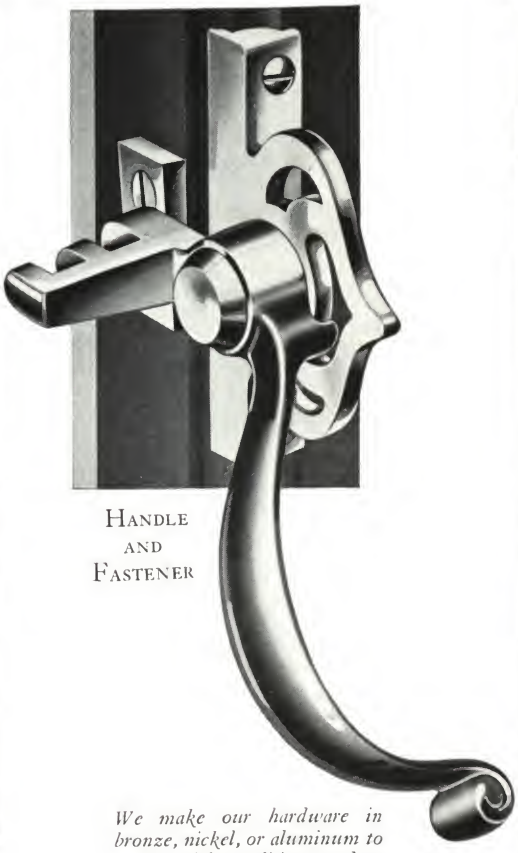
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TRANSOM CATCH
In Swinging

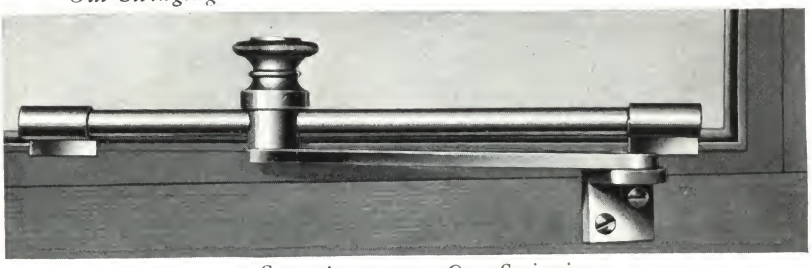


TRANSOM CATCH
Out Swinging

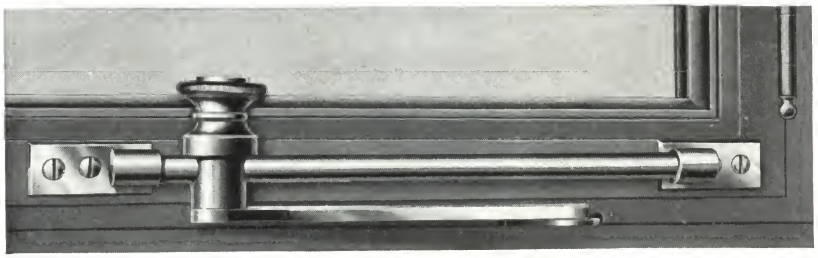


HANDLE
AND
FASTENER

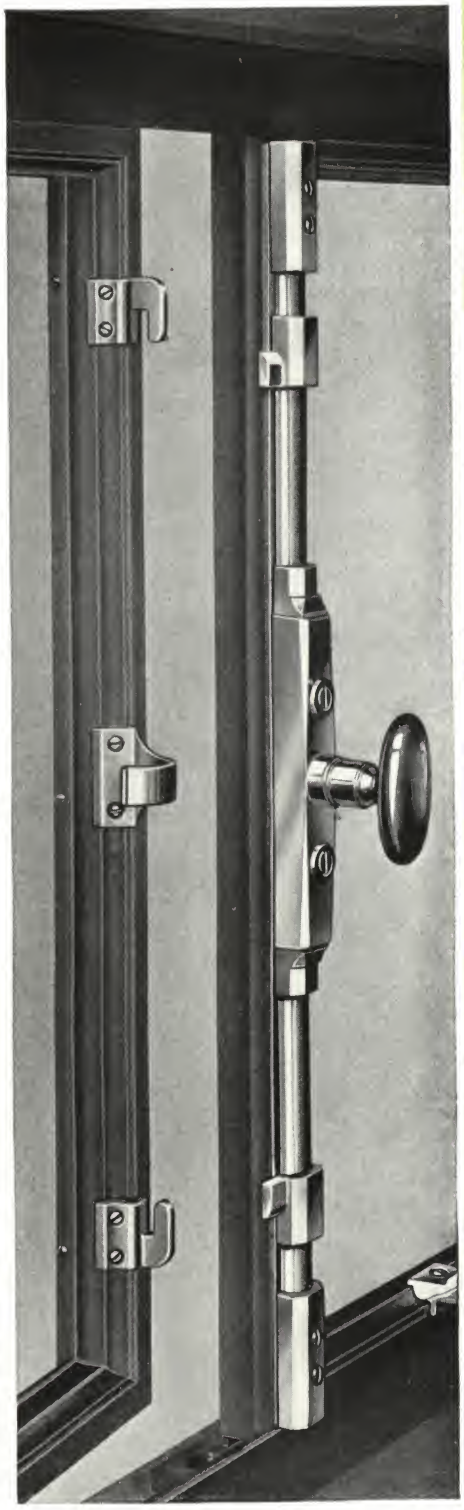
We make our hardware in bronze, nickel, or aluminum to suit special conditions and to match the window material



SASH ADJUSTOR—*Out Swinging*



SASH ADJUSTOR—*In Swinging*



CREMORNE BOLT
top, bottom and center lock

GENERAL BRONZE SPECIAL HARDWARE
FOR CASEMENT WINDOWS AND TRANSOM SASH

Continued on next page

DESCRIPTION OF THE "POLACHEK" PATENTED DOUBLE HUNG AND CASEMENT WINDOW

THE "POLACHEK" PATENTED DOUBLE HUNG WINDOW, owned and manufactured exclusively by General Bronze Corporation, is air-tight and weatherproof without binding or rattling in any position; non-rusting, permanent and quiet in operation. Salient patented features are a series of accurately-matched integral wedge-shaped tongues and grooves, effecting positive multiple contacts throughout the perimeter of both sashes when closed, and concealed devices within the sash construction which effectively prevent sash rattling while in any position. Patented in the U. S. on Dec. 1, 1924; and improved on July 7, 1925; July 19, 1927, and Nov. 29, 1927.

All parts of the window are made by special dies of Extruded Metal—a trade name applied to well-known, standardized alloys in Bronze, Aluminum, Benedict Nickel Metals. Metal formed by the extrusion process contributes qualities of particular advantage to window construction —uniformity in profile, strength, rigidity and surface texture. These, combined with intelligent design, precise machining and careful assembling of the members, insure a permanently satisfactory and distinctive installation.

The design of the window is simple, dignified and architecturally correct. Frame and Sash are so designed as to combine sufficient strength with the maximum obtainable of daylight opening. Sash provided for glazing from inside. Construction is rigid and permanent—it being impossible for the corners of sash or frame to open. Mitres, copes, tenons, and all other inter-



Main Platform—CHASE NATIONAL BANK, *Head Office, New York City*

Continued on next page

sections are precision-gauged and machined; members are carefully fitted and assembled, and each unit thoroughly inspected before shipment. Workmanship is assured thru employment of artisans trained in handling fine ornamental bronze work.

The "Polachek" Double Hung Window is produced in two types:

FIRST TYPE as illustrated on page 4 with no trim, plaster adjoining jamb of the window as shown by the letter "A". In this type, a part of the jamb is removable for access to the weight box, as indicated.

SECOND TYPE provides a metal trim on the inside which gives the window a more pleasing appearance. This trim is removable for easier access to the weight pocket as indicated by letter "B". This type can be furnished with a moulded trim, as indicated by letter "C" or with a trim returning to plaster, as indicated by letter "D", to meet special conditions.

Moulded or plain extruded metal stools, if required, will be provided for any of the above types.

We have designed, for each of the above types, three sets of die sections for horizontal sash rails for varying widths of windows.

STANDARD EQUIPMENT: The frames are fitted with heavy, galvanized iron, asphaltum-coated weight boxes; roller-bearing, overhead-type pulleys in heavy housings bronze faced to match frames; cast-iron weights and Hercules finish or hot galvanized, extra-heavy, steel sash chain, plated to match frames.

Each window is fitted with two sash lifts, one sash lock, one sash pull and four sash bumpers —all heavy, solid bronze, nickel or aluminum to match windows.

STANDARD EXTRA EQUIPMENT: (—) Cleaner's safety hooks and belts, (—) sash pull hooks on wood poles, (—) shade brackets, (—) curtain rod brackets and rods, and (—) drapery hooks.

SPECIAL EXTRA EQUIPMENT: Fly Screens, Wind Shields, Awning Brackets, Venetian Blind Supports, Radiator Brackets, Hoods, Enclosures, with or without grilles.

Special Steel Double Hung Windows are also manufactured by the Corporation. Details upon request.



IRVING TRUST CO.
230 Park Avenue, New York City



BANKERS TRUST CO.
57th Street & Madison Avenue, New York City

Continued on next page

The "POLACHEK" PATENTED CASEMENT WINDOW is another exclusive product of General Bronze Corporation and embodies the same standards of Good Construction, Excellent Workmanship and Permanent Service. It is so designed and fabricated as to produce continuous three-point contact throughout the sash perimeter, when closed. Patented in the U. S. March 9, 1929.

Frame, sash and trim throughout are of extruded metal from special dies.

The Corporation also makes a casement window, the stiles and rails of the sash being tubular-shaped (closed section) of drawn metal, which is also a three-point contact type, as illustrated on page 7. The tubular-shaped members add strength and rigidity to the sash and a more finished appearance when the sash is open and are specially adapted to large casements and casements extending to the floor that serve as doors.

The superior weatherproof qualities of these windows are recognized and attested to by many Architects, Owners and Builders who have used them, and are apparent to the discerning eye from a careful study of the sections herein shown.

STANDARD EQUIPMENT: General Bronze Special Hardware, as illustrated on page 10, is standard for all casements. Attractive, sturdy and efficient, it harmonizes perfectly with this most attractive type of window. Note particularly the absence of extreme projections and the general compactness of operating and engaging parts, not obtainable in other makes.

STANDARD AND SPECIAL EXTRA EQUIPMENT for casement windows is furnished the same as noted above for Double Hung Windows.

Complete architectural specifications and details also samples of "Polachek" Double Hung and Casement Windows will be supplied on request. We solicit the opportunity to quote on your requirements.

Address either the Eastern General Sales Office, 480 Hancock Street, Long Island City, N. Y., the Western General Sales Office, Builders Building, Chicago, Ill., or any office of the Corporation's Sales Representatives, located in principal cities.



FRED F. FRENCH BUILDING, *Fifth Avenue, New York City*

Continued on next page



NEW YORK LIFE INSURANCE BUILDING

Cass Gilbert, Architect *Starrett Brothers & Eken, Builders*

BRONZE WINDOWS

of the "Polachek" Double Hung Type Throughout

Continued on next page

A PARTIAL LIST OF INSTALLATIONS OF BRONZE AND ALUMINUM "POLACHEK" DOUBLE HUNG AND CASEMENT WINDOWS

Building	*Location*	*Architects*
N. Y. Life Insurance Co.	New York, N. Y.	Cass Gilbert
Prudential Life Insurance Bldg.	Newark, N. J.	Cass Gilbert
West Virginia State Capital	Charlestown, West Va.	Cass Gilbert
Aeolian Building	New York, N. Y.	Warren & Wetmore
N. Y. Central R.R. Office Bldg.	New York, N. Y.	Warren & Wetmore
Pennsylvania Railroad Building	Philadelphia, Pa.	Graham, Anderson, Probst & White
Medical Arts Building	Cleveland, Ohio	Graham, Anderson, Probst & White
Koppers Building	Pittsburgh, Pa.	Graham, Anderson, Probst & White
Foreman National Bank	Chicago, Ill.	Graham, Anderson, Probst & White
Chase National Bank	New York, N. Y.	Graham, Anderson, Probst & White
Mitsui Main Building	Tokyo, Japan	Trowbridge & Livingston
Central Union Trust Co.	66 Broadway, N. Y.	Cross & Cross
First National Bank of Boston	Buenos Ayres Branch	York & Sawyer
Northwestern Mutual Life Ins. Co.	Milwaukee, Wis.	Holabird & Root
Mutual Benefit Life Ins. Co.	Newark, N. J.	John H. & Wilson C. Ely
Municipal Building	East Orange, N. J.	John H. & Wilson C. Ely
Nebraska State Capital Building	Lincoln, Neb.	Bertram Goodhue Associates
County Office Building	Pittsburgh, Pa.	Stanley L. Roush
New York County Court House	New York, N. Y.	Guy Lowell
N. Y. State Office Building	Albany, N. Y.	W. E. Haugaard
N. Y. State Office Building	New York, N. Y.	W. E. Haugaard
City Hall Annex	Philadelphia, Pa.	Phillip H. Johnson
Sterling Memorial Library	New Haven, Conn.	James Gamble Rogers
Clark Library	Los Angeles, Calif.	Robt. D. Farquhar
Wayne County & Home Bank	Detroit, Mich.	Albert Kahn
Title Guaranty & Trust Co.	New York, N. Y.	John Mead Howells
Chemical National Bank	New York, N. Y.	Walker & Gillette
Bankers Trust Company	New York, N. Y.	Charles E. Birge
East New York Savings Bank	Brooklyn, N. Y.	Holmes & Winslow
Hoboken Bank for Savings	Hoboken, N. J.	Ludlow & Peabody
Bronx Savings Bank	New York, N. Y.	Morgan, French & Co., Inc.
First National Bank & Trust Co.	Ridgewood, N. J.	Morgan, French & Co., Inc.
City National Bank & Trust Co.	Danbury, Conn.	Morgan, French & Co., Inc.
Farmers Bank	Wilmington, Del.	Edward Canby May
Federal American National Bank	Washington, D. C.	Alfred C. Bossom
Farmers National Bank	Beaver Falls, Pa.	Uffinger, Foster & Bookwalter
Ozone Park National Bank	Woodhaven, N. Y.	Uffinger, Foster & Bookwalter
Allentown National Bank	Allentown, Pa.	Ruhe & Lange
Newport Savings Bank	Newport, R. I.	Thomas M. James
Apartment 740 Park Avenue	New York, N. Y.	Rosario Candela
Fred F. French Co. Building	New York, N. Y.	Fred F. French Co.
Packard Building	Philadelphia, Pa.	Ritter & Shay
Grant Building	Pittsburgh, Pa.	Henry Hornborstel
Phillips Office Building	Butler, Pa.	Janssen & Cocken
Villa Maria College	Chester City, Pa.	Paul Monoghan
Cypress Hills Mausoleum	Brooklyn, N. Y.	Gregory B. Webb
Fairview Community Mausoleum	Fairview, N. J.	Webb & Sohn
Greenmount Community Mausoleum	Baltimore, Md.	Buckler & Fenhagen

Continued on next page

GENERAL BRONZE CORPORATION

Distinctive Productions in All Metals

ART, ARCHITECTURAL, SCULPTURAL, DECORATIVE AND MISCELLANEOUS
METAL WORK OF EVERY DESCRIPTION

MADE BY THE

ORNAMENTAL BRONZE AND IRON TRADES

THESE products are specially manufactured to meet the most exacting demands of Architects' Plans and Specifications, Sculptors' Models and Artists' Designs. The Engineering methods of Bronze Construction and Bronze Working, which we employ in manufacture, preserve every art value of design while enhancing them with distinctive qualities of metalcraft.

We also develop standardized ARCHITECTURAL and BUILDING SPECIALTIES in METAL. These retain the same CLASS and QUALITY that distinguish our Special Work.

Our DESIGNING, DRAUGHTING, ENGINEERING, EXPERIMENTAL and RESEARCH Departments are open to the Profession in Developing Plans and Details as well as Assisting in the co-ordination of other Trades in connection with ORNAMENTAL METAL WORK—Contracted or Prospective.

EXECUTIVE OFFICES

480 HANCOCK STREET
LONG ISLAND CITY, N. Y.

WESTERN SALES OFFICE
BUILDERS BUILDING
LaSalle & Wacker Drive
Chicago, Ill.

MINNEAPOLIS OFFICE
27th Avenue & 27th Street, So.

ART SHOW ROOMS
56TH STREET GALLERIES
6 East 56th Street
New York

FACTORIES

John Polachek Bronze & Iron Plant
Long Island City, N. Y.

Tiffany Bronze & Iron Plant
Corona, N. Y.

Renaissance Bronze & Iron Plant
Long Island City, N. Y.

Roman Bronze Works Statuary Foundry
Corona, N. Y.

Flour City Ornamental Iron Plant
Minneapolis, Minn.

Wisconsin Ornamental Bronze Plant
Milwaukee, Wis.

Guarantee Iron & Steel Plant
Chicago, Ill.

Dominion Bronze & Iron Plant
Winnipeg, Manitoba, Can.

Sales Representatives in Principal Cities

HENRY HOPE & SONS INC.

MAKERS OF

Metal Casements, Steel Windows, Leaded Glazing and Leadwork

101, PARK AVENUE

NEW YORK, N.Y.

Telephone: ASHLAND 8047, 8048 & 8039

STEEL & BRONZE WINDOWS
suitable for Residences, Universities, Colleges, Public Buildings, Schools, etc.

SECTIONS as illustrated full size, based upon over 100 years' experience, provide two points of contact, with ample interior cavity to prevent capillary attraction. Thissystem has proved weathertight in the most exposed situations throughout the world. These three sections are of universal application, and can be made to open outwards, inwards, or to pivot horizontally or vertically. We recommend as a general rule that casements should open outwards.

HARDWARE. Our hardware is of the highest class, made from BRONZE to U.S.A. Naval Specification, all working parts machined with ample bearing surfaces for everlasting wear. All hinges are of solid bronze, and horizontally and vertically pivoted casements are hung on our patent solid bronze cup pivots, which afford perfect security, easy working and exclusion of the weather.

QUALITY. We make three qualities, No. 1 fitted with Hope's bronze hardware; No. 2 with iron hardware (the steel for both these qualities is finished with two coats of anti-corrosive paint); Quality No. 1A is finished with a stoved coat of enamel in addition.

GLAZING & SETTING
We keep a staff of fully qualified workmen, and undertake contracts including setting and glazing complete.

· HOPE'S WINDOWS ·



EDSEL FORD RESIDENCE, GROSSE POINT, MICHIGAN

The finest buildings throughout the world are fitted with HOPE'S Casements

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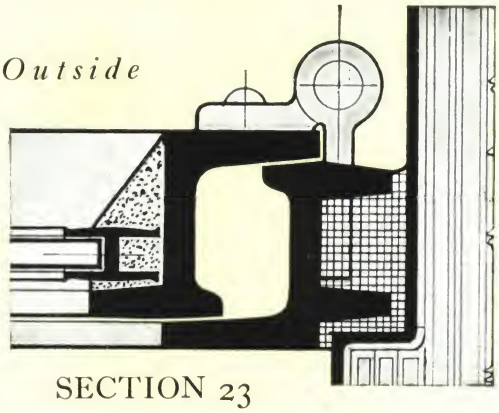
HOPE'S STEEL & BRONZE WINDOWS

FULL SIZE DETAILS AT JAMBS *of* SECTIONS No. 21, 22, 23



PHOTOGRAPH OF HOPE'S SIDE HUNG & TOP HUNG CASEMENT IN SECTION 23, QUALITY 1, HANDLE No. 1393, SLIDING STAY 223. THE TOP HUNG CASEMENT IS HUNG ON HOPE'S BRONZE CUP PIVOTS, AND FITTED WITH HOPE'S PATENT CAM OPENER

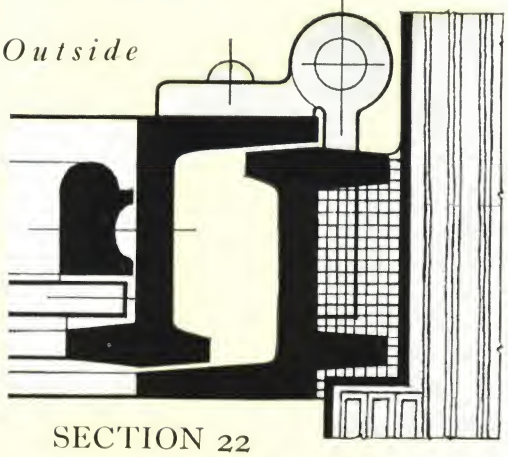
Outside



SECTION 23

FOR CASEMENTS UP TO 1′ 9″ WIDE

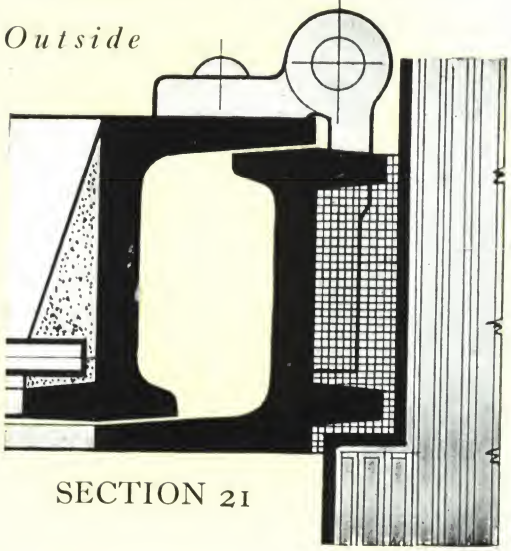
Outside



SECTION 22

FOR CASEMENTS UP TO 2′ 6″ WIDE

Outside



SECTION 21

FOR CASEMENTS OVER 2′ 6″ WIDE

FOR THE HIGHEST CLASS OF WORK WE RECOMMEND THE USE OF SOLID BRONZE. IT IS EVERLASTING IN WEAR, HAS A BEAUTIFUL SURFACE, AND IMPROVES IN COLOUR WITH AGE. WE MAKE ALL OUR SECTIONS IN THIS METAL AND WILL FURNISH SAMPLES AND ESTIMATE OF THE COST WHEN DESIRED

CAMPBELL CASEMENT WINDOW CORP.

Manufacturers of Steel, Bronze and Aluminum Windows and Doors

Pershing Square Building, NEW YORK, N. Y.

SALES REPRESENTATIVES IN PRINCIPAL CITIES

Products

HEAVY SECTION WEATHERSTRIPPED CASEMENTS and DOORS, in steel, bronze and aluminum; STANDARD STEEL WEATHERSTRIPPED CASEMENTS; DOUBLE GLAZED CASEMENTS; BALANCED STEEL WINDOWS; PROJECTED STEEL WINDOWS; BASEMENT WINDOWS in cast iron.

Also Heavy and Standard Casements non-weatherstripped, and Factory Sash.

Weatherstripping

The efficiency of the Campbell patented method of weatherstriping casements is definitely proven by the performance of 3,300 Campbell Weatherstripped Casements installed in the Harkness Memorial Quadrangle at Yale University in 1920. These casements are absolutely weatherproof and have given complete satisfaction. It is a convincing example of a permanent and thoroughly efficient method of weatherproofing. Due to this success, the CAMPBELL CASEMENT WINDOW CORP. now brings out for the first time a series of Casements weatherstripped in accordance with their patents.

Campbell Weatherstripped Casements eliminate inleaking air draughts and water—they are stormproof and dustproof.

Campbell Weatherstripped Casements—400 Series

Furnished with muntins or for leaded glass.

This series embraces side hung or pivoted casement windows for residences, banks, clubs, public buildings, churches, etc., balanced and projected windows for hospitals and schools, double glazed windows (either side hung or pivoted) and casement doors.

The appearance of both fast and opening portions is identical throughout. Whether opening or fixed, the sight lines of all windows are exactly similar and the glass is in the same plane. Hinges are of solid bronze, of unusually substantial design.

Campbell Pivoted Casements are hung on our special solid brass, machine turned pivots of large diameter. They are formed with two ribs on the outside of each part designed to prevent any thrust on the screws that hold them in position. The bars to which the pivots are fixed are machined from solid, continuous sections, instead of being formed by reversing and welding two bars together. The weathering is solid with the frames and not obtained by the use of welded or screwed beads or strips.

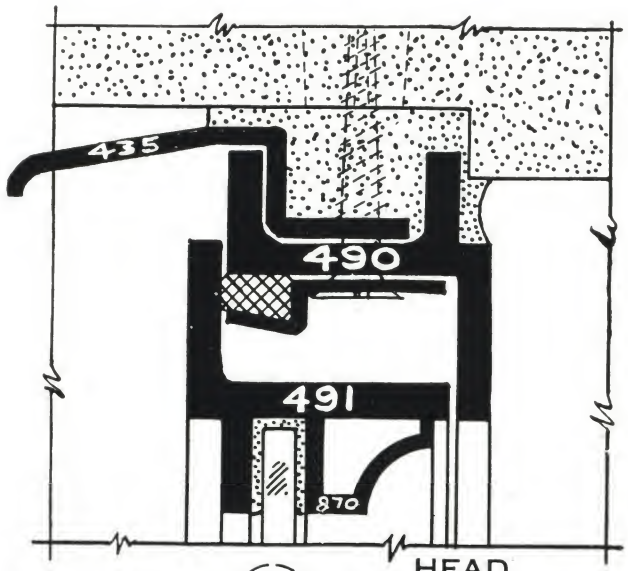
Construction—The Campbell Patented Weatherstrip is inserted in a dovetailed groove in the casement frame. The sash is so arranged as to make a continuous contact with the weatherstrip in addition to the usual metal to metal contact.

Cross joints of glazing bars are locked to avoid cutting away the strength of the bar at the joint and to give a distinctive appearance to the window. All corners are tenoned by specially designed tools, machine riveted, and then welded solid. All contacts polished smooth.

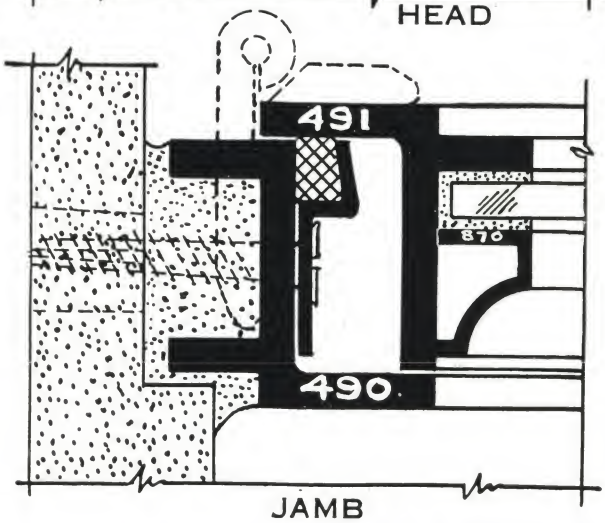
Hardware—2-point solid bronze handle. Bronze sliding adjusting stay. Extension hinges, permitting cleaning the window from the inside.

Non-weatherstripped Casements

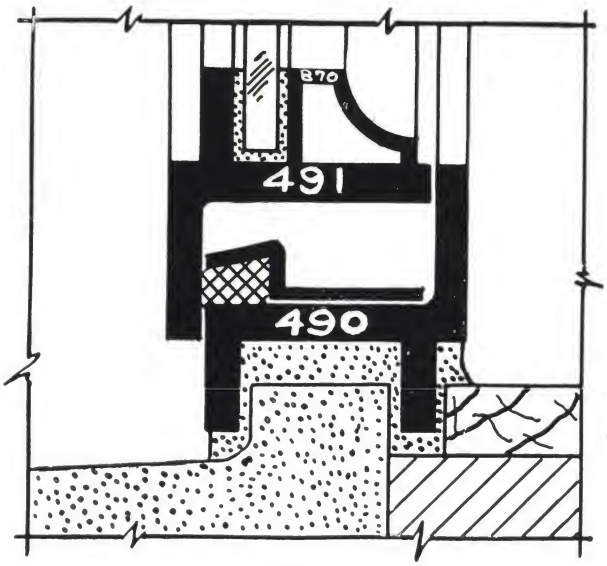
400 Series Casements can also be furnished, if desired, in non-weatherstripped sections.



HEAD



JAMB



SILL

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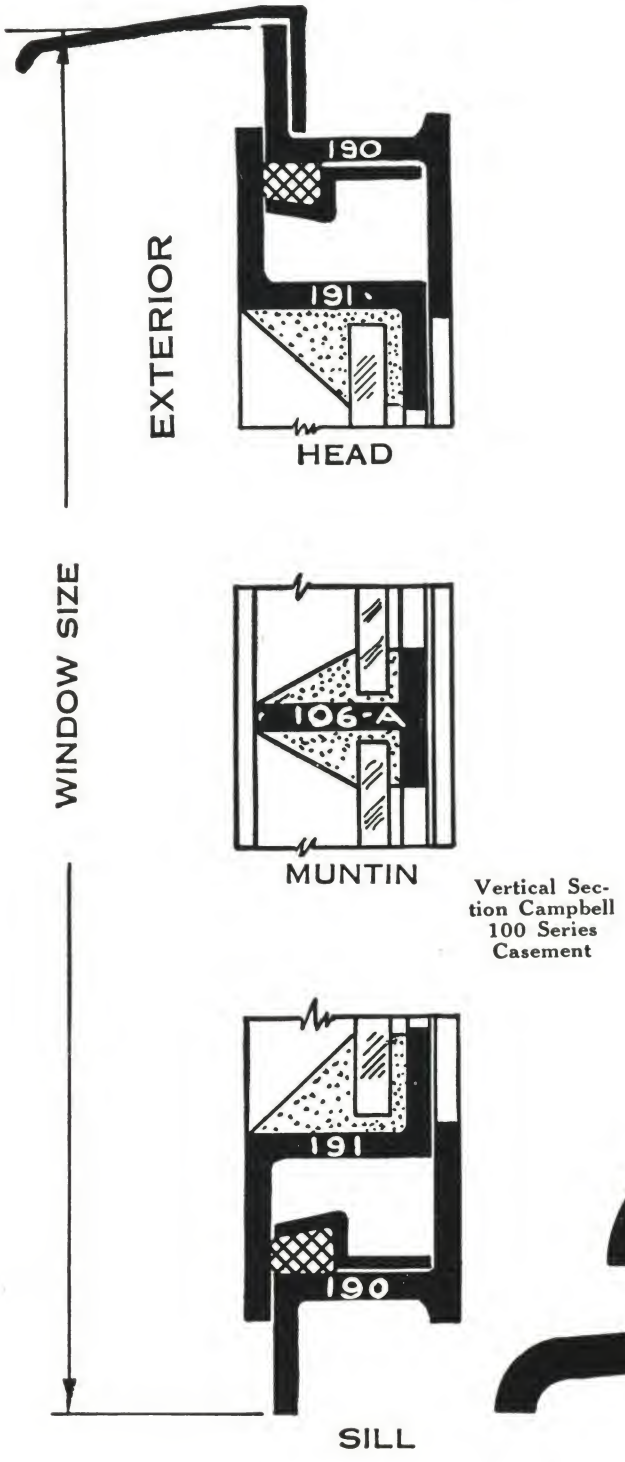
Campbell Standard Casements—100 Series

Furnished with muntins or for leaded glass.

Campbell Casements are arranged for coupling together by means of our heavy mullion and transom bars specially designed to afford double weathering and rigidity, neither of which is secured when T-bars are used for this purpose. This feature enables the use of these windows in large openings, even when exceptional wind pressure must be provided against.

Material Specifications—Windows are constructed of rolled mild steel sections of best quality, hydraulically straightened. Cross joints of glazing bars are locked to avoid cutting away the strength of the bar at the joint and to give a pleasant and distinctive appearance to the windows.

The frame member is so designed that an undercut slot is formed for the reception of a continuous felt weatherstrip around its entire perimeter. The sash is so arranged in the frame that it makes one weathering contact with the felt weatherstrip and one weathering contact with the steel frame.



Vertical Section Campbell 100 Series Casement

All corners are tenoned by specially designed tools, machine riveted and then welded solid.

All casements open outwards and are hung on heavy steel hinges, with ⅜-in. diameter bronze pins. Side hung casements are fitted with two-point solid bronze handles and solid bronze sliding adjusters. Top hung casements are fitted with hinges and solid bronze peg stay with pin and rest.

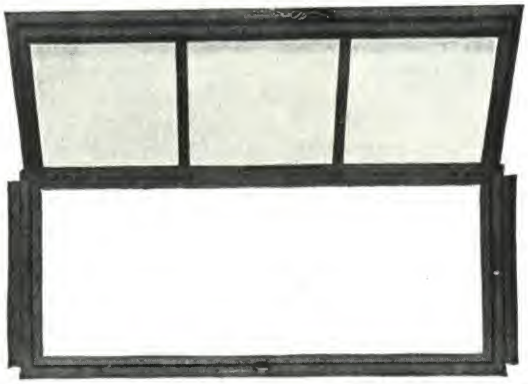
All fittings have bronze working parts.

These windows are designed for building in as the work proceeds and anchors are provided for this purpose. Where it is desired to erect these in wood or stone, countersunk fixing holes are provided.

100 Series Casements can also be furnished, if desired, in non-weatherstripped sections.

Campbell Cast Iron Basement Windows

These windows cannot rot or corrode. Their sash and frame are cast as single units insuring absolute rigidity and accurate fitting of sash in the frame. No warping or bending is possible. Hinges, cast integrally with sash and frame, are of



rugged and simple design. The withdrawal of two pins allows complete removal of sash from the frame.

Frames are provided with locking pin attached with chain. Holes for application of screens are also included.

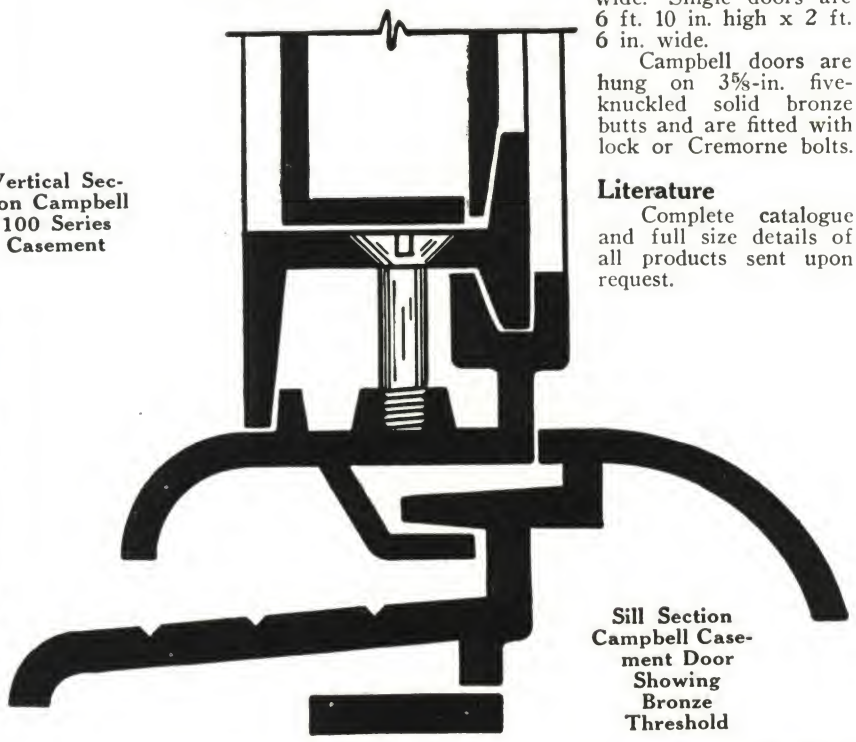
Standard Sizes—

1 ft. 3 in. x 2 ft. 9¾ in.	1 ft. 11 in. x 2 ft. 7⅜ in.
1 ft. 9 in. x 3 ft. 3¾ in.	1 ft. 11 in. x 2 ft. 9¾ in.

Campbell Casement Doors

All Campbell Casement Doors are made in 400 series sections as we are unable to recommend a lighter weight section for doors. Standard doors are 6 ft. 10 in. high x 3 ft. 4¼ in. wide. Single doors are 6 ft. 10 in. high x 2 ft. 6 in. wide.

Campbell doors are hung on 3½-in. five-knuckled solid bronze butts and are fitted with lock or Cremorne bolts.



Sill Section Campbell Casement Door Showing Bronze Threshold

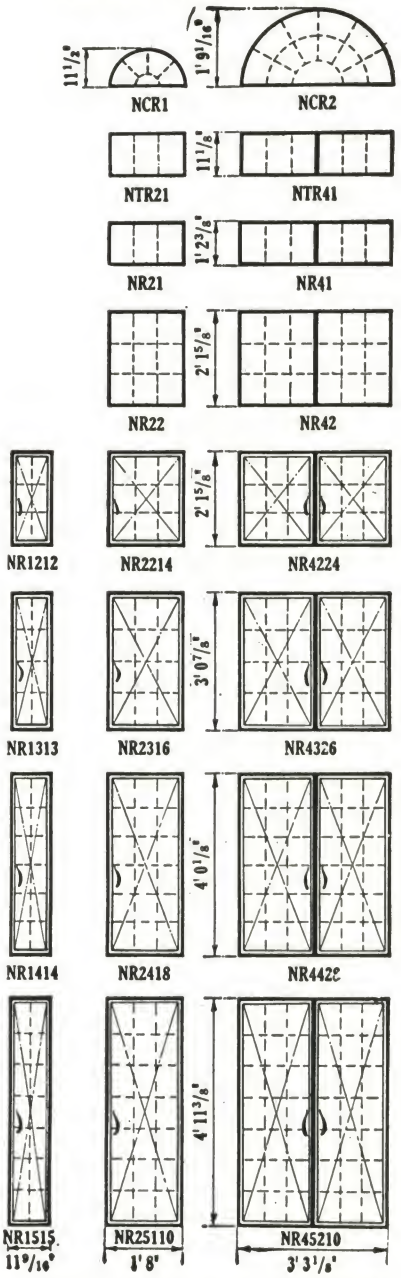
Literature

Complete catalogue and full size details of all products sent upon request.

Continued on next page

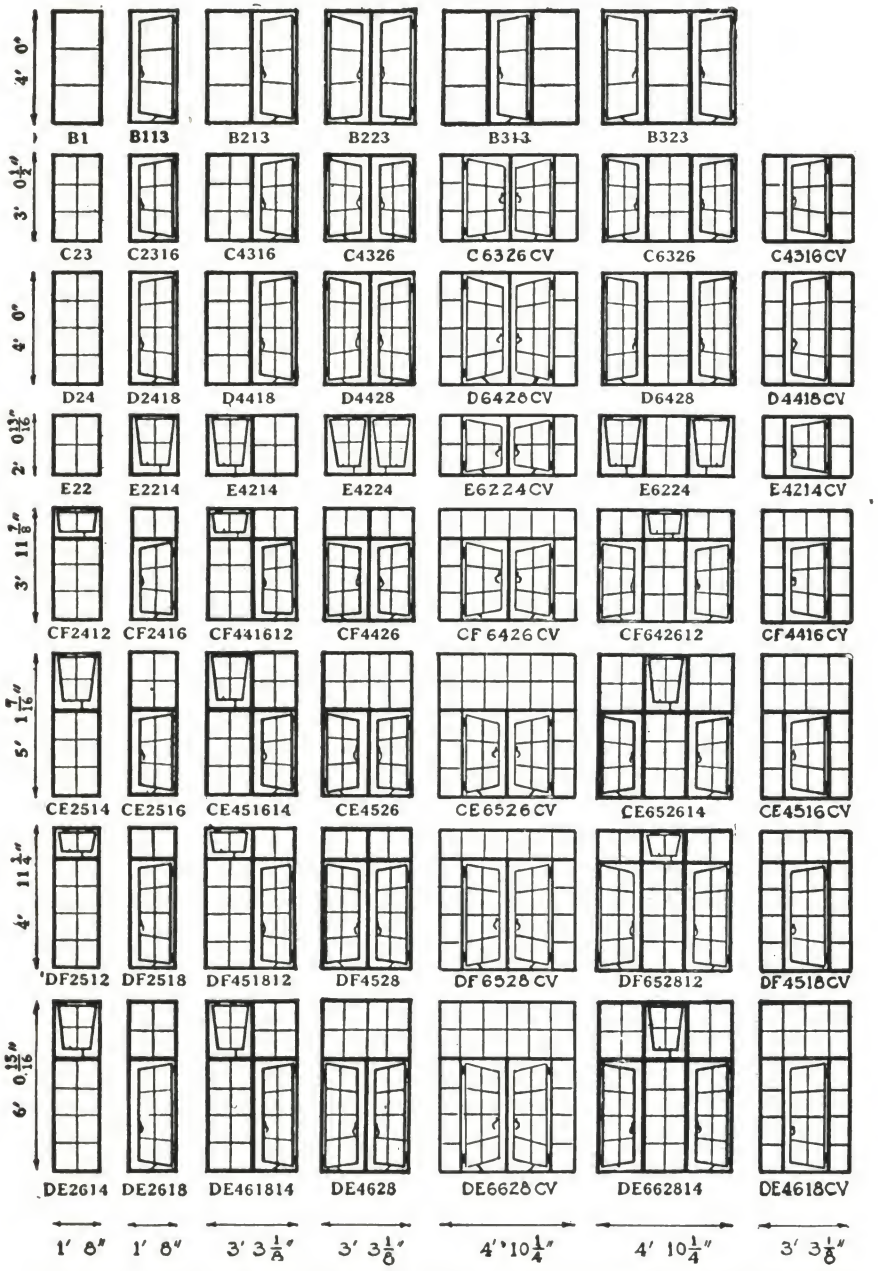
TYPES AND SIZES CAMPBELL CASEMENTS IN STANDARDIZED UNITS

Standard Types 400 Series



Carried in stock and can be furnished either without muntins for lead glazing or with muntins for plain glass

Standard Types 100 Series



Carried in stock with the exception of the "B" and "CF" series and Types D6418, DF2512, DF451812, DF651822, DF652812 and DF1511. Transoms in the "E" series are carried in stock also as side hung windows

Recent Installations by Campbell Casement Window Corp.

Hotel Waldorf Astoria, New York, N. Y.
New York Hospital, New York, N. Y.
Diplomatic and Consular Establishments, Tokio, Japan
Grover Cleveland High School, New York, N. Y.
Walton High School, New York, N. Y.
San Remo Towers, New York, N. Y.
Rochester State Hospital, Rochester, N. Y.
Pilgrim State Hospital, Suffolk County, Long Island, N. Y.
Brooklyn State Hospital, Creedmoor Division, Queens, N. Y.
Wassaic State School, Amenia, N. Y.
R. C. A. Building, New York, N. Y.
Sun Life Assurance Building, Montreal, Canada
First Plymouth Congregational Church, Lincoln, Neb.
Union League Club, New York, N. Y.
Stamford Y. W. C. A., Stamford, Conn.
West Side Y. M. C. A., New York, N. Y.
New York Curb Exchange, New York, N. Y.
Clearview Apartments, Philadelphia, Pa.
American Museum of Natural History, New York, N. Y.
Hotel Dixie, New York, N. Y.
St. Moritz Hotel, New York, N. Y.
Allegheny County Hospital, Pittsburgh, Pa.
Hotel Edison, New York, N. Y.
Lower School for Washington Cathedral, Washington, D. C.
St. John's College School of Law, Brooklyn, N. Y.
Jackson Trust Co., Jersey City, N. J.
Siwanoy Country Club, Mount Vernon, N. Y.
Science and Technology Building, Pratt Institute, Brooklyn, N. Y.
La Isla Office Building, Colombia, South America
Hunter College, New York, N. Y.

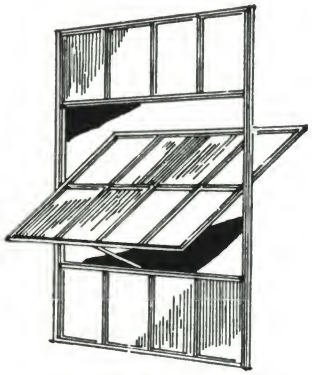
The CAMPBELL CASEMENT WINDOW CORPORATION is affiliated with Campbell Metal Window Corporation, Campbell Industrial Window Company, Inc. and Voightman Metal Window Corporation.

CAMPBELL INDUSTRIAL WINDOW COMPANY, INC.

Manufacturers of Solid Section Metal Windows

100 East 42nd Street
Pershing Square Building
NEW YORK, N. Y.

FACTORIES—BALTIMORE, MD., and KALAMAZOO, MICH.
EASTERN WAREHOUSE: 1160 Flushing Avenue, BROOKLYN, N. Y.
AGENTS IN ALL PRINCIPAL CITIES



Horizontally Pivoted

Products

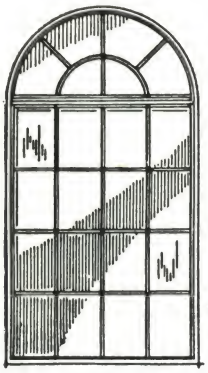
SOLID SECTION METAL WINDOWS, steel and aluminum.

PATENTED WEATHERSTRIPPED INDUSTRIAL WINDOWS.

CASEMENT WINDOWS.

INDUSTRIAL DOORS.

Also Ash Pit Doors, Dampers, Grilles, Window Screens, etc.



Curved Head Unit

Engineering Products

Horizontally pivoted windows
Underwriters labeled windows
Curved head windows
Side hinged windows
Vertically pivoted windows
Horizontally rolling windows

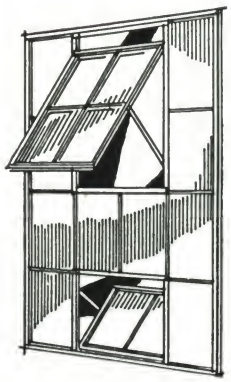
Note: *All of the above windows may be furnished in steel, aluminum, or galvanized steel.*

Pivoted Window Mechanical Operators.

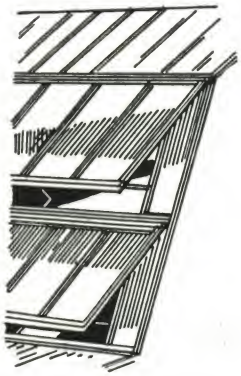
Manual and Electrical Control:
Worm and gear (torsion type)
Rack and pinion (torsion type)
Commercial Projected Windows
Architectural Projected Windows:
Inside or outside glazed
Office Type Projected Windows:
For outside glazing
Continuous Windows:
Fixed or top hung swing

Continuous Window Mechanical Operators.

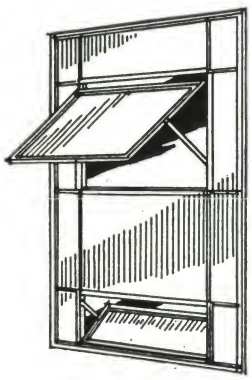
Manual or Electrical Control:
Toggle arm (tension type)
Rack and pinion (torsion type)
Industrial Doors:
Swing type
Slide type
Vertical fold
Vertical lift



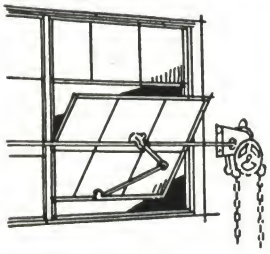
Commercial Projected



Top Hung Continuous Window

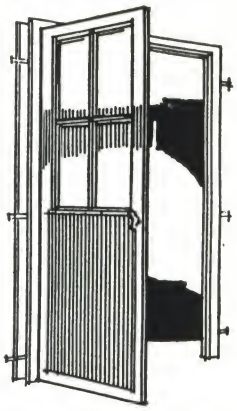


Architectural Projected



Mechanical Operators

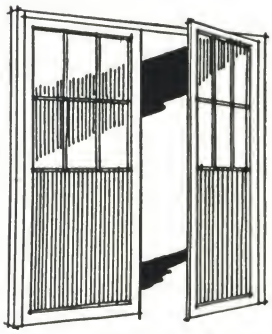
Continued on next page



Standard Swing Door



Standard Double Slide Doors



Standard Double Swing Doors



Industrial Doors

Tubular Rail or Structural Steel Doors—for all types for new construction and replacements

Fire Department Doors

Airplane Hangar Doors:

Curved track type

Straight slide type

Pier and Wharf Doors

Commodity Products—Warehouse and Dealer Distribution

Basement Windows of Cast Iron:

Four standard sizes

Flat Type Screens for Basement Windows

Standard Pivoted Windows:

50 standard sizes

12x18 and 14x20-in. glass sizes

Standard Commercial Projected Windows:

31 standard sizes

12x18 and 14x18-in. glass sizes

Utility Windows:

Projected type

One standard size

Standard Doors and frames:

Slide or swing types

Standard Casement Windows:

Residence and apartment type

32 standard sizes

Casement Window Screens:

Flat and roll type

Coal Chutes:

Cast iron

Chimney and Ashpit Doors:

Cast iron

Ash Dump Doors for Fireplaces:

Cast iron

Fireplace Dampers:

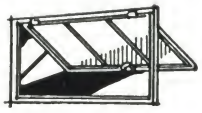
Cast iron

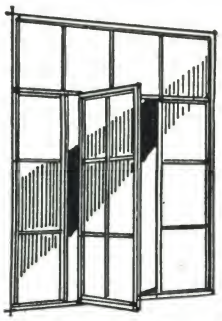
Ventilator Grilles for Foundation and Attic Walls:

Cast iron

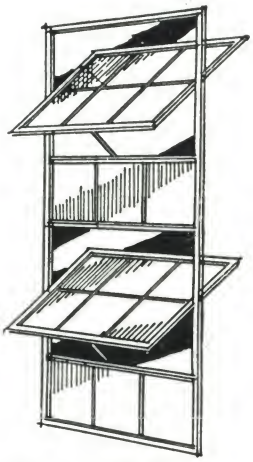
and other standard cast iron building products



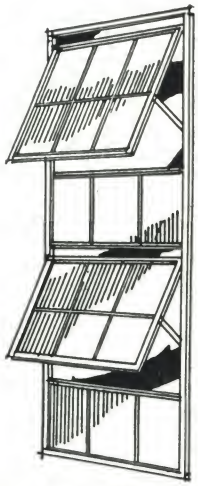




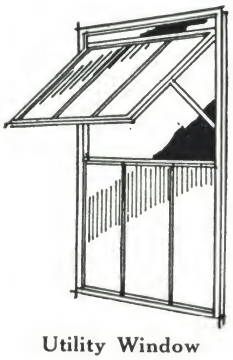
Standard Casements



Pivoted Windows



Commercial Projected



Utility Window

CAMPBELL METAL WINDOW CORPORATION

Pershing Square Building, NEW YORK, N. Y.

BALTIMORE, MD., Bush and Hamburg Streets

Campbell Solid Metal Windows

Model No. 26-MW Double Hung—All exterior parts of the sash and frame, as indicated on detail drawings, are formed of No. 12 gage blue annealed steel, the balance No. 14, 16 and 20 gages. Sash weights are single-unit castings. Chains are of steel, hot galvanized, with galvanized connectors to sash and weights. Rubbing strips are on each jamb at ends of meeting rails. Screws are of steel with standard 10-24 machine thread and heads as detailed. Cast iron sills and stools furnished for this model, if desired.

Model No. 25-MW Double Hung—Materials entering into the construction of Model No. 25-MW are essentially the same as described for Model No. 26-MW with the exception that the sash members are made of No. 14 gage steel and weight boxes and jamb cover of No. 20 gage. Sills are of No. 12 gage drawn steel.

Assembly—Sash frames have mitered and welded corners. Glazing stops are secured without screws on interior. Members forming jambs and head boxes are welded together. The frames are shipped with sash, pulleys and chains installed.

Weathering—Sill, meeting rails and head are fitted with metallic flexible weather stops. Vertical guides and sash members are fitted with metallic flexible interlocking weather stops within the boxes.

Guarantee—The amount of infiltration of air through standard double hung windows is guaranteed not to be more than ½ cu. ft. of air per foot of sash perimeter per minute when subjected to a static air pressure equivalent to the pressure exerted by a wind of 25 miles per hour.

Adjustment—Sash have concealed adjusters to prevent sash members from rubbing on exposed face of jambs and scraping paint.

Finish and Hardware—All steel in windows, except inside glass stops and inside cover plates, is galvanized after fabrication.

All finish hardware is solid bronze, polished and unlacquered.

Painting—All parts of window shall receive a coat of best quality paint, baked on.

Labels—Where required, windows are made in accordance with the regulations of the National Board of Fire Underwriters and bear their label.

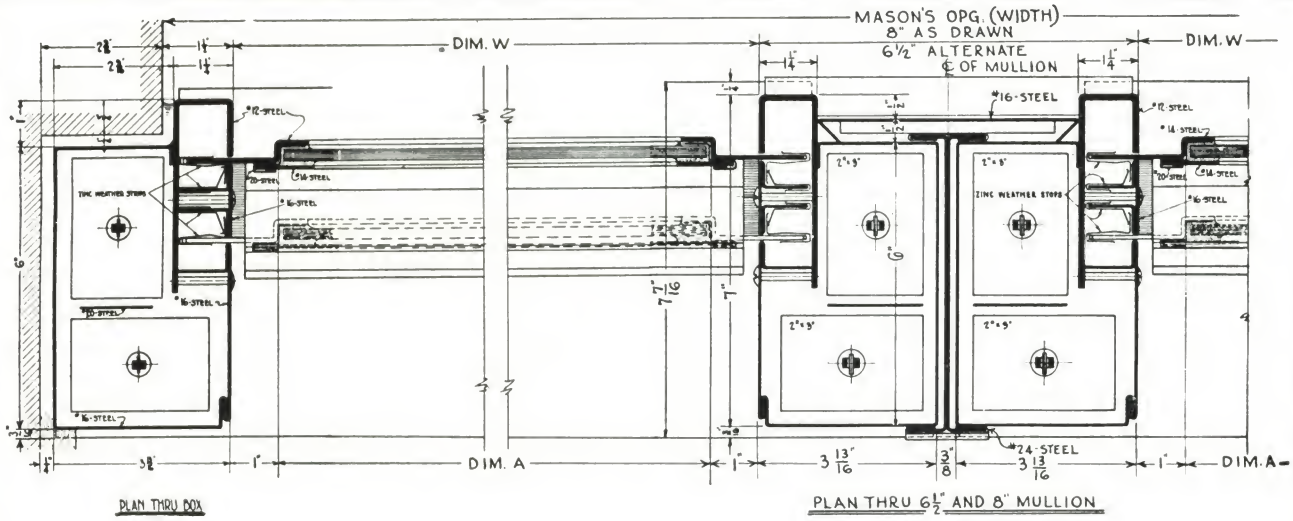
Aluminum and Bronze Windows

All types are made in aluminum or bronze if desired.

A Few of the Recent Prominent Buildings Equipped with Campbell Windows

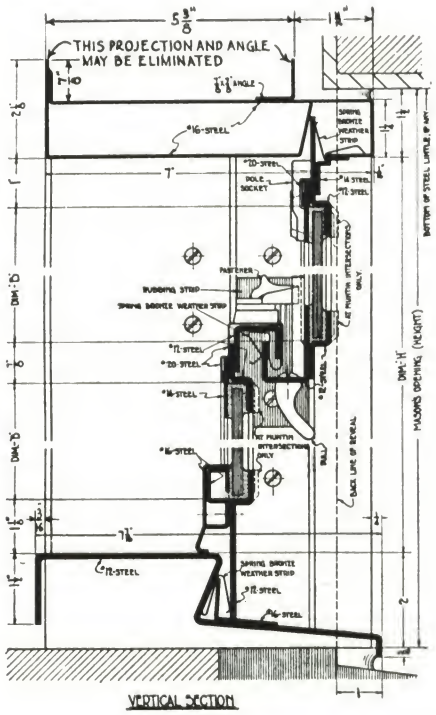
Building and Location	Architect	Builder	Windows
New York Hospital, New York, N. Y.	Coolidge, Shepley, Bullfinch & Abbott	Marc Eidlitz & Son, Inc.	7260
Columbia-Presbyterian Medical Center, New York, N. Y.	James Gamble Rogers	Marc Eidlitz & Son, Inc.	6434
Empire State Building, New York, N. Y.	Shreve, Lamb & Harmon	Starrett Bros. & Eken, Inc.	6349
Waldorf-Astoria Hotel, New York, N. Y.	Schultze & Weaver	Thompson-Starrett Co.	5273
New Yorker Hotel, New York, N. Y.	Sugarman & Berger	New Yorker Hotel Corp.	5190
Twenty North Wacker Drive, Chicago, Ill.	Graham, Anderson, Probst & White	John Griffiths & Son, Inc.	4450
Graybar Building, New York, N. Y.	Sloan & Robertson	Todd, Robertson, Todd Eng. Corp.	3784
Lincoln Building, New York, N. Y.	J. E. R. Carpenter and Associates	Dwight P. Robinson & Co., Inc.	3602
Chrysler Building, New York, N. Y.	William Van Alen	Fred T. Ley & Co.	3554
Internal Revenue Building, Washington, D. C.	James A. Wetmore	James Baird Co.	3136
Carew Tower, Cincinnati, Ohio	W. W. Ahlschlager and Delano & Aldrich	Starrett Bros., Inc.	3055
New York Central Building, New York, N. Y.	Warren & Wetmore	James Stewart & Co., Inc.	2967
Chanin Building, New York, N. Y.	Sloan & Robertson	Chanin Construction Co.	2825
Forty Wall Street, New York, N. Y.	H. C. Severance and Yasuo Matsui	Starrett Bros., Inc.	2725
1400 Broadway Building, New York, N. Y.	Ely Jacques Kahn	Tanager Construction Co.	2526
1 La Salle Street Building, Chicago, Ill.	K. M. Vitzthum & Co.	John Griffiths & Son, Inc.	2300
New York Daily News, New York, N. Y.	Howells & Hood	Hegeman-Harris Co., Inc.	2282
Cathedral of Learning, Pittsburgh, Pa.	Charles Z. Klauder	Stone & Webster Eng. Co.	2214
500 Fifth Avenue Building, New York, N. Y.	Shreve, Lamb & Harmon	C. T. Wills, Inc.	2017
Savoy-Plaza Hotel, New York, N. Y.	McKim, Mead & White	Geo. A. Fuller Co.	1996
La Salle-Wacker Building, Chicago, Ill.	Holabird & Root and Andrew Rebori	Hegeman-Harris Co., Inc.	1988
Barclay-Vesey Telephone Building, New York, N. Y.	Voorhees, Gmelin & Walker	Marc Eidlitz & Son, Inc.	1933
Palmolive Building, Chicago, Ill.	Holabird & Root	Lundoff-Bicknell Co.	1704
American Women's Club, New York, N. Y.	Benjaman W. Morris	Marc Edilitz & Son, Inc.	1660
Pierre Hotel, New York, N. Y.	Schultze & Weaver	Geo. A. Fuller Co.	1659
Chicago Daily News, Chicago, Ill.	Holabird & Root	Hegeman-Harris Co., Inc.	1584
29 Broadway Building, New York, N. Y.	Sloan & Robertson	Adelson Const. & Eng. Corp.	1491
Irving Trust Building, New York, N. Y.	Voorhees, Gmelin & Walker	Marc Eidlitz & Son, Inc.	1456
Koppers Building, Pittsburgh, Pa.	Graham, Anderson, Probst & White	Mellon-Stuart Co.	1406
Wall and Hanover Street Building, New York, N. Y.	Delano & Aldrich	Starrett Bros., Inc.	1373
RCA-Victor Building, New York, N. Y.	Cross & Cross	A. L. Hartridge Co., Inc.	1333
Sherry-Netherland Hotel, New York, N. Y.	Schultze & Weaver	Shroder & Koppel, Inc.	1306
Carlyle Apartment Hotel, New York, N. Y.	Bien & Prince	Calvin-Morris Corp.	1281
22 East 40th Street Building, New York, N. Y.	Kenneth Franzheim	Dwight P. Robinson & Co., Inc.	1125
Brooklyn Telephone Building, Brooklyn, N. Y.	Voorhees, Gmelin & Walker	Cauldwell-Wingate Co.	1096
Fuller Tower, New York, N. Y.	Walker & Gillette	Geo. A. Fuller Co.	1062
Broadway and 41st Street Building, New York, N. Y.	Ely Jacques Kahn	Shroder & Koppel, Inc.	1036
Lincoln-Liberty Building, Philadelphia, Pa.	J. T. Windrim	John N. Gill Const. Co.	806

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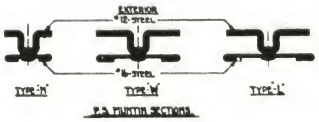


PLAN THRU BOX

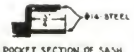
PLAN THRU 6½" AND 8" MULLION



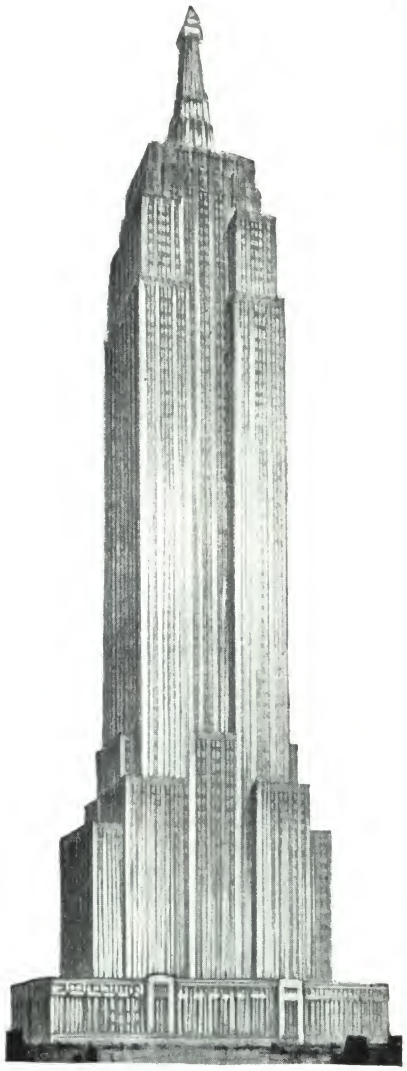
VERTICAL SECTION



P.S. MUNTIN SECTIONS



GLASS POCKET SECTION OF SASH FRAMES AS REQUIRED FOR LABELLED WINDOWS
BOTTOM RAIL OF LOWER SASH REMAINS AS SHOWN ON VERTICAL SECTION



Empire State Building, New York, N. Y.
Shreve, Lamb & Harmon, Architects
Starrett Bros. & Eken, Inc., Contractors
6349 Campbell Metal Windows

STANDARD DETAILS OF CAMPBELL SOLID METAL WINDOW
DOUBLE HUNG MODEL NO. 26-MW

INTERNATIONAL CASEMENT CO. INC.

Manufacturers of Metal Casement Windows

JAMESTOWN, N. Y.

SALES OFFICES

NEW YORK, N. Y., 101 Park Avenue
ST. LOUIS, MO., 417 Chemical Building
ATLANTA, GA., 405 Bona Allen Building
CHICAGO, ILL., 820 Tower Court
CLEVELAND, OHIO, 509 Insurance Center Building
LOS ANGELES, CALIF., 308 Transportation Building
BOSTON, MASS., 201 Devonshire Street
WASHINGTON, D. C., 1005 Hill Building
INDIANAPOLIS, IND., 825 Architects and Builders Building

Products

INTERNATIONAL CASEMENT WINDOWS and DOORS in solid rolled steel, extruded bronze and aluminum sections.

STANDARD COTSWOLD CASEMENTS and Doors in solid rolled steel sections.

SCREENED COTSWOLD and CUSTOM BUILT CASEMENTS, including Screens.

AUSTRAL SOLID STEEL WINDOWS.

PRESSED STEEL "BILTIN" SUB-FRAMES.

Literature and Drawings

The following literature contains scale and full size details, photographs and measured drawings:

No. 7—International Casement Catalogue (224 pages).

No. 13—International Austral Window Catalogue (28 pages).

No. 14—International Cotswold Casement Catalogue (44 pages).

Screened casement leaflet (4 pages).

Specifications for International Steel Casement Windows Set to Rabbeted Wood Frames or Cut Stone

Solid rolled steel casement windows as manufactured by INTERNATIONAL CASEMENT CO. INC., or equal in the opinion of the architect. Steel sections of suitable design and weight, metal to metal contact, no loose strips. Bars hydraulically straightened, corners accurately machined, electrically welded and cleaned free from flux.

Casement manufacturer shall furnish and apply at the factory all hardware and operating devices, which shall be of solid bronze. Side hinged casements swinging out 5 ft. high and over shall have double grip bolt in addition to fastener, and side hinged casements swinging in 4 ft. 6 in. high and over shall be similarly equipped.

Sash shall be fitted with moulded steel glazing beads (glass stops) set with brass screws. Corners mitered and neatly fitted. All steel work cleaned free from rust and scale, painted two coats rust resisting paint, each coat separately baked on.

Casement window contractor shall set casement sash. Frames to be bedded and pointed (inside and out) with approved mastic cement, finished in a workmanlike manner and guaranteed absolutely weathertight. If set to stone rabbets, lead expansion shields to be used.

Not included: glass, glazing, painting after erection, screens or preparation for same.

Specifications for International "Biltin" Sub-frames and Steel Casement Windows Set to Masonry Reveals

Sub-frames of pressed steel No. 12 gauge [No. 11 gauge, ingot iron] of size and contour as shown by scale details.

If both dimensions exceed 7 ft. they shall be assembled at the factory, taken down and shipped knocked down.

If under this size, corners shall be electrically welded and cleaned free from flux.

Steel work painted two heavy priming coats of rust resisting paint, each coat separately baked on.

The sub-frames are to be delivered to the building site by the casement manufacturer but must be set and built in by the mason.

The masonry contractor will be required to set frames plumb and level, in close contact with masonry reveal at sides and head, and resting solidly on sill.

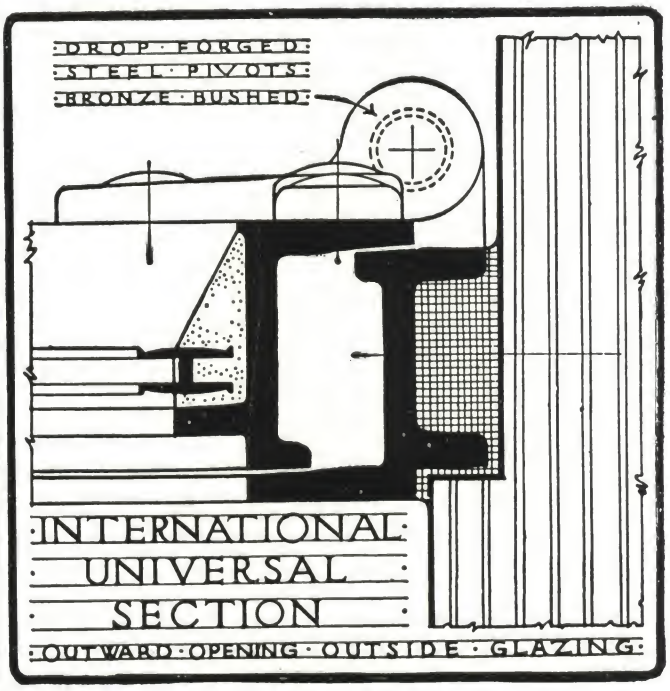
After setting, wood spreaders or braces shall be placed in the frames to keep them true and square.

Calking—The calking between masonry and subframe to be covered under separate heading.

Casement Sash—Shall be of suitable design and weight, etc. (See specifications above.)

Note: For complete specifications and details refer to our No. 7 catalogue.

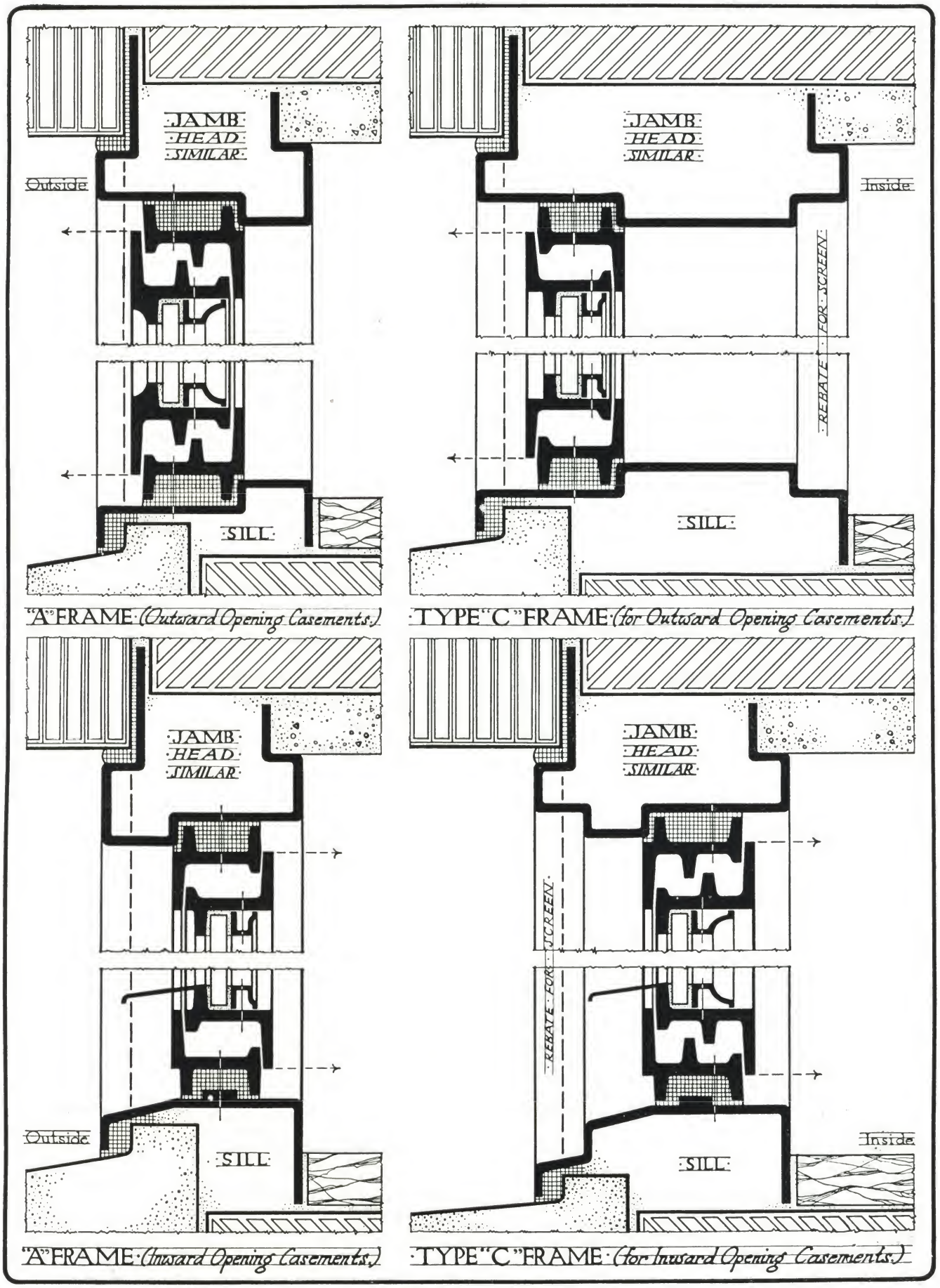




Full Size Details

Continued on next page

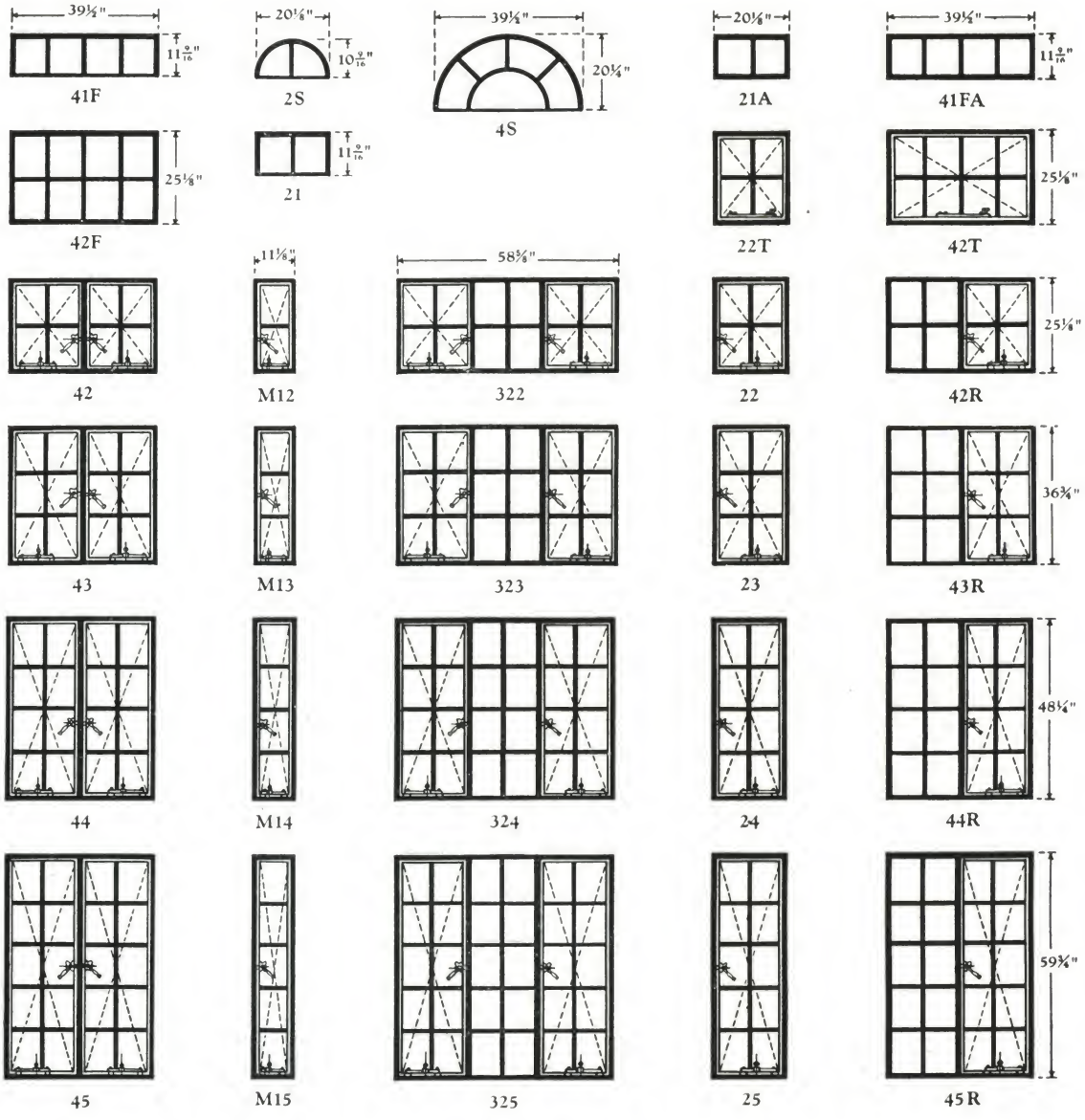
"BILTIN" SUB-FRAMES MADE IN SAME FACTORY WITH CASEMENTS



Half Full Size Details

Continued on next page

INTERNATIONAL STANDARD COTSWOLD CASEMENTS AND DOORS



Casement Description

Types 41F, 2S, 4S and 21 are fixed sash and are suitable for composite units only. Types 21A, 41FA and 42F are also fixed sash but are suitable as transom lights in single openings. Types 22T and 42T are casements hinged at top opening outwards fitted with solid bronze peg adjuster. All other casements are hinged at side opening outwards. The single casements are shown as right-hand casements but can be supplied left hand if desired. Types 42R, 43R, 44R and 45R are right-hand casements. They can be supplied with left-hand casements and will then be of the following corresponding types: 42L, 43L, 44L and 45L. The above are all fitted with tee-bar muntins.

Leaded Glass—All the above types can be supplied for use with leaded glass (muntins being omitted). See pages 10, 11 and 12 of the Cotswold Catalogue No. 14.

Cotswold Casement Specification

(1) Casements of Cotswold type, made from heavy two-point steel section (not Cottage Sections) hinged at side opening outwards painted two coats of rust resisting paint, each coat separately baked on, hung on drop forged steel pivots bronze bushed and fitted with solid bronze hardware of standard design.

(2) Furnish leaded glass of standard sizes and design, first quality D.S.A. glass ⅝-in. lead cames, all horizontal cames steel reinforced.

(3) If steel muntins are required omit paragraph 2 and specify steel muntins to be furnished.

(4) The whole to be set by sash contractor and guaranteed weathertight.

Cotswold Doors

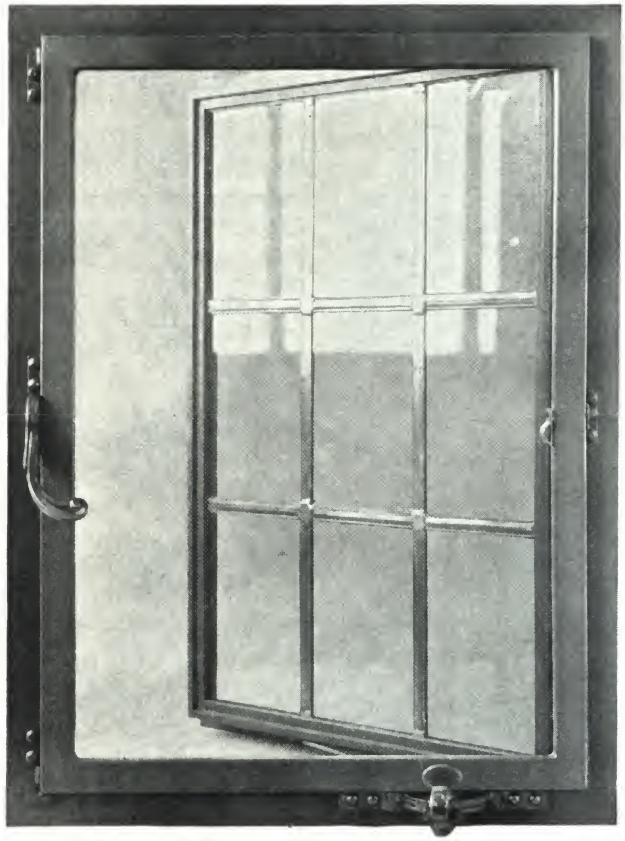
For further information and details of Cotswold Casements and Cotswold Doors, see Catalogue No. 14.

Continued on next page

INTERNATIONAL SCREENED CASEMENTS

Specifications for International Screened Casements

All windows shall be International Solid Steel Cotswold Casements with integral screens, as manufactured by the INTERNATIONAL CASEMENT CO. INC., Jamestown, N. Y., in the standard types and sizes they have established and as shown by reference numbers on the elevations. (When specifying custom made casements state that they are to be manufactured to shapes and sizes shown on the drawings and to consist of heavy three-point sections or heavy two-point sections to suit the sizes of the openings). All casements shall be hung on drop forged bronze bushed steel pivot hinges of the projecting type to facilitate cleaning and shall be fitted with solid bronze casement fasteners and adjusters so designed and fitted as to permit the proper operation of the casement without any slots or holes through the screen. All steel work shall be painted one coat of special rust-resisting primer and one coat of gray, each coat baked on separately.



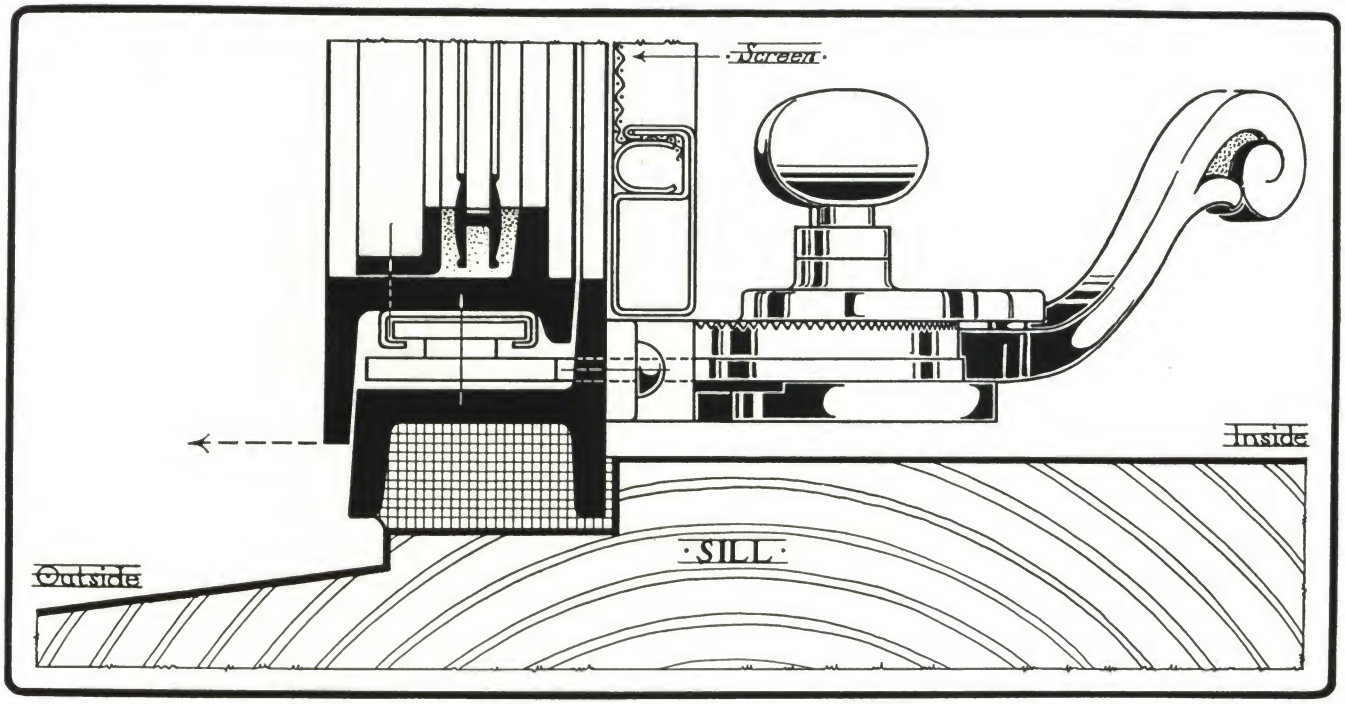
Screened Cotswold Casement Type 33x0

If casements with muntins are to be furnished, specify that the casements shall be divided into panes with rolled steel tee muntins. If leaded glass is to be furnished, refer to page 14 of International Cotswold Catalogue No. 14 for suitable specifications.

The screens shall be of standard sizes as supplied by the INTERNATIONAL CASEMENT CO. INC., and shall be carefully packed and shipped separately. They shall consist of $1''\times\frac{7}{16}''$ framework made from copper-bearing open hearth steel hot galvanized after manufacture and after all cutting and abrasive operations have been completed. All corners oxy-acetylene welded. Equipped with standard weight Old English gauge 16-mesh anaconda bronze wire cloth.

The setting of the casements shall be done by the casement manufacturer after plastering is completed. They shall be bedded and pointed inside and out in mastic cement, the whole finished in a workmanlike manner and guaranteed weathertight.

Note: For further information and details write for descriptive leaflet.



Full Size Detail Showing Operation of Screened Casement

Continued on next page

INTERNATIONAL AUSTRAL WINDOWS IN STEEL AND BRONZE FOR OFFICE BUILDINGS & SCHOOLS



Girls' Senior High School, Atlanta, Ga.
EDWARDS & SAYWARD, Architects

Specifications International Austral Windows

Windows where marked on plans to be copper-bearing steel with Austral balance arms as manufactured by the INTERNATIONAL CASEMENT CO. INC., Jamestown, N. Y. Sub-frames of No. 12 gauge steel, with welded corners, painted two priming coats, each coat separately baked on, to be delivered to building site, but same to be set up, built in and calked by mason contractor.

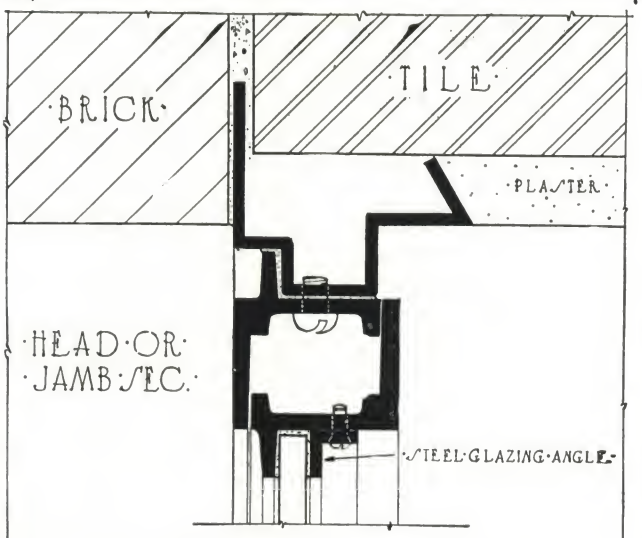
Sash to be of special shapes, made of copper-bearing steel. All bars hydraulically straightened, corners electrically welded and cleaned free from flux.

Frames and sash carefully fitted to insure absolute weathertightness. Fit with steel glazing beads (glass stops) set with brass screws. Clean all steel work free from rust and scale and paint two heavy priming coats, each coat separately baked on.

This contractor shall furnish all necessary hardware and fittings as follows: galvanized drop-forged steel window cleaner's bolts, shade brackets for both upper and lower sash with roller guides to hold cords. Polished cast bronze automatic cam catch and pull.

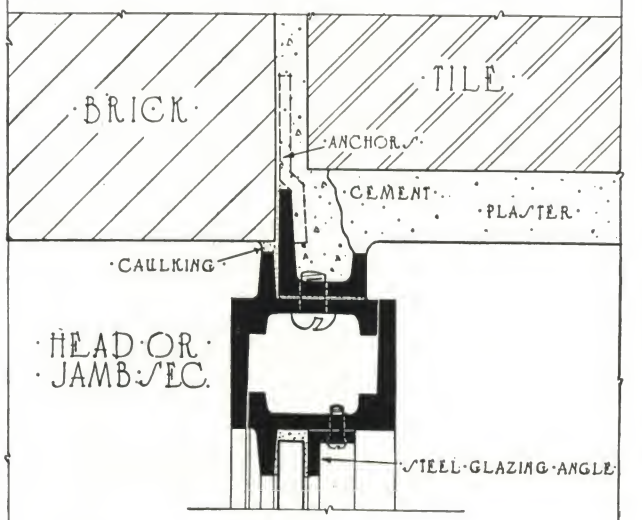
The sash shall be erected by this contractor after the plastering is completed. Same to be bedded and pointed in mastic cement and secured to subframe by machine screws. All to be finished in a workmanlike manner and guaranteed weathertight.

Note: For complete specifications and details refer to our Austral Window Catalogue No. 13.



No. 12 GA. PRESSED STEEL FRAME BUILT INTO MASONRY OPENINGS FOR INTERNATIONAL AUSTRAL ROLLED STEEL SASH

ONE HALF FULL SIZE DETAILS



No. 86 ROLLED STEEL CHANNEL SECTION SET WITH INTERNATIONAL AUSTRAL ROLLED STEEL SASH

ESTABLISHED 1827

WM. H. JACKSON COMPANY

Windows of Bronze and Aluminum

TELEPHONE
CUMBERLAND 4252

FOUNDRY AND SHOPS
335 Carroll Street
BROOKLYN, N. Y.

NEW YORK WAREROOMS: 2 West 47th St.—Telephone, Bryant 8930

CHICAGO WAREROOMS: 318 North Michigan Ave.—Telephone, Dearborn 8450

Products

CASEMENT WINDOWS.
STANDARD DOUBLE HUNG WINDOWS.
FIRE UNDERWRITERS DOUBLE HUNG WINDOWS.
For Ornamental Metal Work, Stone Mantels, Tile and Swimming Pools, see Manufacturers' Index.

Jackson Windows

Jackson's Windows are the result of many years of development and are accorded the distinction of being among the best windows manufactured. They are being used by architects and engineers throughout the country where permanency of construction is required.

They are made airtight and watertight without the use of weatherstrips, and work with ease of operation to a degree never before attained.

These windows are so made that they can be installed after the masonry opening has been completed.

Permanent and Economical

All of Jackson's Windows are made of bronze. These enduring metals give them an unlimited term of service.

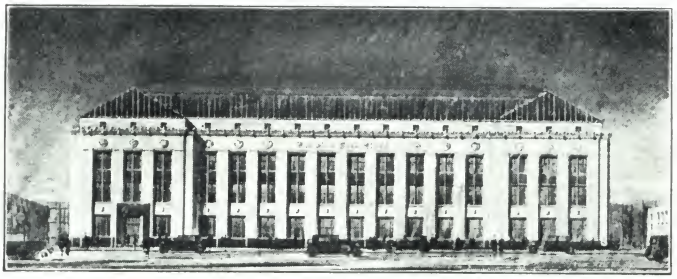
The quality of permanence, together with the fact that they require no maintenance, make Jackson's Windows ultimately less expensive than that of other materials. The maintenance of steel windows will, in a short number of years, amount to as much as the difference between the initial cost of Jackson's Windows and the steel windows. In addition to this, the weathertightness of Jackson's Windows decreases the cost of fuel.

Catalogues and Service

Catalogue No. 21, "Jackson Windows of Bronze," will be sent on request; also, our Service Department is at your disposal in working out window problems. Full size drawings will be sent on Architects' and Engineers' request.



Folger Shakespeare Memorial Library, Washington, D. C.
PAUL PHILLIPE CRET, Architect
ALEXANDER B. TROWBRIDGE, Consulting Architect
Aluminum windows and architectural work installed by Jackson



New York Times Building, Brooklyn, N. Y.
ALBERT KAHN, INC., Architect
Jackson bronze double hung windows installed throughout entire building

Some Recent Installations of Jackson Windows

BUILDING	LOCATION	ARCHITECT
Fidelity-Philadelphia Trust Co.	Philadelphia, Pa.	Simon & Simon
Central Savings Bank	New York, N. Y.	York & Sawyer
Federal Reserve Bank	New York, N. Y.	York & Sawyer
Fisher Building	Detroit, Mich.	Albert Kahn, Inc.
Travelers Insurance Building	Hartford, Conn.	Voorhees, Gmelin & Walker
Royal Insurance Company	New York, N. Y.	Starrett & Van Vleck
Buckeye State Building & Loan Co.	Columbus, Ohio	Hopkins & Dentz
Graybar Building	New York, N. Y.	Sloane & Robertson
Equitable Trust Co.	New York, N. Y.	Trowbridge & Livingston
Mrs. Florence Twombly Residence	New York, N. Y.	Warren & Wetmore
Lakewood Cemetery Assn. Building	Minneapolis, Minn.	Ernest Kennedy
New York Times Building	Brooklyn, N. Y.	Albert Kahn, Inc.
C. Brewer & Company Building	Honolulu, Hawaii, T. H.	Mayers, Murray & Phillip
Kings County Savings Bank	Brooklyn, N. Y.	Halsey, McCormack & Helmer, Inc.
National Savings Bank	Albany, N. Y.	Halsey, McCormack & Helmer, Inc.
Frederick W. Allen Residence	Manhasset, L. I., N. Y.	Cross & Cross
Bloomfield Bank & Trust Co.	Bloomfield, N. J.	Uffinger, Foster & Bookwalter, Inc.
Bank of the Manhattan Co. Building	40 Wall Street, N. Y.	H. Craig Severance and Yasuo Matsui
New York County Lawyers' Assn. Building	New York, N. Y.	Cass Gilbert
Kirby Memorial Health Center	Wilkes-Barre, Pa.	Thomas H. Atherton
Haddon Hall	Atlantic City, N. J.	Rankin & Kellogg

THE KAWNEER COMPANY

AND SUBSIDIARIES

Sealair In-swinging Windows

NILES, MICHIGAN

For Branch Offices, refer to our pages on Kawneer Store Fronts

SEE OUR PERMANENT EXHIBIT AT THE ARCHITECTS' SAMPLE CORPORATION, NEW YORK, N. Y.

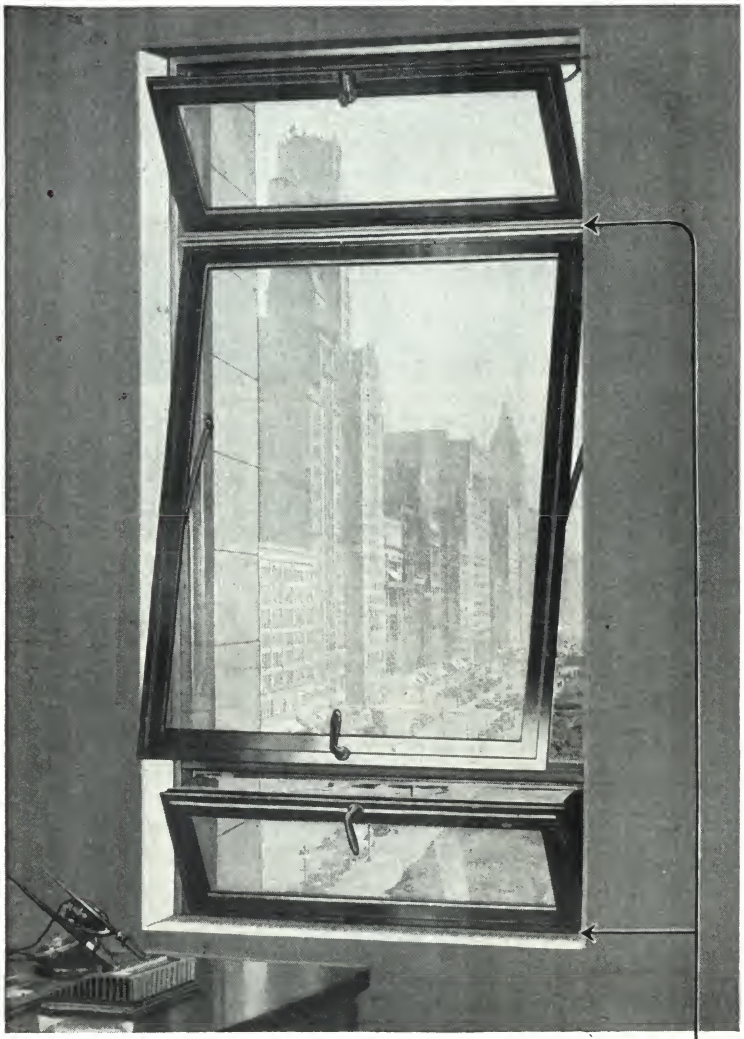
Products

SEALAIR IN-SWINGING WINDOW.

Also Sculptural and Architectural castings in any practical metal, Metal Thresholds, Kick Plates, Push Plates and Grilles, Metal Architectural Mouldings, Ventilator Brackets.

For Welded Bronze Doors, Store Fronts made of solid bronze, aluminum alloy or copper, see Manufacturers' Index.

Kawneer WINDOWS



IN-SWINGING SEALAIR WINDOW



CONTINUOUS ONE-PIECE WATER PROOF HINGE PATENTS APPLIED FOR

Specifications

SEALAIR Special In-swinging Sash Windows are constructed by THE KAWNEER COMPANY, Niles, Michigan.

The weight of metal for all members ranges from 11 to 16 gage, depending upon where the greatest strength is required. All material for windows shall be of bronze unless otherwise specified.

All fittings are to be bronze or an appropriate substitute.

The sashes are to operate independently, the ventilator to be controlled by ventilator brackets and the sash proper by self-adjusting operators.

All joints of the window frames or sashes that are permanent are to be welded and reinforced as necessity requires. All glass is to be back puttied and thoroughly bedded in putty, the glass to be held by two frame members of the sash.

Also may be putty glazed without the use of metal glazing strips.

Suitable steel bucks including weather bar are provided.

Features

Ventilation—

In-swinging Sashes permit controlled ventilation, without unpleasant drafts.

Cleaning—

May be washed entirely from the inside.

Insulation—

When closed, insulation between sash and frame protects against weather.

Safety—

Difficult for anyone to fall or leap out.

Noiseless—

Sealair Windows will not rattle—operate easily, silently and independently.

Shade may be applied to center sash, with translucent glass in transom.

These windows can be screened on the outside.

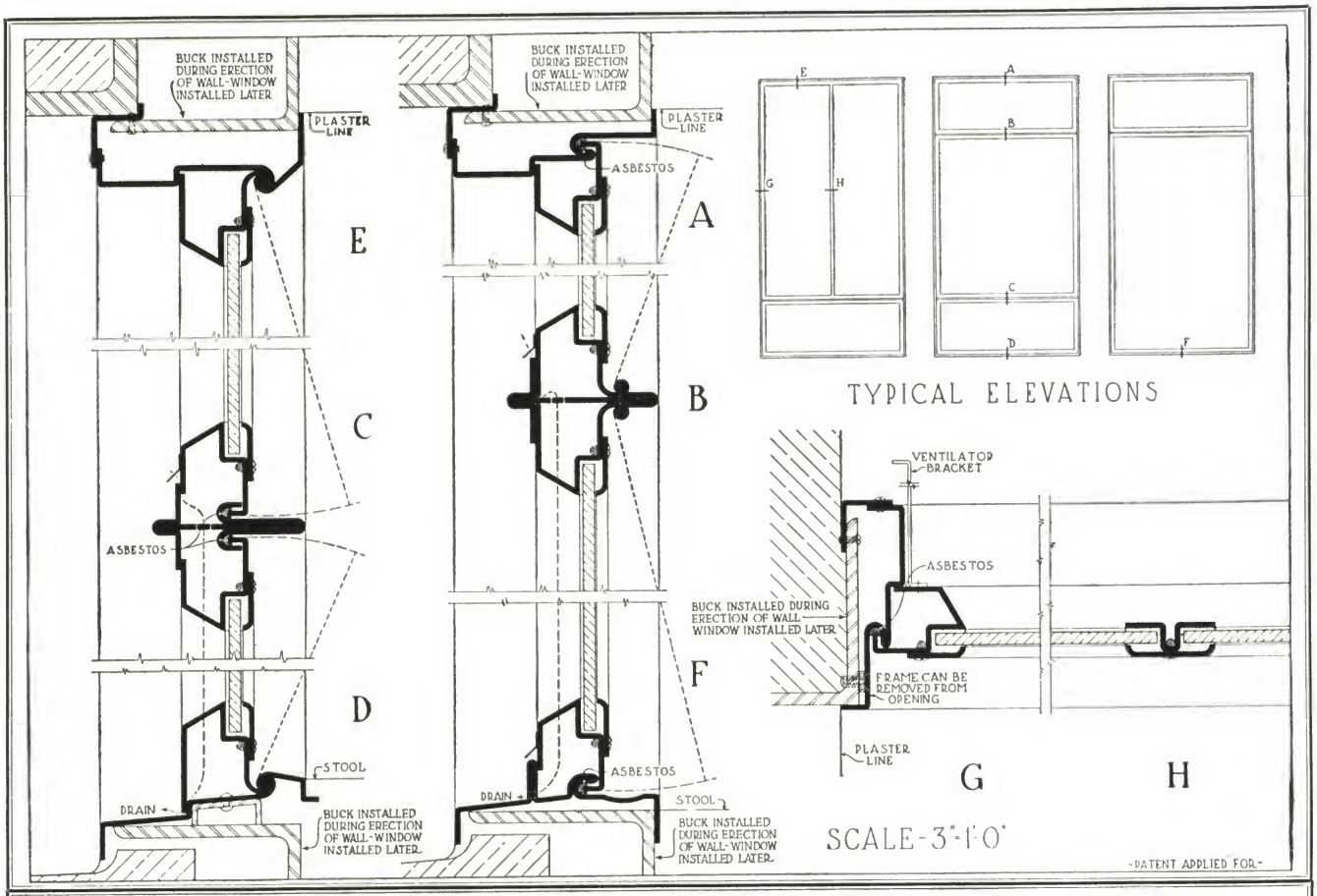
Furnished in Bronze, Aluminum Alloy or Steel.

All joints strongly welded.

Information

Send for circular of full size details.

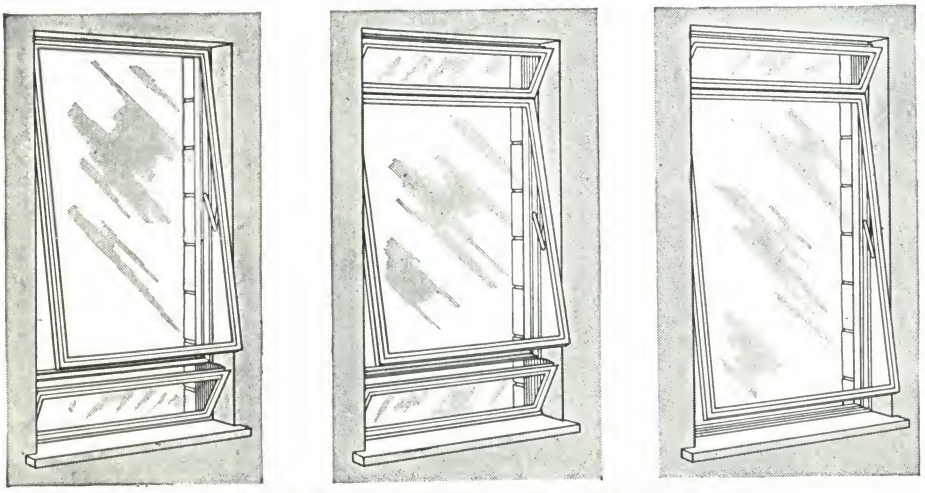
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SEALAIR IN-SWINGING WINDOWS



Application of shade to center sash with translucent glass used in transom



THREE STANDARD TYPES

These three standard types furnished in bronze, aluminum alloy, or steel. All joints strongly welded. Each sash is hung by a continuous weather-proof hinge which is an integral part of the frame

SEALAIR IN-SWINGING WINDOWS

W. C. LEA

Manufacturer of Steel Windows and Doors

653 South Clarence Street
LOS ANGELES, CALIF.

Products

HEAVY STEEL CASEMENTS of all types and sizes. STEEL SPECIAL SASH; STEEL SPECIAL FRENCH DOORS; STEEL FACTORY SASH; STEEL PROJECTED SASH; STEEL DOUBLE HUNG WINDOWS.

General

The outstanding principles uppermost in the minds of the designers and manufacturers of "Lea" products are beauty, simplicity, strength, practicability and economy.

The accomplishment of these principles has been the contributing factor for their widespread and determined selection.

The ultimate satisfaction "Lea" products are rendering in utility, durability and convenience, elevates them to a high position in the minds of the leading architects and builders. This is especially so of our heavy steel casements, thereby placing them in a commanding position in the steel casement manufacturing industry.

"Lea" Steel Casements are now being used in the largest and finest buildings of the West and bear recognition.

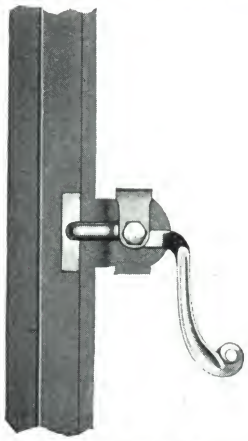
The complete line of types and sizes we are in a position to furnish is not included in this catalogue. The heavy weight and structural strength of our sections enables us to build casements of much larger dimensions than shown.

We have furnished and installed many large as well as small installations of special sash and are in a position to fill your special requirements.

Advisory Service

Our Service Department is prepared to give full information and to offer suggestions regarding problems to meet individual requirements. Architects and builders are invited to avail themselves of our facilities and service. Your inquiries will receive prompt attention.

FASTENERS AND HINGES FOR "LEA" STEEL CASEMENTS



Standard Steel Latch Plate, Solid Bronze Latch Lever, and Wedge Strike



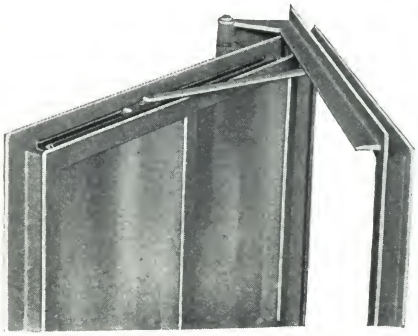
Pair of Casement Fasteners



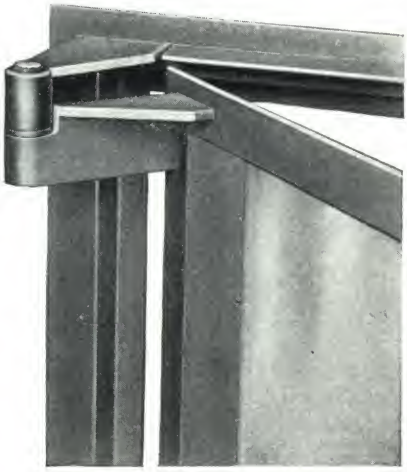
Single Casement Fastener



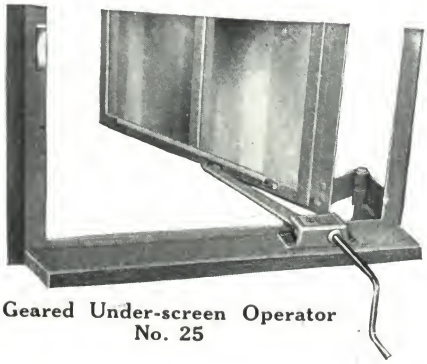
Hinge



Concealed Friction Adjuster



Heavy Steel Angle Extension (Cleaning) Hinge with Bronze Pin



Geared Under-screen Operator No. 25

Continued on next page

Specifications for "Lea" Steel Casements

General—Where steel casements are shown they shall be "Lea" Steel Casements as manufactured by W. C. Lea, Los Angeles, California.

Scope of Work—The Steel Casement Contractor shall include in his work the furnishing and installing of all steel casements complete, adjusting of casements after erection and attaching of hardware after glazing and painting have been finished.

Work Not Included in Steel Casement Contract—Window cleaner bolts or belts, the filling of sills with concrete, glass or glazing or putty, metal stools, bronze sills or thresholds, metal trim or plaster mould, grounds, screens, painting (except standard shop coat of gray metallic paint), grouting, calking or pointing, any expense for use of telephone, light, power or equipment of owner or general contractor.

Material—Sections used in the manufacture of these casements shall be copper bearing hot rolled steel sections containing not less than 0.15% nor more than 0.30% copper, and shall be of size and special shapes as shown in the 25th Edition of Sweet's Architectural Catalogues. Weight of sections shall be not less than 1.67 lb. per ft. for the outside frame, 1.45 lb. per ft. for the swing leaf frame and .89 lb. per ft. for muntin bars.

Construction—All corners of frame and swing leaves shall be mitred, electrically butt-welded and ground smooth. All transom bars and meeting rails shall be riveted to the adjoining section and the inside face of joint shall be electrically welded and ground smooth. Where muntins occur, they shall be riveted to the adjoining section and the inside face of joint shall be electrically welded and ground smooth. Cross joint of muntin bars shall be "Lea" dovetailed and interlocked intersections.

Weathering—Continuous contact weathering shall be provided. Head section (for outswing casements) where swing leaf comes to top of sash and transom bar shall have a continuous drip which shall be an integral part of the section.

Hardware—Unless otherwise specifically mentioned, hardware shall consist of the following: Heavy steel angle extension (cleaning) hinges with bronze pins, standard steel latch plate, solid bronze latch lever and wedge strike and concealed friction adjuster. (Inswing casements shall have hardware as shown in the 25th Edition of Sweet's Architectural Catalogues.)

Painting—Casements snall receive one dip coat of "Lea" special gray metallic paint before shipping.

Erection—General contractor shall build openings for steel casements according to details and dimensions shown on Steel Casement Contractor's drawing as approved by the architect.

Steel Casement Contractor shall set casements into wall, adjust after erection and before glazing, and attach hardware after glazing and painting have been finished as called for on drawings and covered in these specifications. Mastic shall be applied by Steel Casement Contractor as shown on approved drawings.

Glazing—All casements shall be glazed as shown on approved details. Unless otherwise shown, glass shall be held in place by "Lea" coppered spring steel wire glazing clips and shall be bedded and face puttied with "Lea" metal window putty. Where glazing beads are shown, corners shall be mitred, electrically butt-welded and ground smooth, they shall be fastened to sash with countersunk oval head bronze screws.

Hoisting—General contractor shall do all hoisting of materials for Steel Casement Contractor from the street level to the floors on which the material is to be used. Steel Casement Contractor shall do all necessary distributing of the sash on the floors. Such hoisting shall be without cost to Steel Casement Contractor.

Instructions for Setting

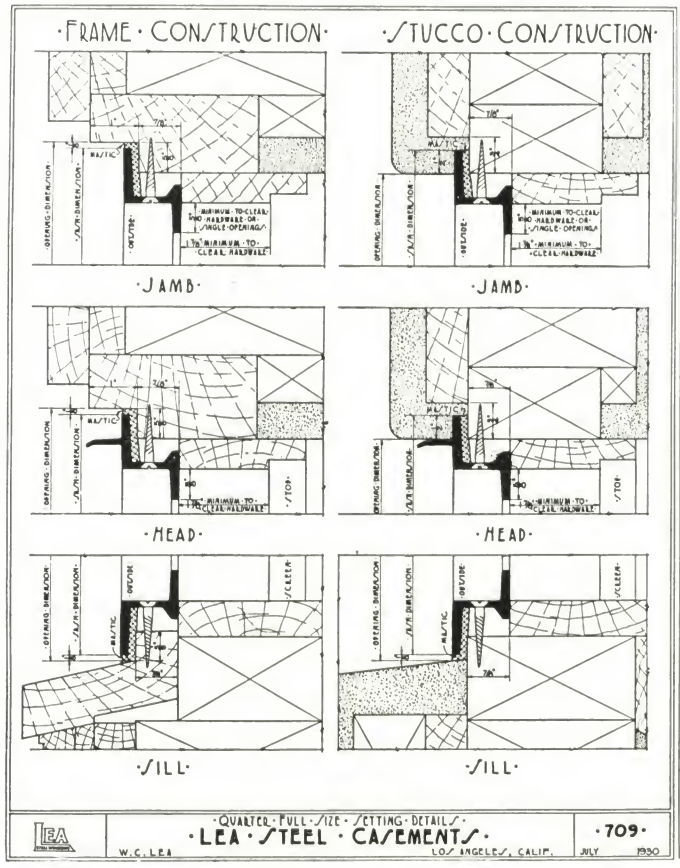
When sash are delivered to job they should be stacked on end so that they will not be sprung by their aggregate weight.

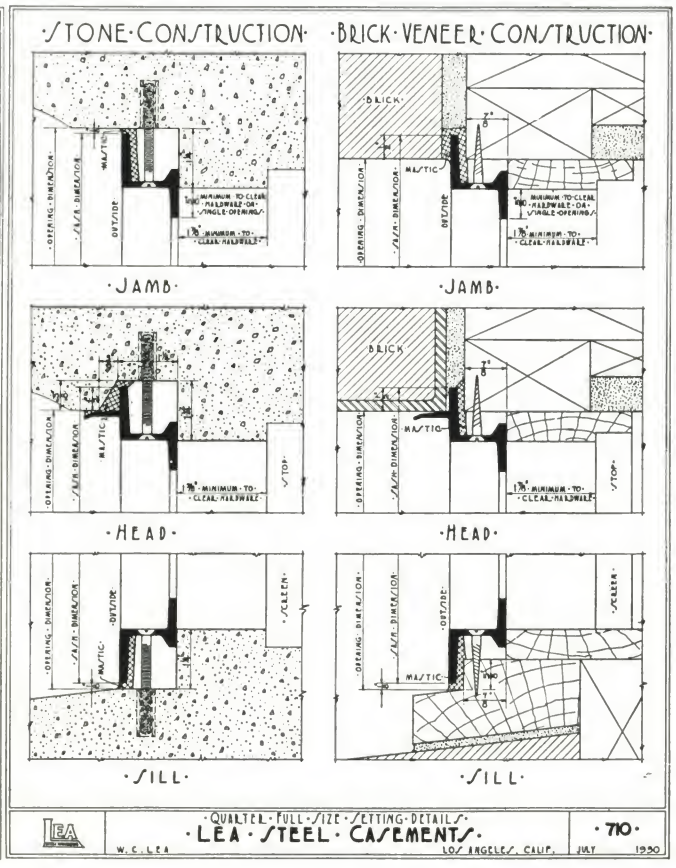
Openings for "Lea" Steel Casements should be built as detailed below and on page following. Care should be taken in the construction of these openings that they be plumb and square, and that clearance called for on details is provided. The dimensions given for units shown on W. C. Lea page 4 are sash dimensions. If openings are properly built the sash will slip easily into place. *Mastic should be substantially applied to casements before they are permanently screwed or grouted into place. This will insure a watertight joint between them and collateral construction.

It is necessary for perfect operation of swing leaves that casements be set plumb and square into openings. The frame should not be crowded nor used to carry other construction. The swing leaves should be tested and adjusted if necessary just before windows are glazed. Finish hardware is usually applied after the glazing and finish painting have been completed.

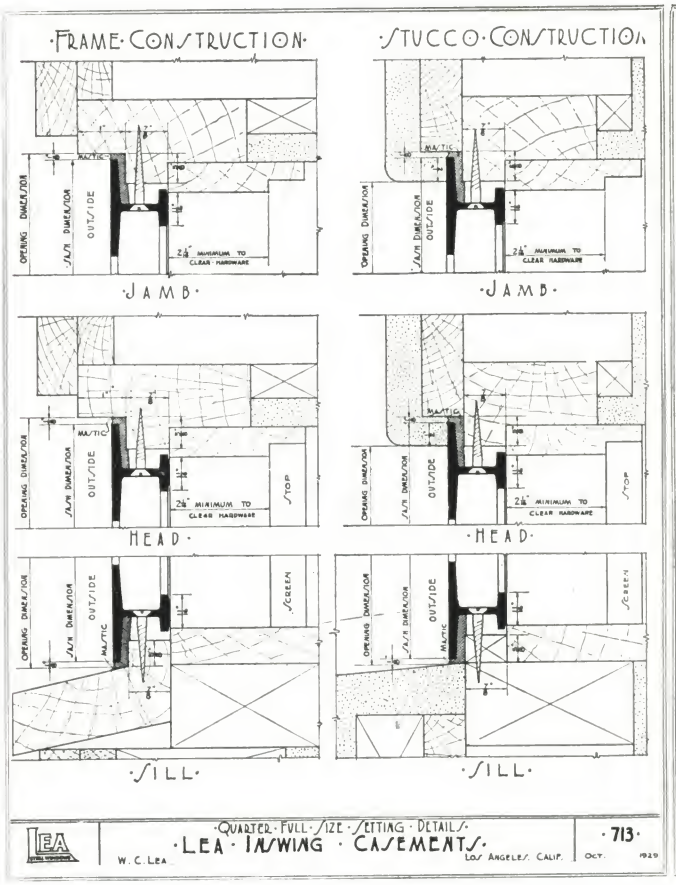
If the building construction is other than that shown here, we shall be pleased to submit other details for your approval.

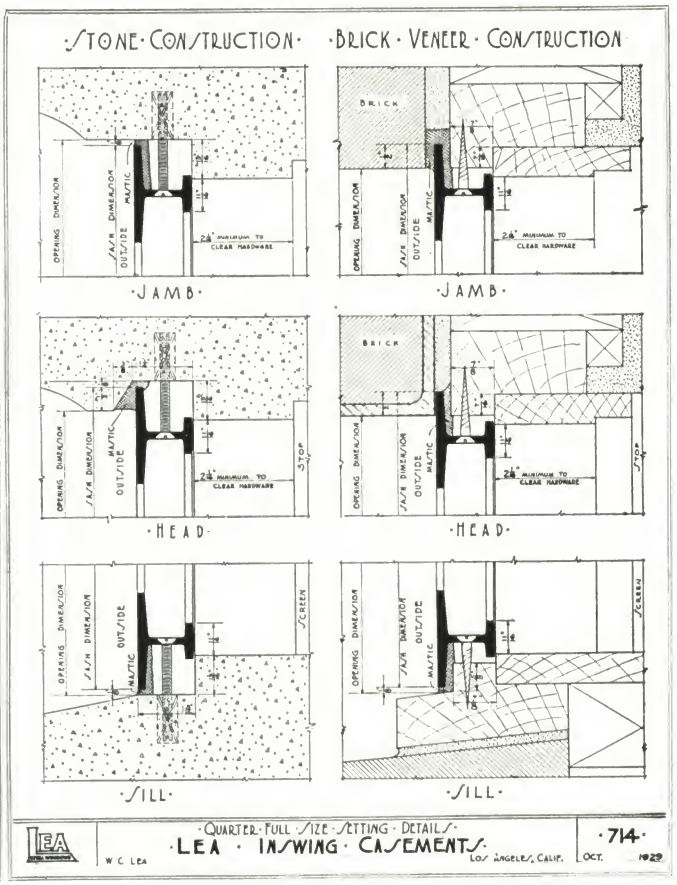
*Note: Sufficient mastic is furnished without additional cost (1 lb. to 10 lineal ft.); additional mastic may be secured at additional cost.

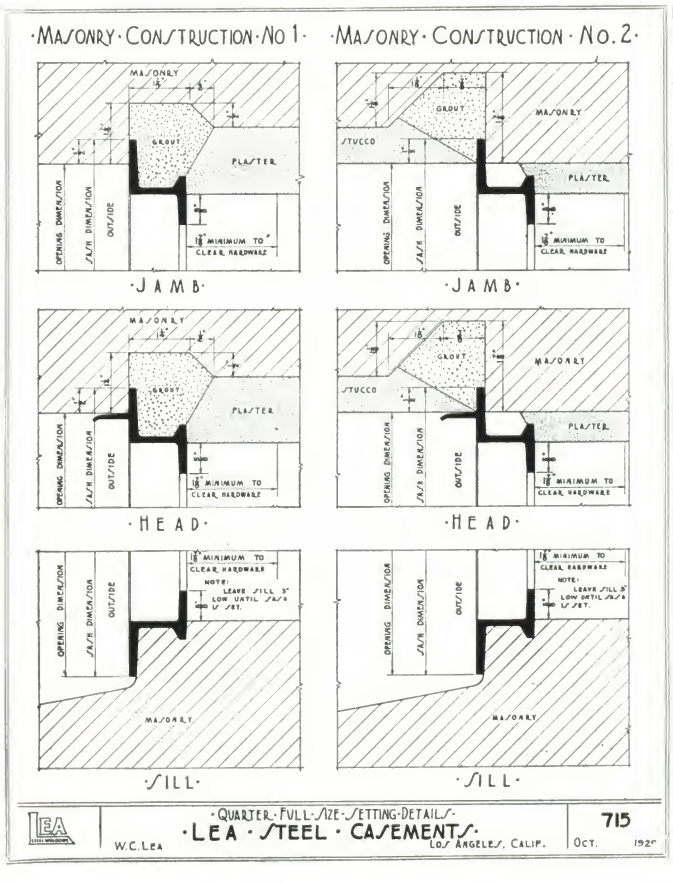


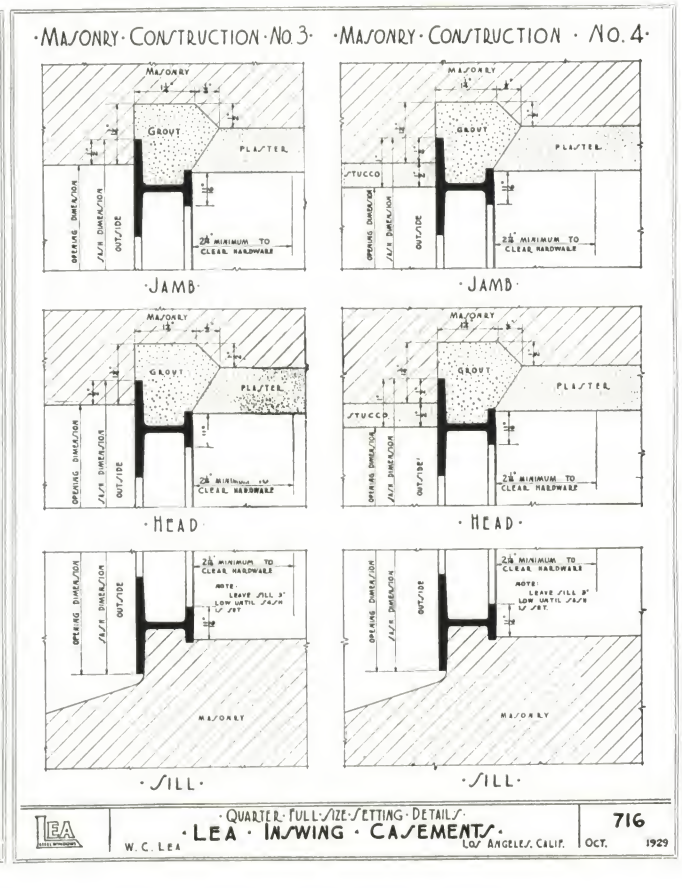


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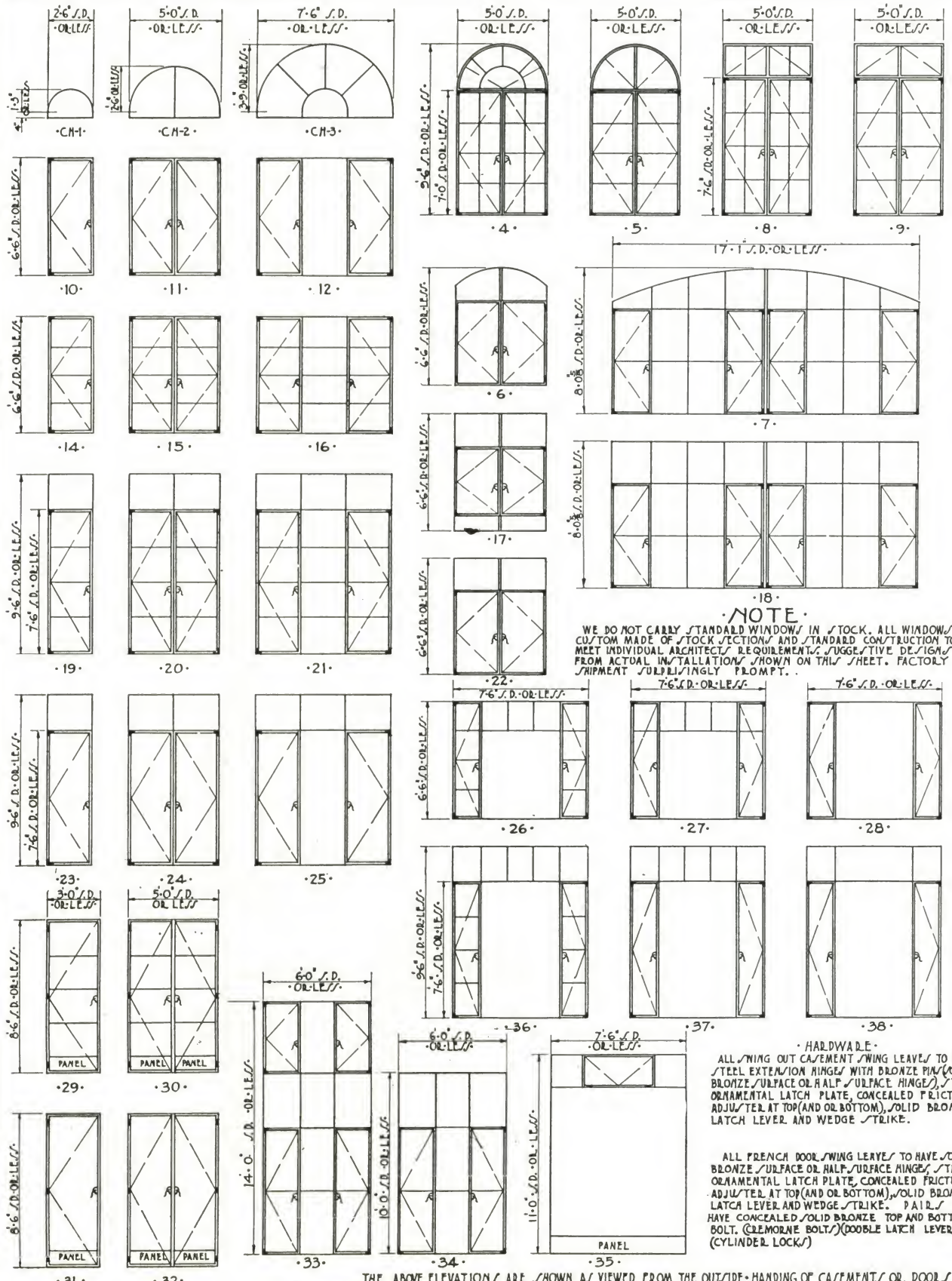








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·NOTE·

WE DO NOT CARRY STANDARD WINDOWS IN STOCK. ALL WINDOWS CUSTOM MADE OF STOCK SECTIONS AND STANDARD CONSTRUCTION TO MEET INDIVIDUAL ARCHITECTS REQUIREMENTS. SUGGESTIVE DESIGNS FROM ACTUAL INSTALLATIONS SHOWN ON THIS SHEET. FACTORY SHIPMENT SURPRISINGLY PROMPT.

·HARDWARE·

ALL SWING OUT CASEMENT SWING LEAVES TO HAVE STEEL EXTENSION HINGES WITH BRONZE PINS (SOLID BRONZE SURFACE OR HALF SURFACE HINGES), STEEL ORNAMENTAL LATCH PLATE, CONCEALED FRICTION ADJUSTER AT TOP (AND OR BOTTOM), SOLID BRONZE LATCH LEVER AND WEDGE STRIKE.

ALL FRENCH DOOR SWING LEAVES TO HAVE SOLID BRONZE SURFACE OR HALF SURFACE HINGES, STEEL ORNAMENTAL LATCH PLATE, CONCEALED FRICTION ADJUSTER AT TOP (AND OR BOTTOM), SOLID BRONZE LATCH LEVER AND WEDGE STRIKE. PAIRS TO HAVE CONCEALED SOLID BRONZE TOP AND BOTTOM BOLT. (CREMORNE BOLTS) (DOUBLE LATCH LEVERS) (CYLINDER LOCKS)

THE ABOVE ELEVATIONS ARE SHOWN AS VIEWED FROM THE OUTSIDE · HANDING OF CASEMENTS OR DOORS IS DETERMINED BY THE HINGE LOCATION VIEWED FROM THE OUTSIDE · HINGED AT LEFT IS A LEFT HANDED CASEMENT OR DOOR.

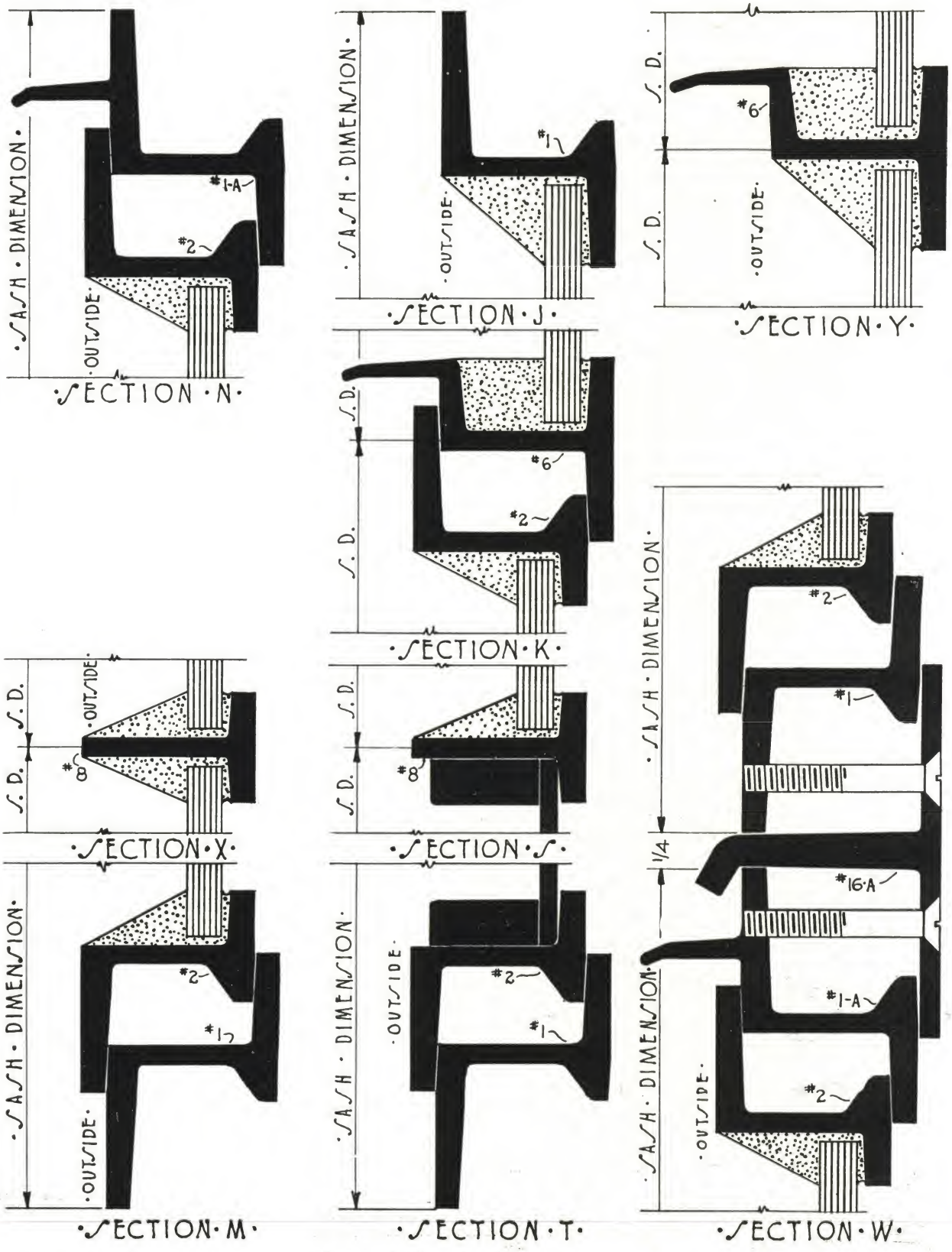
LEA STEEL WINDOWS

·LEA·STEEL·CASEMENTS & FRENCH·DOORS·

·724·

W. C. LEA — LOS ANGELES, CALIF. — JULY 1930

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LEA STEEL WINDOWS

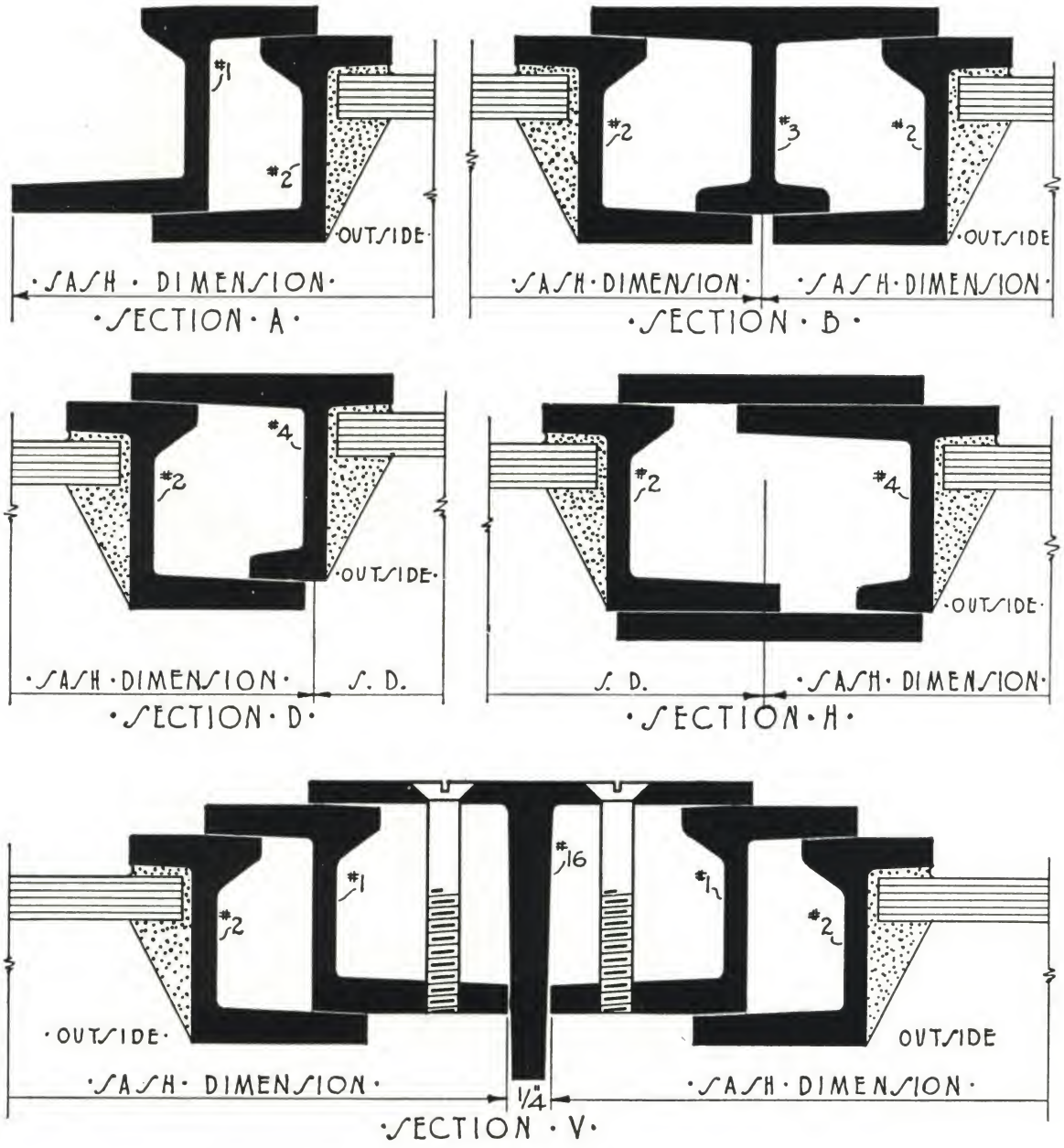
FULL SIZE DETAILS
LEA STEEL CASEMENTS

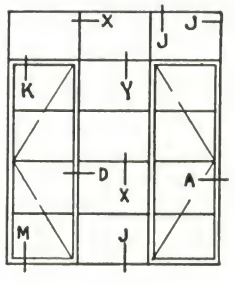
W. C. LEA — LOS ANGELES, CALIF.

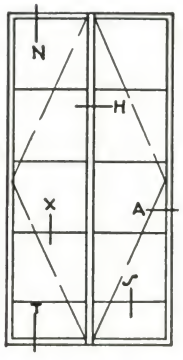
708-A

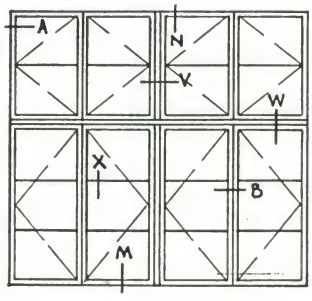
JULY 1930

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LEA STEEL WINDOWS

W. C. LEA

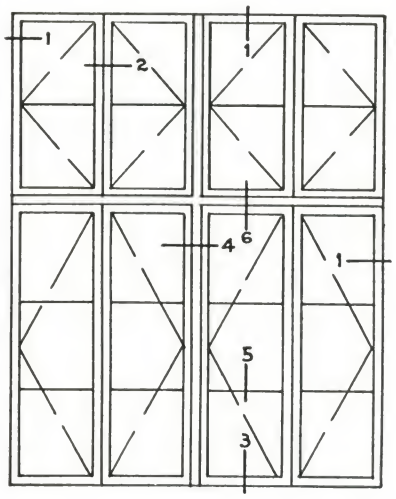
FULL SIZE DETAILS
LEA STEEL CASEMENTS

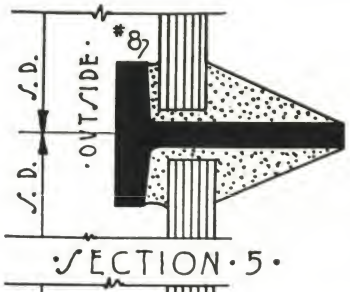
LOS ANGELES, CALIF.

708-B

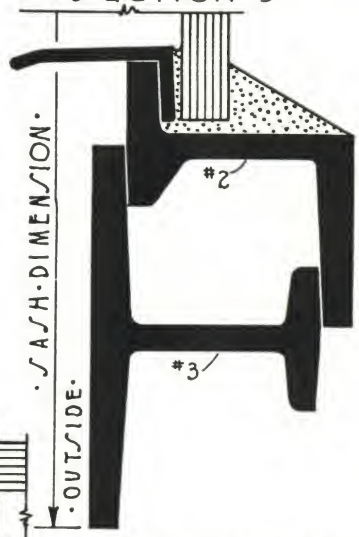
JULY 1930

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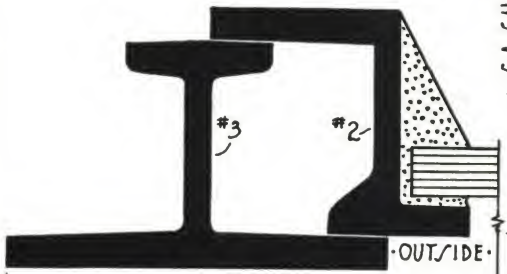




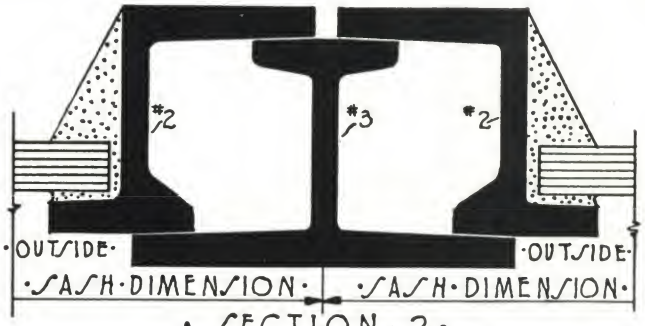
·SECTION·5·



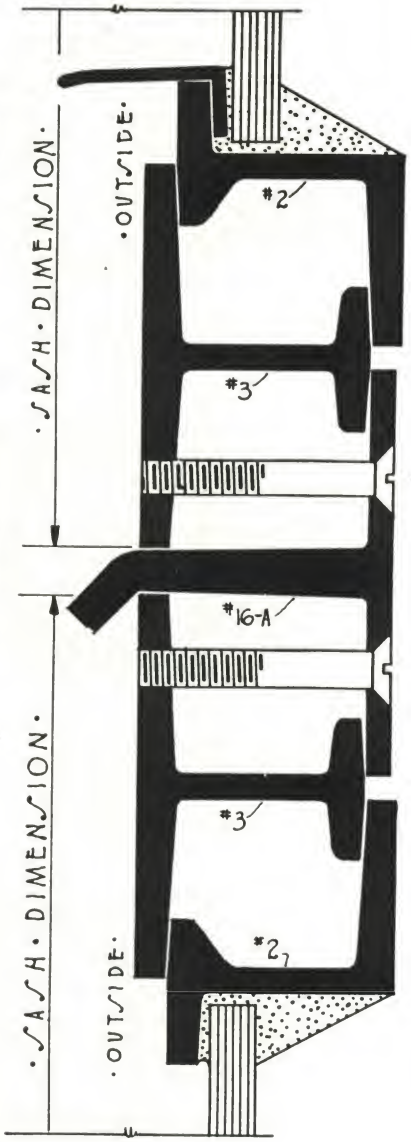
·SECTION·3·



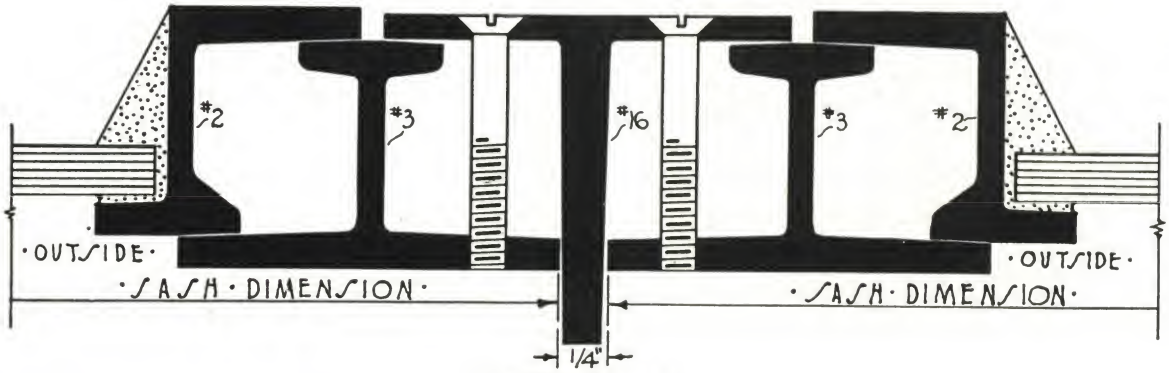
·SECTION·1·



·SECTION·2·



·SECTION·6·



·SECTION·4·

LEA STEEL WINDOWS

·FULL·SIZE·DETAILS·

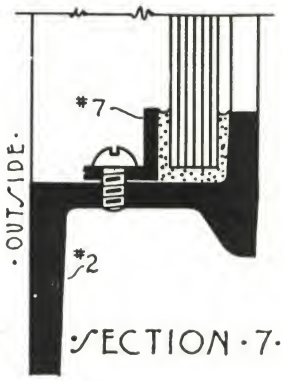
·LEA·INSWING·CASEMENTS·

W.C.LEA LOS ANGELES, CALIF.

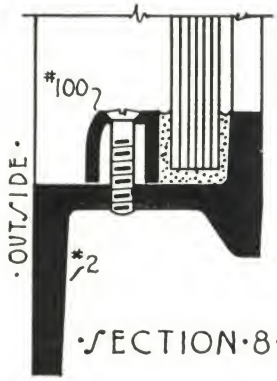
·712-A·

JULY 1930

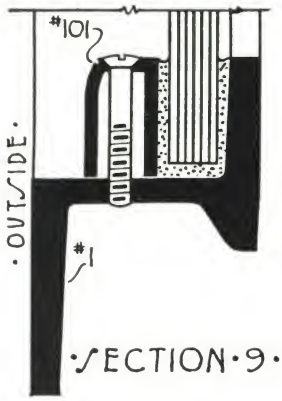
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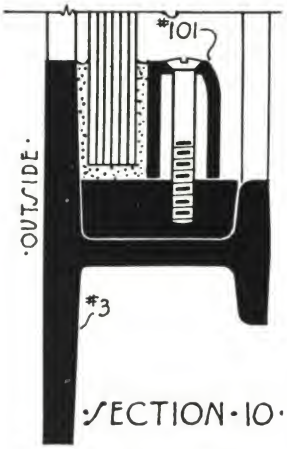
SECTION 7



SECTION 8



SECTION 9



SECTION 10

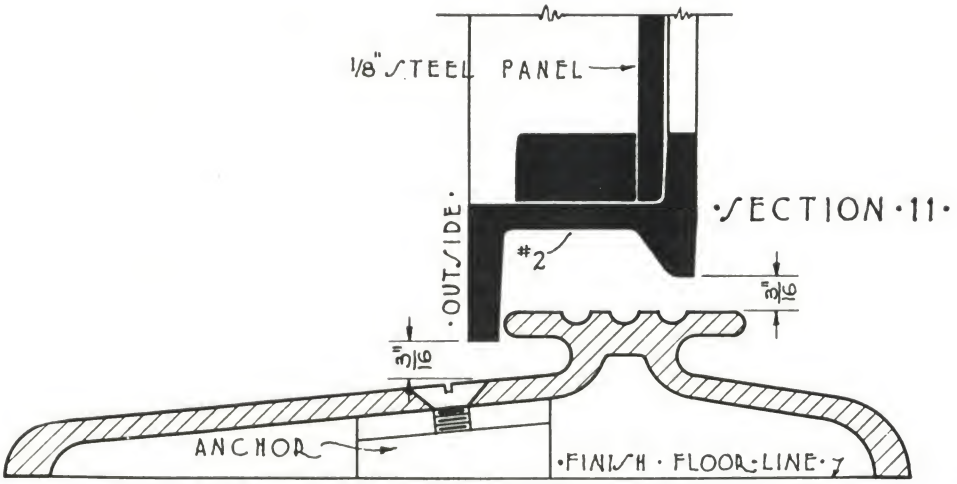
TYPES OF GLAZING

GLAZING ANGLE ON SWING LEAF SECTION

GLAZING BEAD ON SWING LEAF SECTION

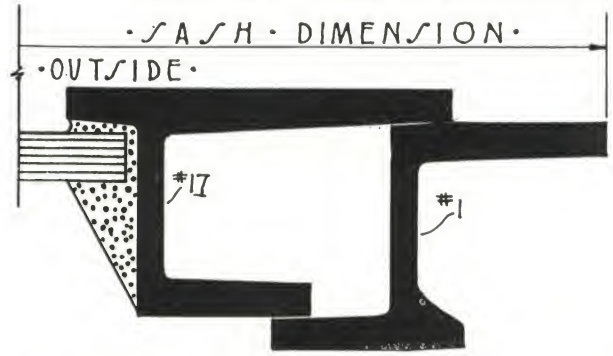
GLAZING BEAD ON OUT SIDE SECTION OUT SWING TYPE

GLAZING BEAD ON OUT SIDE SECTION IN SWING TYPE

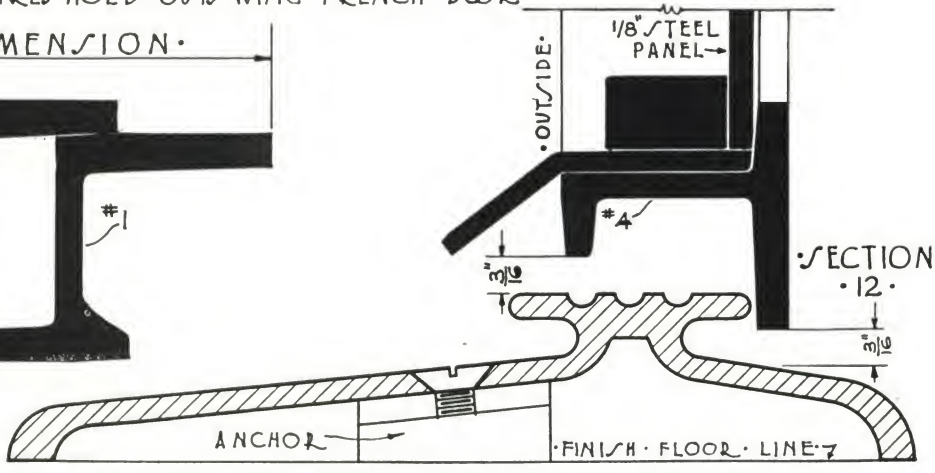


SECTION 11

BRONZE THRESHOLD OUT SWING FRENCH DOOR



SECTION 14



SECTION 12

BRONZE THRESHOLD INSWING FRENCH DOOR

LEA STEEL WINDOWS

W. C. LEA

SPECIAL DETAILS

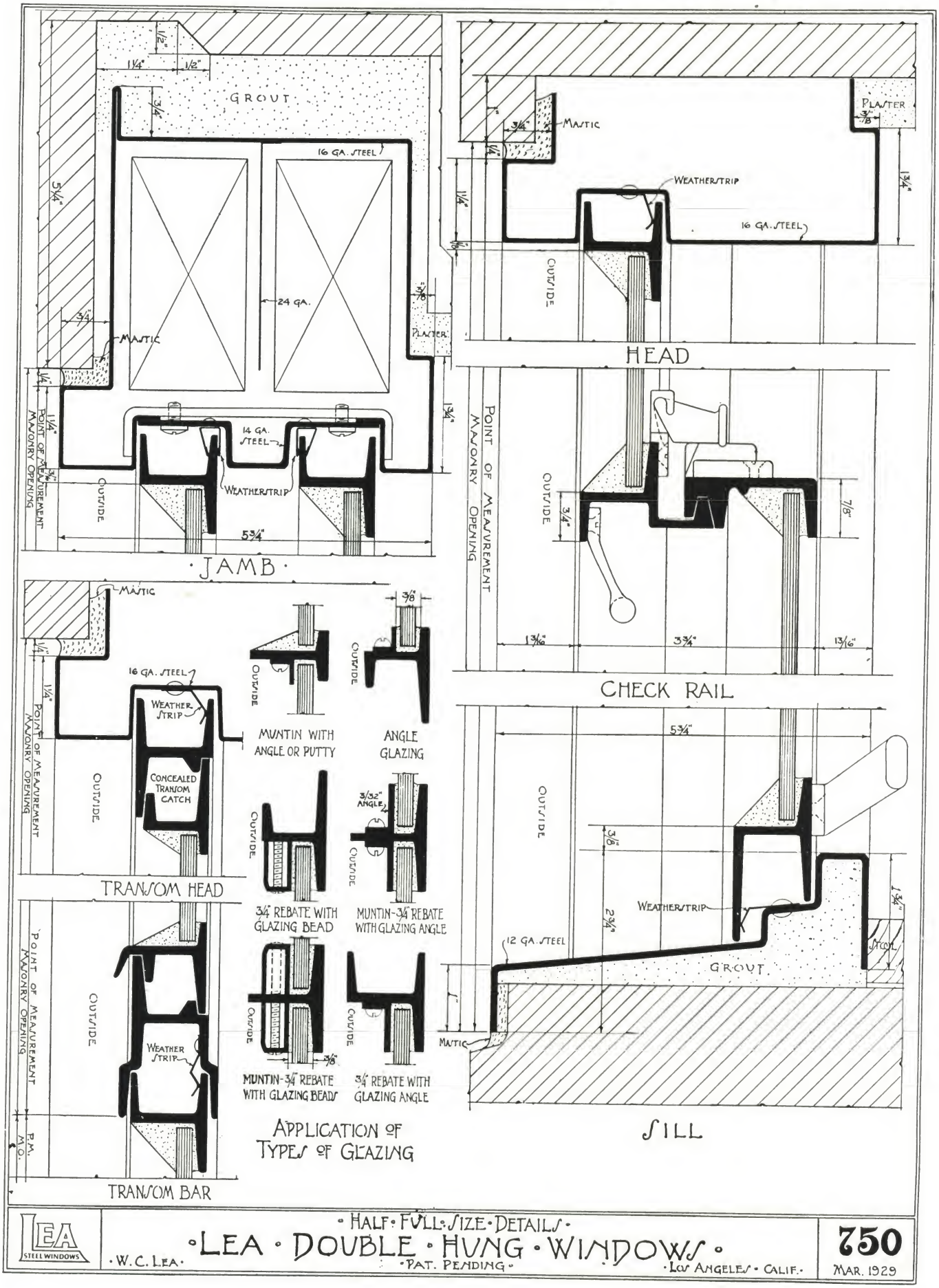
LEA STEEL CASEMENTS

LOS ANGELES, CALIF.

717-A

JULY 1930

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LEA STEEL WINDOWS

·W. C. LEA·

·HALF·FULL·SIZE·DETAILS·

·LEA·DOUBLE·HUNG·WINDOWS·

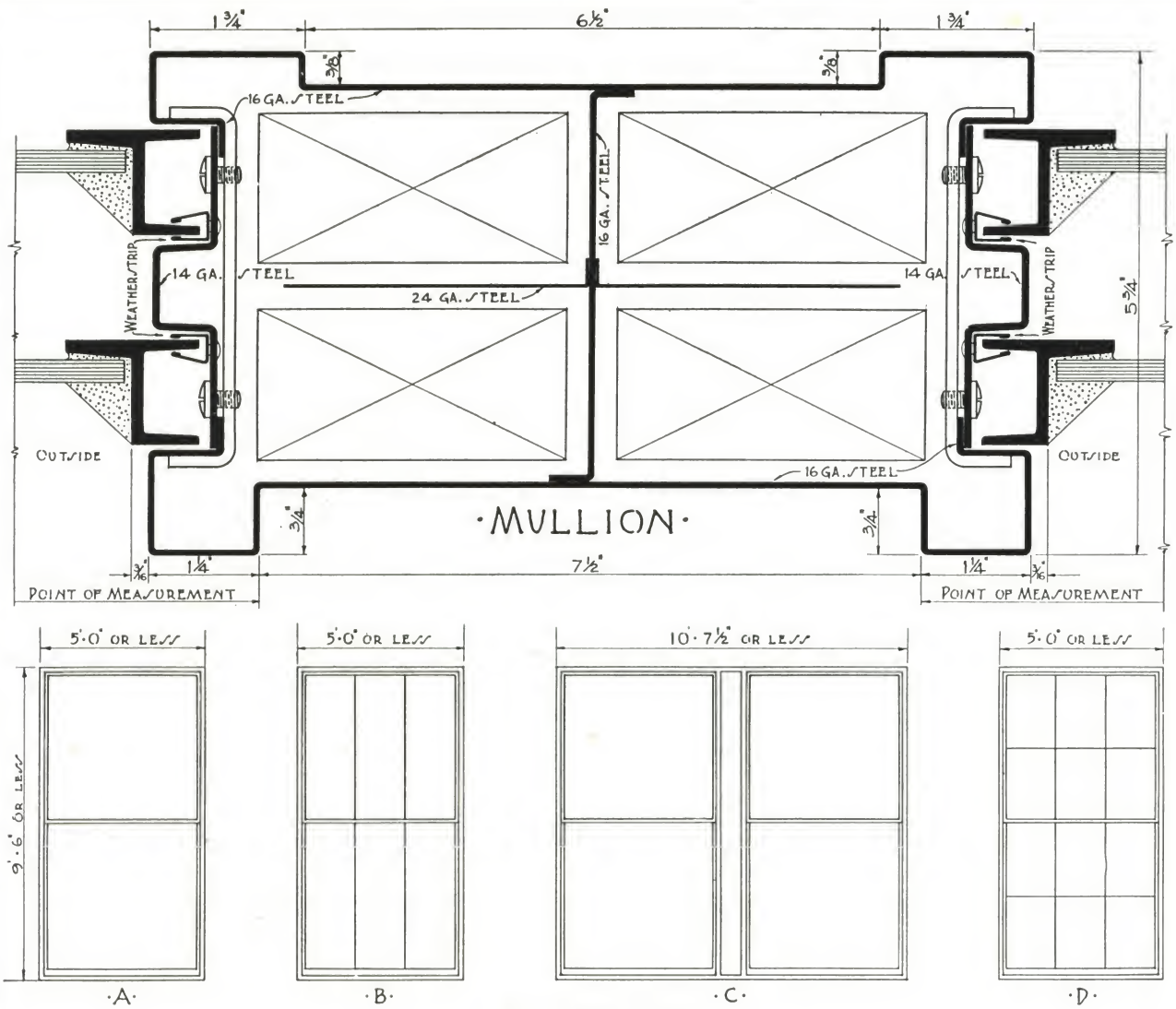
·PAT. PENDING·

·LOS ANGELES·CALIF.·

750

MAR. 1929

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ELEVATIONS
SCALE 3/16"-1'-0"

Specifications for "Lea" Steel Double Hung Windows

General—All exterior steel double hung windows shall be "Lea" Steel Double Hung Windows as manufactured by W. C. Lea, Los Angeles, Calif.

Work Not Included in Steel Double Hung Window Contract—Setting of frames, filling of sills with concrete, grouting, calking, pointing and hoisting, glass, glazing, putty, (metal stools), metal trim or plaster mould, grounds, screens or painting (except standard shop coat of paint).

Material—Frame members to be constructed with the following gauges of galvanized steel:

Weight box	No. 16 gauge
Weight box covers	No. 14 gauge
Head jamb	No. 16 gauge
Sill	No. 12 gauge
Weight division	No. 24 gauge

Special "Lea" Weatherstrip (bronze).

Sash members to be constructed of hot rolled copper bearing solid steel sections, containing not less than 0.15% nor more than 0.30% of copper.

Minimum weight per lineal foot of sash members to be as follows:

Top rail and sides	1.45 lb.
Top check rail	1.95 lb.
Bottom check rail	2.08 lb.
Bottom rail	1.95 lb.

Glazing angles to be $\frac{7}{16}$ x $\frac{3}{4}$ x $\frac{5}{32}$ in.

Construction—Joints between weight boxes, head jambs and sills to be welded and ground smooth, weight box covers to be fastened to weight box by means of especially formed clamps and screws.

Dimensions of frame shall not be more than 5¾ in. from outside to inside. Weight box shall be so formed as to provide a continuous anchor behind grout.

All double hung frames shall be equipped with (bronze) guides, which form a weatherstrip, so that sash will slide against same instead of sliding against steel portion of frame. Head jamb, sill (and transom bar where required) to be equipped with (bronze) weatherstrips.

Corners of sash shall be mitred, electrically butt-welded and ground smooth. Sash sections are to be punched and tapped for the attachment of all finish hardware.

Hardware—All hardware to be "Lea" standard hardware. Frames are to be equipped with special removable bronze pulleys with $\frac{7}{16}$-in. diameter steel pins. Sash are to be hung with heavy (red metal) galvanized steel chain No. A or equal. Sash are to be properly balanced with one-piece cast iron weights $1\frac{3}{8}$x3½ in. in section.

Frames are to be equipped with "Lea" No. 125 window cleaner bolts and reinforcements.

All finish hardware shall be solid bronze finished to match other hardware in the building. Such hardware to consist of two bar lifts for lower sash, one bar pull for upper sash, and sash lock.

Where transoms occur they shall be reversible type to open in at top with concealed reversible hardware and concealed transom catch at top with solid bronze control on inside face of transom. Finish hardware and weights are to be shipped separately to be attached at the building.

Paint—Before shipment, windows are to be thoroughly cleaned and given one shop coat of "Lea" gray metallic paint.

Installation—General contractor will fill sills of window frames with concrete and will set or build the window frames in the wall perfectly true, straight, square and plumb and do all necessary grouting, calking and pointing. After frames are set, steel double hung window contractor will install all sash weights and, when glazing is done by others, will properly balance sash and weights. After painting is done by others, steel double hung window contractor will apply all "Lea" standard finish hardware and properly adjust all sash, leaving them in a first class working condition.

Hoisting—General contractor will do all hoisting of materials, for steel double hung window contractor, from the street level to the floors on which the material is to be used, steel double hung window contractor to do all necessary distributing of the sash and hardware on the floors. Such hoisting shall be without cost to steel double hung window contractor.

LEA STEEL WINDOWS

·HALF·FULL·SIZE·DETAILS-ELEVATIONS & SPECIFICATIONS·

·LEA·DOUBLE·HUNG·WINDOWS·

W.C.LEA PAT. PENDING ·LOS·ANGELES, CALIF.

725 JULY 1930

KEWANEE MANUFACTURING COMPANY

Steel Basement Windows and Other Building Products

1600 Burlington Avenue, KEWANEE, ILL.

NATIONALLY DISTRIBUTED THROUGH DEALERS IN BUILDING MATERIALS

Products

KEWANEE COPPER STEEL BASEMENT WINDOWS.

Also Fireplace Dampers, Ash Dumps, Clean-out Doors, Package Receivers, Built-in Mail Chutes, Garbage Receivers, and other Building Products.

For Kewanee Copper Steel Basement Chutes, see Manufacturers' Index.

Kewanee Basement Window (Patent Applied For)

The Kewanee Basement Window fulfills all requirements of the modern home. Its superior box frame all-steel construction precludes warping, shrinking, swelling, slivering, and rotting. Its attractive sturdy design embodies the spirit of modern architecture, permitting the maximum amount of daylight to reach the basement and combining convenience, protection, and general adaptability to a greater extent than an ordinary window.

Kewanee Top Hung Window—This window operates in the usual way, sash hinging at top and swinging open at bottom. All parts are of heavy rust-resistant copper steel, electric welded at every joint. The action of the hook hinges at the top and the cam-action lock at the bottom is to draw the die-pressed sash and frame together into a true double weathering contact all around which defies rain, wind and cold.

Kewanee Bottom Hung Window—Meets the demand for top ventilation. It is merely the top hung window in inverted position, except for the overhanging drip bar being built into the hinge side instead of the latch side of the sash, and the two jointed arms, one on each side of the sash, which are added for the purpose of limiting the opening of the sash. By lifting the ends of the jointed arms out of the slots in the window frame in which they engage, the sash can be swung down into horizontal position and detached from the frame.

Distinctive Features

Rigid Box Frame—Of heavy copper steel, formed into stiff channel section and electrically welded at corners.

Easily Installed—Frame stands alone while being set. Edges of frame serve as a masonry guide for workman.

Top or Bottom Hung Windows—Two types, affording a choice and meeting all requirements.

Sash Removable—By swinging into horizontal position and lifting off hook hinges.

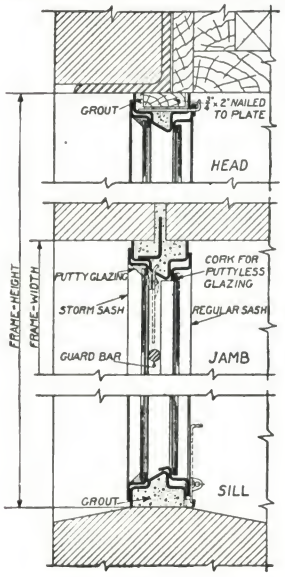
Double Contact—Frame and sash die-pressed to a perfect double weathering contact.

Putty or Puttyless Glazing—Attachments furnished in each case are described at right.

Screen and Storm Sash—These are accommodated in a neat and efficient manner.

Guard Bars—Welded to frame where this special protection is desired.

Low Cost—With all these vital features the new Kewanee Window costs no more than inferior windows.

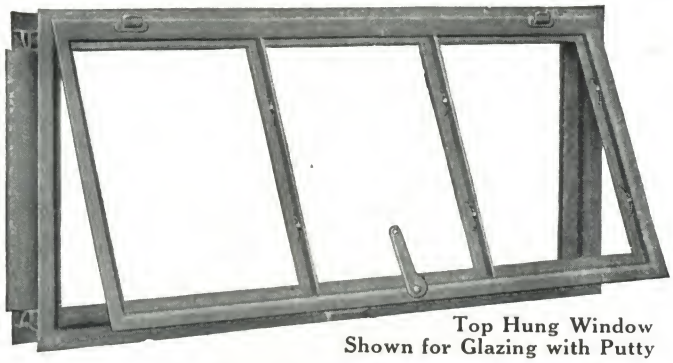


Construction Details

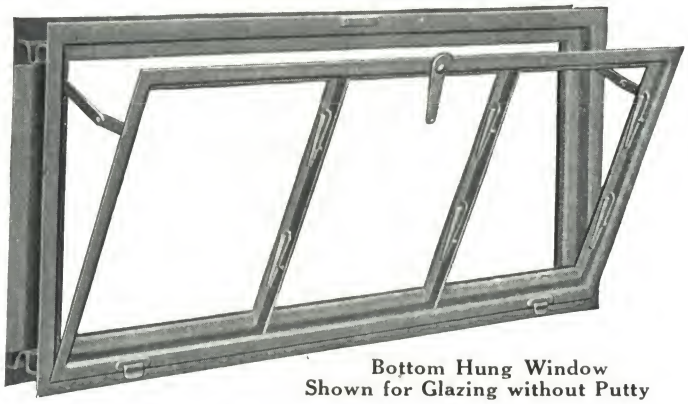
Diagram shows exact shape of the different members, and efficient way in which the regular sash, storm sash (or screen) and guard bars are accommodated within the frame of the new Kewanee Window. Note the double contact of storm sash as well as of regular sash.

Diagram also shows how easily the new Kewanee Window is installed in the foundation wall. Box frame stands upright of itself—does not need to be held or braced while being set.

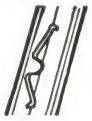
Edges of the frame form a definite masonry guide to which workman builds on all sides. Anchor fins, one on either side of the frame, extend ¾ in. into the jamb, and hold frame securely in place. Space within the channel-like section of frame forms a pocket for mortar which seals the frame tightly to wall.



Top Hung Window Shown for Glazing with Putty



Bottom Hung Window Shown for Glazing without Putty



Putty or Puttyless Glazing

At left the double glazing clip which is sprung under a lug in the side of sash to hold pane of glass in place against the bed putty while face putty is being applied. Four of these clips are supplied for each pane of glass.

Illustration at right shows sash for glazing without use of putty. Strips of composition cork are cemented to the bearing surfaces of sash and the glass is pressed against this cork cushion by means of an adjustable retaining wedge—four for each pane—which catches under the sash lug.



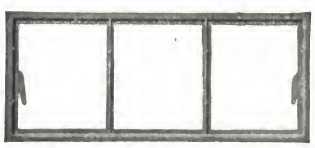
SPECIFICATIONS

Size of window		Wall opening required, in.		Net and Shipg. weight, lbs.
Lights	In.	Width	Height	
3	10x12	33 5/8	14 7/8	20
2	14x20	31 1/4	22 7/8	22
3	10x16	33 5/8	18 7/8	22
3	10x20	33 5/8	22 7/8	24
3	12x18	39 5/8	20 7/8	25
3	11x24	36 5/8	26 7/8	27

Over-all dimensions same as "Wall Opening Required," except for anchor fins which project on each side ¾ in. beyond frame proper.



The Kewanee Screen attaches from the inside of window by means of cam-action latches which engage in slots in the window frame. The screen frame is of steel, electrically welded at corners, and wire cloth is 16-mesh bronze.



The Kewanee Storm Sash attaches from the inside of window in the same manner as the Kewanee Screen. The double weathering contact which the storm sash makes with the frame assures the exclusion of cold air.

Kewanee Windows can be furnished with Guard Bars welded to frame. They do not interfere with screen or storm sash.

LEMCO

STEEL CASEMENTS

CUSTOM BUILT
STANDARD SIZES
PROJECTED TYPE
CASEMENT DOORS

LUNDELL-ECKBERG MANUFACTURING CO., INC.
JAMESTOWN, NEW YORK

LEMCO REPRESENTATIVES

ALBANY, N. Y.
FRED G. SCHILLING, JR.
99 North Allen Street

ATLANTA, GA.
STEEL SPECIALTIES COMPANY
606 Walton Building

BALTIMORE, MD.
CONSOLIDATED SUPPLY COMPANY
10 West Chase Street

BUFFALO, N. Y.
JAMES M. HAWKINS COMPANY, INC.
885-887 Ellicott Square
Telephone, Seneca 7830

CHICAGO, ILL.
W. L. VAN DAME COMPANY
Room 408, 820 Tower Court
Telephone, Superior 3244

CINCINNATI, OHIO
DURBROW & OTTE
206 West Court Street

COLUMBUS, OHIO
ALVAN TALLMADGE
63 Parkwood Avenue
Telephone, FR 5487

DALLAS, TEX.
METAL PRODUCTS COMPANY
406 Linz Building
Telephone, 2-8719

WICHITA, KAN.
LUSCO BRICK & STONE COMPANY

LITTLE ROCK, ARK.
CHAS. S. WATTS
700 Pyramid Life Building
P. O. Box 92

LOS ANGELES, CALIF.
ASSOCIATED MATERIALS COMPANY
707 East 61st Street
Telephone, Axridge 9078

MIAMI, FLA.
J. K. BRANDT
408 City National Bank Building

MINNEAPOLIS, MINN.
HAUENSTEIN & BURMEISTER
614 Third Avenue, South

NEW YORK, N. Y.
A. F. NAGLE COMPANY, INC.
10 East 43rd Street
Telephone, Vanderbilt 1120

PITTSBURGH, PA.
HARRY H. FRANK
207 Fulton Building
Telephone, Atlantic 9730

Some Lemco Installations and the Architects

Banks, Commercial and Public Buildings

River Forest State Bank, River Forest, Ill., Schmeitler & Wenisch
Title Insurance and Trust Bldg., Los Angeles, Cal., John & Donald Parkinson
Laramie State Bank, Chicago, Ill., Meyer & Cook
Hyde Park National Bank, Chicago, Ill., K. M. Vitzthum & Co.
Baltimore Trust Co. Bldg., Baltimore, Md., Taylor & Fisher; Smith & May
Suffolk Title Guarantee & Trust Co., Jamaica, N. Y., Dennison & Hirons
Detroit Savings Branch Bank and Office, Detroit, Mich., C. L. Phelps
State Savings Bank Bldg., St. Paul, Minn., Toltz, King & Day
West Town State Bank Bldg., Chicago, Ill., Mundie & Jensen
Worthen Bank, Little Rock, Ark., Mann, Wanger & King
Butler Savings & Trust Co., Butler, Pa., Mowbray & Uffinger
People's State Bank, Detroit, Mich., Hans Gehrke
Franklin Savings & Trust Co., Pittsburgh, Pa., Thomas Pringle
Chicago Daily News Bldg., Chicago, Ill., Holabird & Root
Jewel Tea Company Bldg., Barrington, Ill., Holabird & Root
Internal Revenue Bldg., Washington, D. C., J. A. Wetmore
Wall & Hanover Bldg., New York, N. Y., Delano & Aldrich
Rockland State Hospital, Orangeburg, N. Y., New York State Architect
One La Salle Street Bldg., Chicago, Ill., K. M. Vitzthum & Co.
St. Joseph's Sanitorium, Albuquerque, N. M., George Williamson, Inc.
Central Fire and Police Station, Columbus, Ohio, Allied Architects

Churches

Immanuel Baptist Church, Little Rock, Ark., Mann & Stern
St. Benedict's Parish Bldg., Detroit, Mich., Donaldson & Meier
Synagogue for Congregation Rodeph Sholom, New York, N. Y., Charles B. Meyers
St. Joseph's Cathedral Rectory, Buffalo, N. Y., Mortimer J. Murphy
Hendricks Memorial Chapel (Syracuse University), Syracuse, N. Y., John Russell Pope and Dwight James Baum, Associate Architects
St. Catherine's Parish, Detroit, Mich., Donaldson & Meier
Northminster Presbyterian Church, Evanston, Ill., Mundie & Jensen
Episcopal Church School, Middletown, Del., Arthur H. Brockie
Wilmette Parish M. E. Church, Wilmette, Ill., Granger & Bollenbacher
Second Presbyterian Church Addition, Wilkinsburg, Pa., Lawrence Wolfe
St. Joseph's Church, Owatonna, Minn., Slifer & Abrahamson
Ida F. Stiles Memorial Church, Jackson, Mich., Thielbar & Fugard
St. George's Monastery, Cincinnati, Ohio, Crowe & Schulte
St. Boniface Parish, Philadelphia, Pa., Frank R Watson
Holy Trinity Parish, Erie, Pa., Fuller & Stickle
Holy Trinity Parish, Cleveland, Ohio, J. M. Miller
St. Stephen's Church, Philadelphia, Pa., Wetherill P. Trout
Presbyterian Church, Tacoma, Wash., Sutton, Whitney & Dugan
M. E. Church, Lincoln, Ill., Deal & Ginzel
Spiritual Science Church, Jamestown, N. Y., Oliver R. Johnson

Residences

Bernard Residence, Pasadena, Cal., Morgan, Walls & Clements
Hess Residence, Wheeling, W. Va., Sidney F. Heckert
Franklin Baker Residence, Newton Township, Delaware County, Pa., Carl A. Ziegler
Wilson Residence, Rochester, N. Y., Smith, Hinchman & Grylls
Henry A. Page Residence, Toledo, Ohio, Mills, Rhines, Bellman & Nordhoff
Wm. Chamberlain Residence, Winnetka, Ill., S. S. Beman
Bryant Residence, Detroit, Mich., Smith, Hinchman & Grylls
Edwin Merrill Residence, Bedford Hills, N. Y., Frank E. Newman
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George B. Everitt Residence, Winnetka, Ill., S. S. Beman
George R. Elder, Jr., Residence, Greenwich, Conn., Edgar A. Self
Kayser Residence, Minneapolis, Minn., Carl A. Gage
William F. Raskob Residence, Wilmington, Del., E. William Martin
M. R. Burrowes Residence, Farmington, Mich., M. R. Burrowes
Field Residence, Jackson, Mich., L. H. Field
S. F. Abraham, Detroit, Mich., Abraham & Wood
Dr. Hall, Detroit, Mich., W. C. Morris
W. H. McGarr, Birmingham, Mich., Hugh T. Keyes
Frank R. Watson, Philadelphia, Pa., F. R. Watson
Henry Rigg's Residence, Ann Arbor, Mich., Chas. J. Sullivan

Continued on next page

Foreword

WE specialize in high grade steel casements of any design or size. Our casements and doors may be divided into two general groups.

STRICTLY CUSTOM BUILT CASEMENTS AND DOORS

These are made of No. 200 heavy three-point section and No. 600 heavy two-point section. They may be of any shape or size.

STANDARDIZED STEEL CASEMENTS AND DOORS

Casements and doors are made of our No. 600 heavy two-point section in standard sizes and are kept in stock at all times for immediate shipment.

LEMCO QUALITY

Our casements are produced to conform to a high standard of both workmanship and material. The sections, which are unusually heavy, are made from hot rolled steel bars and are carefully straightened. The corners are accurately mitered and electrically welded together, making strong and neatly finished casements.

They are made by expert mechanics and all work is subjected to rigid inspection for precision of contact parts and assembly. The hardware, including hinges and fasteners, is made of bronze and not of malleable iron.

LEMCO HARDWARE

All hardware is solid bronze, even for the most inexpensive sash, and is made in our own foundry. Plates 1H-1, 1H-2 and 1H-3 show the designs of the various parts.

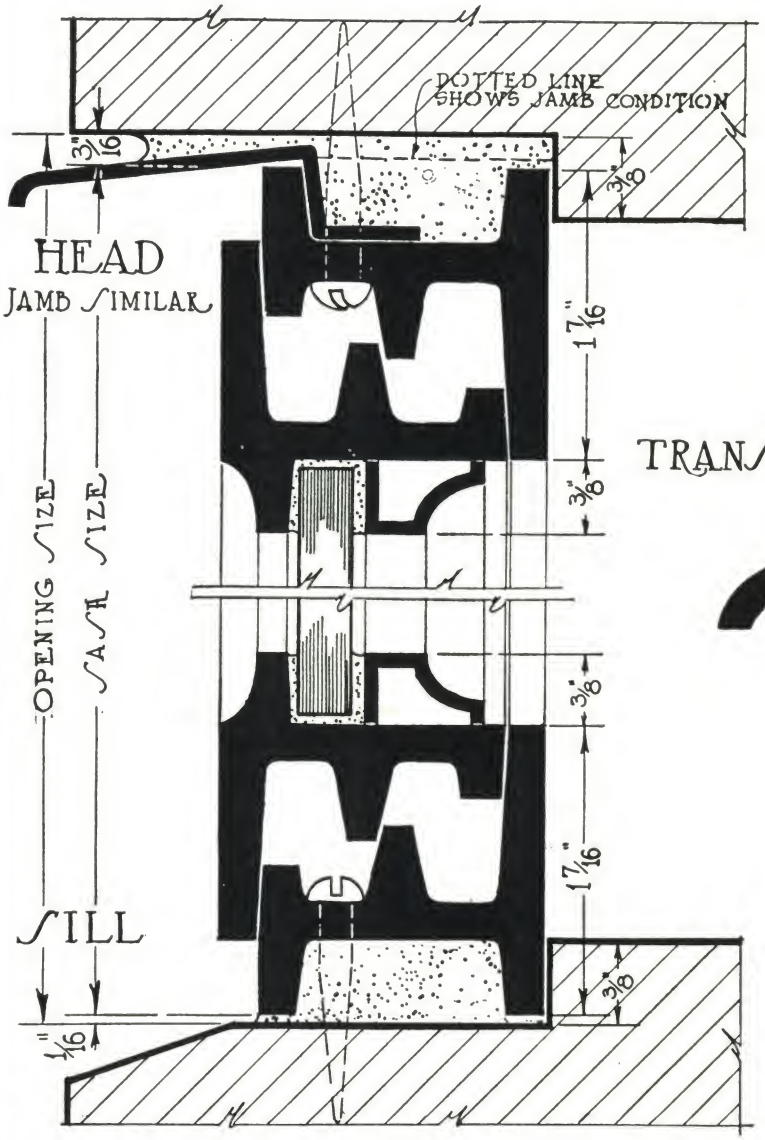
Our patented safety cleaning friction hinge allows the outside of the glass to be cleaned from the room side and the friction feature does away with the use of a sill adjuster. The friction hinge is easily operated, yet it will hold the sash in any desired position.

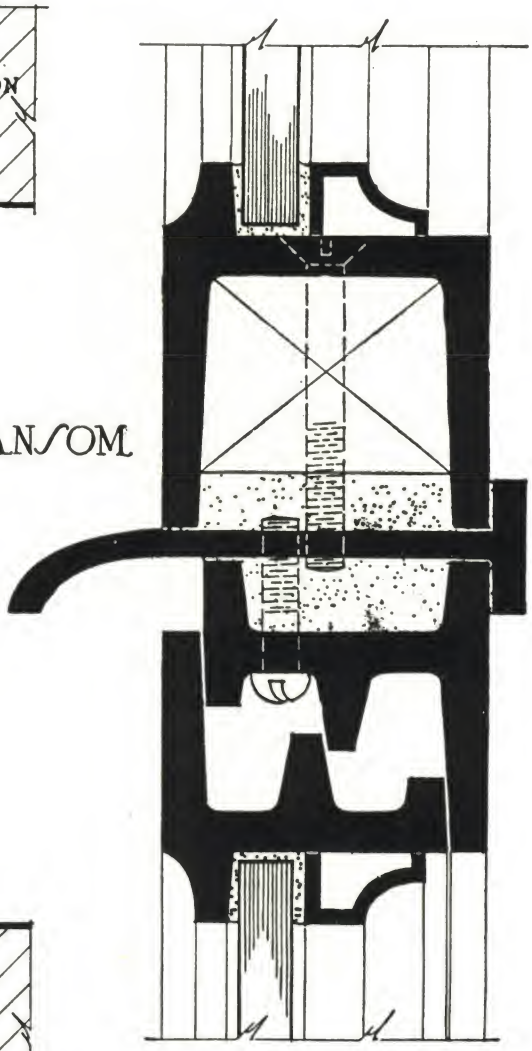
LEMCO FINISH

All steel is thoroughly cleaned and brushed before painting. All custom built jobs receive one coat of rust resisting paint and one coat of gray enamel, each coat baked on separately; standardized casements receive only one coat of gray enamel. However, painting specifications may vary to meet conditions or architect's specifications.

Continued on next page

NO. 200 LEMCO
HEAVY THREE POINT SECTION CASEMENT OPENING OUTWARD

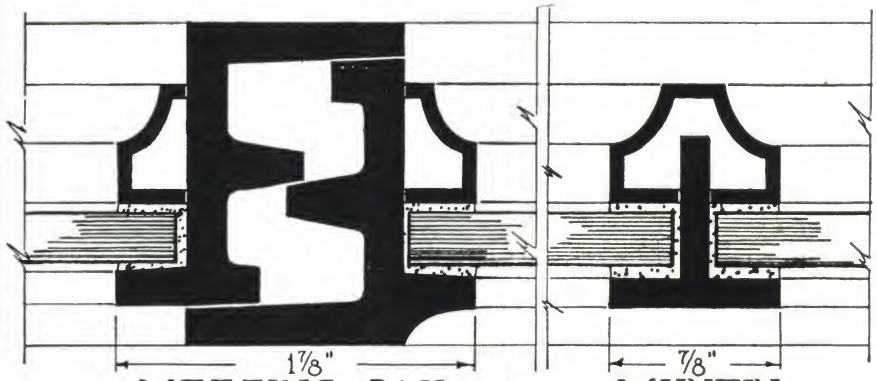




MULLION SIMILAR TO THAT SHOWN ON PLATE NUMBER 2A-1.

SECTIONS CAN BE ARRANGED FOR INSIDE OR OUTSIDE GLAZING.

CLEARANCE FOR SETTING SHOULD BE INCREASED TO 1/8" FOR MASONRY & CAST IRON.



SCALE-FULL SIZE

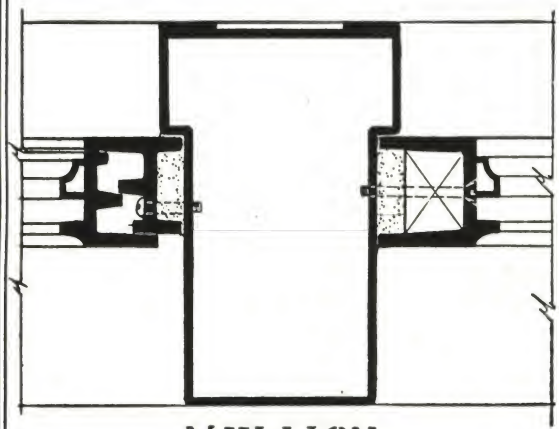
PLATE NO. 1A-1

Continued on next page

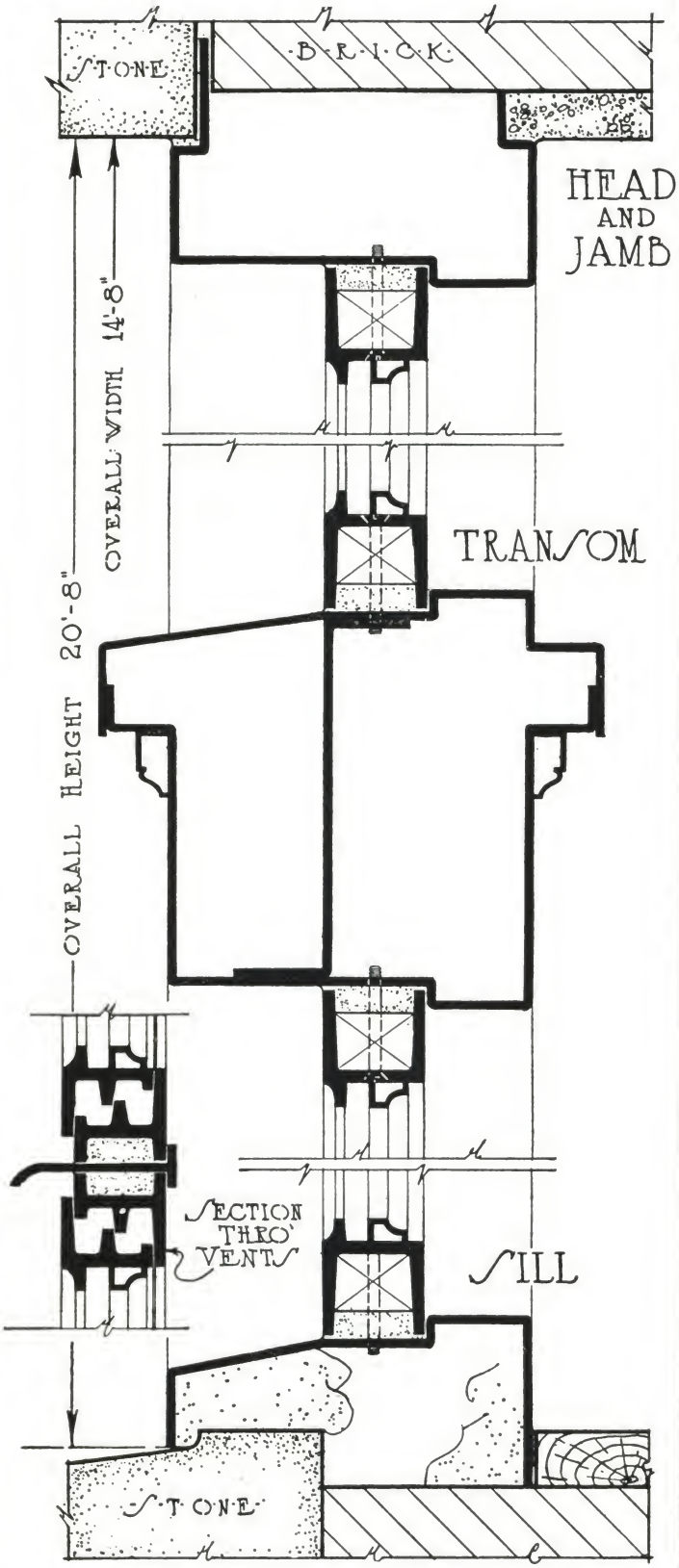
LEMCO THREE POINT SECTION SASH OPENING OUT SET TO LEMCO SUBFRAMES



SUBFRAMES CONSTRUCTED OF No TWELVE GUAGE STEEL.
VENTILATORS ARE HINGED AT TOP AND ARE CONTROLLED BY ROD GEARING.



MULLION

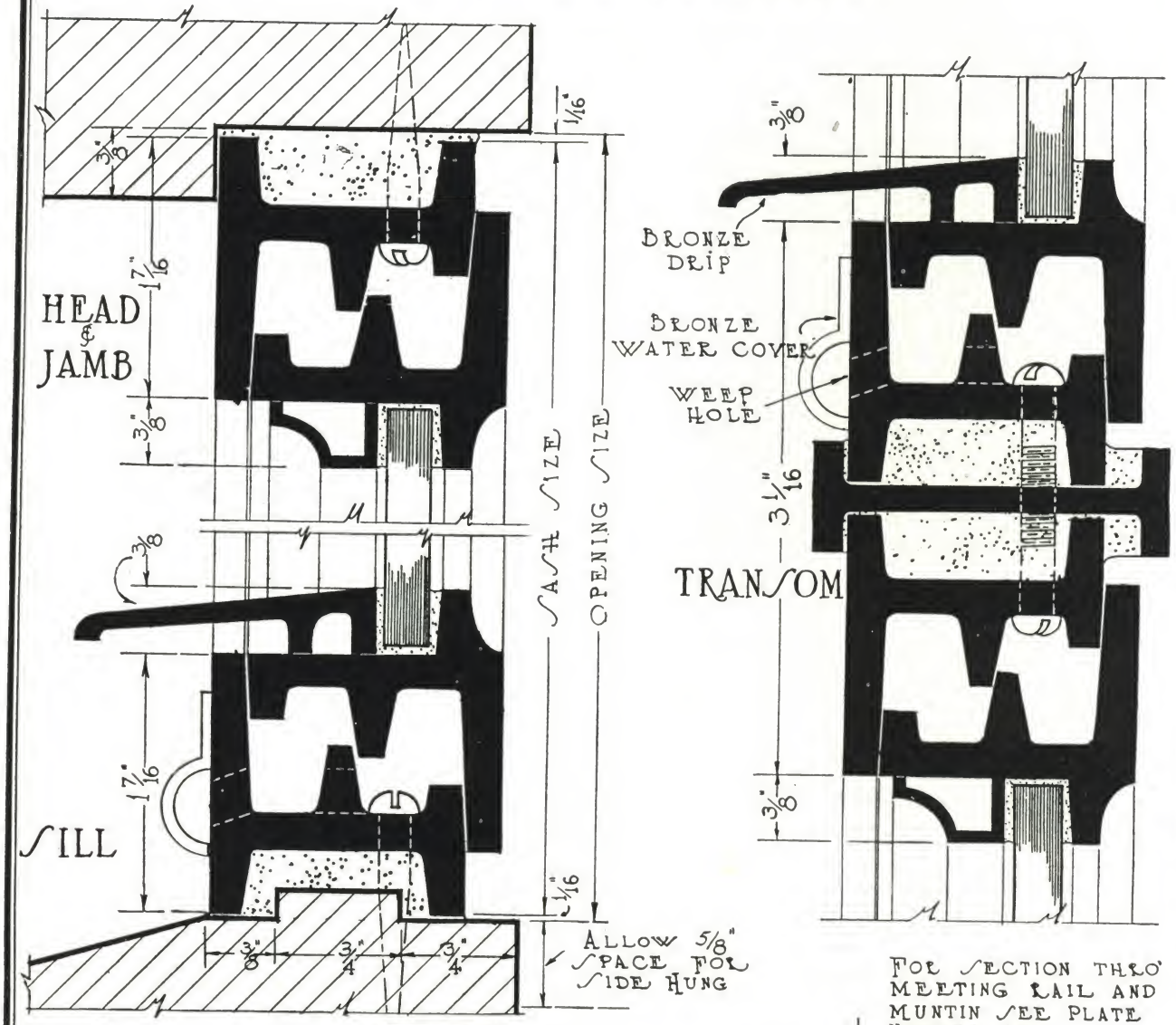


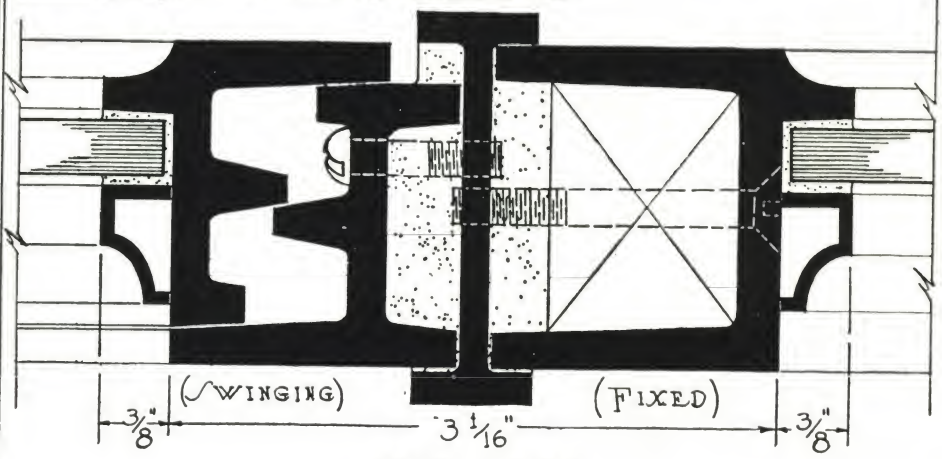
SCALE DETAIL
BAY RIDGE SAVINGS BANK
BROOKLYN, NEW YORK
HALSEY, MC CORMACK & HELMER
ARCHITECTS

PLATE NO. 1A-2

Continued on next page

NO. 200 LEMCO
HEAVY THREE POINT SECTION CASEMENT OPENING INWARD





MULLION

SCALE-FULL SIZE

FOR SECTION THRU MEETING RAIL AND MUNTIN SEE PLATE NUMBER 1A-1.

SECTIONS CAN BE ARRANGED FOR INSIDE OR OUTSIDE GLAZING.

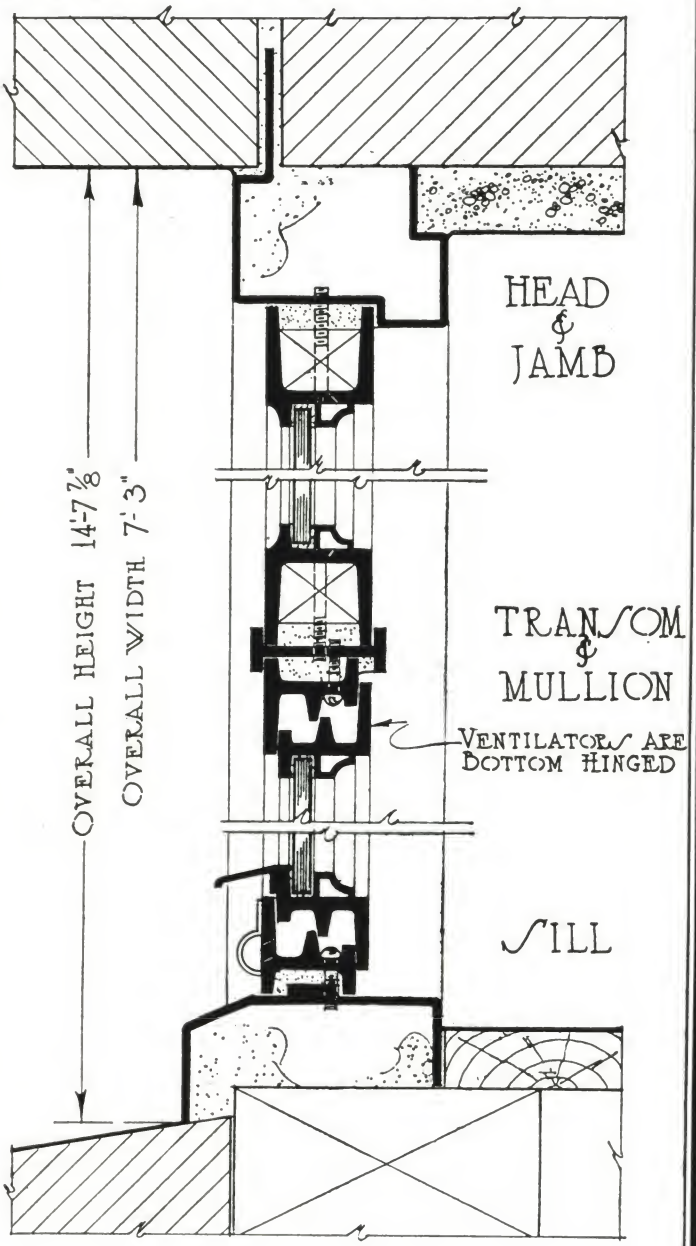
CLEARANCE FOR SETTING SHOULD BE INCREASED TO 1/8" FOR MASONRY & CAST IRON.

PLATE NO. 2A-1

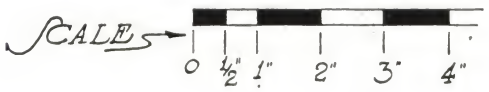
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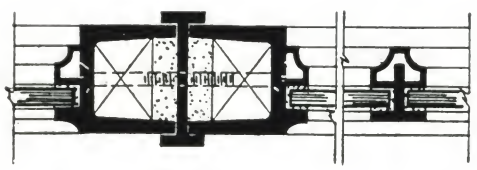
LEMCO THREE POINT SECTION SASH OPENING IN SET TO LEMCO SUBFRAMES





SUBFRAMES CONSTRUCTED OF № TWELVE GUAGE STEEL.
UPPER VENTILATORS OPERATED FROM FLOOR WITH CORDS. BRONZE CORD CLEAT PLACED ON MULLION A CONVENIENT DISTANCE FROM FLOOR.
LOWER VENTILATORS OPERATED WITH BRONZE SPRING CATCH AND BRONZE FOLDING SIDE ARMS.





MULLION MUNTIN

SCALE DETAILS

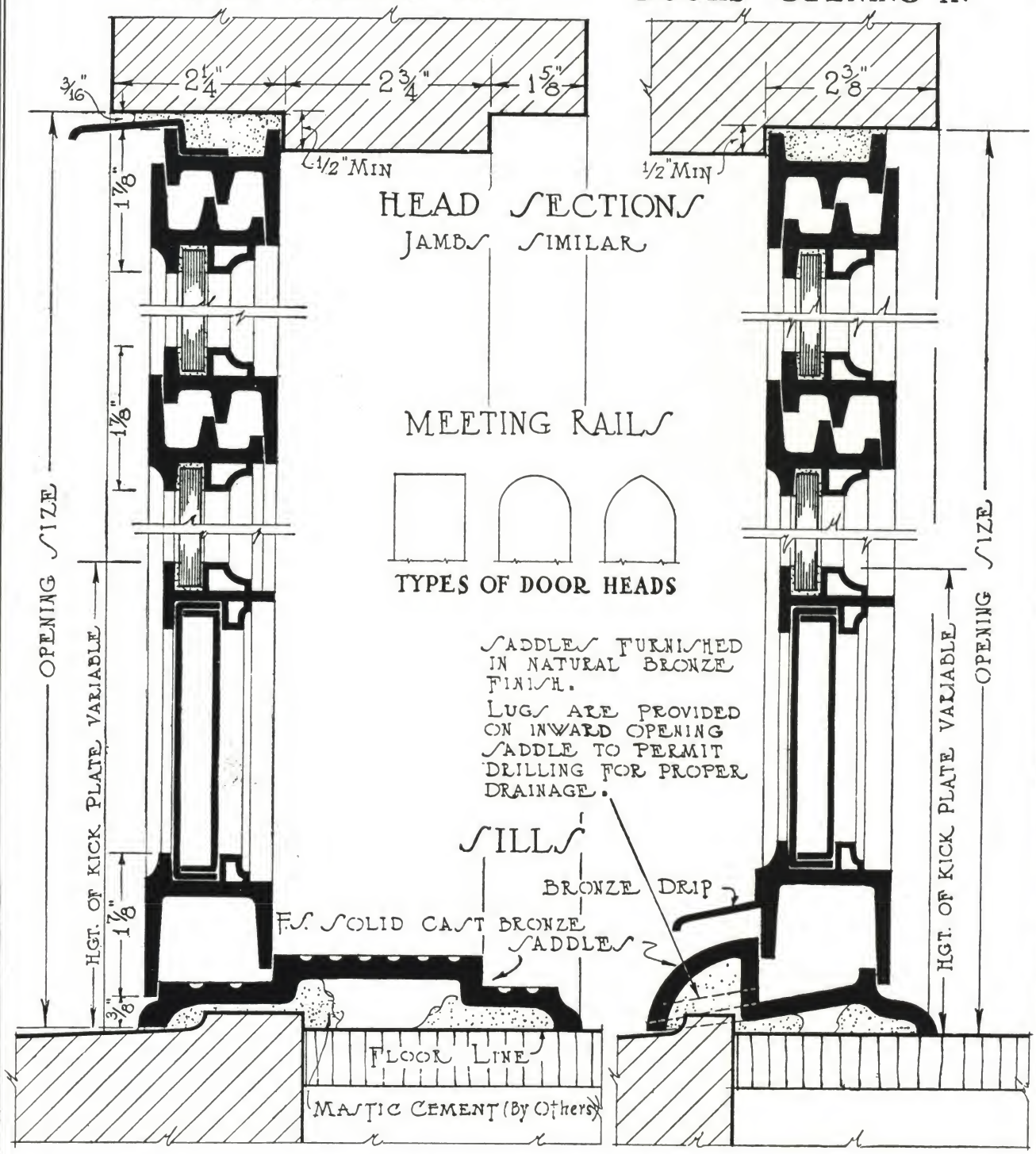
WOODCLIFF TRUST COMPANY
NORTH BERGEN, NEW JERSEY
WALTER L UHL — ARCHITECT

PLATE NO. 2A-2

Continued on next page

LEMCO DOUBLE FOLDING DOORS

HEAVY THREE POINT SECTION — SEE PLATE NO. 1A-1

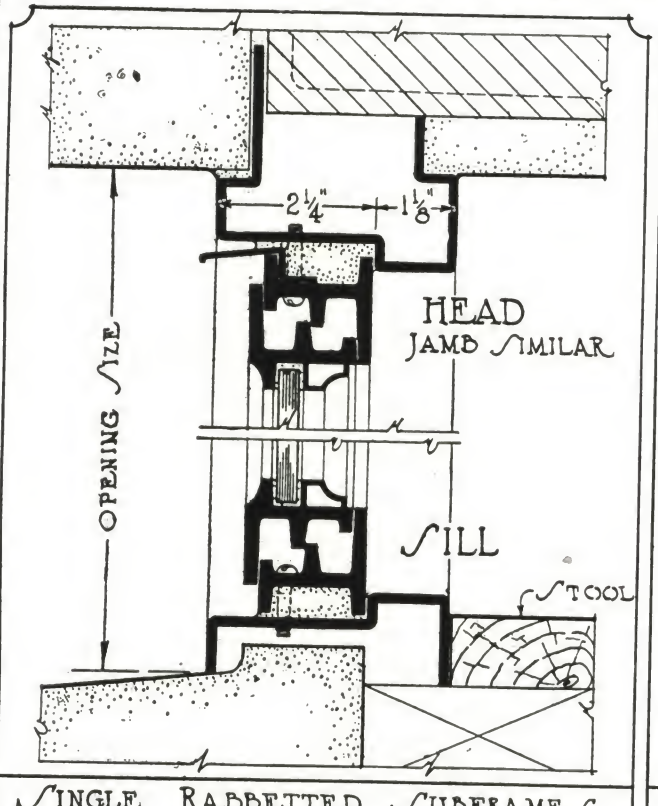


NOTE — OUTWARD OPENING DOOR SHOWN WITH DOUBLE RABBETTED SADDLE AND INWARD OPENING DOOR SHOWN WITH SINGLE RABBETTED SADDLE. EITHER TYPE OF SADDLE CAN BE FURNISHED FOR BOTH OUTWARD AND INWARD OPENING DOORS. SCALE-ONE-HALF FULL SIZE

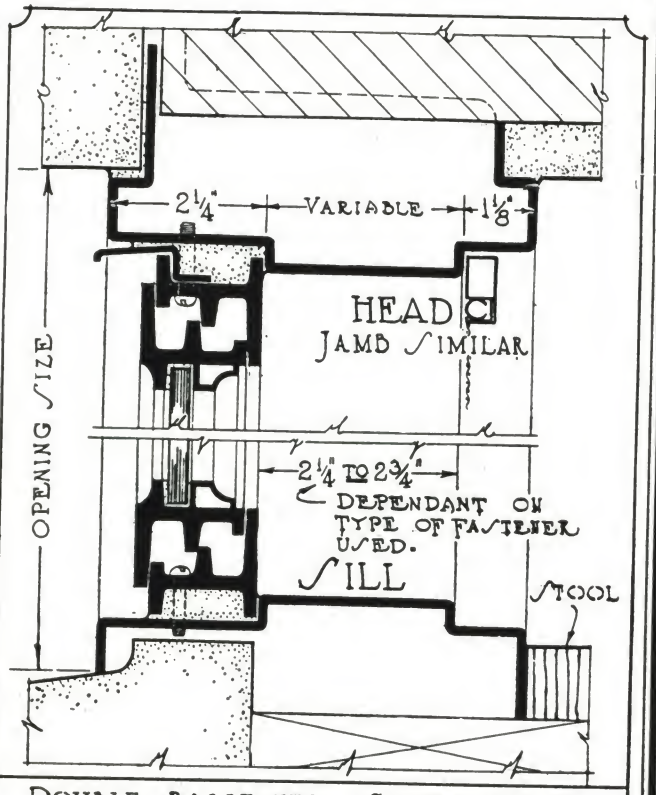
PLATE NO. 3A-1

Continued on next page

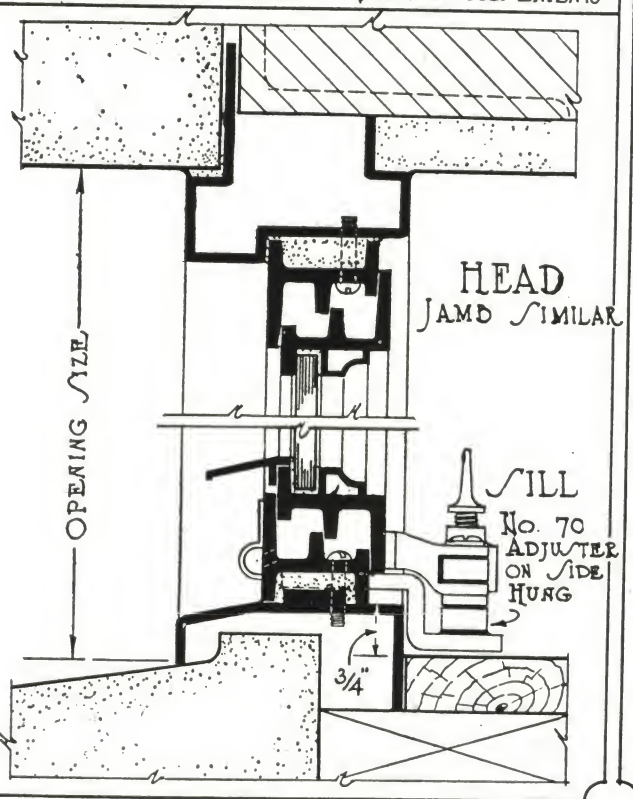
LEMCO BUILTIN SUBFRAMES APPLICATION DETAILS

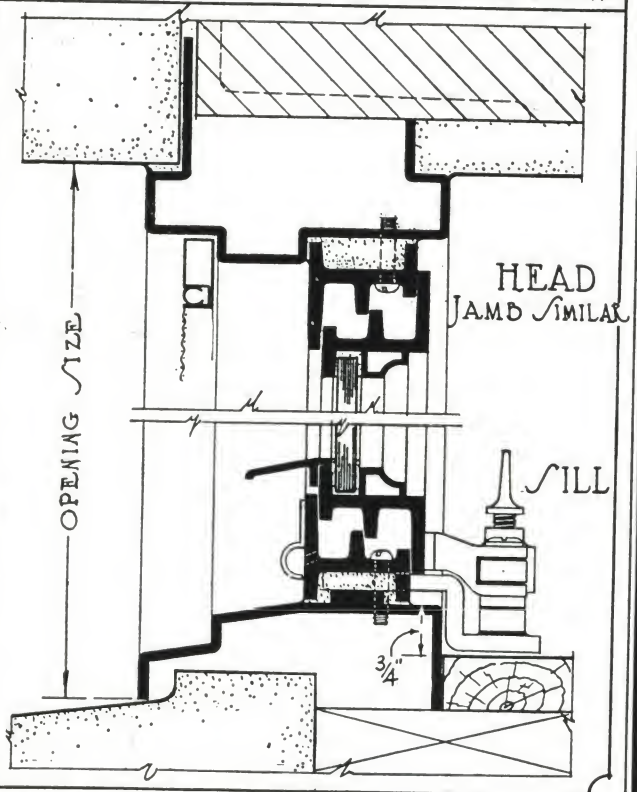


SINGLE RABBETTED SUBFRAMES
OUTWARD AND INWARD OPENING CASEMENTS



DOUBLE RABBETTED SUBFRAMES
OUTWARD AND INWARD OPENING CASEMENTS



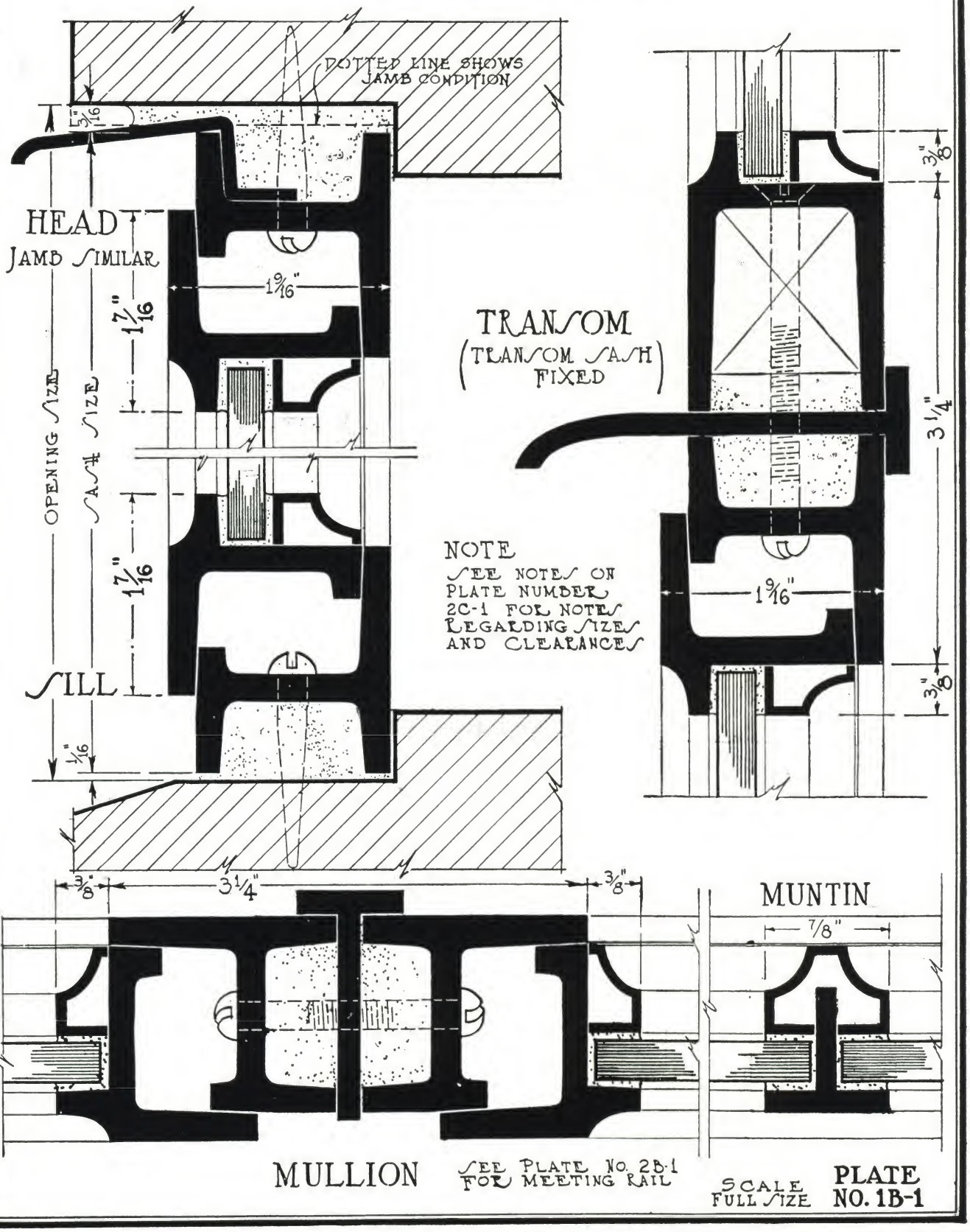


SUBFRAMES ARE BUILT INTO MASONRY BY MASON CONTRACTOR. CASEMENTS ARE SET AFTER ALL ROUGH TRADES HAVE BEEN COMPLETED. ALL FRAMES ARE RIGIDLY CONSTRUCTED OF No. 12 GUAGE STEEL. MADE TO ARCH'TS. DETAILS.

PLATE NO. 4A-1

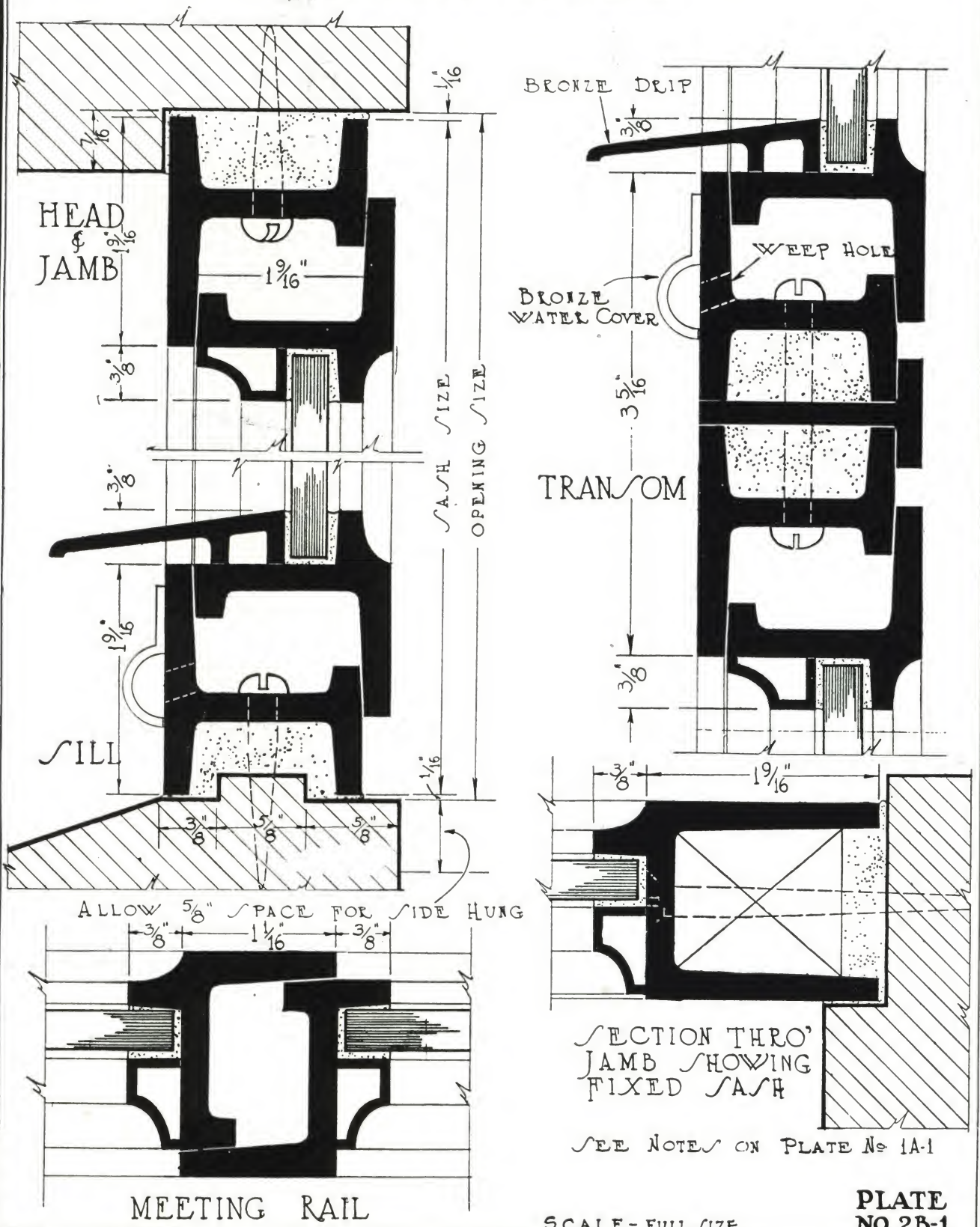
Continued on next page

NO. 600 LEMCO
HEAVY TWO POINT SECTION CASEMENT
OPENING OUTWARD



Continued on next page

NO. 600 LEMCO
HEAVY TWO POINT SECTION CASEMENT
OPENING INWARD



SEE NOTES ON PLATE No 1A-1

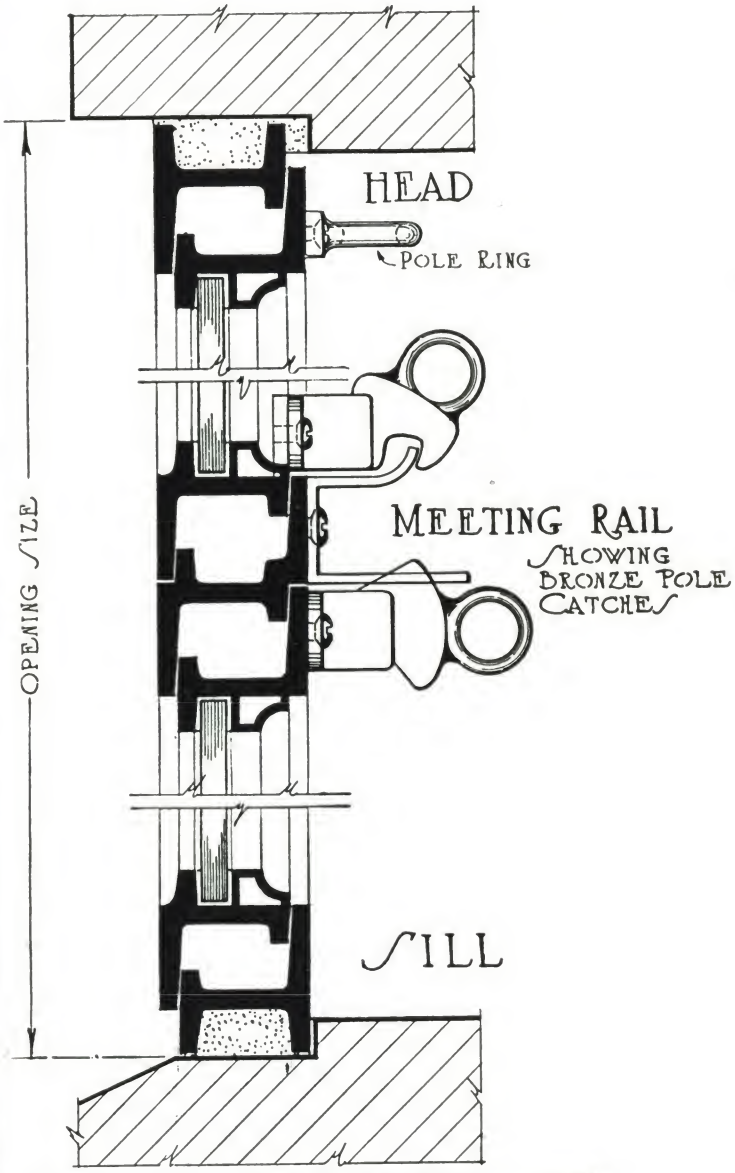
SCALE- FULL SIZE

PLATE NO. 2B-1

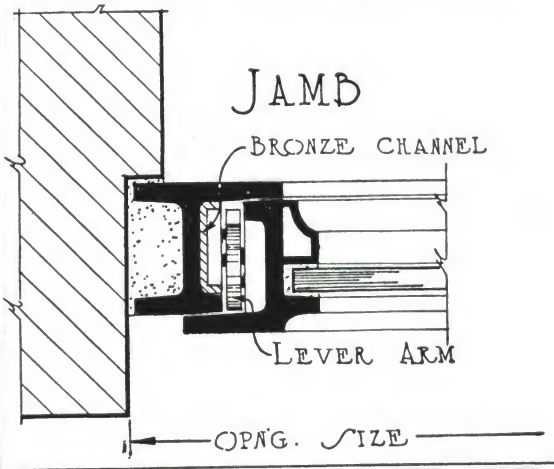
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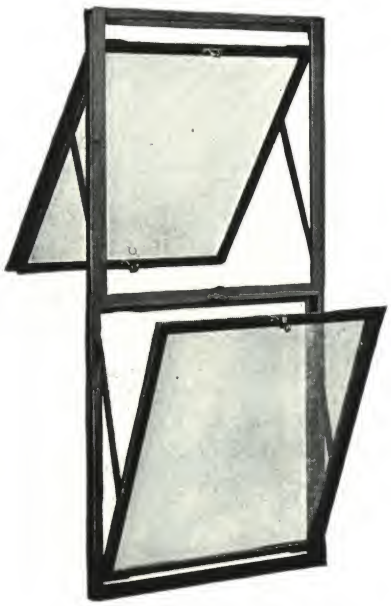
LEMCO PROJECTED TYPE SASH

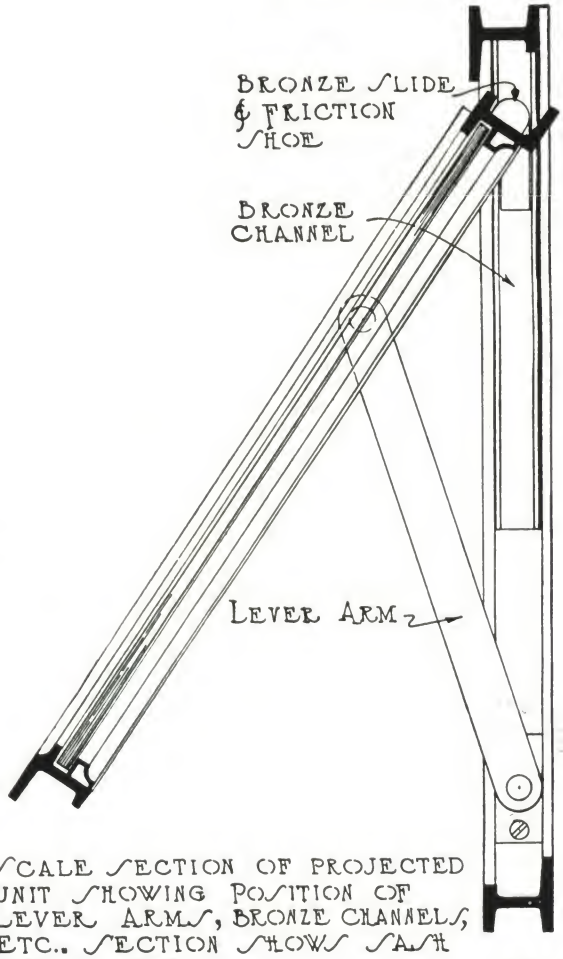
HEAVY TWO POINT SECTION—SEE PLATE NO. 1B-1



DETAILS—ONE HALF FULL SIZE





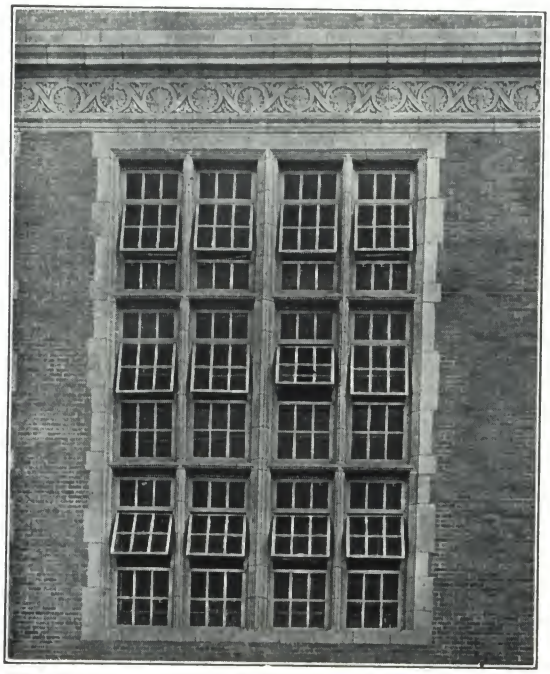


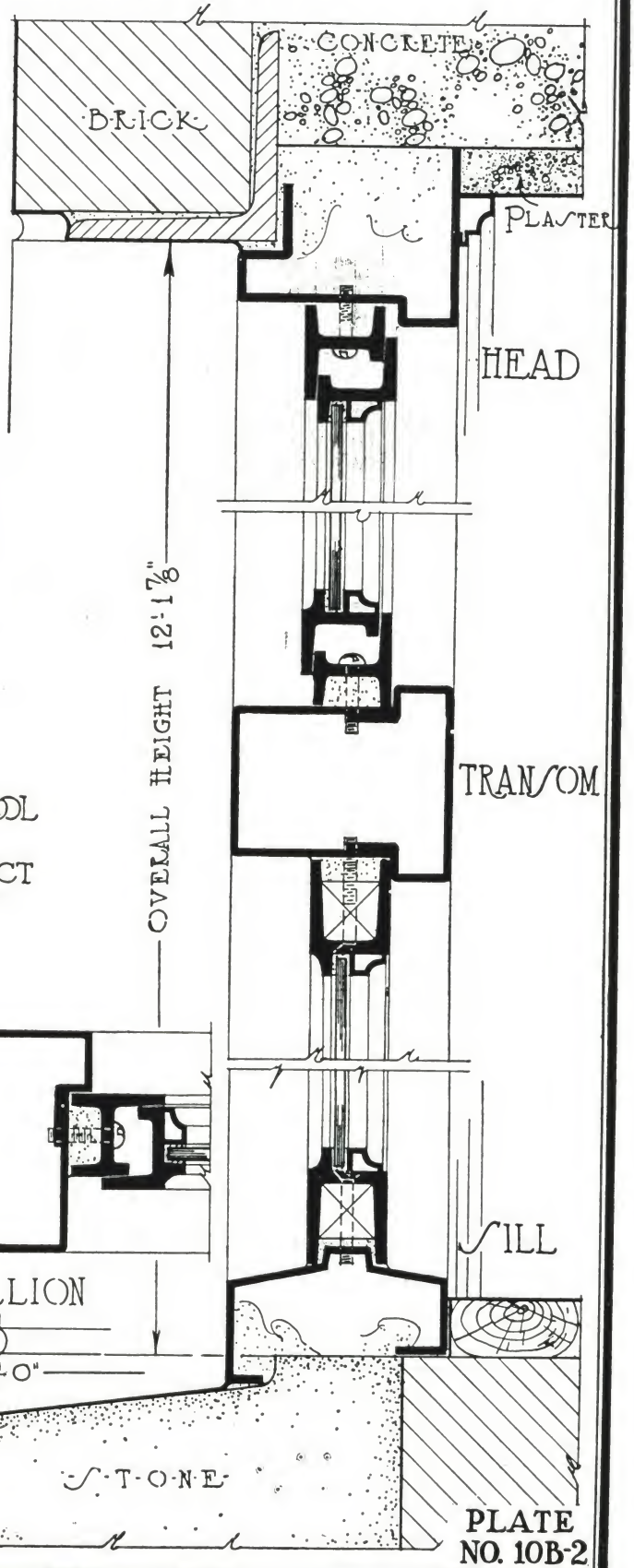
SCALE SECTION OF PROJECTED UNIT SHOWING POSITION OF LEVER ARMS, BRONZE CHANNELS, ETC.. SECTION SHOWS SASH PARTLY OPEN.

PLATE NO. 10B-1

Continued on next page

LEMCO PROJECTED TYPE SASH SET TO SUBFRAMES

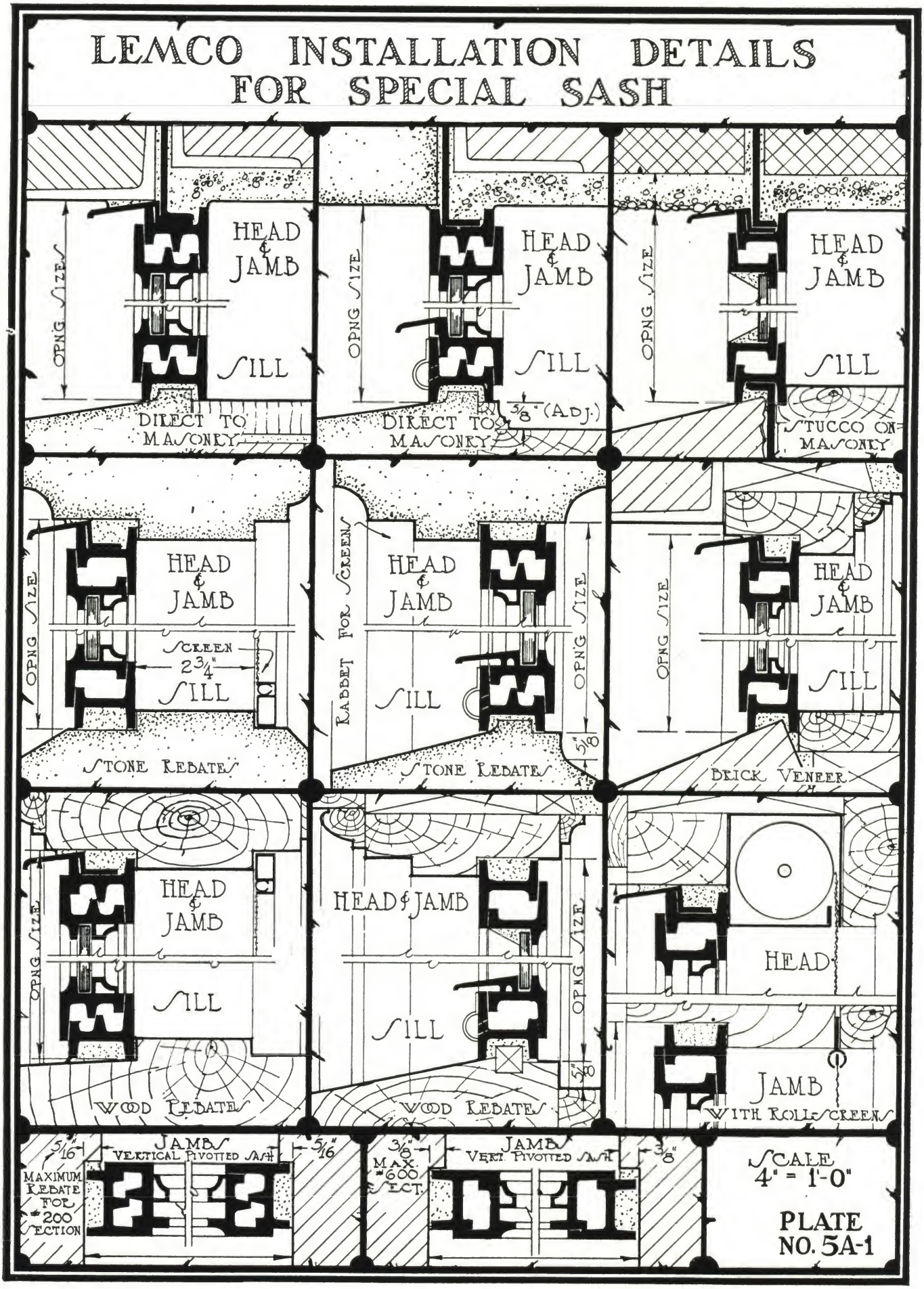




SCALE DETAILS
FAR ROCKAWAY HIGH SCHOOL
NEW YORK CITY
WM H. GOMPERT ----- ARCHITECT

PLATE NO. 10B-2

Continued on next page



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LEMCO SOLID BRONZE CASEMENT HARDWARE



No. 36



No. 32





No. 26



No. 27

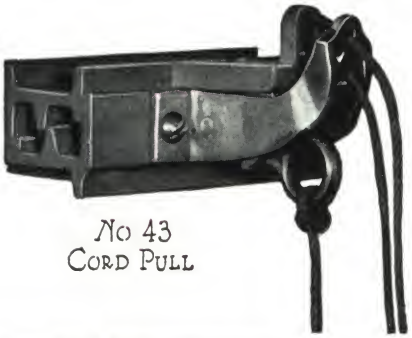


No. 27
DOUBLE GRIP FOR WINDOWS OVER 60 IN.



FASTENERS

TRANSOM CATCHES



No 43
CORD PULL

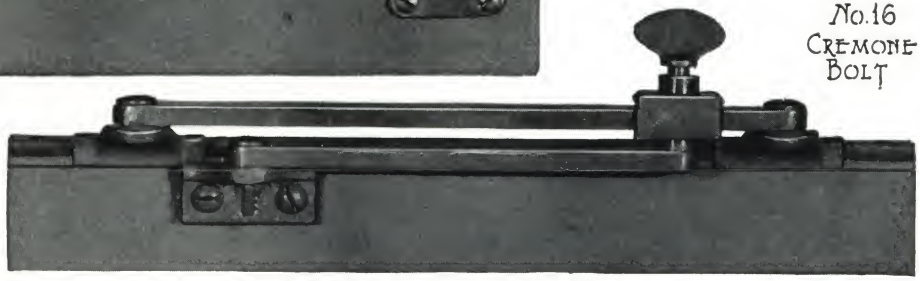


No. 41
POLE TYPE

ADJUSTERS



No 78
FOR DOORS



No. 16
CREMONE BOLT



No. 70 FOR WINDOWS OPENING-IN

No. 70
FOR WINDOWS OPENING-OUT

PLATE NO. 1H-1

Continued on next page

LEMCO SOLID BRONZE CASEMENT HARDWARE



No 77 Peg Adjuster



No 74 Cam Adjuster





No 26 Fastener
Inward Opening
Casement



No 115 Butt



No 83
Cam Adjuster

No 111 Side Arm

PLATE No. 1H-2

Continued on next page

LEMCO SOLID BRONZE CASEMENT HARDWARE



No 75 Transom Opener



No 125 Fastener
With Double Grip



No 118



No 34



No 120



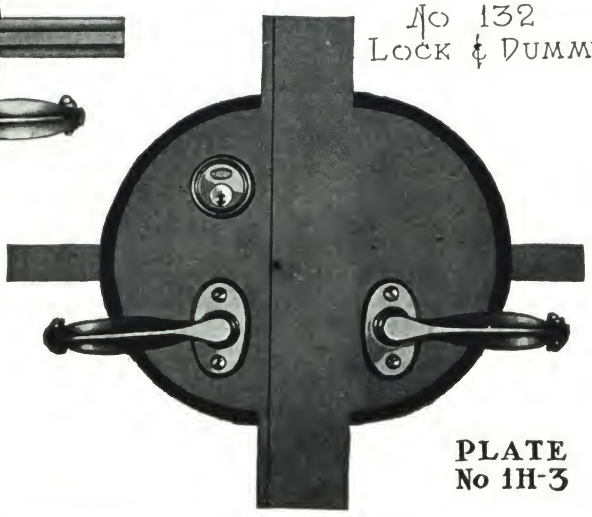
No. 10
Cleaning Hinge



No. 11
Friction Pivot



No 132
Lock



No 132
Lock & Dummy



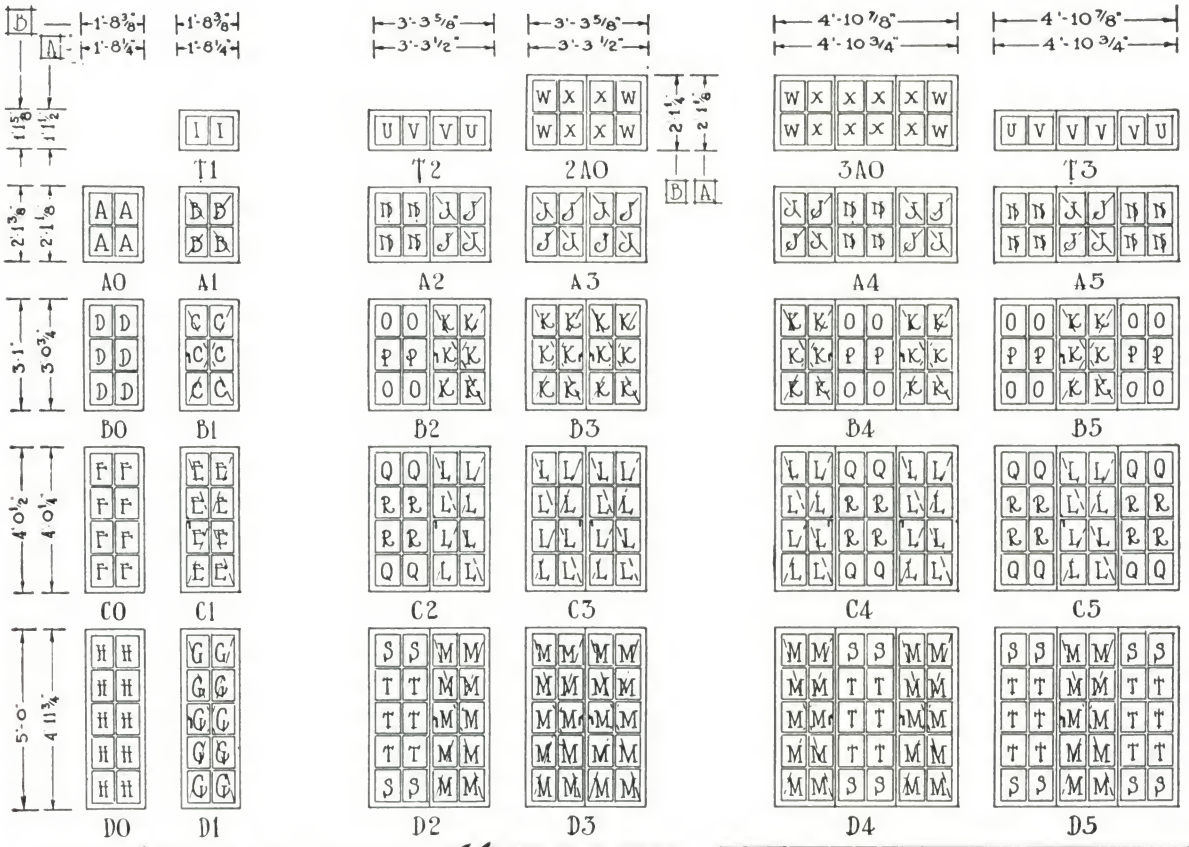
No 64
Foot Bolt

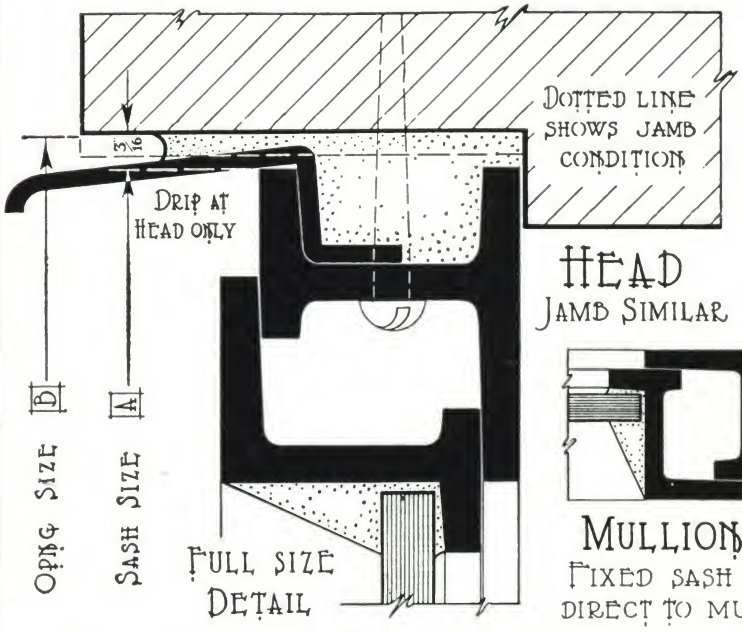
No 107
Bottom Bolt

**PLATE
No 1H-3**

Continued on next page

STANDARD LEMCO CASEMENTS

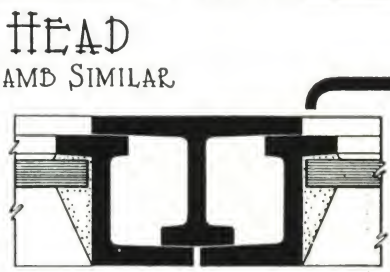




GLASS SCHEDULE

MAKE ALLOWANCE FOR FITTING — SIZES ARE NOT GUARANTEED

PANE	SIZE	PANE	SIZE	PANE	SIZE
A	8 1/2 × 10 15/16	I	8 1/2 × 11 3/4	Q	9 3/16 × 11 7/8
B	8 7/16 × 10 7/8	J	8 7/16 × 10 7/8	R	9 3/16 × 11 1/8
C	8 7/16 × 11 1/16	K	8 7/16 × 11 1/16	S	9 3/16 × 11 5/16
D	8 1/2 × 11 1/16	L	8 7/16 × 11 1/8	T	9 3/16 × 11 3/16
E	8 7/16 × 11 1/8	M	8 7/16 × 11 3/16	U	8 1/2 × 11 3/4
F	8 1/2 × 11 1/8	N	9 3/16 × 11 5/8	V	9 3/16 × 11 3/4
G	8 7/16 × 11 3/16	O	9 3/16 × 11 13/16	W	8 1/2 × 10 15/16
H	8 1/2 × 11 3/16	P	9 3/16 × 11 1/16	X	9 3/16 × 10 15/16



HEAD
JAMB SIMILAR

MULLION (½ full size)
FIXED SASH ARE GLAZED DIRECT TO MULLION BARS



TRANSOM SECTION
½ full size

MUNTIN
½ full size

CASEMENTS ARE SIDE HINGED TO SWING OUT EXCEPT TYPE A WHICH ARE TOP HINGED TO PUSH OUT. THESE ARE MADE SIDE HINGED TO ORDER. ABOVE UNITS CAN BE CHANGED INTO VARIOUS COMBINATIONS; FOR EXAMPLE: T3 CAN BE PLACED OVER B4, C4 OR D4.

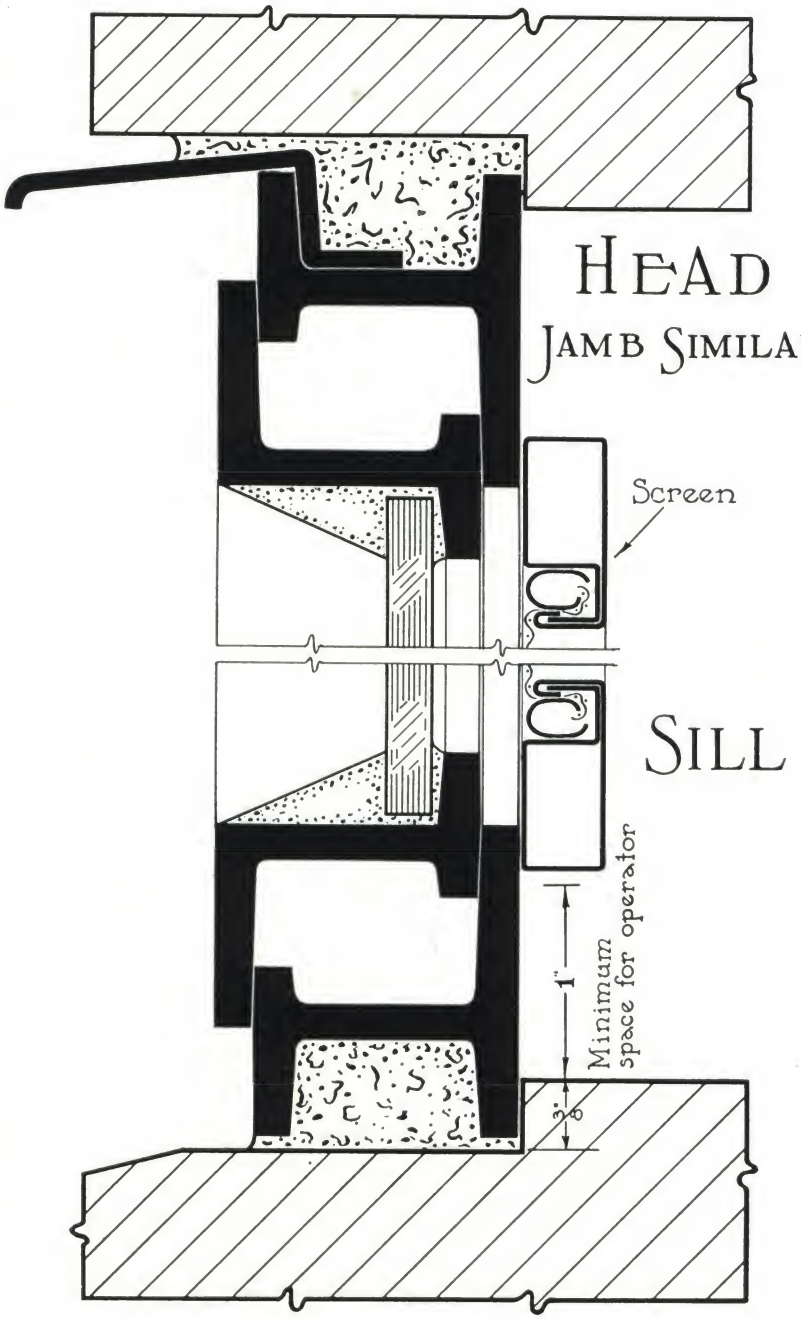
Continued on next page

LUNDELL-ECKBERG MFG. CO., INC.

JAMESTOWN, NEW YORK.

MANUFACTURERS OF HIGH GRADE STANDARD AND CUSTOM BUILT STEEL CASEMENTS AND SOLID BRONZE CASEMENT HARDWARE. WRITE FOR OUR COMPLETE CATALOG.

LEMCO - STANDARD - SCREENED - CASEMENTS



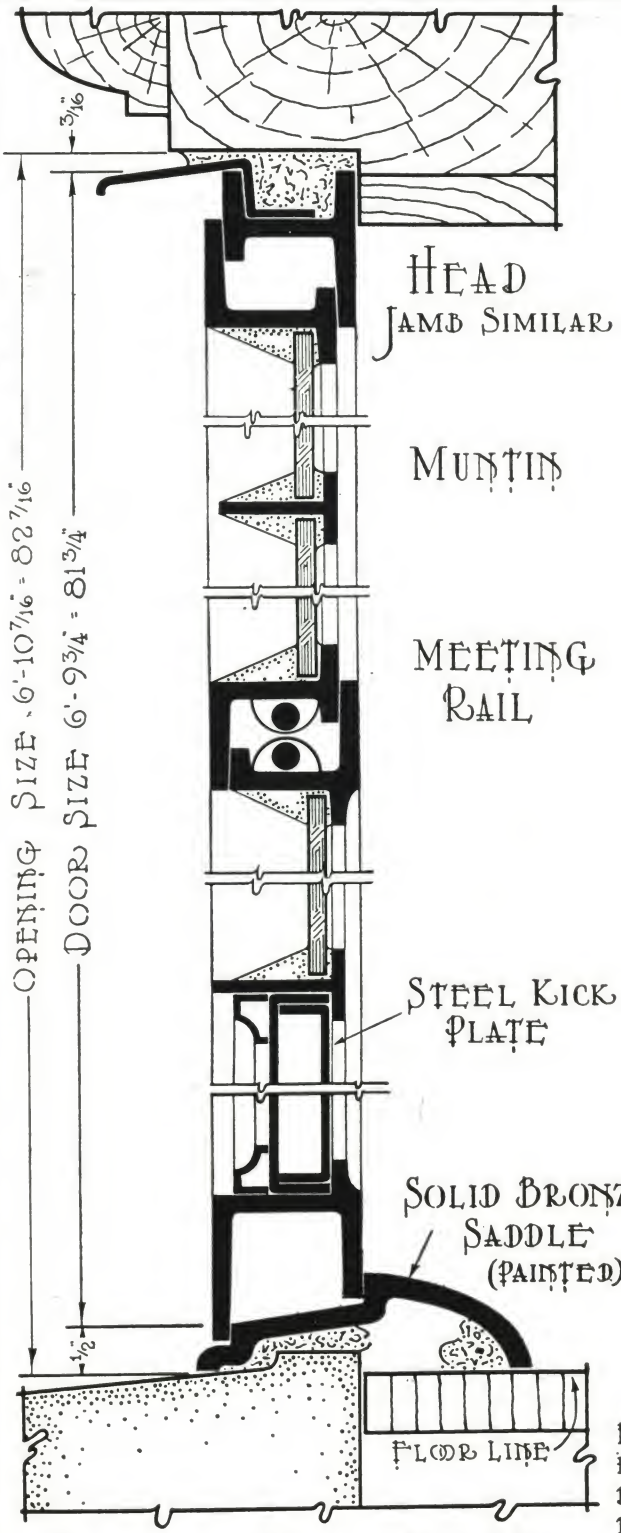
FULL SIZE DETAIL OF STANDARD SASH SHOWING APPLICATION OF SCREEN AND SILL CONDITIONS FOR OPERATORS ETC.



EACH UNIT OF THE NEW SCREENED CASEMENTS IS EQUIPPED WITH AN OPERATOR DESIGNED TO PERMIT EASY REMOVAL OF SCREENS AND FOR FACILITY IN WINDOW OPERATION. SEPARATE SCREEN IS FURNISHED FOR EACH UNIT. THESE SASH ARE FURNISHED IN STANDARD & SPECIAL SIZES.

Continued on next page

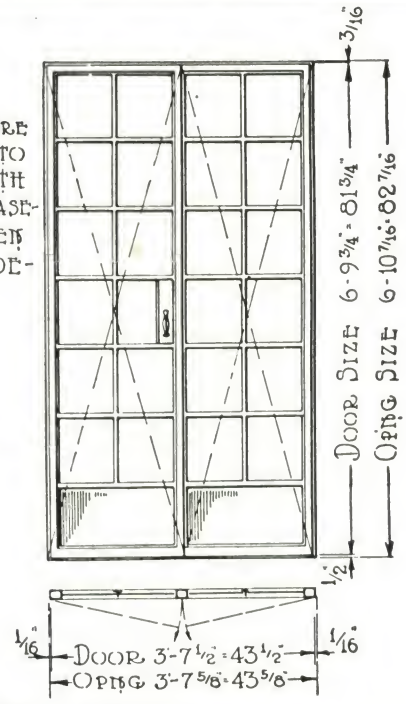
STANDARD LEMCO DOORS



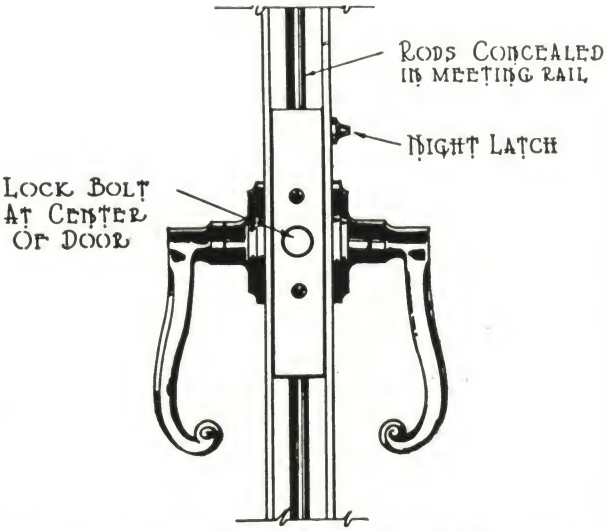
SECTION THRU DOOR

Scale ½ Full Size

NOTE MUNTINS ARE ARRANGED TO LINE UP WITH STANDARD CASEMENTS WHEN USED AS SIDE-LIGHTS.



ELEVATION Scale 3/8"-1'-0"



DETAIL OF ACTIVE LEAF OF MEETING RAIL SHOWING CONCEALED LOCK RODS

HARDWARE

EACH LEAF HUNG ON THREE 3" BRONZE BUTTS. RIGHT HAND LEAF FITTED WITH ALUMINUM LOCK BOX AND BRONZE LEVER HANDLES OPERATING CONCEALED RODS THAT LOCK DOORS AT HEAD AND SILL. DOORS ALSO LOCK AT CENTER. LEFT HAND LEAF FITTED WITH CONCEALED TOP AND BOTTOM BOLTS. FRICTION ADJUSTERS APPLIED TO HEAD OF EACH LEAF.

LUPTON

STEEL PRODUCTS

1931

Sales Representative

DAVID LUPTON'S SONS COMPANY

Allegheny Ave. & Tulip St.
PHILADELPHIA

ADDITIONS *and* CHANGES

Since the printing of the 1930 SWEET'S ARCHITECTURAL CATALOGUE and with the printing of the present issue a number of modifications have been made both in the products described and the method of presentation. In order to avoid confusion which might result from using information taken from old catalogues we are directing attention to the important changes and additional information presented in the 1931 Catalogue.

The following products not described fully in previous issues of SWEET'S CATALOGUE are described in this issue.

Casements—Underwriters' Type
Casement Doors
*Aluminum Casements
Aluminum Windows—Industrial Type
Commercial Projected Windows equipped with explosion releasing device
Corrugated Wire Glass Construction
Utility Window

*This information supersedes that given in the catalogue "Aluminum Windows by Lupton" in the matter of hardware. Hardware for Aluminum Windows is now made of white bronze instead of aluminum.

Products in which modifications or changes have been made since previously issuing SWEET'S are listed below with the more important changes.

Steel Casements for Standard Size Openings (Projected Casements)

Catalogue numbers of standard units have been changed.
Methods of applying screens are shown.

Residence Casements

Additional installation details shown.
Screening details added.
A new ventilating unit shown for use at sill.
Methods of applying shade brackets shown.
Glass sizes in units 4426TH4 and 4528TH4 have been changed.

Basement Windows

Sizes are now shown for actual opening required instead of overall size of unit.

Double Hung Windows

New improved type sill weathering has been made standard to give additional assurance of weathertightness.
Catalogue numbers of standard units have been changed.

Architectural Projected Windows

Both inside glazed and outside glazed windows now have the same type of section for frame member and are therefore interchangeable. Wall details, glass sizes, etc., are the same for both types.
Catalogue numbers of standard units have been changed.
Data for Commercial Projected and Pivoted Windows has been revised and rearranged and new wall details added.

Operating Devices

Limits are given for Lupton Rack and Pinion Operator applied to Lupton Continuous Windows.

Industrial Doors

New improved weathering for slide doors permits a slightly wider opening and increases weathertightness.

Airplane Hangar Doors

Doors are now made to fit openings with widths in multiples of 10 ft.
New overhead roller uses single angle track.

DAVID LUPTON'S SONS CO.

All Types of Steel Windows, Window Operating Devices, Skylights, Steel Doors and Partitions, Steel Shelving and Factory Equipment

Allegheny Avenue and Tulip Street
PHILADELPHIA, PA.

SALES OFFICES

ATLANTA, GA., David Lupton's Sons Construction Co., 801 Bona Allen Building
BOSTON, MASS., David Lupton's Sons Co., 38 Chauncy Street
BUFFALO, N. Y., David Lupton's Sons Co., 329 Jackson Building
CHICAGO, ILL., David Lupton's Sons Co., 333 No. Michigan Avenue
CLEVELAND, OHIO, David Lupton's Sons Co., 402 Swetland Building
DALLAS, TEX., David Lupton's Sons Construction Co., 703 Construction Building
DETROIT, MICH., David Lupton's Sons Co., 2631 Woodward Avenue
INDIANAPOLIS, IND., David Lupton's Sons Co., 333 No. Pennsylvania Street
KANSAS CITY, MO., David Lupton's Sons Co., 505 Land Bank Building
LOS ANGELES, CALIF., David Lupton's Sons Construction Co., 440 Commercial Street
MILWAUKEE, WIS., David Lupton's Sons Co., 210 Mason Street
MINNEAPOLIS, MINN., David Lupton's Sons Co., 529 So. 7th Street
NEWARK, N. J., David Lupton's Sons Co., 31-39 Central Avenue
NEW YORK, N. Y., David Lupton's Sons Co., 8 Murray Street
PHILADELPHIA, PA., David Lupton's Sons Co., 801 Integrity Building
PITTSBURGH, PA., David Lupton's Sons Co., 1625 Grant Building
WASHINGTON, D. C., David Lupton's Sons Co., 15th and H Streets, N. W.

Member Solid Section Steel Window Industry (see Manufacturers' Index)

LUPTON

WHERE STEEL IS FUSED WITH SINCERITY

LUPTON SERVICE

General

Lupton Service is maintained to assist you in solving your problems in daylighting and natural ventilation. We will welcome the opportunity to work with you in submitting tentative designs showing practical application of our steel windows, operating devices and skylights.

By careful study and research we have established economies in manufacturing processes, new window designs and methods of control, a broad standardization of our products and new building designs to meet requirements of various industries so that good ventilation and daylight may be provided for any size building floor area.

In the following pages we present information concerning our products, to assist you in the preparation of details and specifications. Irrelevant matter has been eliminated. Text is used to supplement drawings only where it is necessary to give a clear idea of construction or application of our products.

Details are typical, showing construction and general principles underlying satisfactory installation.

Lupton Products are designed to give full investment value and to this end we offer our service and co-operation in whatever degree required to obtain satisfactory results in the natural daylighting and ventilating of your buildings.

Erection Service

Where preferred, we will erect any of our products, but stock items such as Pivoted, Basement and Residence Casement Windows are usually more economically erected by the general building contractor.

All other Lupton Products, however, because of their special application should be erected by our own forces to insure satisfactory installation and service.

There is an erection specification prepared for each product which should be exactly followed and which will secure satisfactory use of product at reasonable cost.

Glazing

Glazing should be done by experienced steel window glaziers. We suggest that glazing of Pivoted, Basement, Commercial and Architectural Projected and Residence Casement Windows be handled by others. However, we will arrange for glazing of any of our products when this is preferred. When glazing, the glass should be bedded in putty to form a watertight seal and to prevent glass touching metal.

Putty

Always specify steel window putty for glazing steel windows. Ordinary putty intended for wood windows will not be satisfactory as it dries hard and cracks away from steel. Because various climates require variations in the ingredients of satisfactory putty, we recommend that putty be obtained from local sources. When this is impossible, putty may be secured from the Lupton Company or its sales representatives.

Calking

See calking specification for each product. The calking cement furnished by Lupton is elastic, dark gray in color, and will not stain masonry. When Lupton applies calking, application is for weathertightness only and is understood not to be a finished pointing job. Erector spreads cement on edge of window and strikes off excess after window is set in place.

Painting

All Lupton Products are given a shop coat of paint before shipment. After glazing, no painting should be done until putty has set (about three weeks). It is advisable to hold the painting contractor responsible for cleaning plaster or other foreign matter from the weathering surfaces of the windows in order that it may not be painted over and cause imperfect contact.

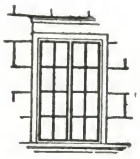
Listing

To insure accurate estimates, all products should be accurately listed and located either in schedules on plans or in specifications. If more than one type of product or type of hardware is desired, each type should be separately listed and located or otherwise clearly designated.

A special is an odd size between two less expensive standards

Continued on next page

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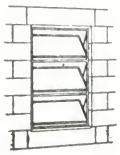
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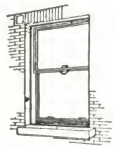


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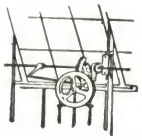


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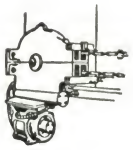
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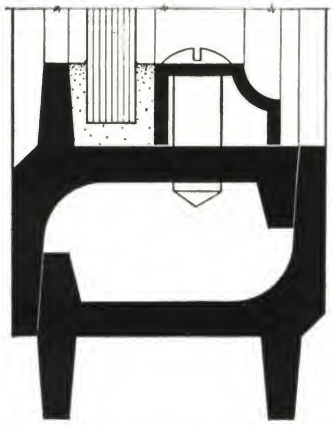


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LUPTON CASEMENTS

The several types of casements here illustrated have been developed by Lupton to meet the varying requirements of modern building construction. Their distinctive appearance, durability and continued ease of operation appeal to architect, owner and tenant. Lupton Casements are made by skilled craftsmen, experienced in casement work and familiar with the high degree of perfection required in this type of window. The fine quality implied when casements are specified is assured by rigid inspection and close adherence to manufacturing standards.

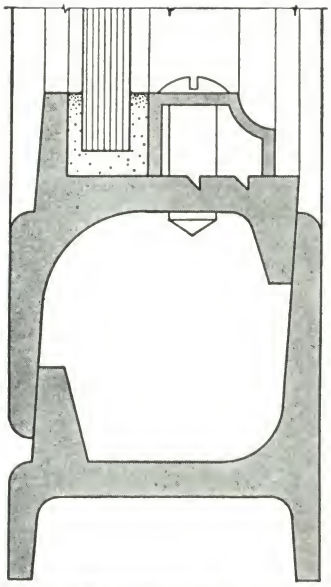


LUPTON · STEEL CASEMENTS (HEAVY · TYPE)

Lupton Casements (Heavy Type)

Casements for distinctive buildings, meeting the most exacting requirements, built to sizes and designs specified by the architect.

Various types of ventilator operation and maximum sizes are given on page 5. Large windows are built up from these smaller units, sometimes using steel plate frames described on pages 13 and 14. Casement doors of this type are described on pages 18 to 21.



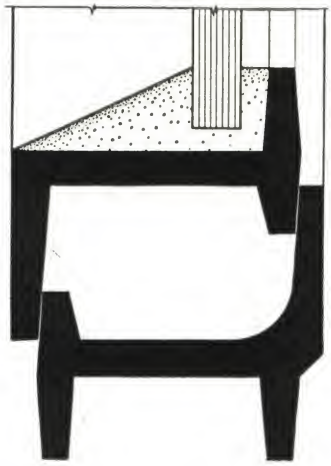
LUPTON ALUMINUM CASEMENTS

Lupton Aluminum Casements

Casements made of a non-corroding alloy, which never needs painting and with a natural color quite in the spirit of modern decoration. Made in sizes and designs specified by the architect. Inside glazing is recommended.

Lupton Projected Casements

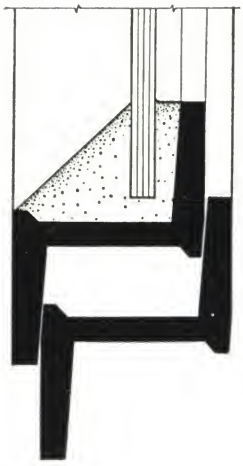
Designed chiefly for use in office buildings, hospitals and schools. They are made in standard sizes and are outside glazed. All ventilators are equipped with the Lupton projected movement which allows cleaning of glass from within the building, and eliminates stay bars and sliding adjusters.



LUPTON · STEEL CASEMENTS (PROJECTED · TYPE) IN · STANDARD · SIZES.

Lupton Residence Casements

Casements made in standard and stock sizes for use in residences or apartments or wherever a casement type window is required in smaller size openings. Sturdily built of one piece steel sections, readily screened and shaded. Standard units have trim slender muntins dividing the window into lights of pleasing proportions. Muntins however may be omitted if it is desired to use leaded glass.



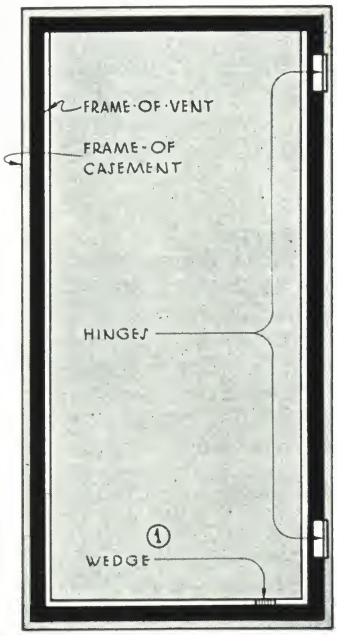
LUPTON · STEEL RESIDENCE CASEMENTS

TYPICAL · FULL · SIZE · SECTIONS

Continued on next page

CASEMENT GLAZING

To assure satisfactory service, weathertightness, and neat appearance, glazing should be done by experienced glaziers, using special steel window putty. (See page 1.)

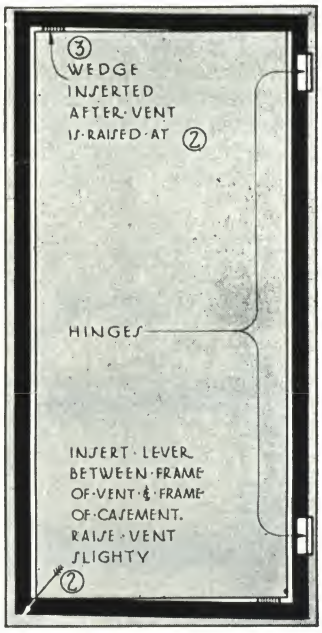


SKETCH "A"

Glazing Side Hinged Casements

All side hinged vents will eventually sag and rub on the bottom frame rail unless the following correct glazing method is used:

1. Check casement to see that vent seats properly and that outer frame has not been twisted or sprung in masonry opening.
2. Bed vent frame with putty.*
3. Set wood wedge and glass in position in vent frame as shown in Sketch "A."
4. Open and close vent several times to seat glass.
5. Open the vent slightly and with a chisel or other lever placed between bottom of vent and frame of window at point (2) Sketch "B" spring entire vent upward. This will open up the space between vent and glass at point (3) Sketch "B." Insert another wood wedge at point (3) before pressure is released on lever.
6. Wedges must be tight and are left permanently in place. Puttying can now be completed or glazing beads attached.



SKETCH·"B"
(EXAGGERATED)

Inside Glazing

Glass should be bedded in putty* and small wooden wedges inserted to prevent squeezing out putty due to pressure on glass.

Glazing stops are carefully fitted and attached in our shop. When glazing, care should be taken to get each piece of moulding back in its original position.

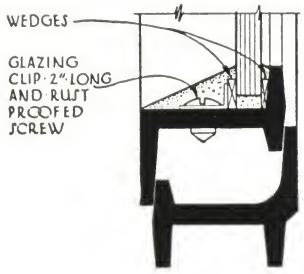
Several types of glazing beads are available for steel casements. All have the same overall dimensions. Standard type (Sec. 377) is cold rolled from 16 gauge steel.

Alternate types are, a hot rolled steel bead (Sec. 379) retaining the advantages of a solid bead without needless weight; and an extruded bronze bead (Sec. 380). An extruded bronze bead (Sec. 378) with a channel in its upper surface for collecting condensation may be had if desired, but usually is unnecessary.

Aluminum casements have aluminum beads fastened with aluminum screws.



STEEL·CASEMENT INSIDE·GLAZED



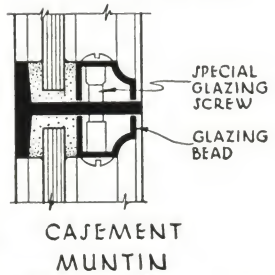
STEEL·CASEMENT OUTSIDE·GLAZED

Outside Glazing

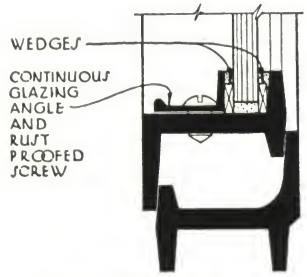
Glass should be bedded in putty* and small wooden wedges inserted to prevent squeezing out of back putty. Glazing angles or clips should then be attached and face putty carefully applied and beveled so as to preserve even sight lines.

When continuous glazing angles are specified for outside glazing they are cut to standard lengths and shipped unattached. Slotted holes are provided to permit adjustment. All screws are rustproofed.

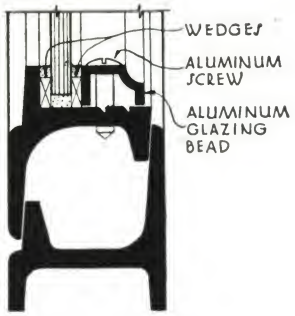
Outside glazing is not recommended for aluminum casements.



CASEMENT MUNTIN



STEEL·CASEMENT OUTSIDE·GLAZED·WITH CONTINUOUS·GLAZING·ANGLES



ALUMINUM CASEMENT

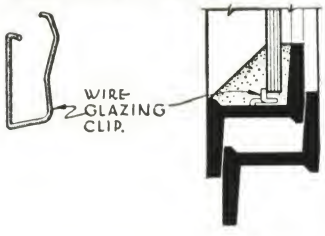
*Putty

(See page 1.)

TYPES·OF·GLAZING·BEADS

Scale – 3" = 1'–0"





RESIDENCE·CASEMENT OF·STEEL

Continued on next page

LUPTON STEEL CASEMENTS—HEAVY TYPE

See Pages 7 and 8 for Hardware

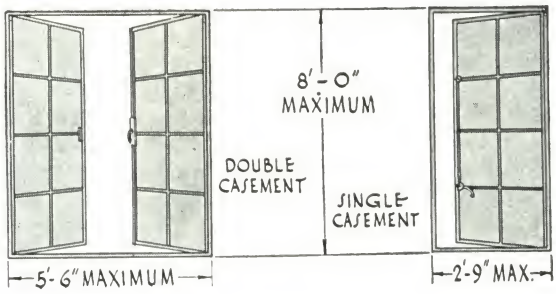
Lupton Casements are designed for use in monumental buildings, educational buildings, public libraries, banks, fine residences, club houses, first class hotels and office buildings and all other buildings of the same general character. Lupton Casements are the highest form of steel window construction and are made in sizes specified by the architect. Pages following list various types of ventilator operation and show construction details. Lupton will gladly co-operate by submitting tentative designs and finished drawings.

Side Hinged Casements

Swing-out casements are recommended in preference to swing-in or vertically pivoted casements. In addition to their superior weathering, they do not interfere with draperies when open.

Hinges are bronze butts or malleable iron friction hinges, as specified.

Single casements and double casements with fixed meeting stile have locking handles. Double, folding casements (illustrated) have exposed or concealed cremone bolt. Sliding adjusters are used if friction hinges are not specified.

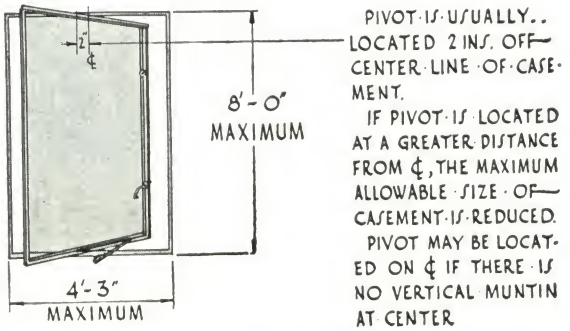


Vertically Pivoted Casements

Not recommended, except where width desired is too great for side hinged casement.

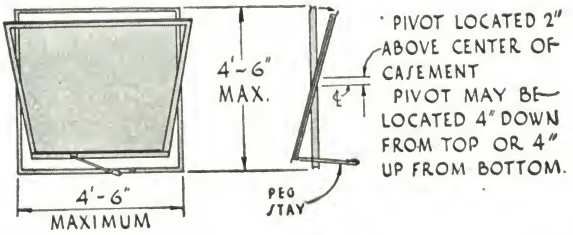
Pivot is usually placed 2 in. off center. Pivot may be nearer jamb but this reduces maximum size.

Casements are usually equipped with locking handles and peg stays.



Horizontally Pivoted Casements

Usually used for transoms or as ventilating units in large windows where casement operators described on pages 21 to 25 are used. When hand operated, top and center pivoted casements within reach are equipped with peg stays. Bottom pivoted may have spring catch or cam handle and friction stays.



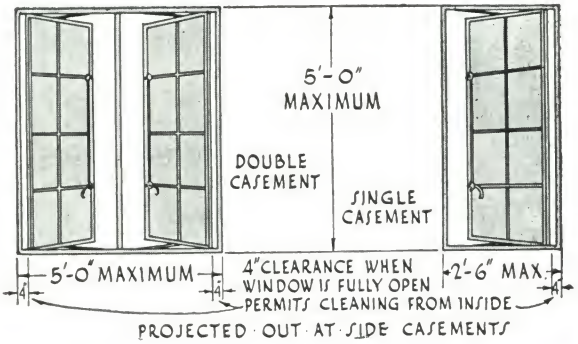
Projected Casements

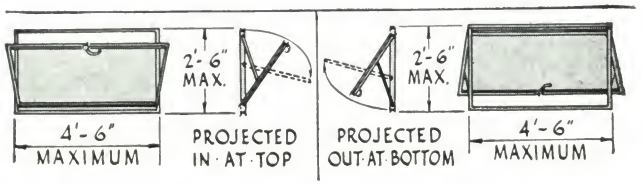
Made in 3 types as illustrated. Adjustable bronze friction device holds casement open at any angle without stay bars, etc.

There is no protruding hinge, yet both sides of glass can be cleaned from inside the building. Can be readily screened and shaded.

Out-at-side type have locking handles. Double casement must have fixed meeting stile.

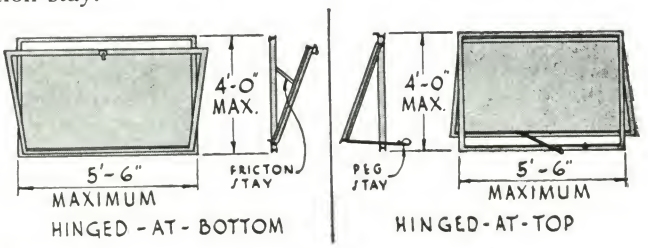
Out-at-bottom and In-at-top types are usually used for transoms, but may be placed one above another to form a large window. Operation is by locking handles or spring catches. Cannot be used with mechanical operators.





Top Hinged and Bottom Hinged Casements

Used as transoms and with mechanical operators described on pages 21 to 25. When hand operated, top hinged casements have stay bar; bottom hinged casements have spring catch or locking handle and friction stay.



General

Fixed units may be of any size within practical, required limits.

Casements may be inside or outside glazed.

Casements may be had with or without muntins.

Units may be combined to form composite windows using mullion and impost bars, or 13 gauge formed steel plate mullions and imposts. See pages 9 to 14.

When viewed from the outside a left-hand casement has hinges on left side and a right-hand casement has hinges on right side.

Continued on next page

SPECIFICATION FOR LUPTON STEEL CASEMENTS—HEAVY TYPE

Work Included

1. Furnish and install where shown on drawings, Lupton Steel Casements (Heavy Type) as manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Materials

2. Frame and Ventilator members shall be made of copper-bearing, rust-resisting steel specially rolled in solid, one-piece sections. Bars shall be straightened and sand-blasted.

3. Muntins shall be specially designed steel T bar section.

4. Vertical mullions shall be specially designed steel H section.

5. Imposts shall be specially designed steel lug bars.

Note: Two sizes of lug bars are standard, the width of the section being 4 in. for the large bar and 2½ in. for the small one. The large bar is used for the larger multiple unit casement windows.

Construction

6 All casement windows shall be designed for inside glazing, with metal glazing stops. (Specify outside glazing if desired.)

7. All casement windows shall be straight and true, members in alignment and surfaces in a plane.

8. Ventilator and Frame Members shall be mitered at corners and solidly butt welded. Exposed welded surfaces shall be ground flush with members. The frame and ventilator shall form a two-point, flat, continuous, weathering contact.

9. Muntin Bars shall be continuous from top to bottom and from side to side between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be interlocked and welded at their intersections so as not to decrease their ultimate strength.

10. Mullions shall be provided and bolts for attachment wherever two or more units are placed side by side in an opening.

11. Imposts shall be provided and bolts for attachment wherever two or more units are placed one directly above the other in an opening.

12. At the head of all open out ventilators a No. 16 gauge formed steel hot galvanized weather bar shall be used, except when condition necessitates the use of the lug bar, the lug bar shall be bent and used as weathering bar.

Note: (a) No. 13 gauge steel fins are furnished only when specified, at slight added cost.

(b) No. 14 gauge steel sill and jamb anchor clips are furnished only when specified.

Glazing Stops

13. Glazing stops shall be of detail shown on window manufacturer's standard drawings and shall be made of drawn rolled steel. All stops shall be accurately coped and fitted.

Note: See details on pages 15, 16, 17 and 18.

Hardware

14. Hinges shall be attached and painted with casements in factory.

Note: Five types of hinges are available.
(a) Solid bronze butt hinges with steel pins.
(b) Close up friction hinges of malleable iron.
(c) Close up friction hinges of bronze.
(d) Extended friction hinges of malleable iron.
(e) Extended friction hinges of bronze.
See pages 8 and 9. Specify the type desired.

Hardware listed below shall be fitted in factory, and shipped unattached, carefully packed to prevent damage.

Note: The following hardware is available, list the types required. Hardware is usually solid bronze but may be malleable iron if desired. Malleable iron is required on Underwriters' casements.

For Double Casements (Side Hinged—Open Out)
Sliding adjusters (not used with friction hinges).
Cremone bolt (concealed or exposed) and pull handle.

For Single Casements (Side Hinged—Open Out)
Sliding adjuster (not used with friction hinges).
Single locking device (ventilators up to 4 ft. 0 in. in height).
Double locking device (ventilators up to 8 ft. 0 in. in height).
Triple locking device (ventilators over 8 ft. 0 in. in height).

For Double Casements (Side Hinged—Open In)
Sliding adjusters.
Cremone bolt (concealed or exposed) and pull handle.

For Single Casements (Side Hinged—Open In)
Sliding adjusters.
Single locking device (ventilators up to 4 ft. 0 in. in height).
Double locking device (ventilators up to 8 ft. 0 in. in height).
Triple locking device (ventilators over 8 ft. 0 in. in height).

For Vertically Pivoted Ventilators
Peg and stay adjuster.
Single locking device (ventilators up to 4 ft. 0 in. in height).
Double locking device (ventilators up to 8 ft. 0 in. in height).
Triple locking device (ventilators over 8 ft. 0 in. in height).

For Horizontally Pivoted Ventilators
Peg and stay adjuster.

For Projected Ventilators—Projected-Out-at-Bottom
Within reach from floor—Cam handle.
Beyond reach from floor—Spring catch and pull down ring for pole operation.

For Projected Ventilators—Projected-In-at-Top
Within reach from floor—Cam handle.
Beyond reach from floor—Spring catch for pole operation.

Calking Cement *(See page 1)*

15. The window manufacturer shall furnish non-staining elastic calking cement (as indicated on window manufacturer's standard details) in quantities sufficient to make head, sill, jambs, mullions and imposts weathertight. Wooden filler-strips shall be furnished and used where indicated on details.

Note: Where casements are to bear Underwriters' label, filler strips must be of formed metal.

Erection

16. All Casement Windows shall be erected in prepared openings by the window contractor (unless otherwise specified).

17. All Casement Windows shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions and imposts shall be bolted securely to frames. Calking cement and filler-strips shall be neatly applied at points indicated on window manufacturer's standard details.

Note: Include in the masonry specifications that all masonry openings shall be accurately constructed in accordance with the installation details for Casement Windows. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

Glass and Glazing

Note: (See also pages 1 and 4.) Specify glass and glazing under proper heading elsewhere in general specifications of other trades.

(a) Do not specify single thickness glass.

(b) Specify a high grade steel casement putty.

(c) Specify that all casement windows shall be glazed from the inside, the glass set in a bed of putty and held by the Lupton metal glazing stops, or

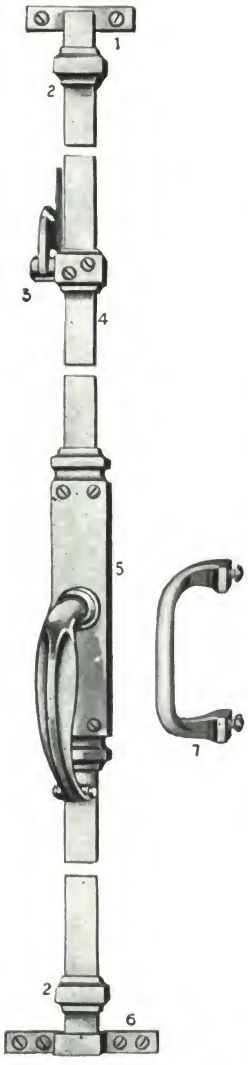
(d) That all casement windows shall be glazed from the outside, the glass set in a bed of putty and held by glazing clips.

Continued on next page

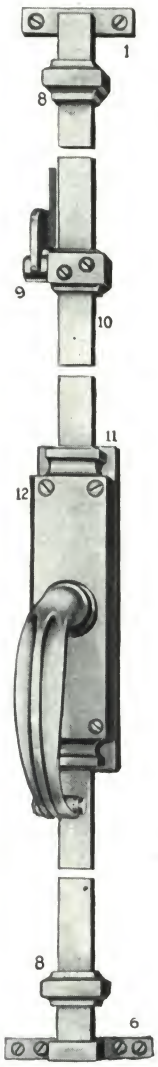
HARDWARE FOR LUPTON STEEL CASEMENTS—HEAVY TYPE

All hardware numbers are for solid bronze hardware highly polished, unless noted otherwise. Cam handles, latches and spring catches are mounted either on the ventilator section or on steel plates welded to the ventilator.

Hardware is also available in bronze in several special finishes and in malleable iron painted or bronze plated at corresponding prices. Malleable iron must always be used on Underwriters' casements.



Bolt for Casements Up to 7 ft. High



Bolt for Casements Over 7 ft. High

Cremone Bolts for Double Casements

Consists of the following:

1. Keeper No. 291
   Used at top and bottom of swing-out casements

   Or

6. Keeper No. 285
   Used at top and bottom of swing-in casements
2. Bar Guide No. 293
   Spaced approx. 1 ft. 0 in. apart
3. Center Latch and Keeper
   No. 286 above handle
   No. 292 below handle
   Spaced approx. 2 ft. 0 in. apart
4. Bronze Bar ½x¼ in.
5. Handle and Case No. 290
7. Pull Handle No. 237

Consists of the following:

1. Keeper No. 291
   Used at top and bottom of swing-out casements

   Or

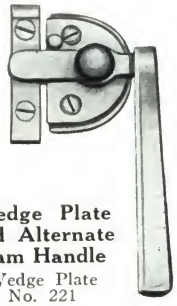
6. Keeper No. 285
   Used at top and bottom of swing-in casements
8. Bar Guide No. 340
   Spaced approx. 1 ft. 0 in. apart
9. Center Latch and Keeper
   No. 337 above handle
   No. 338 below handle
   Spaced approx. 2 ft. 0 in. apart
10. Bronze Bar ⅝x¼ in.
11. Malleable Iron Base Plate No. 146
12. Handle and Case No. 256
7. Pull Handle No. 237



Cam Handle

No. 218 shown (opposite hand No. 219).

Used on side-hinged or vertically pivoted casements up to 4 ft. 0 in. high



Wedge Plate and Alternate Cam Handle

Wedge Plate No. 221

Used on side-hinged-swing-out casements or vertically pivoted casements

Alternate cam handle No. 210 shown (opposite hand No. 211).

When used in the double or triple locking device hardware numbers are as follows:

Swing-out, No. 214, as shown (opposite hand No. 215).

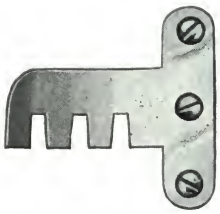
Swing-in, No. 216, as shown (opposite hand No. 217)



Single Keeper

No. 222 shown (opposite hand No. 233)

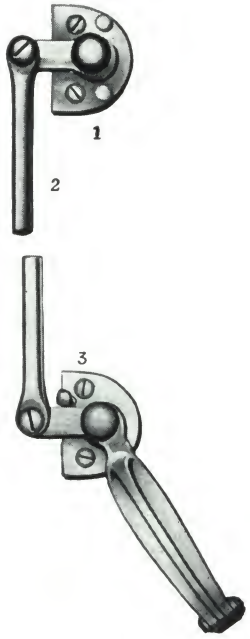
Used on swing-in casements



Triple Keeper

No. 223 shown (opposite hand No. 224)

Used on swing-in casements



Double Locking Device

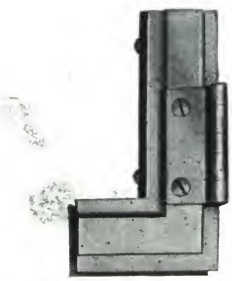
Used on side-hinged swing-out and vertically pivoted casements, over 4 ft. 0 in. and up to 8 ft. 0 in. high. Consists of the following:

1. Auxiliary Latch No. 213
2. ½ in. Steel Tube
3. Cam Handle No. 225 (shown)
   (Opposite Hand No. 226)

Similar device for side-hinged swing-in casements consists of:

1. Auxiliary Latch No. 212
2. ½ in. Steel Tube
3. Cam Handle No. 227 (shown)
   (Opposite Hand No. 228)

Triple Locking Device for use on casements over 8 ft. 0 in. high is similar, with an additional auxiliary latch



Bronze Butt No. 2200

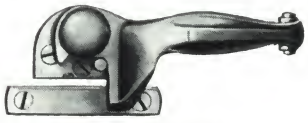
With steel pin. Not polished. Used on hinged casements

Continued on next page

HARDWARE FOR LUPTON STEEL CASEMENTS—HEAVY TYPE

All hardware numbers are for solid bronze hardware highly polished, unless noted otherwise. Cam handles, latches and spring catches are mounted either on the ventilator section or on steel plates welded to the ventilator.

Hardware is also available in bronze in several special finishes and in malleable iron painted or bronze plated at corresponding prices. Malleable iron must always be used on Underwriters' casements.



Cam Handle

No. 268 shown (opposite hand No. 269)

Used at bottom of Projected-Out-at-Bottom ventilators within reach from floor. One handle used for ventilators up to 3 ft. 6 in. wide. Two handles for wider ventilators



Spring Catch No. 243

Used at bottom of Projected-Out-at-Bottom ventilators beyond reach from floor



Cam Handle

No. 266 shown (opposite hand No. 267)

Used at top of Projected-In-at-Top ventilators within reach from floor. One handle used for ventilators up to 3 ft. 6 in. wide. Two handles used for wider ventilators



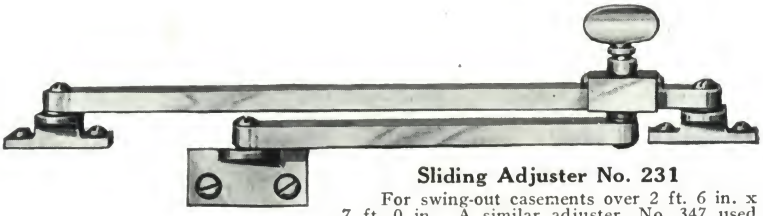
Spring Catch No. 248

Used at top of Projected-In-at-Top ventilators beyond reach from floor



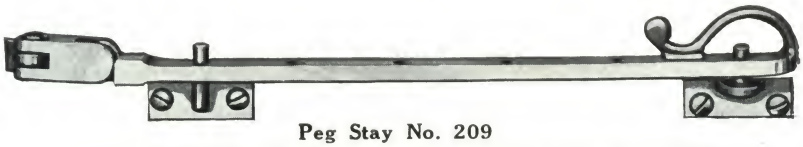
Pull Down Ring No. 358

Used at top of Projected-Out-at-Bottom ventilators



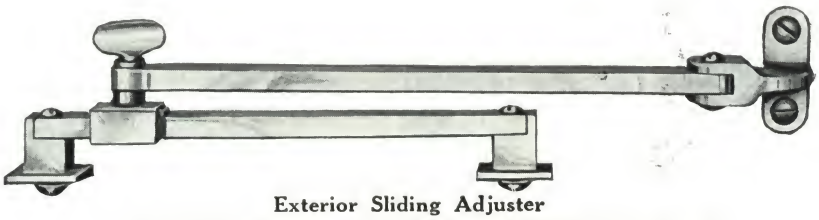
Sliding Adjuster No. 231

For swing-out casements over 2 ft. 6 in. x 7 ft. 0 in. A similar adjuster, No. 347 used for smaller casements not less than 1 ft. 6 in. wide



Peg Stay No. 209

For horizontally pivoted casements. A similar peg stay No. 249 or a peg stay terminating in a scroll (No. 250) is used on vertically pivoted casements



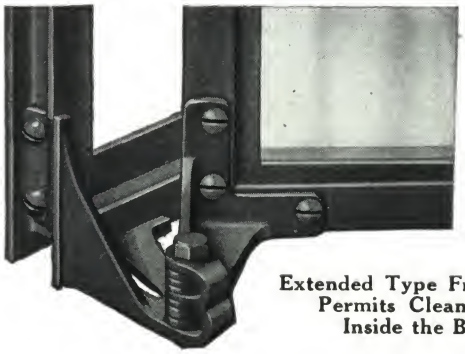
Exterior Sliding Adjuster

For swing-in casements. No. 230 for single casements up to 1 ft. 7 in. wide, or for double casements up to 3 ft. 0 in. wide. No. 229 for larger casements



Interior Sliding Adjuster No. 236

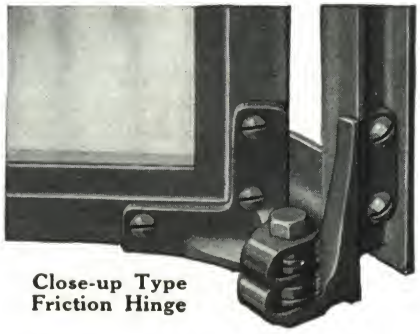
For swing-in casements



Extended Type Friction Hinge Permits Cleaning from Inside the Building

Friction Hinges

Friction Hinges hold ventilators at the desired degree of opening up to 180° without the use of sliding adjusters. Made of bronze or malleable iron in two types. Bronze washers and a cadmium plated pin insure smooth operation. Painted finish.



Close-up Type Friction Hinge

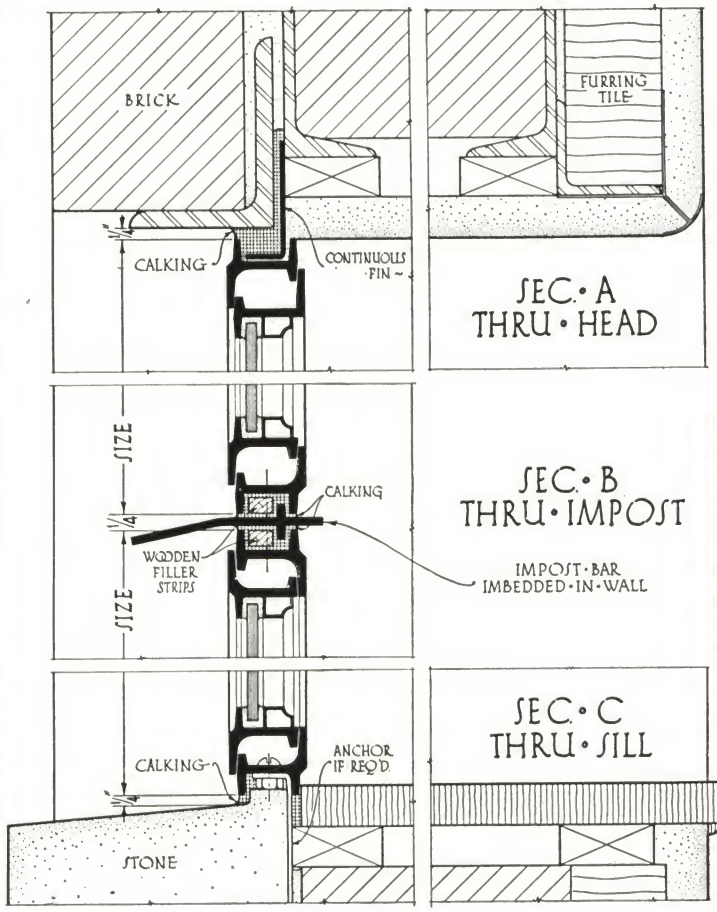
Note: Choice of hinges is limited by the over-all width of casements as follows:

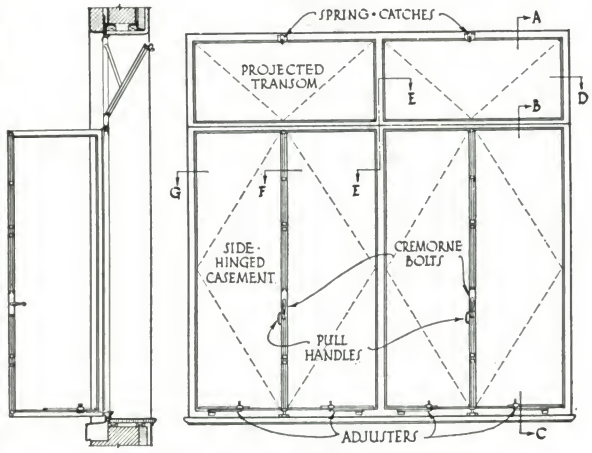
		With extended hinge	With close-up hinge
Minimum over-all width of casements	Single casement	1 ft. 4⅝ in.	8⅝ in.
	Double casement	2 ft. 7¼ in.	1 ft. 3¼ in.

Continued on next page

LUPTON SIDE-HINGED-CASEMENTS WITH-PROJECTED-TRANSOMS

SCALE-FOR-DETAILS-3"—1'-0"





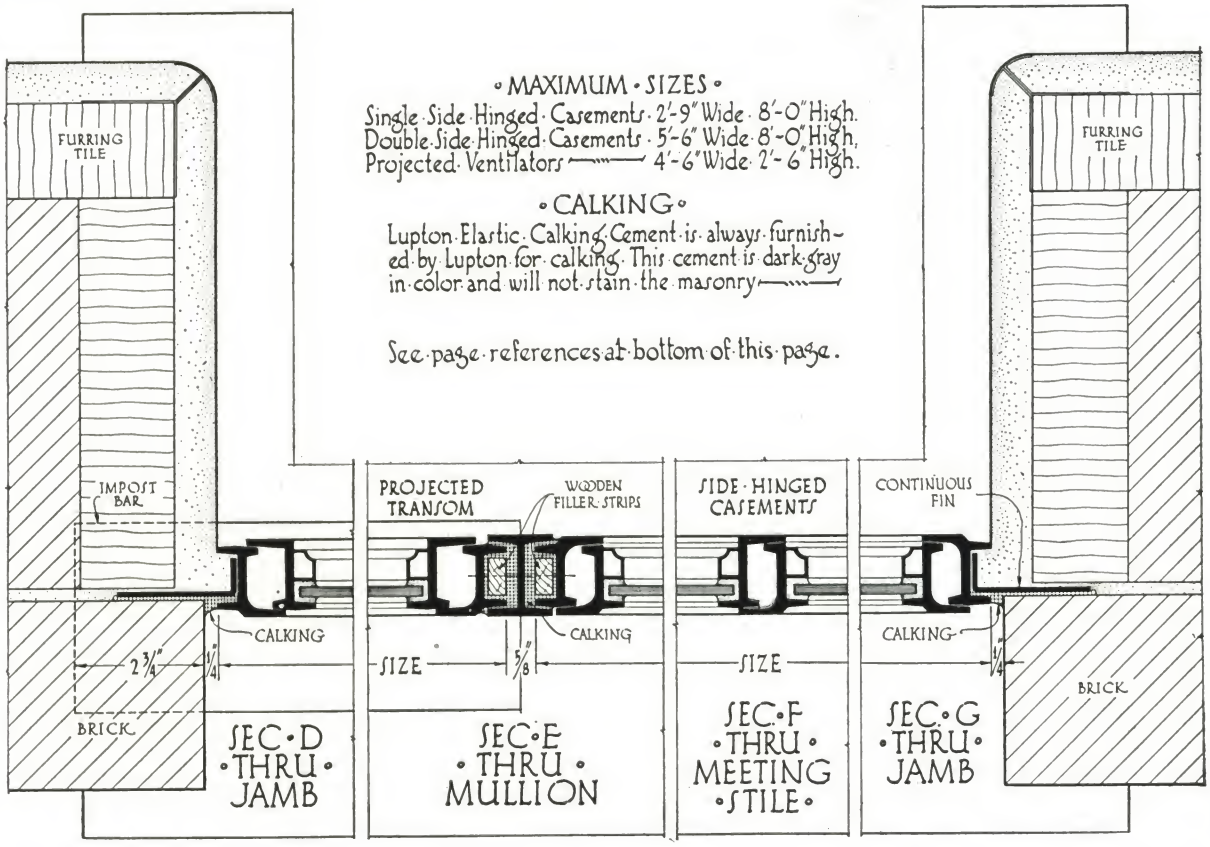
- MAXIMUM-SIZES -

Single-Side-Hinged-Casements-2'-9" Wide-8'-0" High.
Double-Side-Hinged-Casements-5'-6" Wide-8'-0" High.
Projected-Ventilators——— 4'-6" Wide-2'-6" High.

- CALKING -

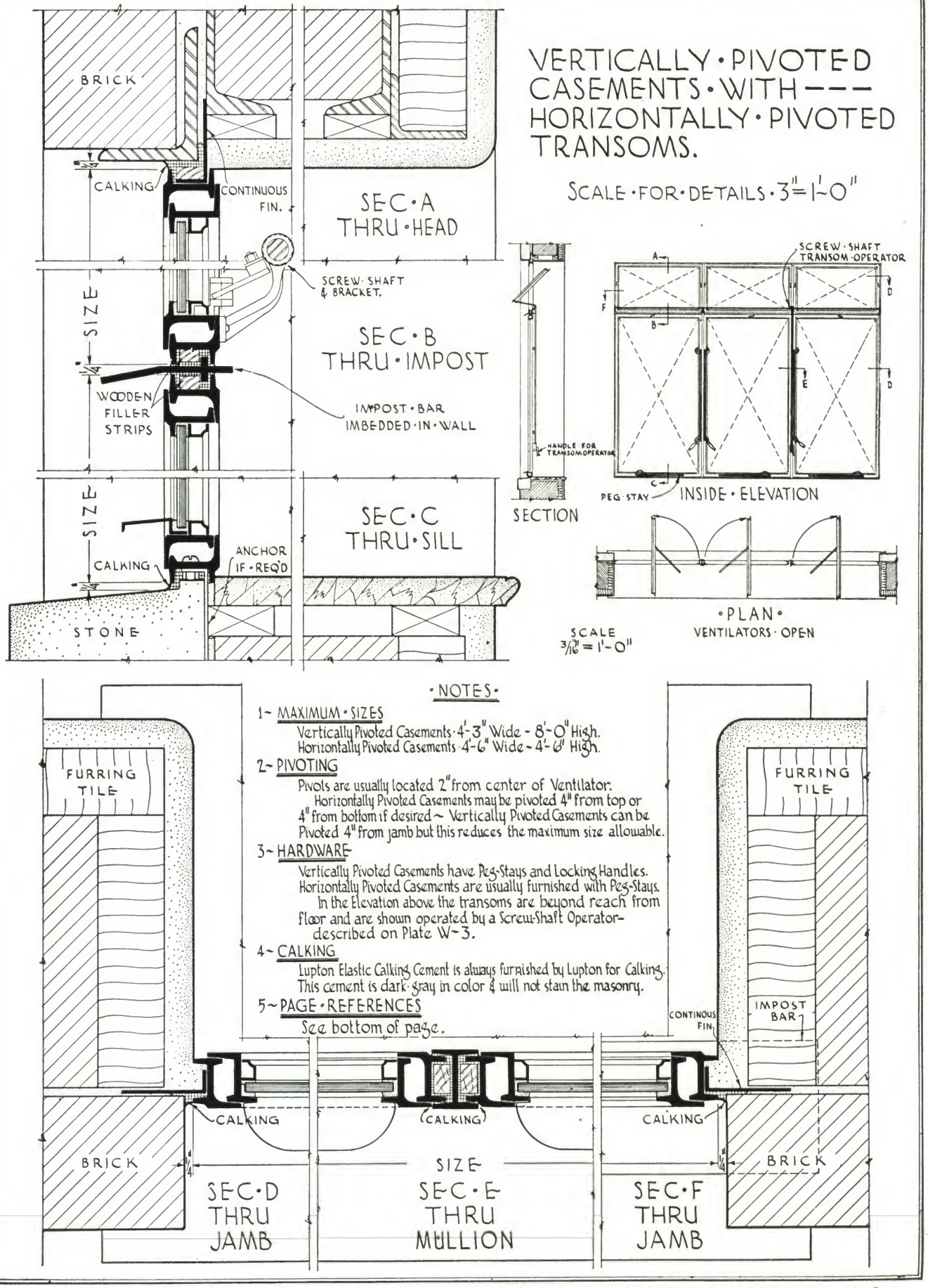
Lupton-Elastic-Calking-Cement-is-always-furnished-by-Lupton-for-calking. This-cement-is-dark-gray in-color-and-will-not-stain-the-masonry———

See-page-references-at-bottom-of-this-page.



Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8; Full Size Sections, pages 15, 16 and 17

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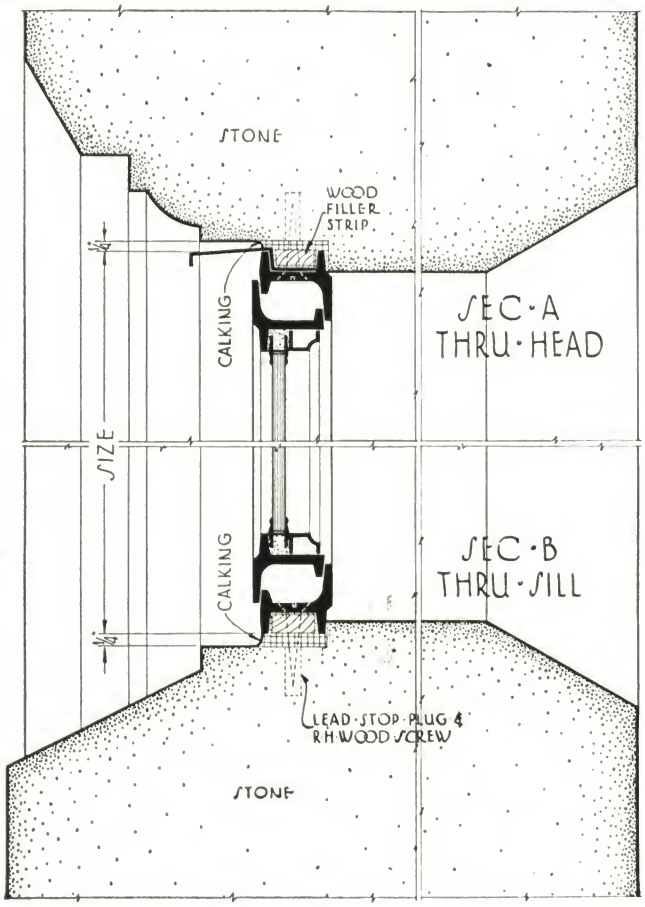


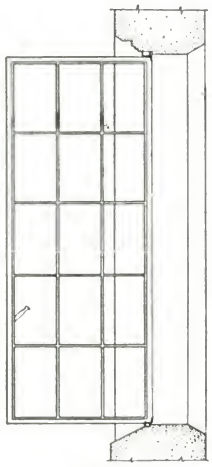
Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8; Full Size Sections, 15, 16 and 17; Casement Operators, page 25

Continued on next page

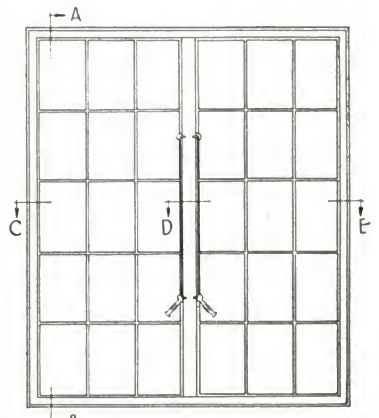
LUPTON·CASEMENTS·WITH PROJECTED·MOVEMENT

SCALE·FOR·DETAILS – 3"=1'-0"

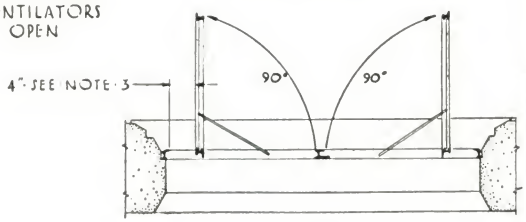




SECTION
VENTILATORS OPEN



INSIDE·ELEVATION
VENTILATORS·CLOSED



PLAN
VENTILATORS·OPEN

NOTES

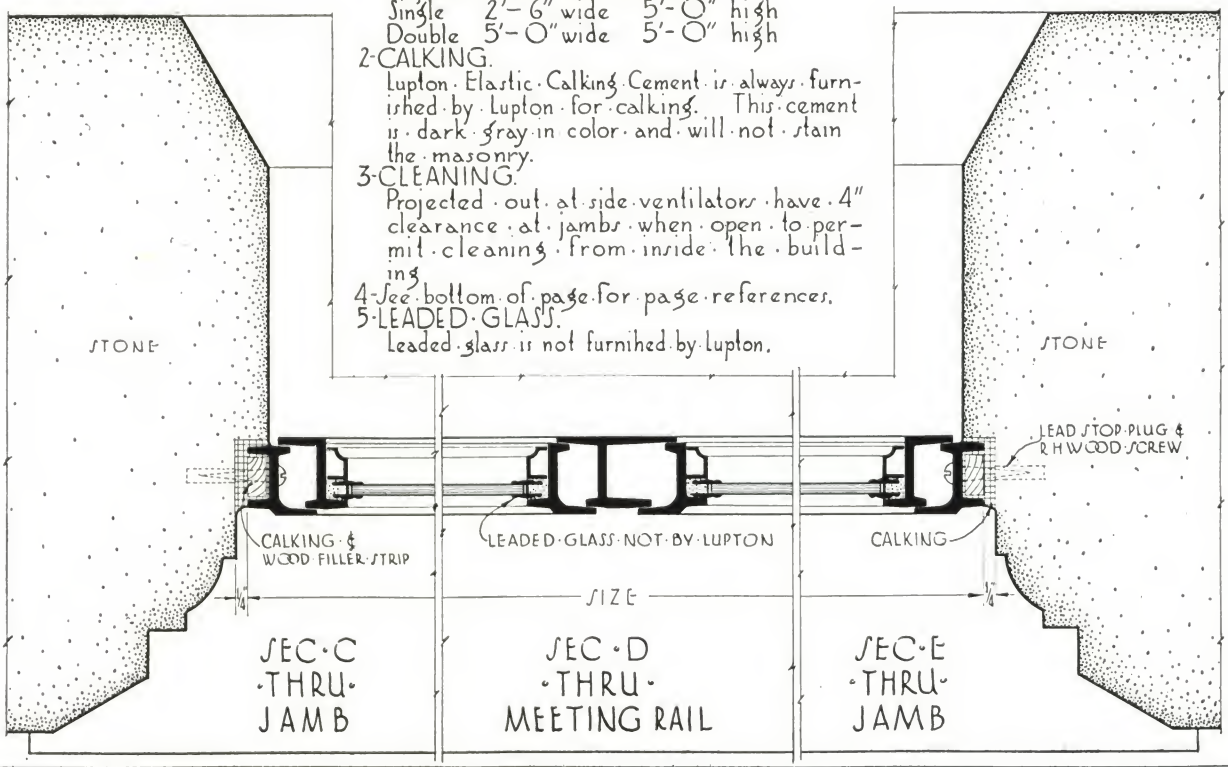
1-MAXIMUM·SIZES.
Projected·Out·at·Side·Casements.
Single 2'-6" wide 5'-0" high
Double 5'-0" wide 5'-0" high

2-CALKING.
Lupton·Elastic·Calking·Cement·is·always·furnished·by·Lupton·for·calking. This·cement is·dark·gray·in·color·and·will·not·stain the·masonry.

3-CLEANING.
Projected·out·at·side·ventilators·have·4" clearance·at·jambs·when·open·to·permit·cleaning·from·inside·the·building.

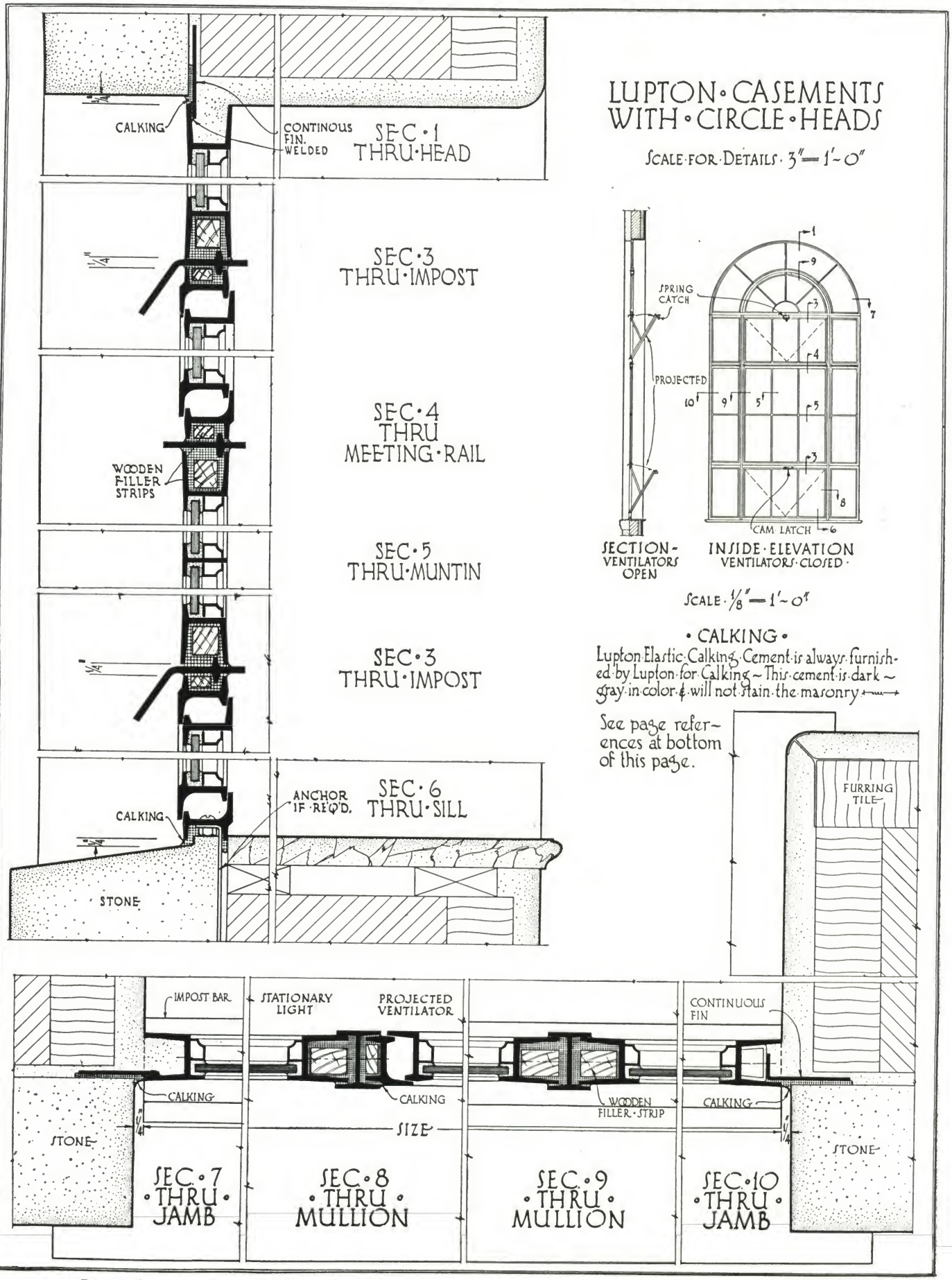
4-See·bottom·of·page·for·page·references.

5-LEADED·GLASS.
Leaded·glass·is·not·furnished·by·Lupton.



Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8; Full Size Sections, pages 15, 16 and 17

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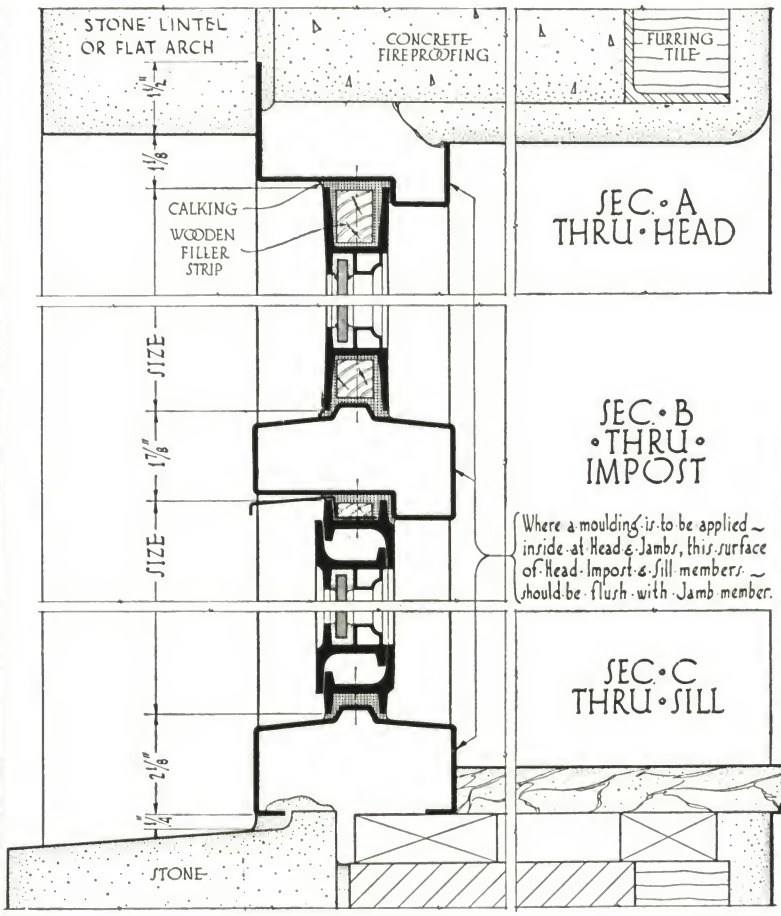


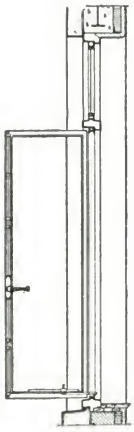
Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8; Full Size Sections, pages 15, 16 and 17

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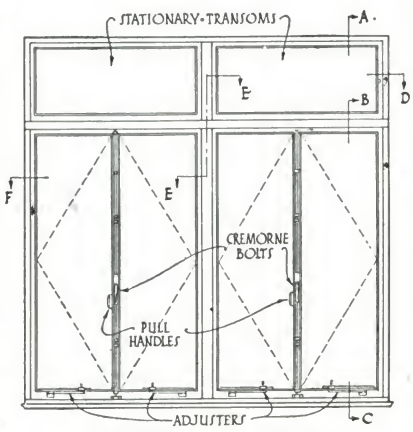
• LUPTON • CASEMENTS • WITH • 4" • PLATE • FRAMES

SCALE • FOR • DETAILS • 3" — 1'-0"





SECTION
VENTILATORS OPEN



INSIDE • ELEVATION
VENTILATORS CLOSED

SCALE • ¼" — 1'-0"

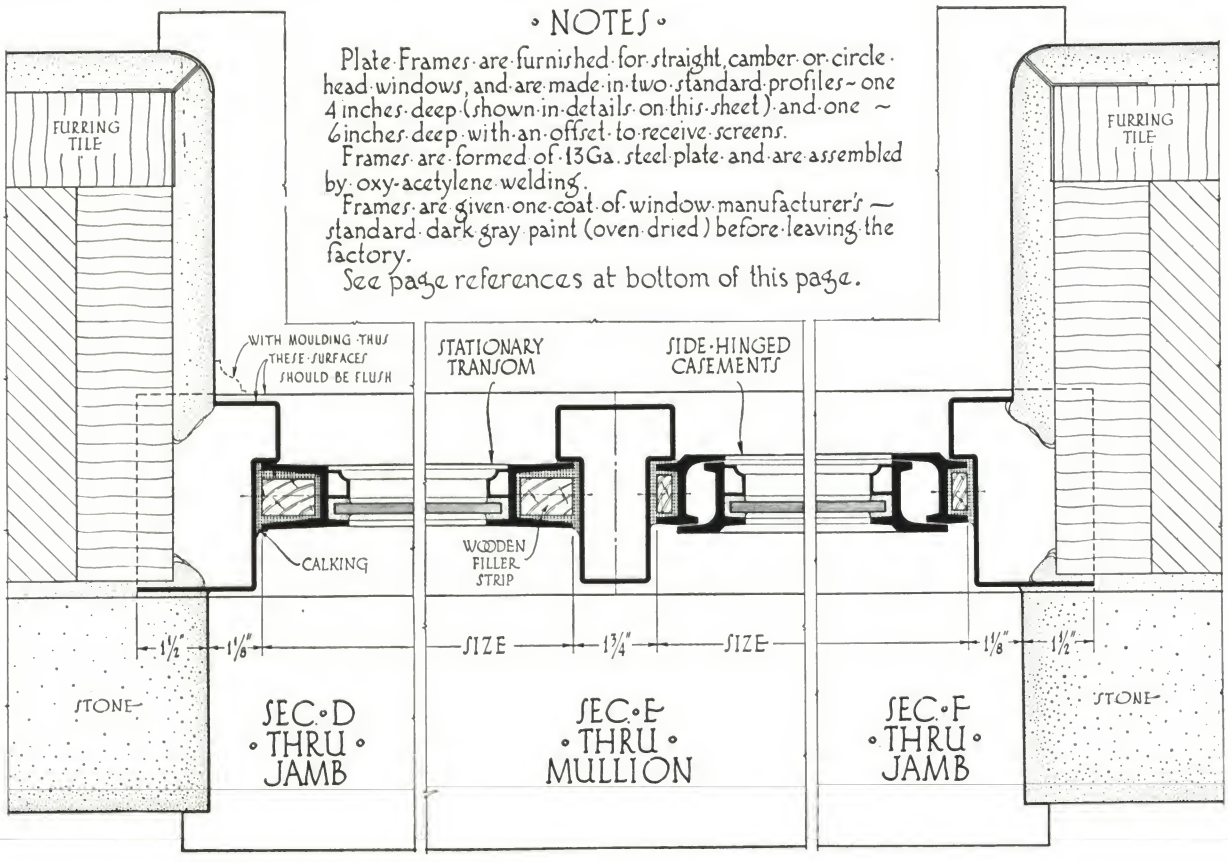
• NOTES •

Plate Frames are furnished for straight, camber or circle head windows, and are made in two standard profiles ~ one 4 inches deep (shown in details on this sheet) and one ~ 6 inches deep with an offset to receive screens.

Frames are formed of 13Ga. steel plate and are assembled by oxy-acetylene welding.

Frames are given one coat of window manufacturer's ~ standard dark gray paint (oven dried) before leaving the factory.

See page references at bottom of this page.

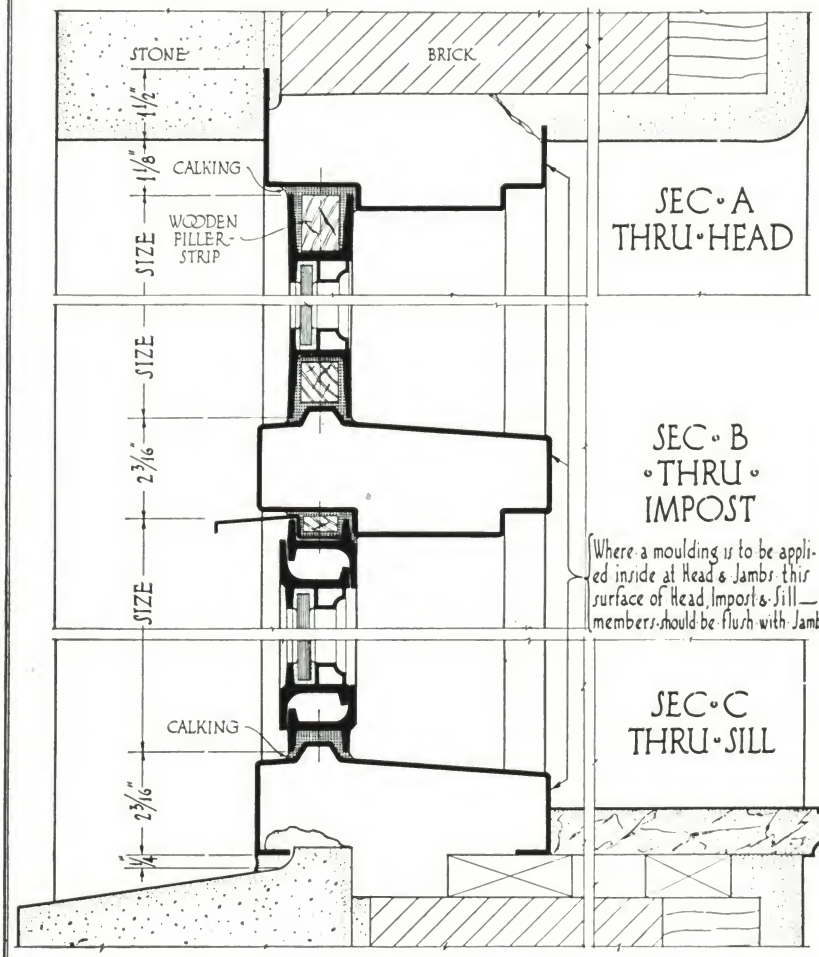


Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8; Full Size Sections, pages 15, 16 and 17

Continued on next page

LUPTON · CASEMENTS WITH · 6" · PLATE · FRAMES

SCALE FOR DETAILS - 3" = 1'-0"



SEC · A THRU · HEAD

SEC · B · THRU · IMPOST

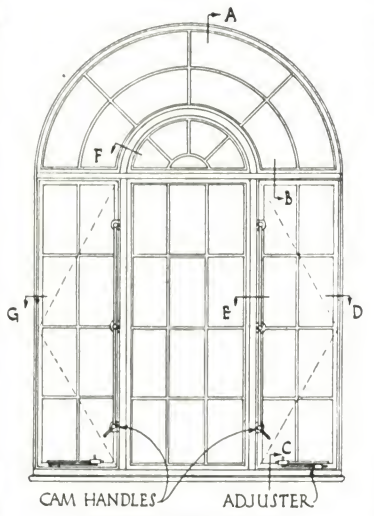
Where a moulding is to be applied inside at Head & Jambs this surface of Head, Impost & Sill members should be flush with Jamb.

SEC · C THRU · SILL

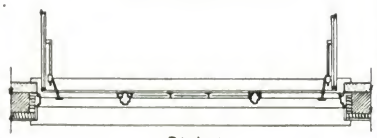


SECTION VENTILATORS · OPEN

SCALE ¼" = 1'-0"



INSIDE · ELEVATION

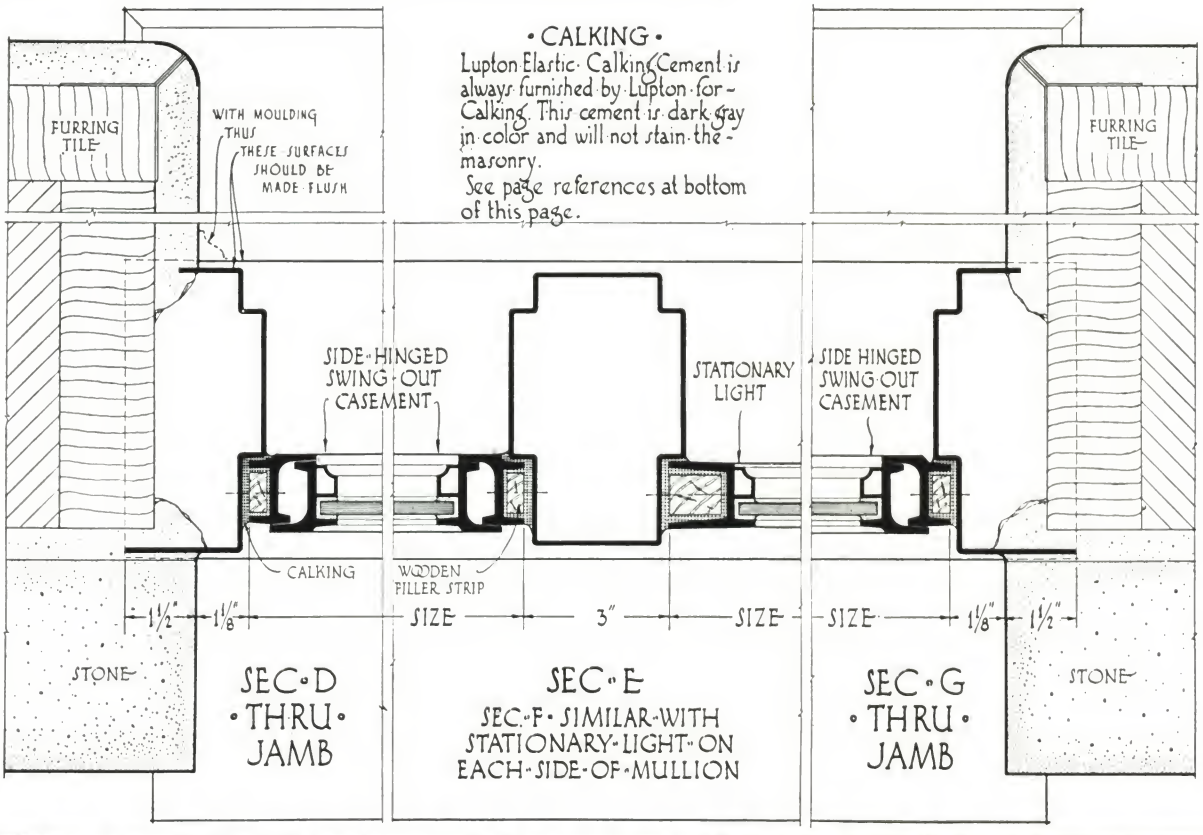


PLAN VENTILATORS · OPEN

· CALKING ·

Lupton Elastic Calking Cement is always furnished by Lupton for Calking. This cement is dark gray in color and will not stain the masonry.

See page references at bottom of this page.



SEC · D · THRU · JAMB

SEC · E

SEC · F · SIMILAR WITH STATIONARY LIGHT ON EACH SIDE OF MULLION

SEC · G · THRU · JAMB

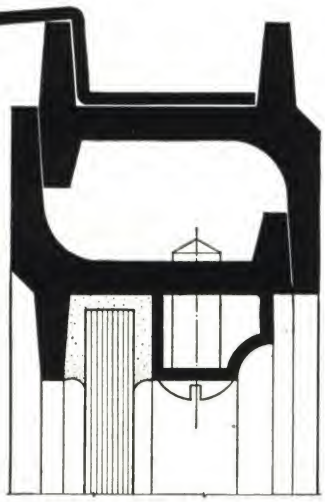
Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8; Full Size Sections, pages 15, 16 and 17

Continued on next page

LUPTON • CASEMENTS - HEAVY • TYPE • FULL • SIZE • SECTIONS •

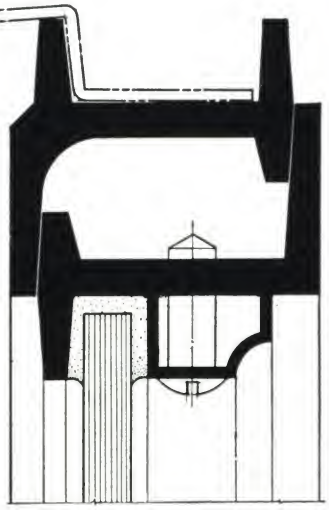
AT HEAD ONLY

HEAD • FOR SWING • OUT CASEMENTS
JAMB SIMILAR
USED ALSO FOR SWING-OUT SIDE OF VERTICALLY • PIVOTED • CASEMENTS

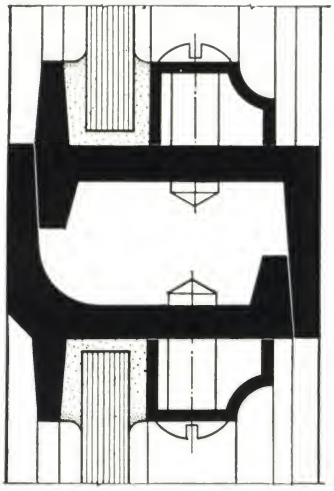


USED ONLY AT HEAD OF VERTICALLY PIVOTED CASEMENTS •••

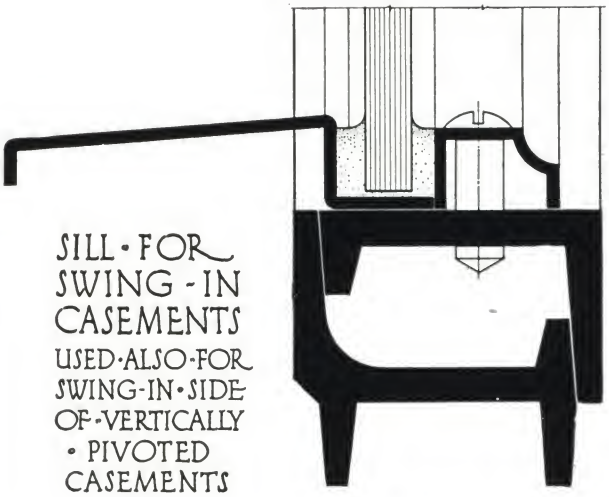
HEAD • FOR SWING - IN CASEMENTS
JAMB SIMILAR
USED ALSO FOR SWING-IN SIDE OF VERTICALLY • PIVOTED • CASEMENTS



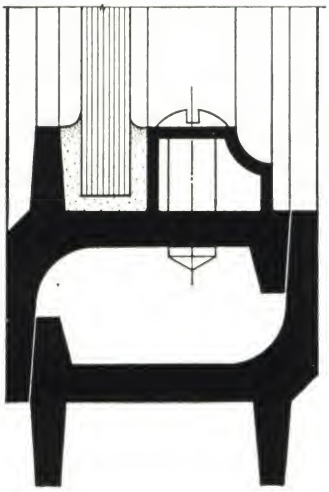
MEETING STILE FOR DOUBLE CASEMENTS
SWING - OUT OR • SWING • IN •



SILL • FOR SWING - IN CASEMENTS
USED ALSO FOR SWING-IN SIDE OF VERTICALLY • PIVOTED CASEMENTS



SILL • FOR SWING • OUT CASEMENTS



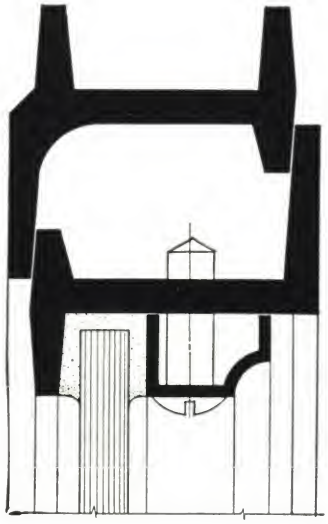
SILL • FOR SWING • OUT SIDE • OF VERTICALLY • PIVOTED • CASEMENTS



Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8

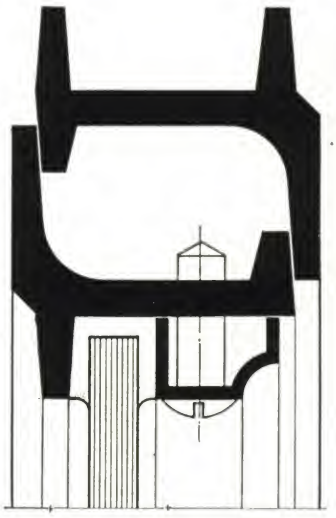
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LUPTON · CASEMENTS - HEAVY · TYPE · FULL · SIZE · SECTIONS ·

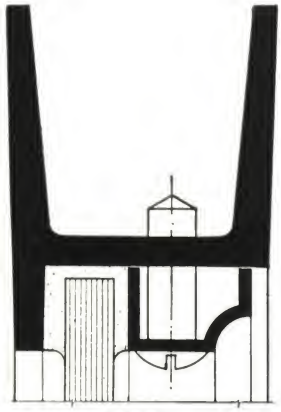


HEAD · FOR PROJECTED · OUT AT · BOTTOM · VENTILATOR

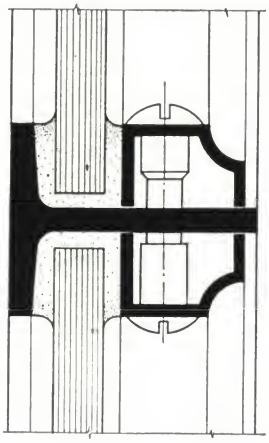
HEAD · & · JAMB · FOR · PROJECTED IN · AT · TOP · VENTILATOR · SIMILAR



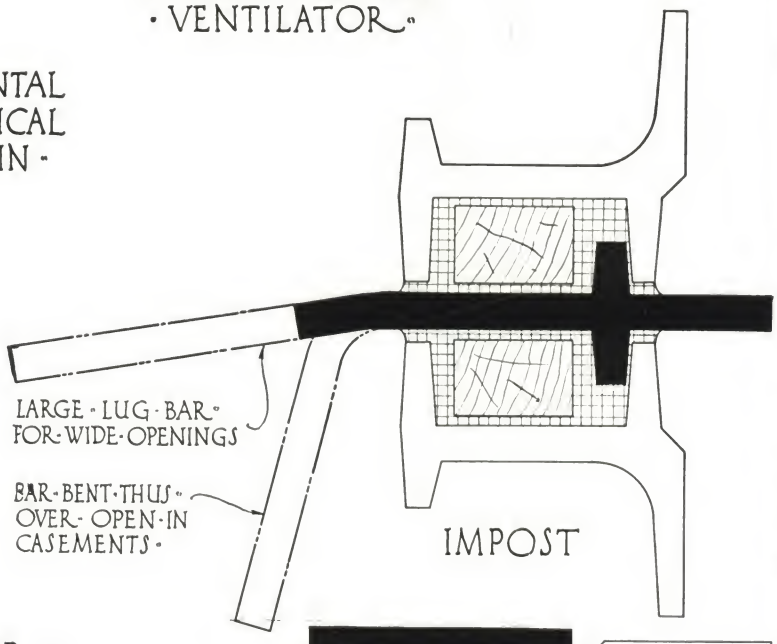
JAMB · FOR · PROJECTED · OUT · AT · BOTTOM · VENTILATOR



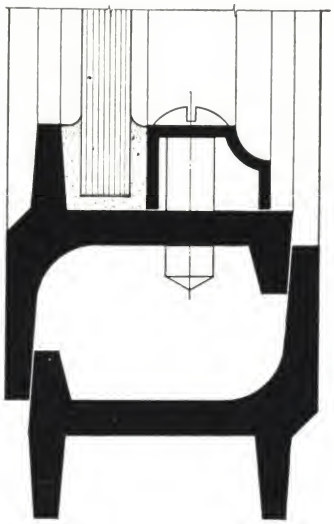
FRAME · MEMBER FOR · STATIONARY · LIGHT ·



HORIZONTAL OR · VERTICAL · MUNTIN ·

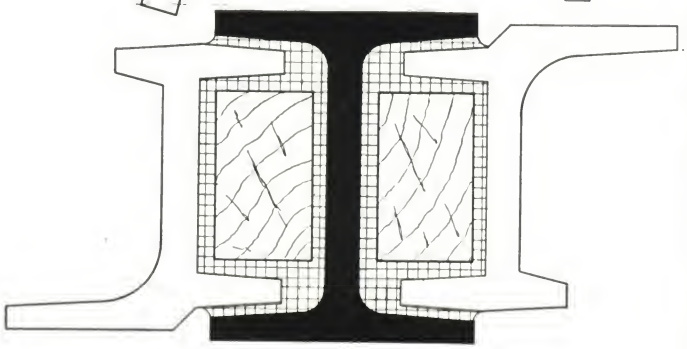


IMPOST



SILL · FOR · PROJECTED · OUT AT · BOTTOM · VENTILATOR

SILL · FOR · PROJECTED · IN · AT · TOP · VENTILATOR · SIMILAR ·

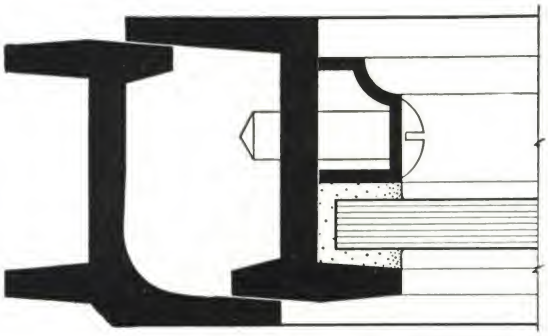


MULLION

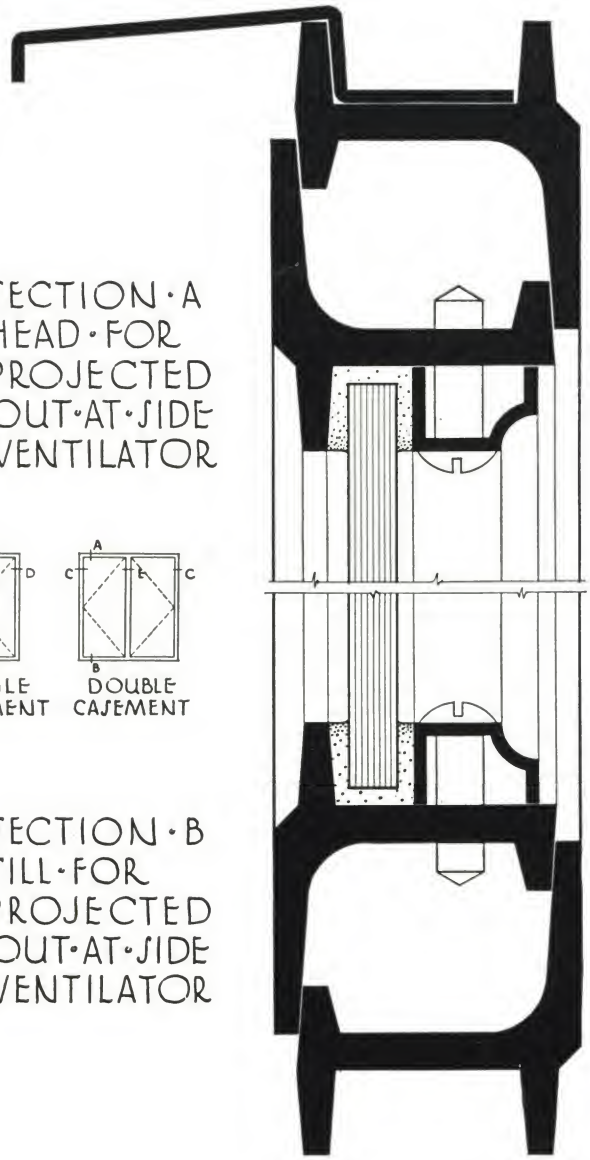
Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8

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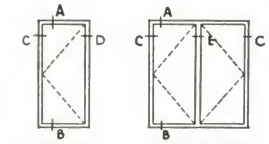
LUPTON · CASEMENTS – HEAVY · TYPE
FULL · SIZE · SECTIONS



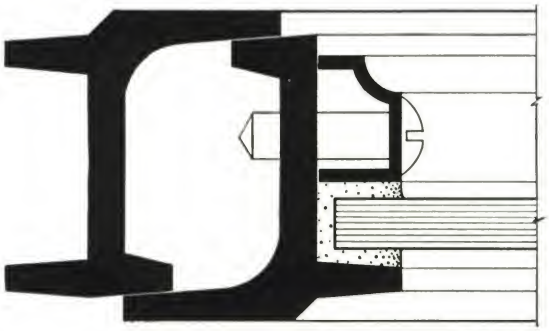
SECTION · C
JAMB · FOR
PROJECTED · OUT · AT · SIDE
VENTILATOR



SECTION · A
HEAD · FOR
PROJECTED
OUT · AT · SIDE
VENTILATOR



SINGLE CASEMENT DOUBLE CASEMENT



SECTION · D
JAMB · FOR
PROJECTED · OUT · AT · SIDE
VENTILATOR

SECTION · B
SILL · FOR
PROJECTED
OUT · AT · SIDE
VENTILATOR

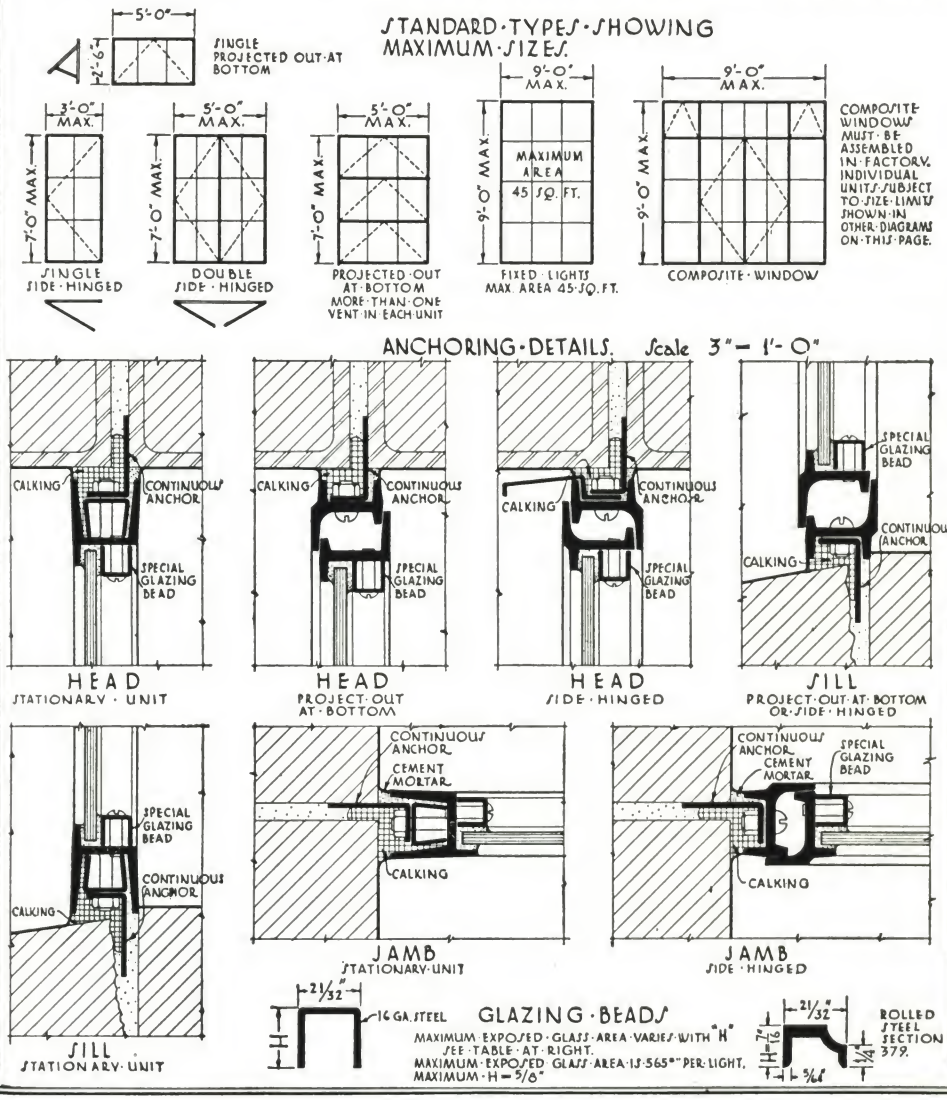


SECTION · E · MEETING · STILE · FOR
PROJECTED · OUT · AT · SIDE · VENTILATORS.

Page references—General Information and Calking, pages 1 and 3; Glazing, page 4; Types of Casements, page 5; Specifications, page 6; Hardware, pages 7 and 8

Continued on next page

UNDERWRITERS · HEAVY · CASEMENTS

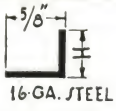


Lupton Steel Casements (Heavy Type) may receive underwriters' labels, subject to the limitations indicated on this page.

Following are the underwriters' specifications in condensed form:

1. Maximum sizes—see diagrams.
2. Construction is essentially the same as for non-labeled casements.
3. All ventilators must open out.
4. Windows composed of two or more units must be assembled in factory.
5. Continuous anchors must be used at head, jambs and sill.
6. Hardware must be malleable iron (bronze plated if desired). Bronze hinges can be used if vents are equipped with steel stop pins.
7. Glass must be ¼ in. thick wire glass.
8. Steel glazing stops must be used (see details).

EXPOSED · GLASS · AREA	H
NOT · EXCEEDING 55"	1/4"
" " 100"	5/16"
" " 155"	3/8"
" " 225"	7/16"
" " 320"	1/2"
" " 400"	9/16"
(MAXIMUM) " 565"	5/8"

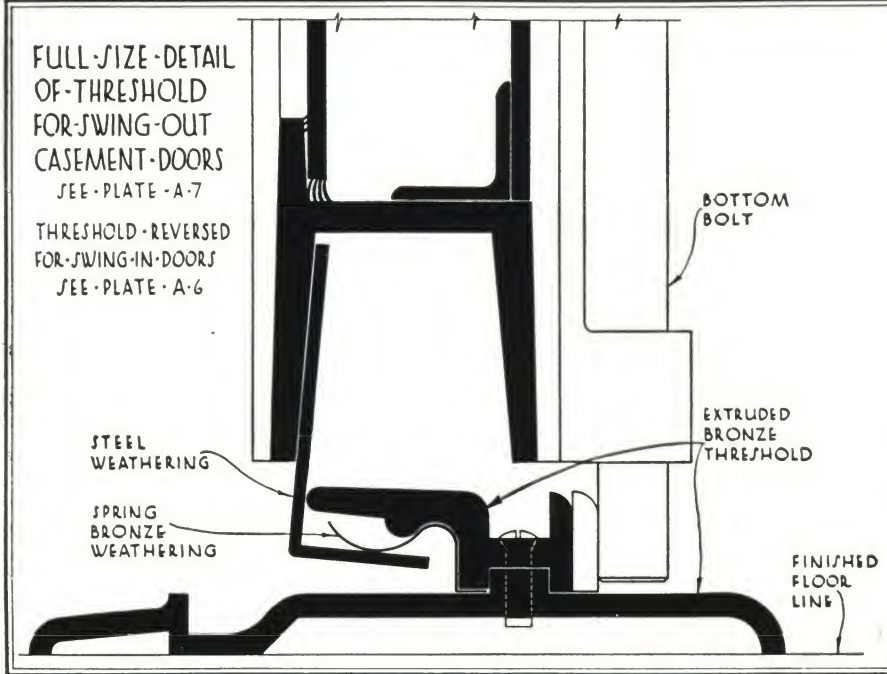


GLAZING ANGLE

CASEMENT DOORS (HEAVY TYPE)

FULL · SIZE · DETAIL OF · THRESHOLD FOR · SWING · OUT CASEMENT · DOORS
SEE · PLATE · A · 7

THRESHOLD · REVERSED FOR · SWING · IN · DOORS
SEE · PLATE · A · 6

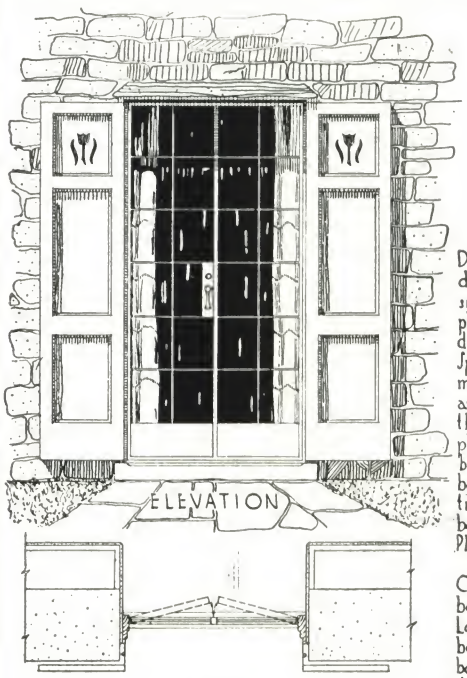


Casement Doors are made in sizes and designs specified by the architect. Materials and construction are the same as for Steel Casements (Heavy Type). Specification for which is given on page 6.

Casement doors have a patented, extruded bronze threshold and usually, a 13 gauge steel panel extends across the bottom forming a kick plate.

Doors are hung on bronze butts with steel pins and may be equipped with friction stays or "Grand Peerless" door stops if desired. Methods of operation and locking are indicated in the details on pages 19 and 20. Detail on page 21 shows correct method for framing lock to avoid glass breakage.

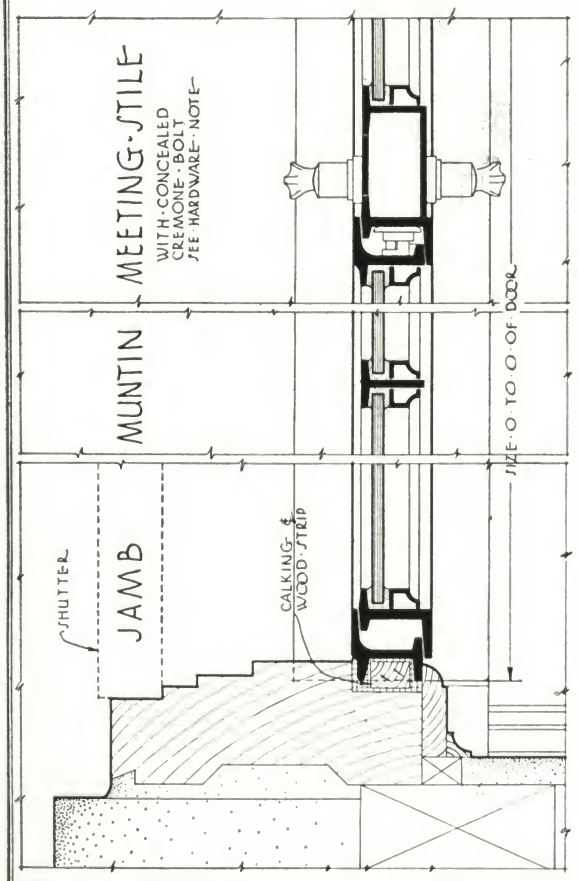
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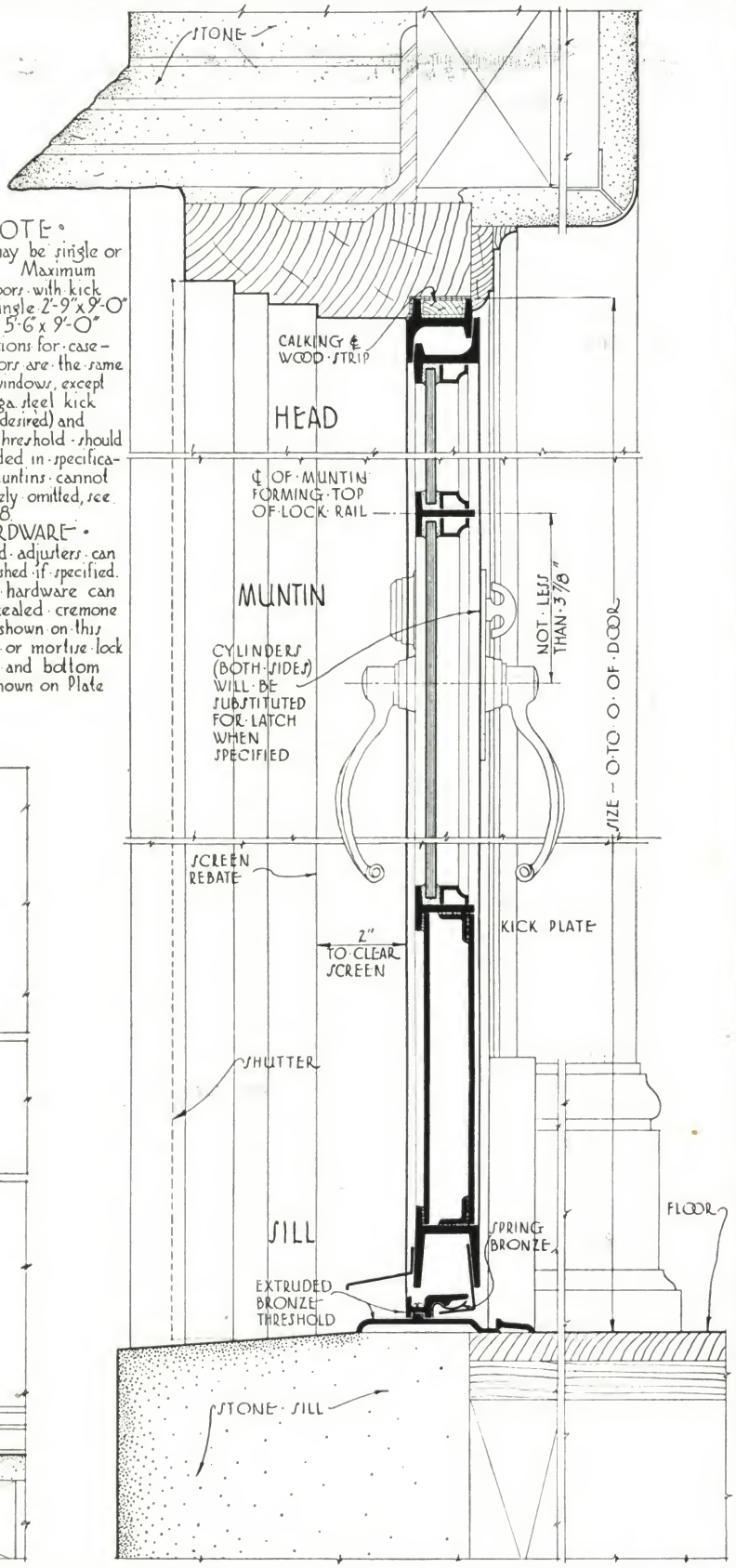


PLAN
Scale 1/4" = 1'-0"

• NOTE •
Doors may be single or double. Maximum sizes (doors with kick plates) single 2'-9" x 9'-0" double 5'-6 x 9'-0" Specifications for casement doors are the same as for windows, except that 13 ga. steel kick plate (if desired) and bronze threshold should be included in specifications. Muntins cannot be entirely omitted, see Plate A-8.

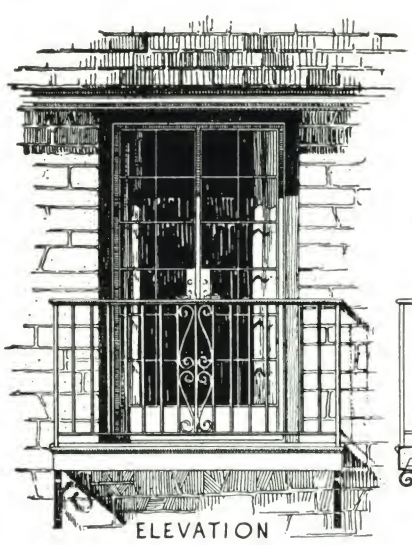
• HARDWARE •
Casehold adjusters can be furnished if specified. Locking hardware can be concealed cremone bolt as shown on this drawing or mortise lock and top and bottom bolt as shown on Plate A-7.

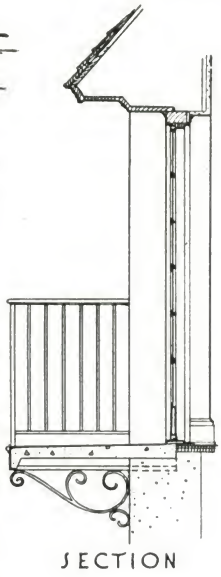


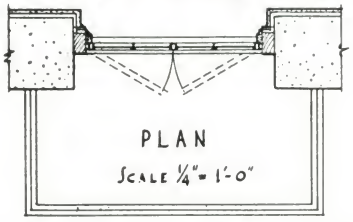


SCALE FOR DETAILS 3" = 1'-0"	CASEMENT DOORS TO SWING IN LUPTON CASEMENTS FOR DISTINCTIVE BUILDINGS	PLATE NUMBER A-6 JANUARY-1930

Continued on next page







NOTES

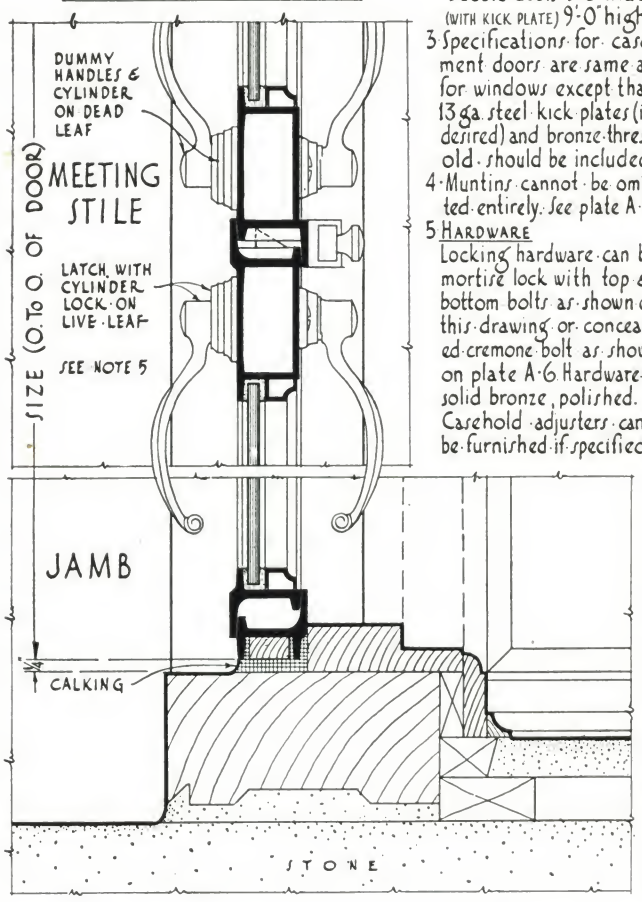
1 Doors may be single or double.

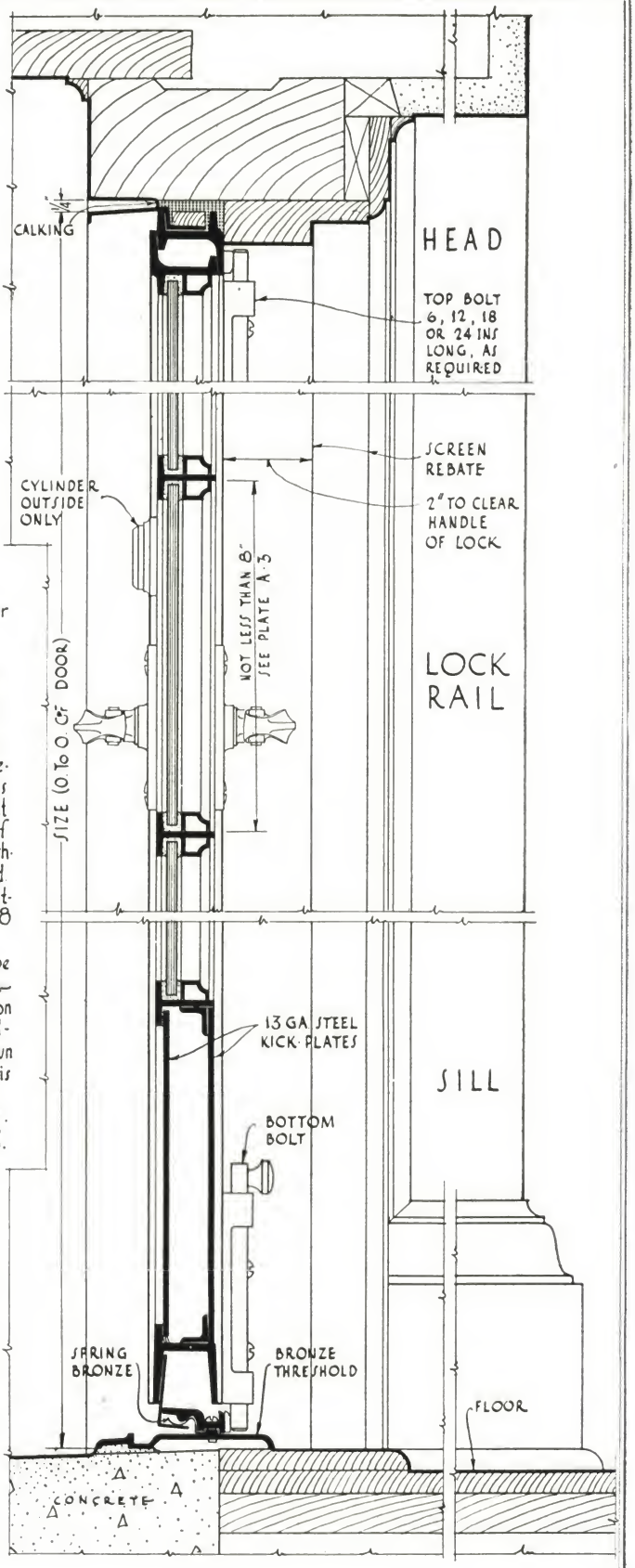
2 MAXIMUM SIZES
Single doors 2'-9" wide (WITH KICK PLATE) 9'-0" high
Double doors 5'-6" wide (WITH KICK PLATE) 9'-0" high

3 Specifications for casement doors are same as for windows except that 13 ga. steel kick plates (if desired) and bronze threshold should be included.

4 Muntins cannot be omitted entirely. See plate A-8

5 HARDWARE
Locking hardware can be mortise lock with top & bottom bolts as shown on this drawing or concealed cremone bolt as shown on plate A-6 Hardware is solid bronze, polished. Casehold adjusters can be furnished if specified.





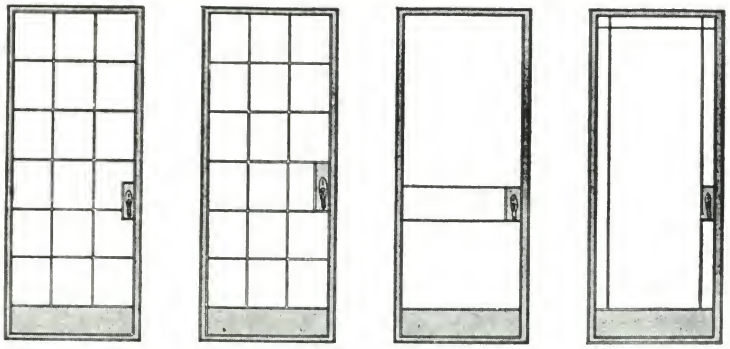
SCALE FOR DETAILS 3"=1'-0"	CASEMENT DOORS TO SWING OUT LUPTON CASEMENTS FOR DISTINCTIVE BUILDINGS	PLATE NUMBER A • 7 JANUARY 1930

Continued on next page

•NOTES•

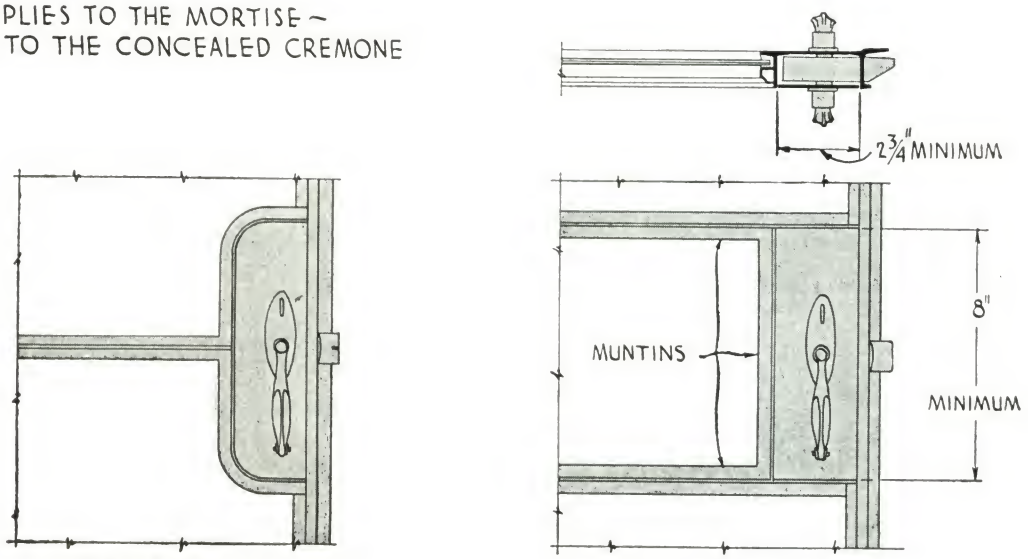
In order to avoid glass breakage resulting from cutting lights to fit around lock as shown by Sketch "A", doors must be designed with muntins arranged to form a lock rail as in Sketch "B".

Lock or concealed Cremone Bolt cannot be used on doors without Muntins. When a large unbroken area of glass is desired a panel must be provided as shown in Sketches "C" or "D" or by some similar arrangement.



SKETCH "A" SKETCH "B" SKETCH "C" SKETCH "D"

"THIS APPLIES TO THE MORTISE-LOCK OR TO THE CONCEALED CREMONE BOLT.



INCORRECT·METHOD
SEE·SKETCH "A"

CORRECT·METHOD
SEE·SKETCHES "B" "C" & "D"

APPLICATION · OF · LOCK · TO · CASEMENT · DOORS

LUPTON CASEMENT OPERATORS—SCREW TYPE

In banks, libraries and other buildings where window openings are fitted with large multiple unit casements, it is necessary to provide a method of operating casement ventilators that are beyond reach from the floor.

For this purpose Lupton has developed the screw type Casement Operator in several forms, to suit the varying requirements.

Classified by method of operation, there are two types of operators: those operated by an endless cord and those operated by a crank and vertical shaft.

Cord Operation

This type of operator is applied to a single ventilator, usually a transom. It is made in two types, details of which are shown on page 22. In the segmental type the cord passes over a pulley that has a threaded core and is mounted on a threaded bronze rod, bent in an arc. As the pulley turns it runs backward or forward on the rod, opening or closing the ventilator. In the alternate type the pulley is rigidly attached to the center of a shaft threaded at one end with a right-hand thread and at the other with a left-hand thread and mounted on the stationary frame of the casement. As the pulley revolves, two bronze nuts travel along the threaded portions of the rod, opening or closing the casement.

Crank and Shaft Operation

This method is used where there are a number of ventilators to be operated simultaneously. Details of operation and application are shown on pages 23 to 25.

With the horizontal screw type shaft shown on page 25 the degree of opening is limited by the width of the ventilator as illustrated in the sketch on plate W-3. This has always to be remembered when designing.

The vertical screw shaft operator will operate a greater number of ventilators and a longer length of shaft than the horizontal type and the degree of opening is not limited by the width of the ventilator, but not more than two tiers of ventilators can be operated from one station.

Continued on next page

SPECIFICATION FOR LUPTON CASEMENT OPERATOR—SCREW TYPE

Work Included

1. Furnish and install where shown on drawings Lupton Casement Operator Screw Type, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Material and Construction

Note: Operators are available in three types.

(A) Horizontal, vertical or curved screw shaft operated by cord and pulley.

(B) Horizontal screw shaft operated by vertical shaft, crank and miter gears.

(C) Vertical screw shaft, operated by crank and miter gears.

2. (A-1) Operator shall have a ⅜-in. diameter steel shaft threaded with right- and left-hand threads mounted on three malleable iron brackets attached to frame of casement. Each threaded portion of the shaft shall be equipped with an adjustable bronze traveling nut. Sash rods shall be of $\frac{3}{16}$x¾-in. round edge high carbon steel connected to the traveling nut and to the window in a manner to prevent chattering or vibration. Shaft shall be operated by a grooved bronze sheave wheel fastened by set screws to the horizontal screw shaft and rotated by means of a $\frac{3}{16}$-in. diameter endless cord.

2. (A-2) Operator shall consist of a ⅜-in. threaded bronze rod bent to the required radius, a grooved pulley mounted on the rod, and a $\frac{3}{16}$-in. diameter endless cord.

Rod and pulley shall be attached, one to the vent and one to the frame in such a way that when the pulley is revolved by means of the cord the vent shall open or close.

2. (B) Operator shall have a ½-in. diameter horizontal steel shaft cut with a 60° 3 per in. double thread. Shaft shall be threaded at one end with a left-hand thread and at the other with a right-hand thread.

Two bronze traveling nuts shall be furnished for each vent, one at each end of the threaded shaft. Traveling nut shall have an adjustable feature for close fitting of the vent. One end of sash rod shall be attached to the traveling nut and the other to the sash. Sash rod shall be made of $\frac{3}{16}$x¾-in. round edge high carbon steel. Shaft shall be supported by malleable iron brackets rigidly attached to the window frame or building structure and spaced so that shaft will be properly supported without excessive deflection.

Power shall be applied through a miter gear box, the gears being turned by a detachable handle 5 in. long. Power boxes and handle shall be of bronze. Each horizontal screw shaft to be operated from a miter gear box rigidly attached to mullion or jamb.

2. (C) Operator shall have a vertical ¾-in. diameter cold rolled steel shaft coupled to a threaded steel shaft 1 ft. 6 in. long and engaging with an internal thread on miter gear in bronze power box.

Power box shall be rigidly attached to window mullion or building structure and be equipped with a bronze handle 5 in. long that may be detachable.

The screw shaft shall move up and down in a vertical plane and turn a ¾-in. diameter horizontal steel shaft by means of a lever arm and connecting link.

Malleable iron arms shall be fastened by set screws to this horizontal shaft and shall be connected to the ventilator by means of flat sash rods.

Two arms and sash rods shall be furnished for each vent. Horizontal shaft shall be supported by malleable iron brackets attached to window or building structure and spaced so that shaft will have a minimum amount of deflection.

Erection

3. Operating devices shall be erected and adjusted to proper working order by the window contractor.

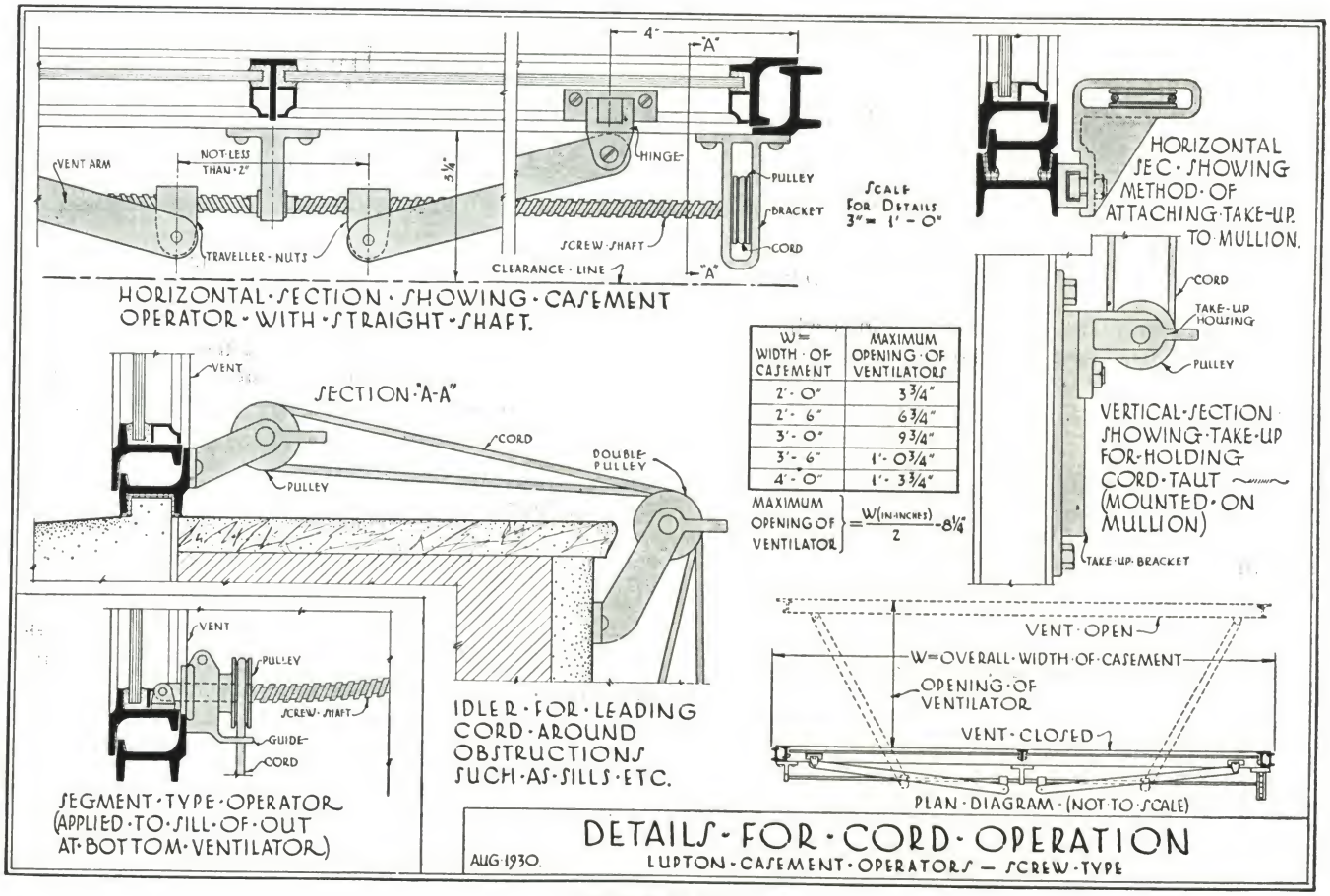
Painting

4. All malleable iron or steel parts shall be given one coat of operator manufacturer's standard dark gray paint, oven dried, before shipment.

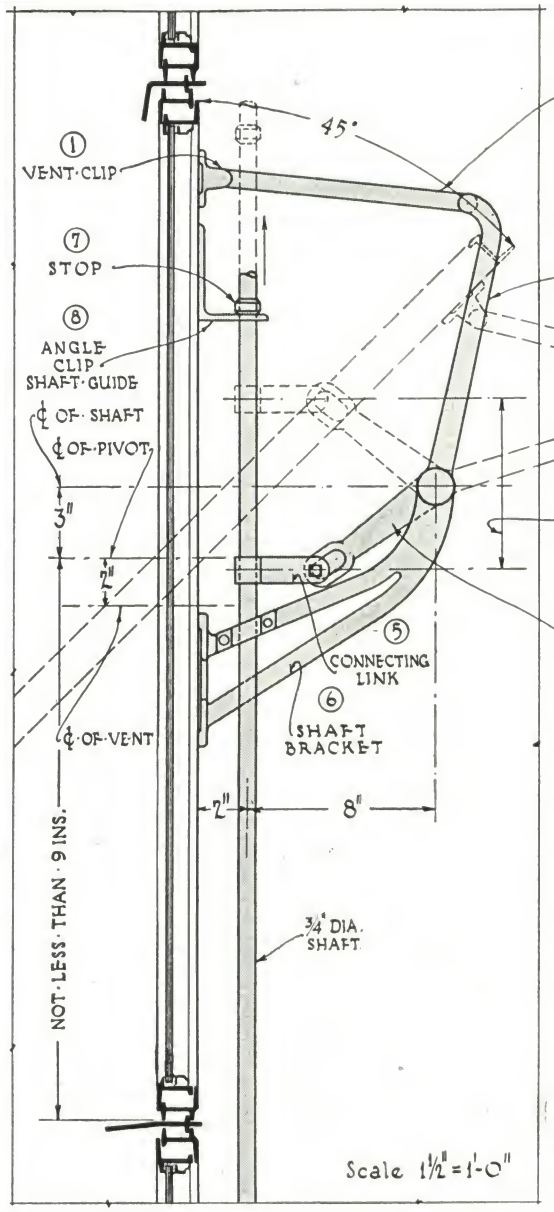
Parts Available in Iron or Bronze

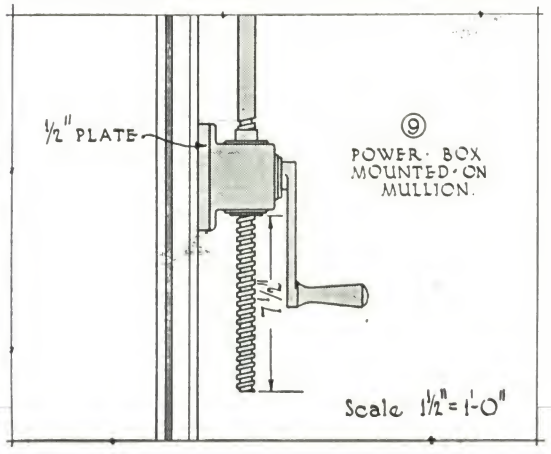
Power Box Handle Miter Gear Box

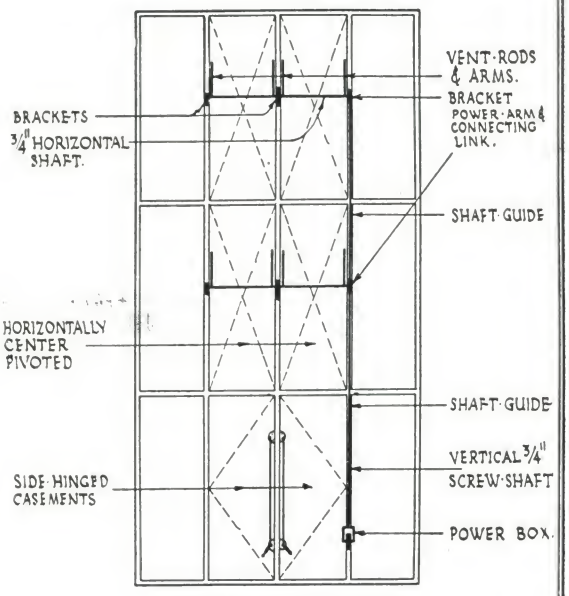
Note: Power box may be concealed in wall, in which case a handle extension can be furnished.



Continued on next page







·INSIDE·ELEVATION·

·LIMITS·

NOT·MORE·THAN·2 TIERS·OF·VENTS·TO BE OPERATED·FROM ONE·POWER

CENTER·PIVOTED·(PIVOTED 2 IN. ABOVE CENTER)
NOT·MORE THAN·140 SQ.FT. NOR 14 VENTS~HORIZONTAL
SHAFT·NOT MORE·THAN·21 FT. LONG·ON·ONE·RUN.

TOP·HUNG (PIVOTED·4 IN·FROM·TOP·OR·TOP·HINGED)
NOT·MORE THAN·100 SQ.FT. NOR 10 VENTS~HORIZONTAL
SHAFT·NOT·MORE·THAN·15 FT. LONG·ON·ONE·RUN.

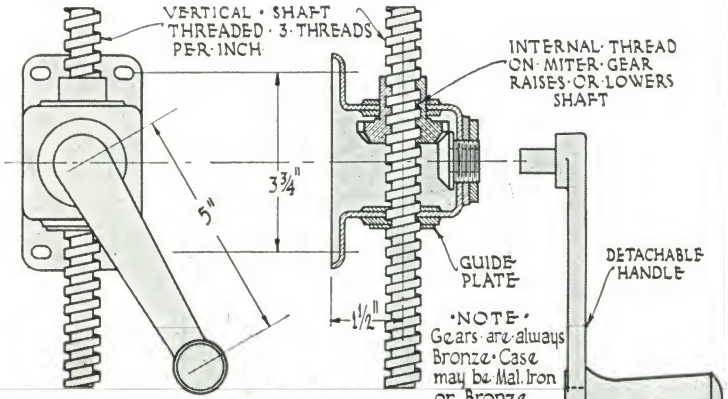
·MATERIALS·

OPERATORS·ARE·FURNISHED·WITH·STEEL·SHAFTS·AND·SOLID·BRONZE·OR MALLEABLE·IRON·FITTINGS·MITRE·GEARS·ARE·ALWAYS·BRONZE~ GEAR·BOX·MAY·BE·IRON·OR·BRONZE·

① VENT·CLIP
② VENT·ROD
③ VENT·ARM
} 2 PER VENT

④ POWER·ARM
⑤ CONNECTING·LINK
} ONE PER HORIZONTAL·SHAFT.

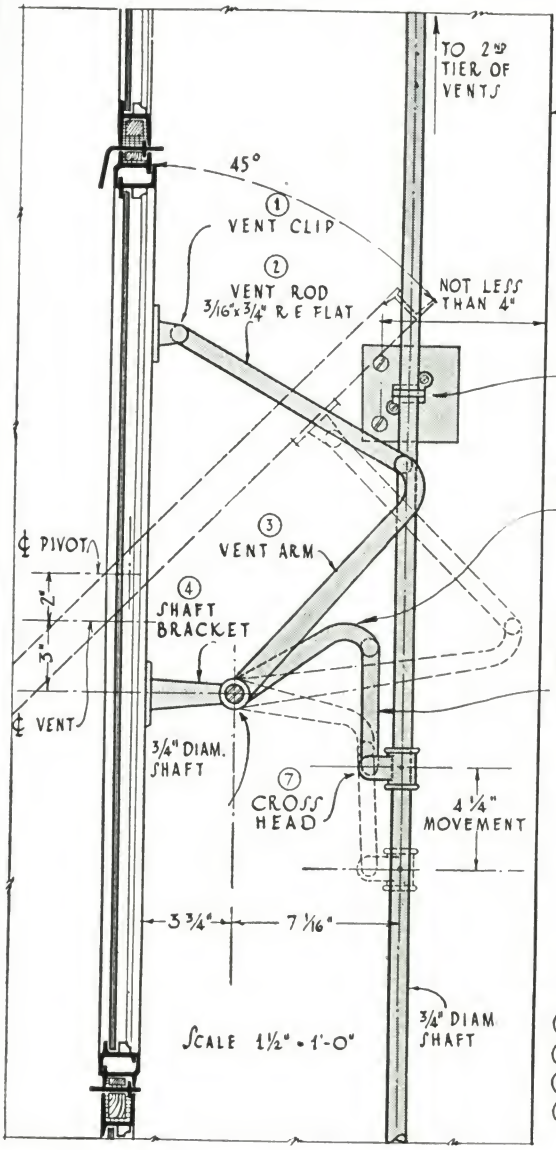
⑥ SHAFT·BRACKET (AT·ENDS·OF·SHAFT AND·AT·MULLIONS)
⑦ STOP (2·PER·VERTICAL·SHAFT)
⑧ ANGLE·CLIP·SHAFT·GUIDE
⑨ POWER·BOX.
(NOT·OVER 6 FT.·APART)

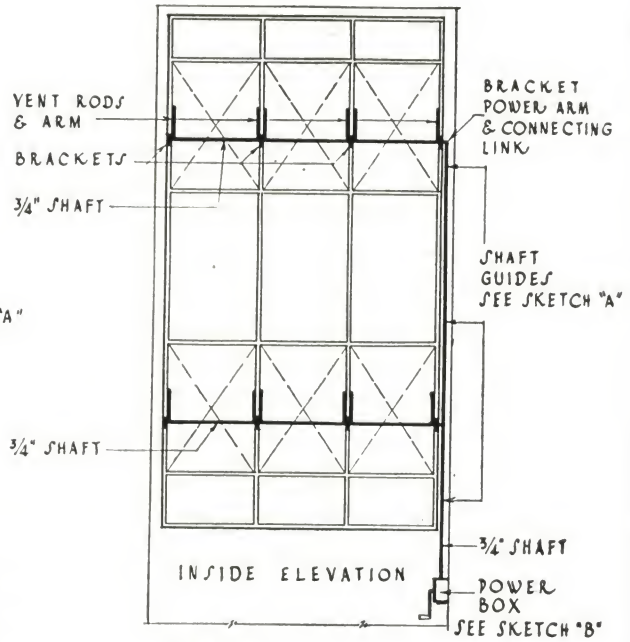


POWER·BOX
SCALE·3"=1'-0"

SCALE·AS SHOWN	OPERATOR·WITH·VERTICAL·SCREW·SHAFT APPLIED·TO·CENTER·PIVOTED·CASEMENTS LUPTON·CASEMENT·OPERATORS ~ SCREW·TYPE·	PLATE·NO W~1 AUGUST·1929

Continued on next page





LIMITS

NOT MORE THAN 2 TIERS OF VENTS TO BE OPERATED FROM ONE POWER.

CENTER PIVOTED (PIVOTED 2 IN. ABOVE CENTER)
NOT MORE THAN 140 SQ. FT. NOR MORE THAN 14 VENTS.
HORIZONTAL SHAFT NOT MORE THAN 21 FT LONG ON ONE RUN

TOP HUNG (PIVOTED 4 IN FROM TOP~OR TOP HINGED)
NOT MORE THAN 100 SQ.FT. NOR MORE THAN 10 VENTS.
HORIZONTAL SHAFT NOT MORE THAN 15 FT. LONG ON ONE RUN.

MATERIAL

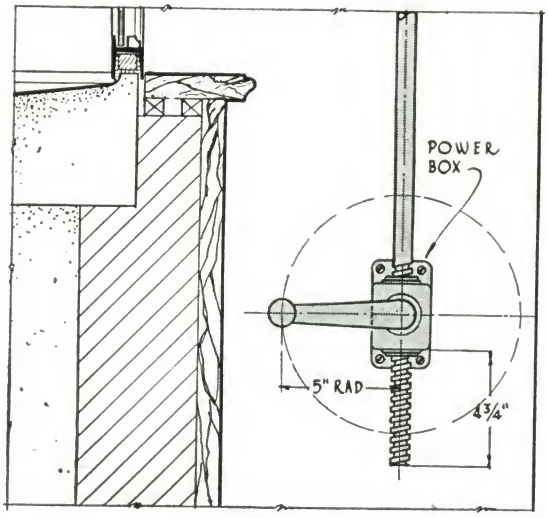
OPERATORS ARE FURNISHED WITH STEEL SHAFTS AND SOLID BRONZE OR MALLEABLE IRON FITTINGS. MITRE GEARS ARE ALWAYS BRONZE. GEAR BOX MAY BE IRON OR BRONZE

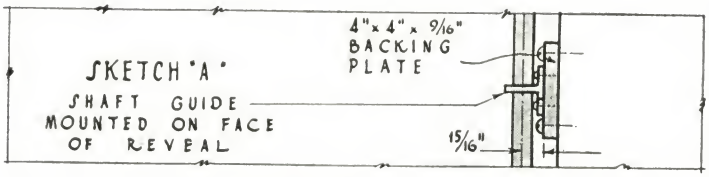
① VENT CLIP
② VENT ROD
③ VENT ARM
} 2 PER VENT

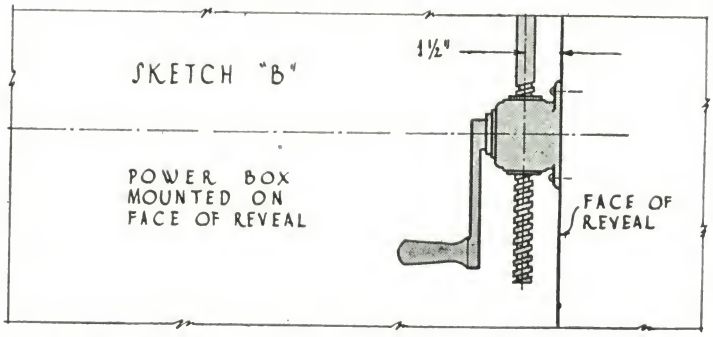
④ SHAFT BRACKET { AT ENDS OF SHAFT AND AT MULLIONS

⑤ POWER ARM
⑥ CONNECTING LINK
⑦ CROSS HEAD
} ONE PER HORIZONTAL SHAFT

⑧ SHAFT GUIDE { NOT MORE THAN 6FT. APART.







SCALE FOR DETAILS 1½" = 1'-0"	•OPERATOR•WITH•VERTICAL•SCREW•SHAFT• •APPLIED•TO CENTER•PIVOTED•CASEMENTS• •LUPTON•CASEMENT•OPERATOR~SCREW•TYPE•	PLATE NO. W~2 AUGUST 1929.

Continued on next page

LIMITS

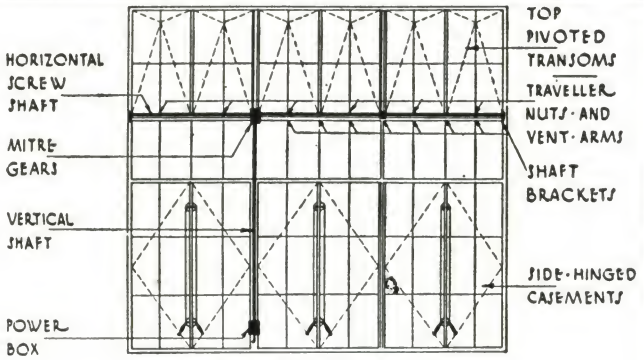
TOP HUNG (PIVOTED 4 IN. FROM TOP OR TOP HINGED)
NOT MORE THAN 90 SQ. FT. OR 9 VENTS • SHAFT NOT MORE THAN 10 FT. EITHER SIDE OF MITER GEAR BOX

PIVOTED (PIVOTED 2 IN. ABOVE CENTER)
NOT MORE THAN 120 SQ. FT. OR 12 VENTS • SHAFT NOT MORE THAN 15 FT. EITHER SIDE OF MITER GEAR BOX.

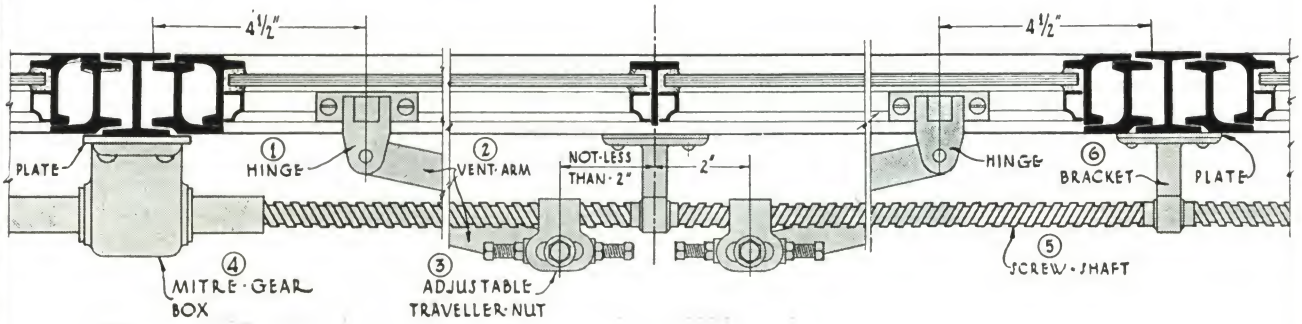
MATERIAL

OPERATORS ARE FURNISHED WITH STEEL SHAFTS AND SOLID BRONZE OR MALLEABLE IRON FITTINGS • FINISH IS BRONZE POLISHED OR MALLEABLE IRON PAINTED

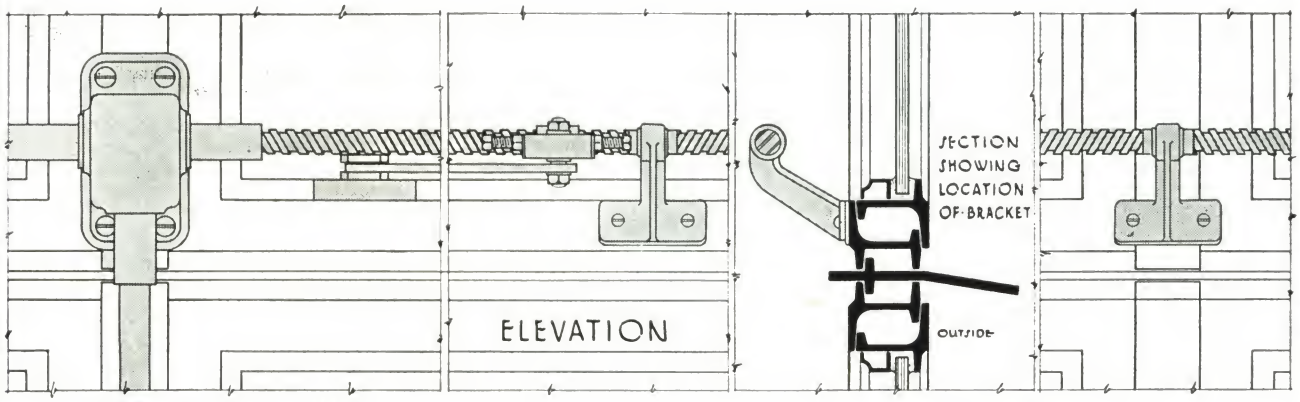
① HINGE & BRACKET } 2 PER VENT
② VENT ARM } 2 PER VENT
③ TRAVELLER NUT } 2 PER VENT
④ MITER GEAR BOX (2,3 OR 4 WAY)
⑤ SCREW SHAFT
⑥ SHAFT BRACKET
⑦ VERTICAL SHAFT
⑧ POWER BOX

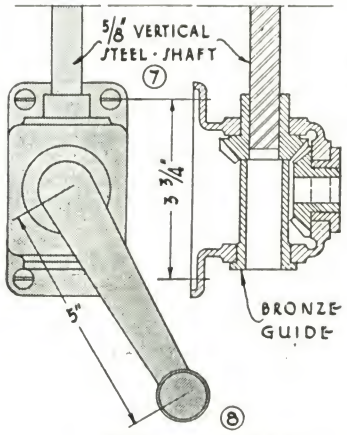


INSIDE ELEVATION



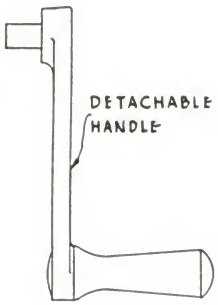
PLAN

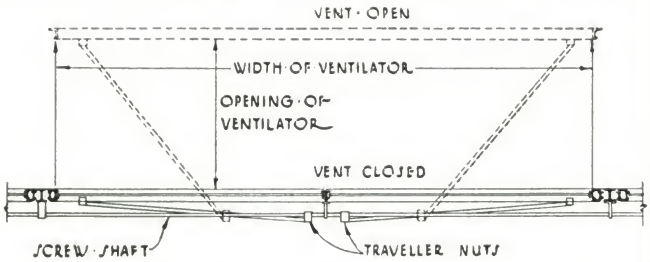




POWER BOX

NOTE
Gears are always Bronze • Case may be Malleable Iron or Bronze





PLAN DIAGRAM
NOT TO SCALE

OPENING OF VENTILATOR VARIES WITH WIDTH OF VENTILATOR AND IS EQUAL TO APPROXIMATELY 6 INS LESS THAN ONE HALF THE WIDTH OF THE VENTILATOR

SCALE FOR DETAILS 3" = 1'-0"	OPERATOR WITH HORIZONTAL SCREW SHAFT APPLIED TO TOP PIVOTED TRANSOMS LUPTON CASEMENT OPERATOR — SCREW TYPE	PLATE NO W-3 AUGUST 1929

Continued on next page

LUPTON ALUMINUM CASEMENTS

The durability of aluminum and its non-corroding properties have been proven by its use in the rubber, automotive and aircraft industries. Aluminum casements are durable, have a low up-keep cost and a fine appearance. These qualities make them the choice for all buildings where architectural design requires the distinctive in windows.

Producing the Sections—Lupton Aluminum Casement bars are made of a special alloy and formed by extruding which assures dense sections of unsurpassed uniformity. Strength compares favorably with mild steel with but approximately one-third the weight of steel. All sections are specially designed for exclusive use in Lupton Aluminum Casements.

Fabricating the Casements—A special gas-welding process eliminates the difficulties incident to welding aluminum by ordinary methods. After welding, excess material is cut away, leaving pure metal in the welded area, and assuring a strong, solid joint.

Finish—Aluminum Casements are carefully brushed and dipped in a special bath which removes grease, grime and flux, and leaves the metal with a soft gray lustre. They are then rinsed and dried. This is the standard finish.

Polished finish is more costly. All exposed surfaces are polished to a high reflecting finish. Finish must be protected with several coats of clear varnish or other coating.

Sandblast finish can also be had at a cost slightly above that of the standard finish.

Hardware—The hardware is white bronze. Where auxiliary latches are used, aluminum tubing connects the latch with locking handle. Hardware backing plates are welded in position.

Types of Aluminum Casements—Side hinged open-out casements are recommended wherever possible to use them. Transoms may be projected out-at-bottom or in-at-top. Maximum sizes are given on page 29. Composite Windows can be built up as shown on page 30. Outside putty glazing is not recommended.

Some Chemical Properties of Aluminum—Aluminum is not appreciably affected by the atmosphere, steam or boiling water. Strong solutions of caustic alkalis and hydrochloric acid attack aluminum. Ammonia and nitric acid also act on it. Sea water affects it to a very small extent.

Aluminum when heated will react with concentrated sulphuric acid, but the diluted acid has little effect on it.

Note: Precautionary measures should be taken to prevent the use of the injurious chemicals listed above in window-cleaning fluids or in cleaning solutions used for washing stone work, etc. Aluminum can be restored to its natural color by rubbing with very fine emery paper or fine steel wool.



Research Laboratory Building, Aluminum Company of America, New Kensington, Pa.
HENRY HORNBOSTEL, Architect P. R. L. HOGNER, Associate Architect

SPECIFICATION FOR LUPTON ALUMINUM CASEMENTS

Work Included

1. All windows called for in these specifications or shown on the drawings shall be Aluminum Casement Windows, manufactured by DAVID LUPTON'S SONS CO., Philadelphia, Pa.

Members

2. The members shall be of special alloy, specially rolled in solid one-piece sections.

3. The weathering of ventilators shall be made by double contacts of the members without the use of built up or added sections.

Assembly

4. All members shall be accurately straightened and true. All joints shall be welded, eliminating all riveted joints. Exposed welded surfaces shall be ground flush with members. Plates to receive handles shall be solidly welded in place. Face members shall be free from hammer marks and sight lines shall be carefully preserved. All aluminum casements shall be designed for inside glazing with glazing stops.

Glazing Stops

5. Glazing stops shall be of the details shown on window manufacturers' standard drawings and made of extruded aluminum sections. All glazing stops to be accurately and carefully fitted and fastened with low round head aluminum screws.

Finish

6. Casements shall have natural extruded aluminum finish, brushed and dipped in cleaning bath before leaving the factory.

Note: Sandblast or highly polished and lacquered finish may be specified if desired.

Hardware

7. Hinged casements shall be hung on specially designed aluminum friction hinges constructed with non-corrosive parts. All friction hinges to be securely welded to frame and ventilator members.

Note: Where friction hinges are not desired, specify cadmium-plated bronze hinges and white bronze sill adjusters. Sill adjusters shall be substantially made and shall hold the window at various angles of opening.

8. Where projected ventilators occur, all parts of projected movement shall be made of special alloy aluminum.

9. All hardware shall be white bronze attached with white bronze screws. Strike wedges are white bronze. All hardware shall have dull finish, lacquered.

Calking Cement (See page 1)

10. The window manufacturer shall furnish non-staining elastic calking cement (as indicated on window manufacturers' standard details) in quantities sufficient to make head, sill, jambs, mullions and imposts weathertight. Wooden filler-strips shall be furnished and used where indicated on details.

Erection (See page 1)

11. All Aluminum Casements shall be erected in prepared openings by the window contractor.

12. They shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions and imposts shall be bolted securely to frames. Calking cement and wooden filler-strips shall be neatly applied at points indicated on window manufacturers' standard details.

Note: Include in the masonry specifications that all masonry openings shall be accurately constructed in accordance with the installation details for Aluminum Casements. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

Glass and Glazing

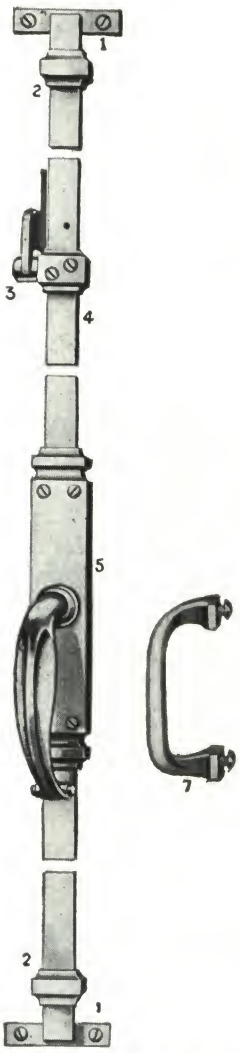
Note: (See also pages 1 and 4.) Specify glass and glazing under proper heading elsewhere in general specifications of other trades.

(a) Do not specify single thickness glass.
(b) Specify a high grade metal casement putty.
(c) Specify that aluminum casements shall be glazed from the inside, the glass set in a bed of putty and held by the Lupton aluminum glazing stops.

Continued on next page

HARDWARE FOR ALUMINUM CASEMENTS

Hardware is white bronze with dull, lacquered finish unless noted otherwise



Cremone Bolt for Double Casements

Consists of the following:

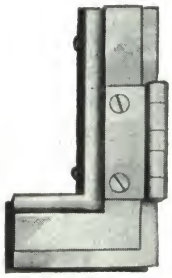
1. Keeper used at top and bottom of swing-out casements.
2. Bar Guide (spaced approx. 1 ft. 0 in. apart).
3. Center Latch and Keeper (spaced approx. 2 ft. 0 in. apart).
4. Bar, ½x¼ in.
5. Handle and Case
7. Pull Handle



Cam Handle

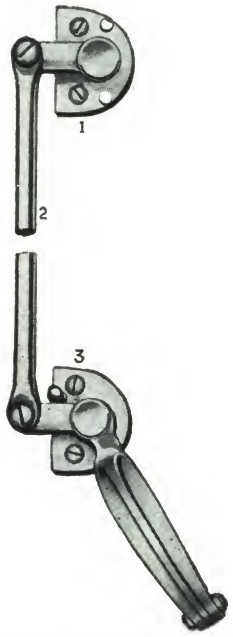
No. 433 shown (opposite hand No. 434)

Used on side-hinged casements up to 4 ft. 0 in. high



Butt Hinge

Bronze with Cadmium or nickel-plating

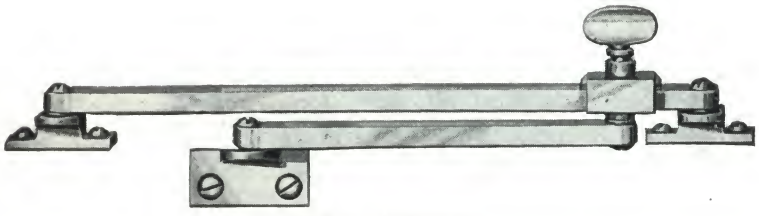


Double Locking Device

Used on side-hinged casements, over 4 ft. 0 in. and up to 8 ft. 0 in. high. Consists of the following:

1. Auxiliary Latch No. 437.
2. ½ in. White Bronze Tube.
3. Cam Handle No. 435 shown (opposite hand No. 436).

Triple Locking Device for use on casements over 8 ft. 0 in. high is similar, with an additional auxiliary latch.



Sliding Adjuster

For Swing-out casements. Used with butt hinges

Continued on next page

HARDWARE FOR ALUMINUM CASEMENTS

Hardware is white bronze with dull, lacquered finish unless noted otherwise.



Ring Handle No. 432

For Projected-Out-at-Bottom ventilators beyond reach from floor.

Also used in Aluminum Pivoted and Commercial Projected Windows described on page 93



Ring Handle No. 429

For Projected-In-at-Top ventilators beyond reach from floor



Pull-Down Ring No. 439

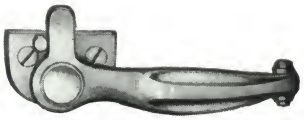
Used at top of Projected-Out-at-Bottom ventilators



Cam Handle

No. 430 shown (opposite hand No. 431)

Used at bottom of Projected-Out-at-Bottom ventilators within reach from floor. One handle used for ventilators up to 3 ft. 6 in. wide, two handles for wider ventilators



Cam Handle

No. 427 shown (opposite hand No. 428)

Used at top of Projected-In-at-Top ventilators within reach from floor. One handle used for ventilators up to 3 ft. 6 in. wide. Two handles used for wider ventilators.

Also used with Aluminum Commercial Projected Windows described on page 93



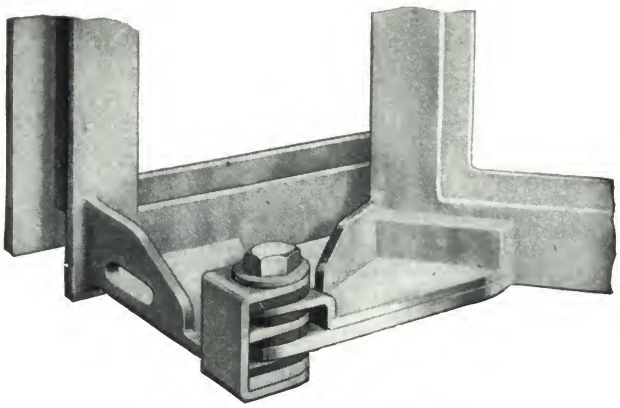
Spring Catch No. 422

Used at top of Projected-In-at-Top ventilators beyond reach from floor as an alternate to the Ring Handle No. 429.

Also used for Aluminum Commercial Projected Windows, described on page 93

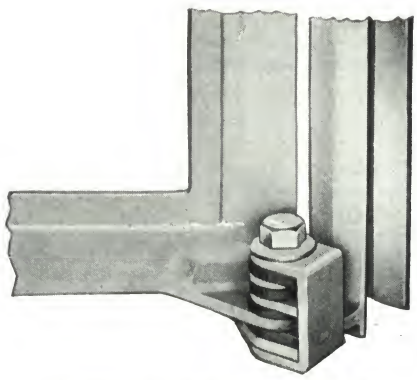
Friction Hinges

Friction hinges of aluminum plate hold casements at any degree of opening up to 180° and eliminate the need of sliding adjusters. Made in two types, close up and extended, and attached securely to ventilator and frame by welding.



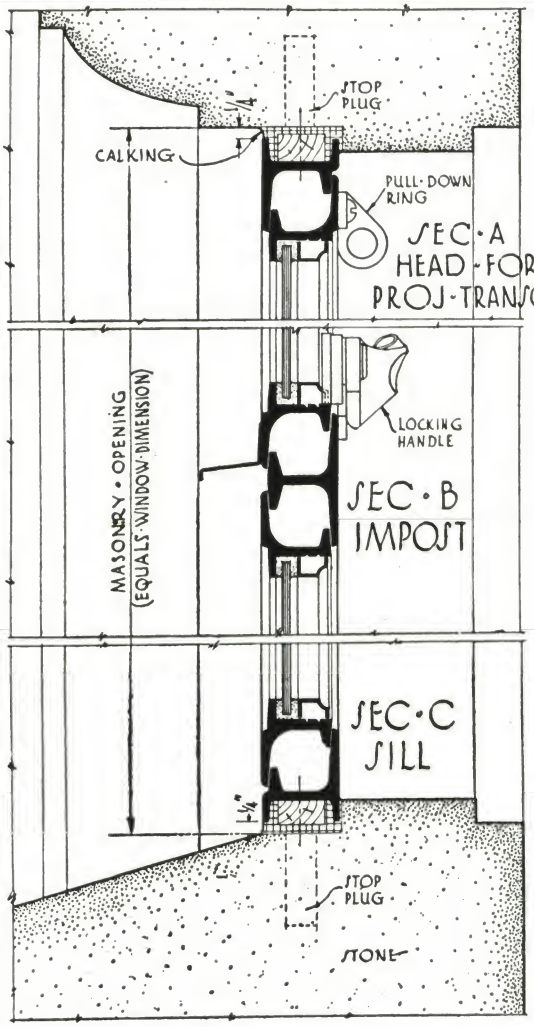
Extended Type Friction Hinge

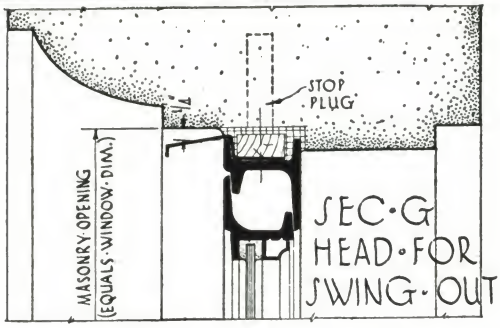
This hinge permits cleaning window from inside the building

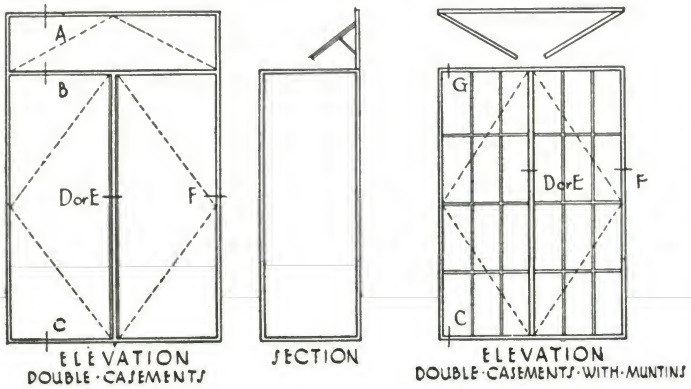


Close-up Type Friction Hinge

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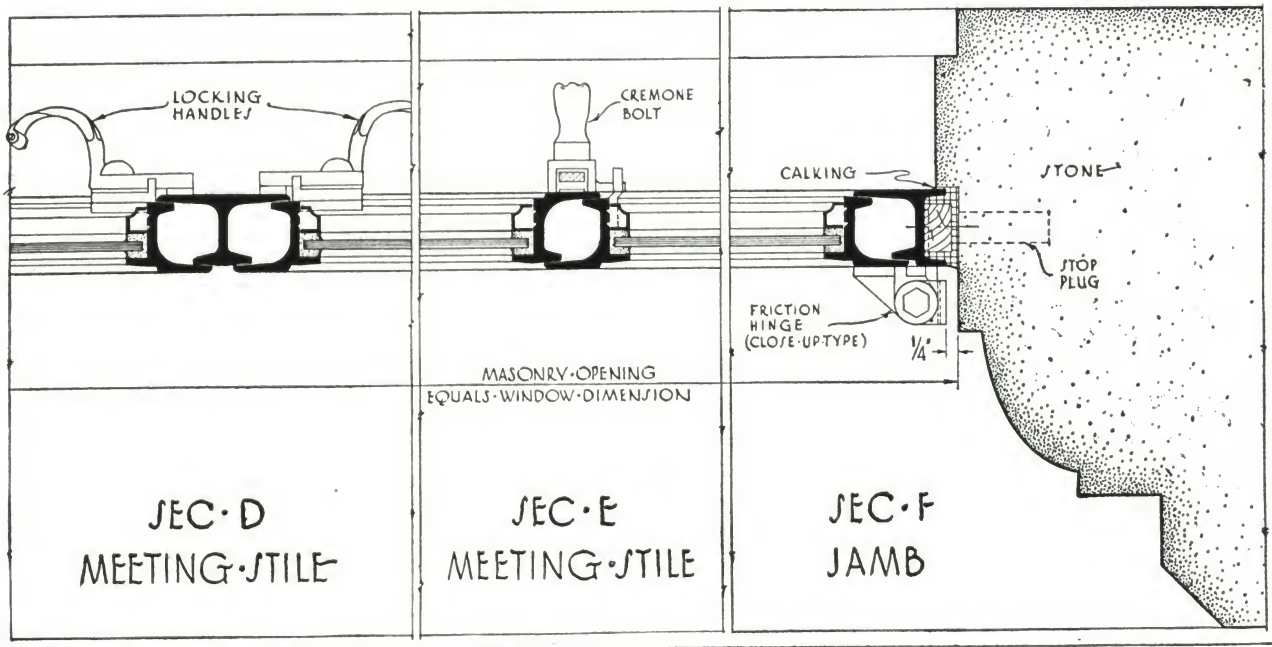


MAXIMUM SIZES

Projected Out at Bottom		4'-6" wide	x 2'-6" high
Side Hinged Casements	Single	2'-9" "	x 8'-0 "
	Double	5'-6" "	x 8'-0 "

HARDWARE

See pages 27 and 28. All locking hardware is white bronze, dull finish. Single casements have locking handles. Double or triple locking device is furnished when casement is more than 4'-0" high.
Double casements may have locking handles as in Sec. D or cremone bolt as in Sec. E.
Projected transoms beyond reach have ring-type locking handles.



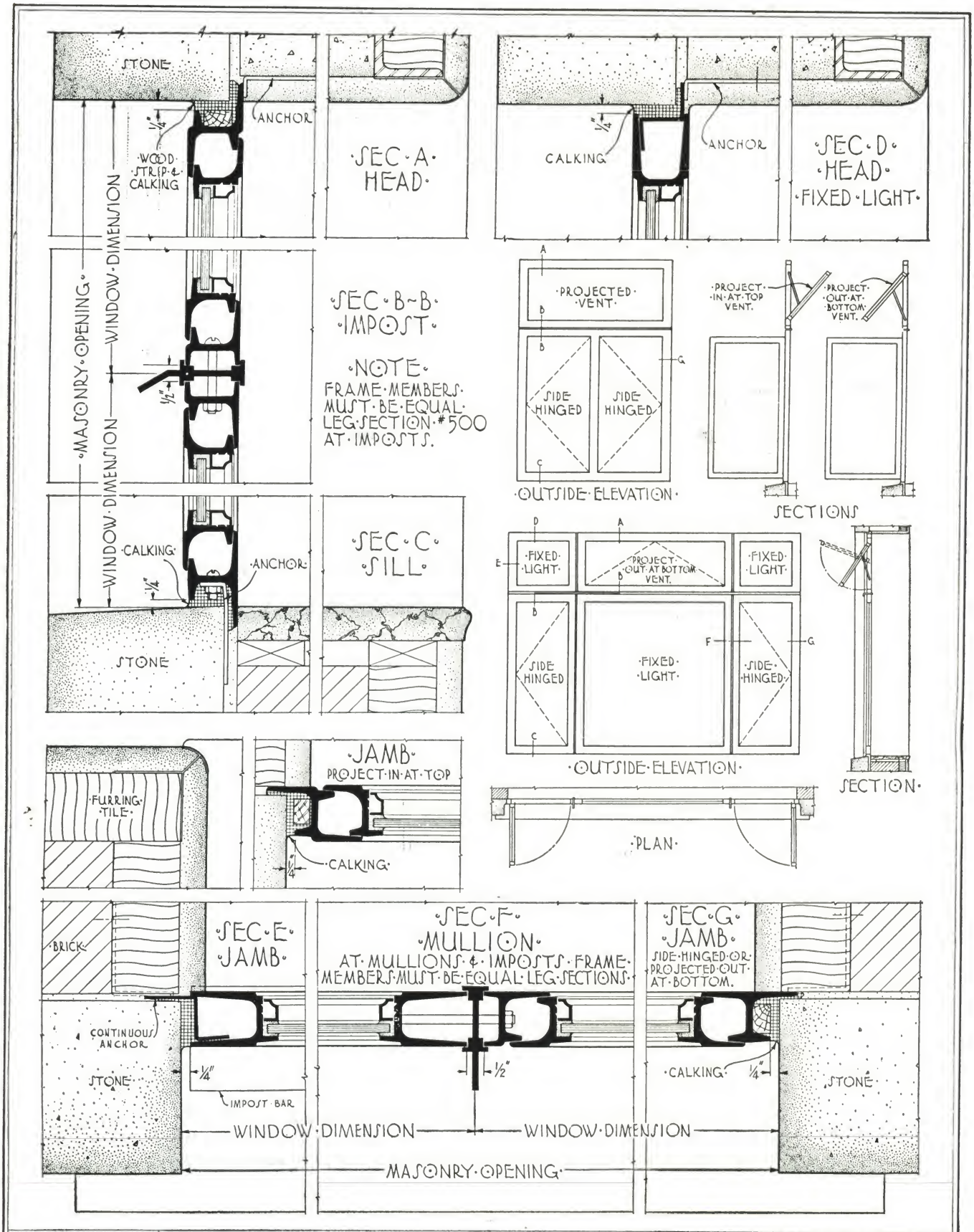
SCALE FOR·DETAILS 3" = 1'-0"

HINGED·CASEMENTS

LUPTON·ALUMINUM·CASEMENTS

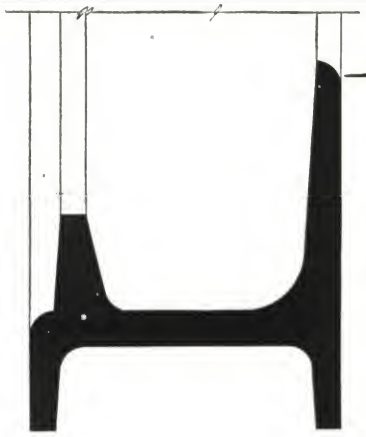
PLATE·NO. AA-1 AUGUST·1930

Continued on next page



SCALE FOR DETAILS 3" = 1'-0"	COMPOSITE WINDOWS LUPTON ALUMINUM CASEMENTS	PLATE NO. AA-2 AUGUST 1930

Continued on next page



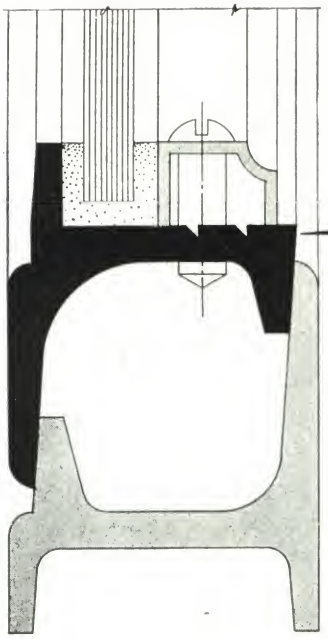
SECTION · 500

FRAME · MEMBER · FOR INSTALLATIONS · IN · CUT STONE · TRIM · OR · METAL SUB - FRAMES.



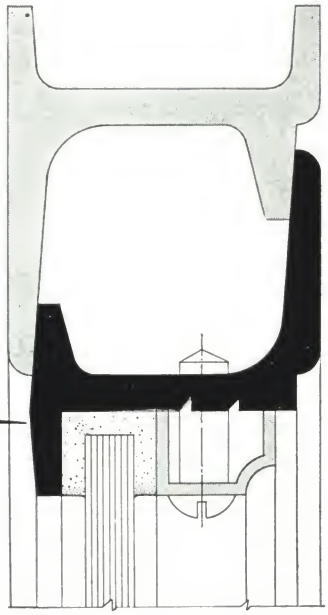
CONTINUOUS · FIN

ALUMINUM · FIN · USED WITH · EQUAL · LEG · FRAME · MEMBER FOR · INSTALLATION · IN · BRICK, STONE · VENEER · OR · SIMILAR CONSTRUCTION



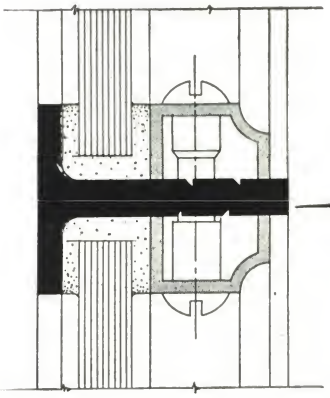
SECTION · 501

SHOWN · IN · COMBINATION WITH · SEC · 500 · ARRANGED FOR SWING · OUT · CASEMENTS



SECTION · 502

SHOWN · IN · COMBINTION · WITH SEC · 500. AT · HEAD · OF · A · PRO - JECTED · OUT · AT · BOTTOM CASEMENTS · OR · PROJECTED IN · AT TOP · CASEMENTS.

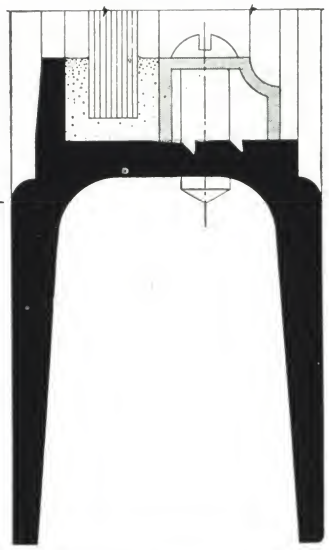


SECTION · 503

FRAME · MEMBER · FOR STATIONARV · UNITS

SECTION · 504

HORIZONTAL · OR · VERTICAL MUNTIN.

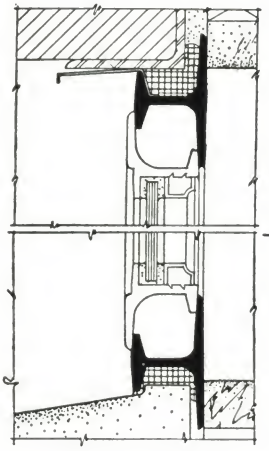


SCALE FULL · SIZE	FULL · SIZE · SECTIONS LUPTON · ALUMINUM · CASEMENTS	PLATE · NO AA - 3 AUGUST · 1930

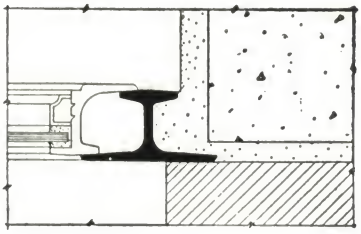
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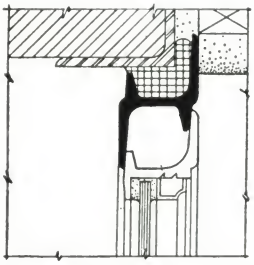


SECTION · 505
USED · AS · A · MEETING · STILE · BETWEEN
TWO · VENTILATORS

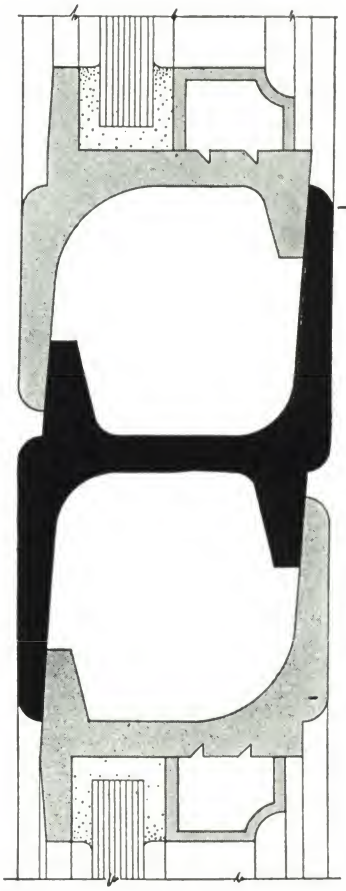


SECTION · 505
USED · AS · FRAME · MEMBER
LONG · LEG · INSIDE · FOR
HEAD · OR · SILL ·
LONG · LEG · OUTSIDE
FOR · JAMBS ·

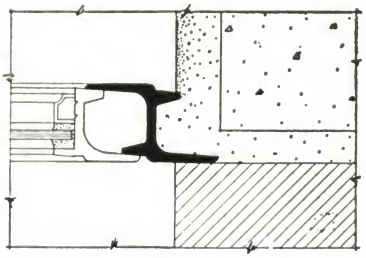




SECTION · 506
USED AS · FRAME
MEMBER · LONG
LEG INSIDE AT
HEAD · // // // // // //
(PROJECTED · OUT
AT · BOTTOM · VENT)



SECTION · 506
USED · AS · A · MEETING · RAIL
BETWEEN · TWO · VENTILATORS



SECTION · 506
USED · AS · A · FRAME
MEMBER · LONG · LEG
OUTSIDE AT · JAMB

SCALE FULL · SIZE	FULL · SIZE · SECTIONS LUPTON · ALUMINUM · CASEMENTS	PLATE · NO. AA-4 AUGUST · 1930

Continued on next page

LUPTON STEEL WINDOWS FOR STANDARD SIZE OPENINGS

Applying to Casements the principles of standardization approved by the U. S. Department of Commerce, Lupton has designed three general types of outside glazed casements, in a wide range of standard sizes.

These casements are available at moderate cost for use in office buildings, hotels, apartment houses, hospitals and similar high grade structures.

Ventilators are of the projected type. A friction shoe holds them at any reasonable degree of opening eliminating sill hardware. Metal screens are designed to be attached to windows where screening is desired.

Note: The Combination and In-at-Top Projected Casements described on this and following pages; the Architectural Projected Windows described on pages 66 to 71; and the Double Hung Windows described on pages 72 to 75 are all made in the same 50 standard sizes.

Lupton Combination Projected Casements

These windows, by their unique design, bring a new high standard of natural ventilation to multiple-story buildings. They are the only windows that afford such positive air control. A horizontal inward-opening ventilator located at the bottom of the window admits fresh air without draft.

Above, forming the upper portion of the window, are two side-projected ventilators. By closing one of these and slightly opening the other against the breeze, an air movement is induced which siphons used air out of the window.

Thus, Lupton Combination Casements provide easily controlled, balanced ventilation through every window opening.

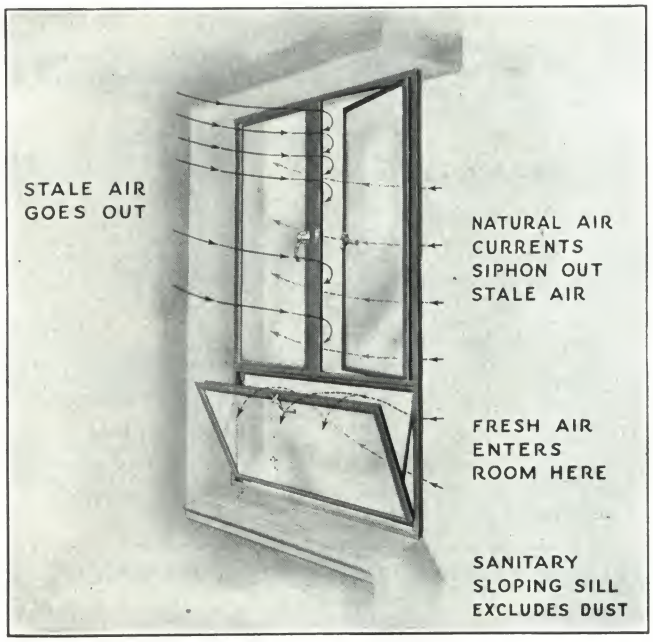


Diagram Showing How Lupton Combination Casements Assure Balanced Ventilation

Dotted arrows show natural fresh-air currents. Solid arrows show stale air moving outward by means of siphon action fully described in text

Lupton Single Casements—Details of these windows are the same as in the Lupton Combination Casements and have the same structural and 100% ventilation advantages. They offer an almost limitless number of arrangements and opening sizes when used in any of the many combinations of which they are capable, both in the horizontal and vertical positions.

Lupton Projected-In-at-Top Casements

Maintenance of strict privacy, adequate ventilation without draft and abundant lighting are features of these windows.

They are particularly desirable for medical institutions, art museums, hospitals, solariums and similar buildings.

SPECIFICATION FOR LUPTON PROJECTED CASEMENT WINDOWS

Work Included

1. Furnish and install where shown on drawings, Lupton Steel Projected Casement Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Materials

2. Ventilator and frame members shall be made of copper-bearing, rust-resisting steel, specially rolled in solid, one-piece sections.

3. Vertical Mullions shall be of 13 gauge plate, formed.

4. Imposts shall be of ⅜ in. thick, steel plate, with a 14 gauge galvanized weathering member.

5. Glazing clips for lights larger than 336 sq. in. shall be angle clips 2 in. long of 20 gauge galvanized steel, held in place by low round head steel machine screws.

*Smaller lights shall have rustproofed wire glazing clips.

**Note:* All standard units are furnished with angle clips.

***Note:** See List of Extras at end of specification.*

Construction

6. All Projected Casements shall be designed for outside glazing.

7. All Projected Casement Windows shall be straight and true, members in alignment and surfaces in a plane.

8. Three sides of the ventilator shall be made of bars weighing not less than 1.7 lbs. per ft. and the remaining side of a bar weighing not less than 1.82 lbs. per ft. Frames shall be made of bars weighing not less than 2.14 lbs. per ft.

9. At the corners and joints of the frames and ventilators the members shall be mitered or notched, framed together and heavily welded so as to make a rigid, tight connection.

Exposed, welded surfaces shall be ground flush with members. The frame and ventilator shall form a two-point, flat, continuous, weathering contact.

10. Mullions and bolts for attachment shall be provided where two or more windows are placed side by side.

11. Imposts and bolts for attachment shall be provided where two or more windows are placed one above the other.

12. At the head of all Projected-Out-at-Side Ventilators a 16 gauge formed steel, hot galvanized, weather bar shall be used.

Continued on next page

13. Fins of 13 gauge steel for Head and Jambs shall be furnished, shipped unattached and applied in the field.

Note: See List of Extras at end of specification.

14. Anchor Clips of 13 gauge steel for Head, Jambs and Sill shall be furnished and applied in field.

15. Muntins shall be T bar section, tenoned and riveted to frame or ventilator members, notched and welded at intersections with exposed surfaces of weld ground flush.

Note: See List of Extras at end of specification.

Note: Muntins are not standard but may be had if specified at added cost.

16. Ventilators shall be accurately pivoted on two ventilator arms of solid steel. The two ventilator arms shall be attached to the ventilator and frame members by malleable iron arm blocks with brass pivot pins and washers. Ventilators shall be equipped with two bronze friction shoes, sliding in the outside frame member so as to guide the ventilator and prevent rattling. The friction shoes shall be equipped with a rustproof steel spring and adjusting screw, so designed to insure constant friction and hold the ventilator in an open position without the use of fasteners or adjusters.

Hardware

17. All Handles, Latches and Pull Down Rings shall be solid bronze with natural bronze finish. All hardware (listed below) shall be fitted in the shop and shipped unattached, carefully packed to prevent damage until applied for use.

Note: The following hardware is standard:

For Projected-Out-at-Side Ventilators

Bronze Cam Handle—for ventilators in windows less than 4 ft. 6 in. in height.

Double Locking Device—for ventilators in windows 4 ft. 6 in. or more in height.

For Projected-In-at-Top Ventilators

Bronze Cam Handle—for ventilators within reach from floor, one handle on windows up to 3 ft. 6 in. wide; two handles on windows over 3 ft. 6 in. wide.

Bronze Ring Type Cam Handle—for ventilators beyond reach from floor.

For Projected-Out-at-Bottom Ventilators

Pull Down Ring and Ring Type Cam Handle for pole operation.

Calking Cement (See Page 1)

18. The window manufacturer shall furnish non-staining elastic calking cement and wooden filler-strips for mullions and imposts as shown in window manufacturer's standard details.

Note: See List of Extras at end of specification.

Erection (See Page 1)

19. All Projected Casement Windows shall be erected in prepared openings by the window contractor (unless otherwise specified).

20. All Projected Casement Windows shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions and Imposts (and continuous fins if specified) shall be bolted securely to windows. Calking cement and wooden filler-strips shall be neatly applied at mullions and imposts as shown on window manufacturer's standard details.

Note: See List of Extras at end of specification.

Note: Include in the masonry specifications that all masonry openings shall be accurately constructed in accordance with the installation details for Projected Casement Windows. Note that when the continuous fins are built in the masonry, the placing of the furring tile at the Jambs must be delayed until after the windows are set. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

Painting

21. All Projected Casement Windows shall receive one coat of manufacturers' standard dark gray paint, oven-dried.

Note: See page 1.

Glass and Glazing

Note: (See also pages 1 and 4.) Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel casement putty (ordinary wood sash putty must not be used).

(c) Specify that all Steel Projected Casements shall be glazed from the outside, the glass set in a bed of putty and held by angle glazing clips.

See List of Extras below.

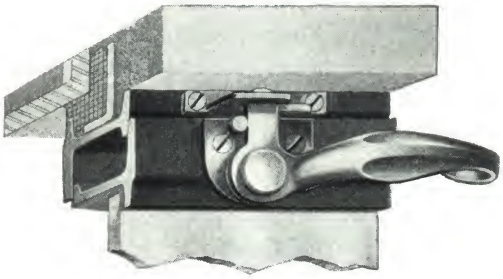
LIST OF EXTRAS

The following are furnished when specified at an added cost.

1. Continuous 13 gauge steel fins for head and jambs.
2. Non-staining elastic calking cement.
3. Application of calking cement at time of erection as shown on our standard details.
4. Continuous Glazing Angles to be substituted for Glazing clips. These glazing angles are made of hot rolled steel angle section $\frac{7}{16} \times 1\frac{3}{4} \times \frac{1}{8}$ in. They are cut in standard lengths with mitered ends, shipped loose and attached by the glazing contractor with the round head, udylited, steel machine screws supplied for the purpose.
5. Muntins.

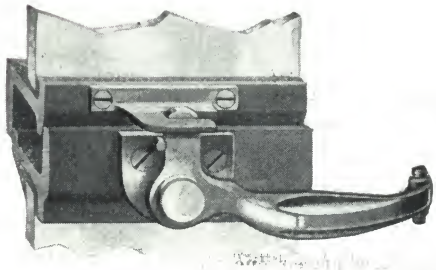
HARDWARE FOR LUPTON PROJECTED CASEMENT WINDOWS

All Handles and Latches Are Solid Bronze with Natural Bronze Finish



Ring Type Cam Handle No. 330

Used at center of Projected-In-at-Top Ventilators beyond reach from floor. For pole operation.



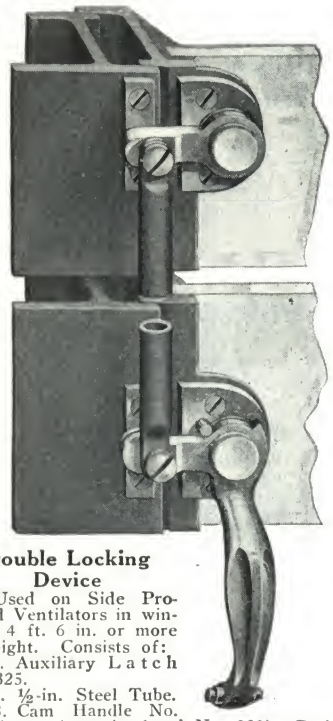
Cam Handle

No. 311 shown (opposite hand No. 312) Used on Projected-In-at-Top Ventilators within reach from floor. One handle for windows up to 3 ft. 6 in. wide. Two handles for windows over 3 ft. 6 in. wide.



Cam Handle

No. 315 shown (opposite hand No. 316) Used on Side Projected Ventilators in windows less than 4 ft. 6 in. in height. Mounted on Steel Backing Plate No. 2238 welded to frame of ventilator



Double Locking Device

Used on Side Projected Ventilators in windows 4 ft. 6 in. or more in height. Consists of:

1. Auxiliary Latch No. 325.
2. ½-in. Steel Tube.
3. Cam Handle No. 322 shown (opposite hand No. 323). Both Auxiliary Latch and Cam Handle are mounted on Steel Backing Plates No. 2238 welded to frame of ventilator

Continued on next page

COMBINATION • PROJECTED • CASEMENTS
100 PER • CENT • VENTILATED
• STANDARD • TYPES • AND • SIZES •

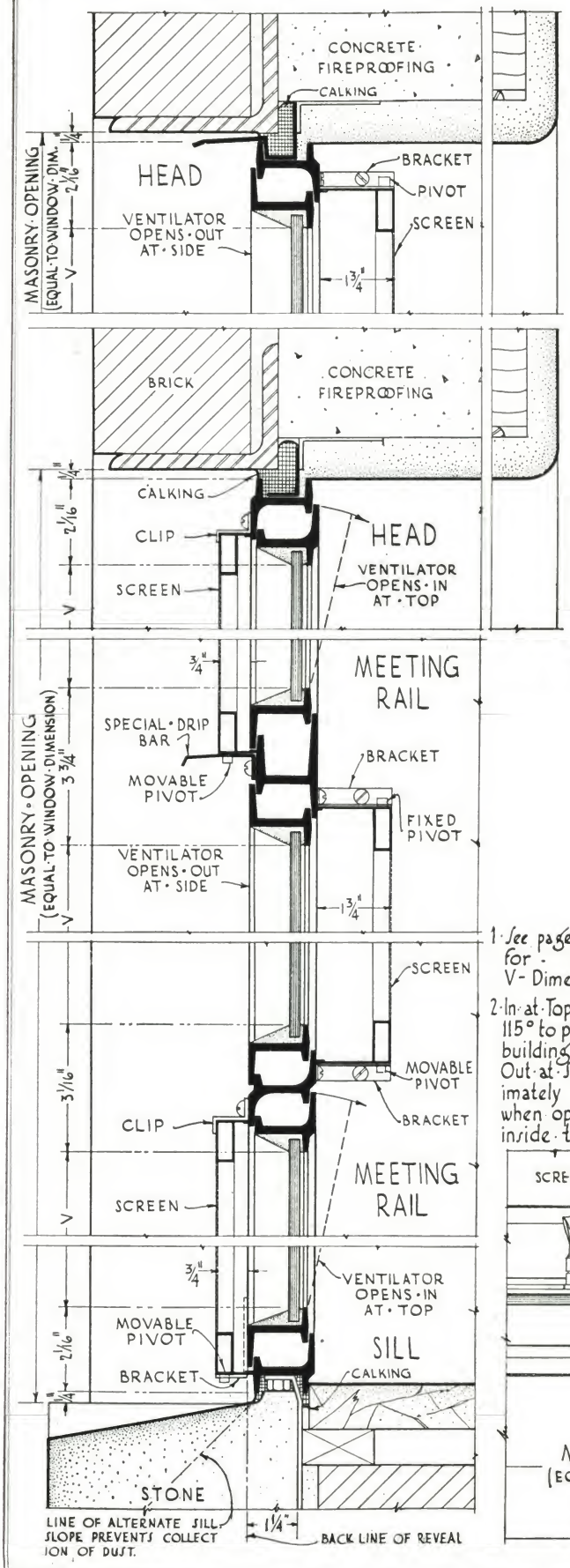
WINDOW DIMENSION	GLASS SIZE	* 3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	V—DIMEN. SEE DETAILS FOR MEASURE POINTS
		15"	18"	21"	24"	27"	
		33¼"	39¼"	45¼"	51¼"	57¼"	
4' – 6"	50"	PS 3046	PS 3646	PS 4046	PS 4646	PS 5046	4' – 1⅜"
5' – 0"	56"	PS 3050	PS 3650	PS 4050	PS 4650	PS 5050	4' – 7⅜"
5' – 6"	41¾"	PST 3056	PST 3656	PST 4056	PST 4656	PST 5056	3' – 5 5/32"
	17¾"						1' – 5 5/32"
6' – 0"	47¾"	PST 3060	PST 3660	PST 4060	PST 4660	PST 5060	3' – 11 5/32"
	17¾"						1' – 5 5/32"
6' – 6"	53¾"	PST 3066	PST 3666	PST 4066	PST 4666	PST 5066	4' – 5 5/32"
	17¾"						1' – 5 5/32"
7' – 0"	53¾"	PST 3070	PST 3670	PST 4070	PST 4670	PST 5070	4' – 5 5/32"
	23¾"						1' – 11 5/32"
7' – 6"	19"	PST 3076	PST 3676	PST 4076	PST 4676	PST 5076	1' – 6 23/64"
	41¾"						3' – 5 5/32"
	19 5/8"						1' – 7 3/64"
8' – 0"	19"	PST 3080	PST 3680	PST 4080	PST 4680	PST 5080	1' – 6 23/64"
	47¾"						3' – 11 5/32"
	19 5/8"						1' – 7 3/64"
8' – 6"	19"	PST 3086	PST 3686	PST 4086	PST 4686	PST 5086	1' – 6 23/64"
	53¾"						4' – 5 5/32"
	19 5/8"						1' – 7 3/64"
9' – 0"	25"	PST 3090	PST 3690	PST 4090	PST 4690	PST 5090	2' – 0 23/64"
	53¾"						4' – 5 5/32"
	19 5/8"						1' – 7 3/64"

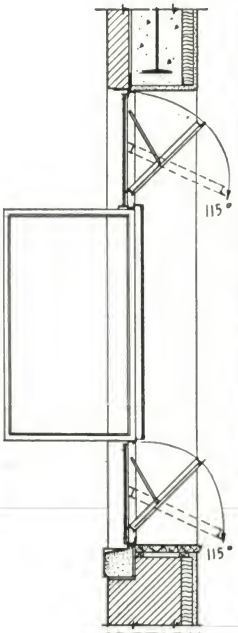
*Window Dimension equals the Masonry Opening required for one unit.

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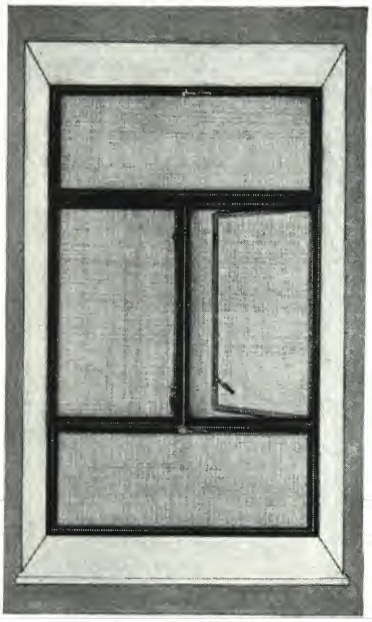
COMBINATION PROJECTED · CASEMENTS 100 · PER · CENT · VENTILATED

SCALE · FOR · DETAILS 3" = 1'-0"



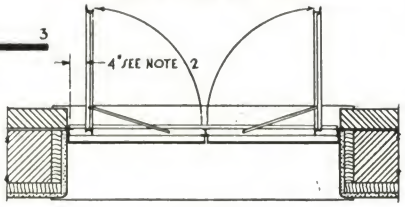


SECTION



INSIDE · ELEVATION

SCALE

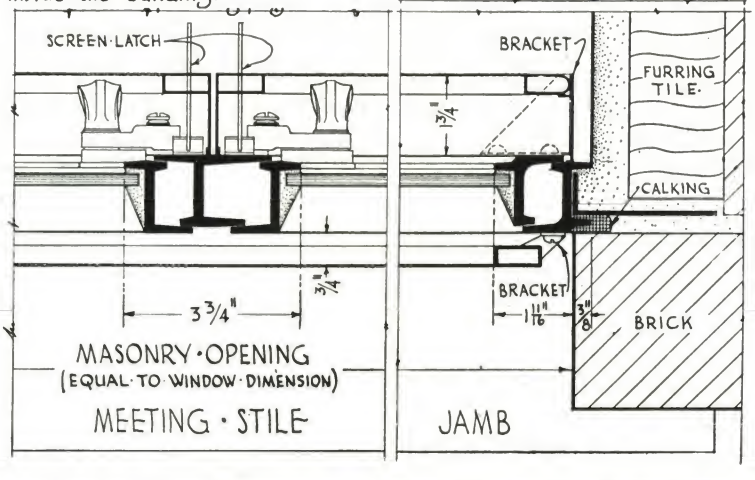


PLAN

· NOTES ·

1 · See page references at bottom of page for · Full Size Sections.
V - Dimensions and Mullion Details.

2 · In · at · Top ventilators open approximately 115° to permit cleaning from inside the building.
Out · at · Side ventilators have approximately 4 inches clearance at jamb when open to permit cleaning from inside · the · building.



Full Size Sections on pages 46 and 47
V Dimensions on page 35
Mullion Details on pages 40 and 45

Continued on next page

PROJECTED • CASEMENTS
100PER•CENT•VENTILATED-IN•AT•TOP
• STANDARD•TYPES•AND•SIZES•

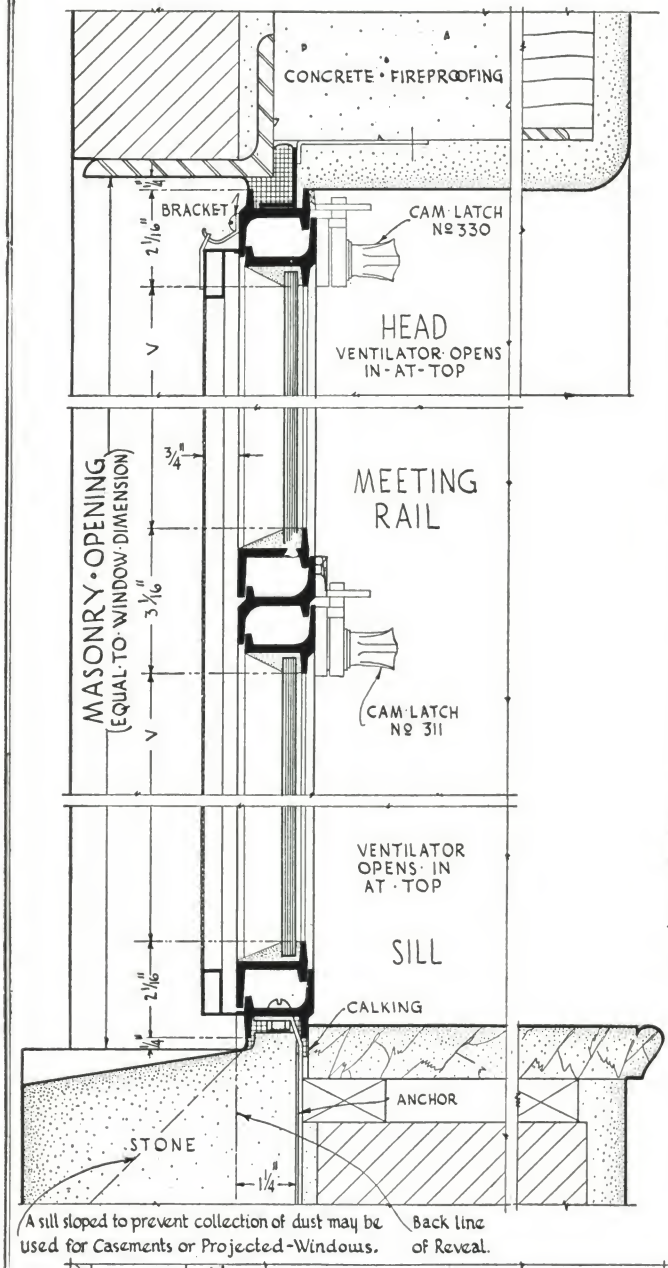
WINDOW DIMENSION *	GLASS SIZE	3'-0" / 33¼"	3'-6" / 39¼"	4'-0" / 45¼"	4'-6" / 51¼"	5'-0" / 57¼"	V–DIMEN. SEE DETAILS FOR MEASURE POINTS
4'–6"	23¾"	PT·3046	PT·3646	PT·4046	PT·4646	PT·5046	1'–11 5/32"
	23¾"						1'–11 5/32"
5'–0"	17¾"	PT·3050	PT·3650	PT·4050	PT·4650	PT·5050	1'–5 5/32"
	17¾"						1'–5 5/32"
	15½"						1'–2 15/16"
5'–6"	19 5/8"	PT·3056	PT·3656	PT·4056	PT·4656	PT·5056	1'–7 3/64"
	19 5/8"						1'–7 3/64"
	17¾"						1'–5 5/32"
6'–0"	22 5/8"	PT·3060	PT·3660	PT·4060	PT·4660	PT·5060	1'–10 3/64"
	22 5/8"						1'–10 3/64"
	17¾"						1'–5 5/32"
6'–6"	25 5/8"	PT·3066	PT·3666	PT·4066	PT·4666	PT·5066	2'–1 3/64"
	25 5/8"						2'–1 3/64"
	17¾"						1'–5 5/32"
7'–0"	25 5/8"	PT·3070	PT·3670	PT·4070	PT·4670	PT·5070	2'–1 3/64"
	25 5/8"						2'–1 3/64"
	23¾"						1'–11 5/32"
7'–6"	19 5/8"	PT·3076	PT·3676	PT·4076	PT·4676	PT·5076	1'–7 3/64"
	19 5/8"						1'–7 3/64"
	19 5/8"						1'–7 3/64"
	19 5/8"						1'–7 3/64"
8'–0"	19 5/8"	PT·3080	PT·3680	PT·4080	PT·4680	PT·5080	1'–7 3/64"
	22 5/8"						1'–10 3/64"
	22 5/8"						1'–10 3/64"
	19 5/8"						1'–7 3/64"
8'–6"	19 5/8"	PT·3086	PT·3686	PT·4086	PT·4686	PT·5086	1'–7 3/64"
	25 5/8"						2'–1 3/64"
	25 5/8"						2'–1 3/64"
	19 5/8"						1'–7 3/64"
9'–0"	25 5/8"	PT·3090	PT·3690	PT·4090	PT·4690	PT·5090	2'–1 3/64"
	25 5/8"						2'–1 3/64"
	25 5/8"						2'–1 3/64"
	19 5/8"						1'–7 3/64"

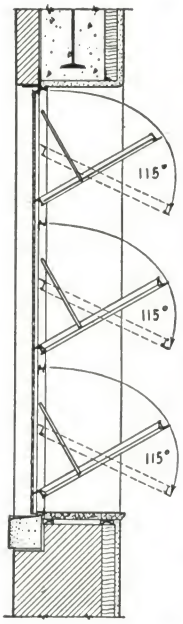
* Window Dimension equals the Masonry Opening required for one unit.

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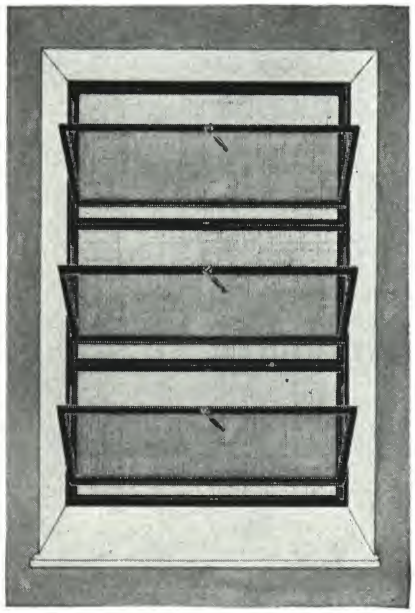
PROJECTED · CASEMENTS 100 PER · CENT · VENTILATED · IN · AT · TOP ·

SCALE · FOR · DETAILS ~ 3" = 1'-0"





SECTION

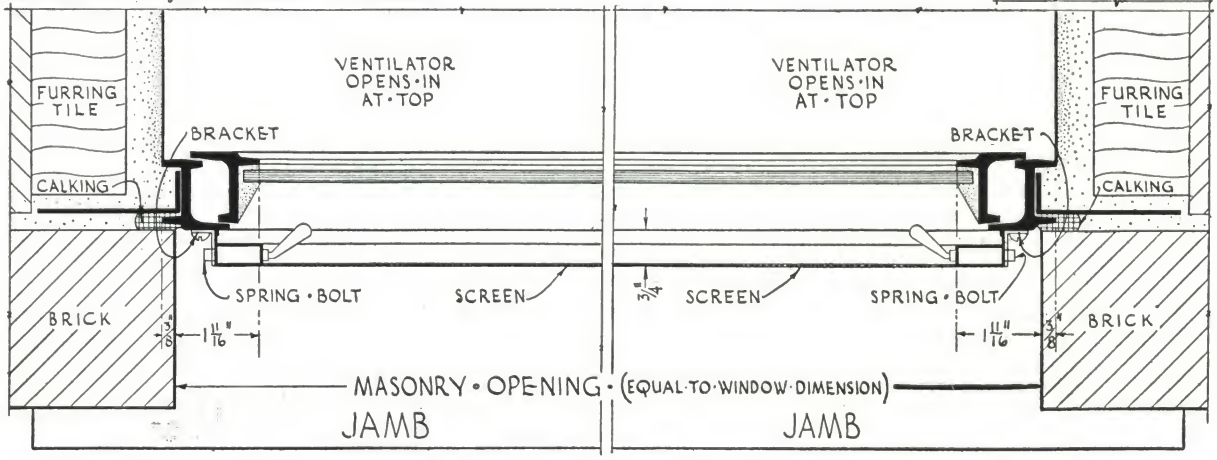


INSIDE · ELEVATION

SCALE 0 1 2 3 FT.

· NOTE ·

1. See page references at bottom of page for Full Size Sections, V· Dimensions, and Mullion Details.
2. Ventilators open approximately 115° to permit cleaning from inside the building



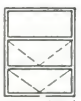
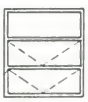
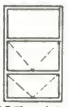
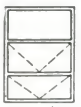
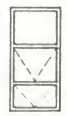
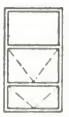
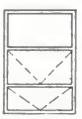
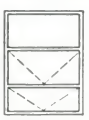
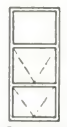
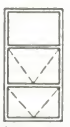
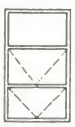
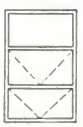
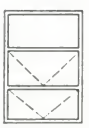
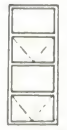
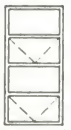
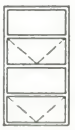
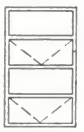
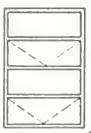
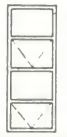
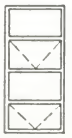
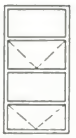
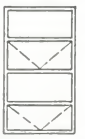
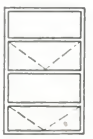
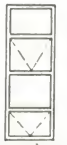
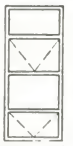
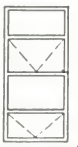
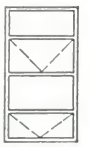
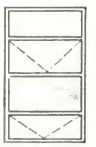
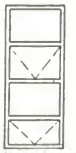
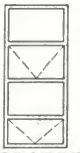
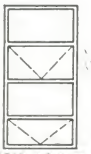
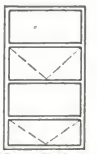
Full Size Sections on pages 46 and 47
V. Dimensions on page 37
Mullion Details on pages 40 and 45

LUPTON PAGE 38

Continued on next page

PROJECTED • CASEMENTS
PART • VENTILATED - IN • AT • TOP

LISTED • SPECIAL • TYPES • IN • STANDARD • SIZES

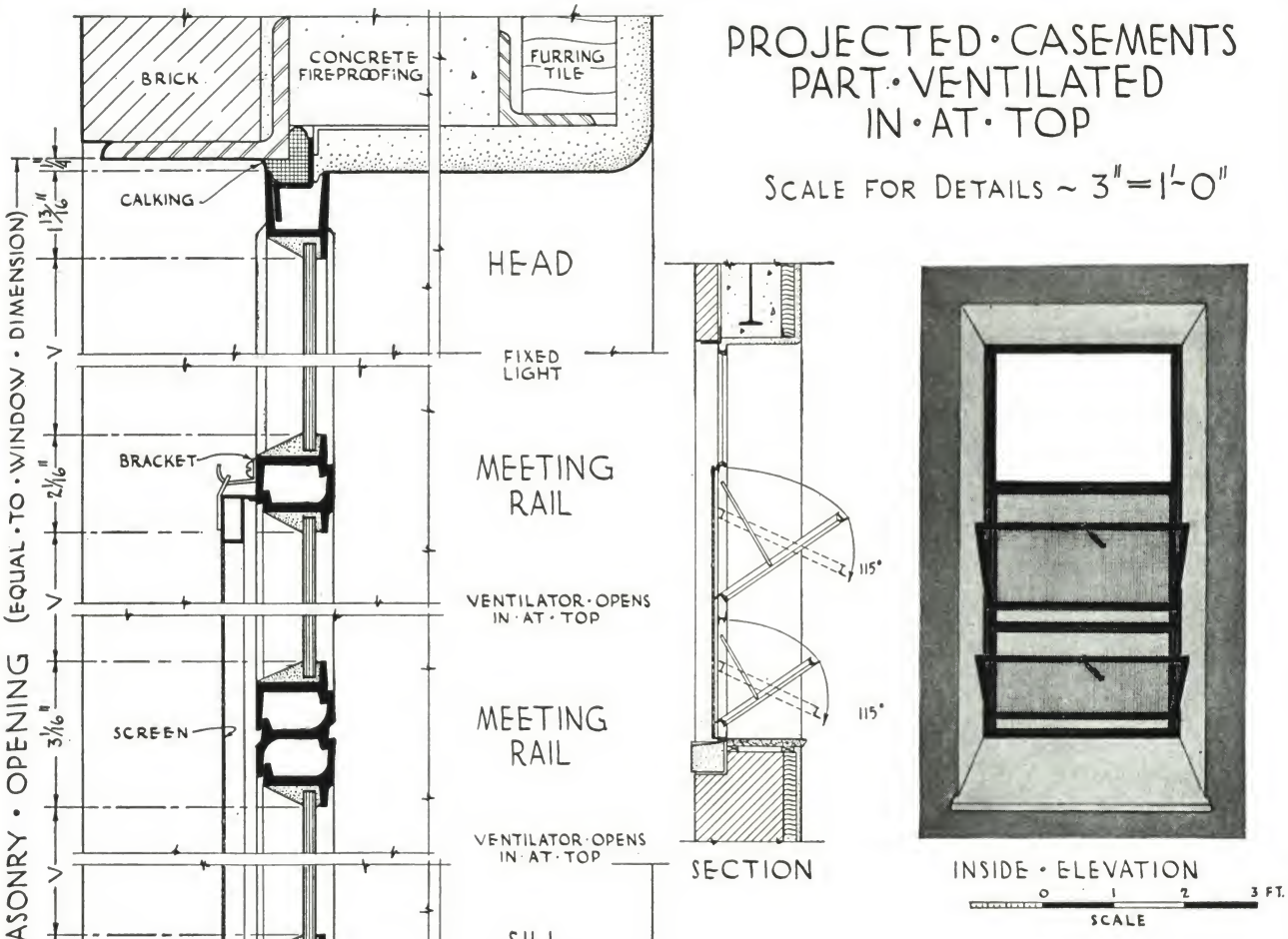
WINDOW DIMENSION * →		3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	V-DIMEN. SEE DETAILS FOR MEASURE-POINTS
GLASS SIZE →		33 1/4"	39 1/4"	45 1/4"	51 1/4"	57 1/4"	
4' – 6"	23 3/4"	 PT-3046	 PT-3646	 PT-4046	 PT-4646	 PT-5046	1' – 11 5/32"
	23 3/4						1' – 11 5/32"
5' – 0"	19"	 PPT-3050	 PPT-3650	 PPT-4050	 PPT-4650	 PPT-5050	1' – 6 13/32"
	17 3/4"						1' – 5 5/32"
	15 1/2"						1' – 2 15/16"
5' – 6"	20 7/8"	 PPT-3056	 PPT-3656	 PPT-4056	 PPT-4656	 PPT-5056	1' – 8 19/64"
	19 5/8"						1' – 7 3/64"
	17 3/4"						1' – 5 5/32"
6' – 0"	23 7/8"	 PPT-3060	 PPT-3660	 PPT-4060	 PPT-4660	 PPT-5060	1' – 11 19/64"
	22 5/8"						1' – 10 3/64"
	17 3/4"						1' – 5 5/32"
6' – 6"	26 7/8"	 PPT-3066	 PPT-3666	 PPT-4066	 PPT-4666	 PPT-5066	2' – 2 19/64"
	25 5/8"						2' – 1 3/64"
	17 3/4"						1' – 5 5/32"
7' – 0"	26 7/8"	 PPT-3070	 PPT-3670	 PPT-4070	 PPT-4670	 PPT-5070	2' – 2 19/64"
	25 5/8"						2' – 1 3/64"
	23 3/4"						1' – 11 5/32"
7' – 6"	20 7/8"	 PPT-3076	 PPT-3676	 PPT-4076	 PPT-4676	 PPT-5076	1' – 8 19/64"
	19 5/8"						1' – 7 3/64"
	21 5/8"						1' – 9 3/64"
	19 5/8"						1' – 7 3/64"
8' – 0"	20 7/8"	 PPT-3080	 PPT-3680	 PPT-4080	 PPT-4680	 PPT-5080	1' – 8 19/64"
	22 5/8"						1' – 10 3/64"
	24 5/8"						2' – 0 3/64"
	19 5/8"						1' – 7 3/64"
8' – 6"	20 7/8"	 PPT-3086	 PPT-3686	 PPT-4086	 PPT-4686	 PPT-5086	1' – 8 19/64"
	25 5/8"						2' – 1 3/64"
	27 5/8"						2' – 3 3/64"
	19 5/8"						1' – 7 3/64"
9' – 0"	26 7/8"	 PPT-3090	 PPT-3690	 PPT-4090	 PPT-4690	 PPT-5090	2' – 2 19/64"
	25 5/8"						2' – 1 3/64"
	27 5/8"						2' – 3 3/64"
	19 5/8"						1' – 7 3/64"

*Window Dimension equals Masonry Opening required for one unit

Continued on next page

PROJECTED · CASEMENTS PART · VENTILATED IN · AT · TOP

SCALE FOR DETAILS ~ 3" = 1'-0"

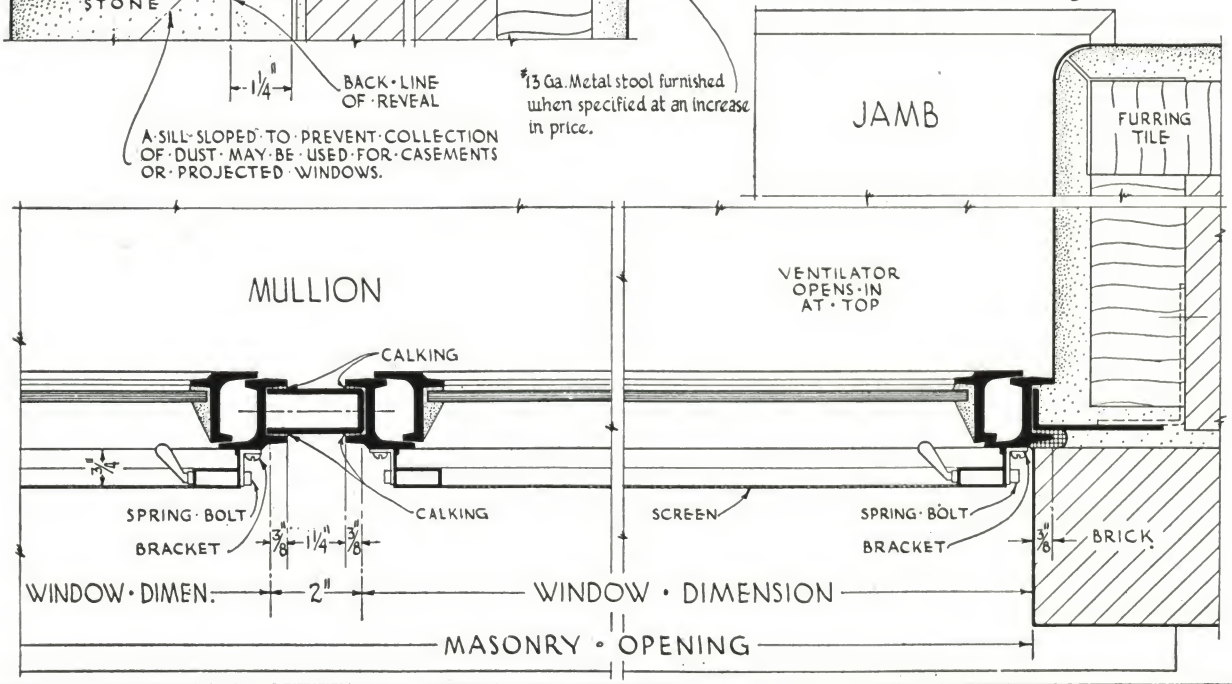


· NOTES ·

1. See page references at bottom of page for ~ Full Size Sections and V. Dimensions.
2. Ventilators open approximately 115° to permit cleaning from inside building.

*13 Ga. Metal stool furnished when specified at an increase in price.

A SILL SLOPED TO PREVENT COLLECTION OF DUST MAY BE USED FOR CASEMENTS OR PROJECTED WINDOWS.

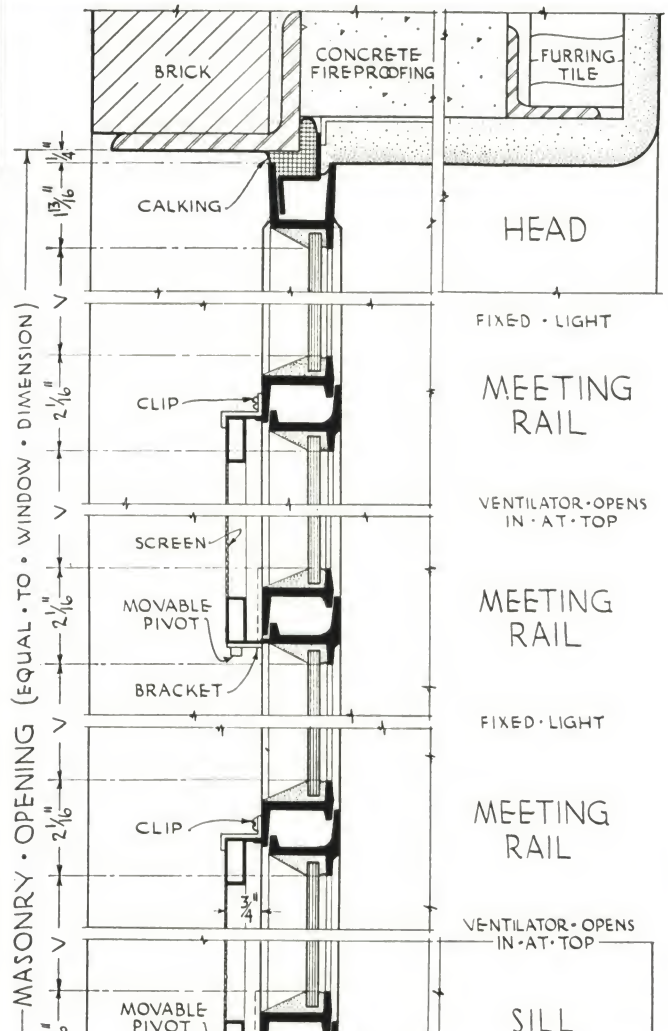


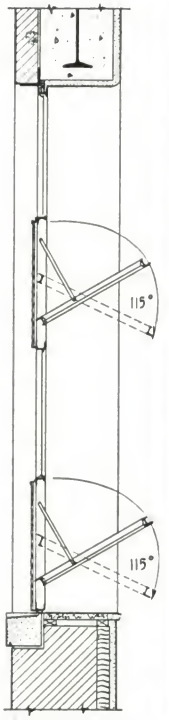
Full Size Sections on pages 46 and 47
V. Dimensions on page 39

Continued on next page

PROJECTED · CASEMENT PART · VENTILATED IN · AT · TOP

SCALE · FOR · DETAILS ~ 3" = 1'~0"



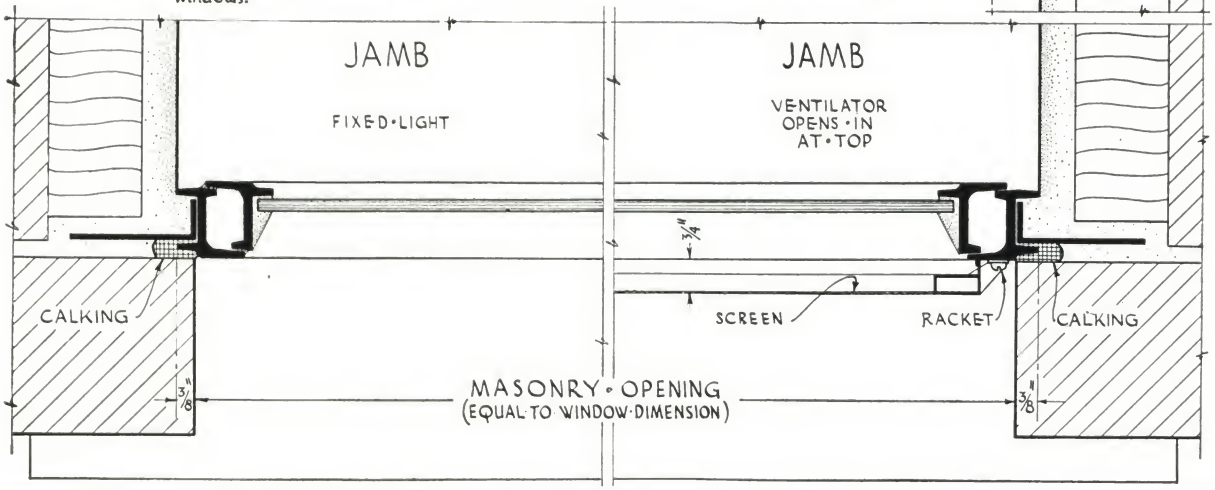




0 1 2 FT.
SCALE

NOTES

1. See page references at bottom of page for Full Size Sections, V-dimensions, and Mullion Details.
2. Ventilators open approximately 115° to permit cleaning from inside the building.



Full Size Sections on pages 46 and 47
V. Dimensions on page 39
Mullion Details on pages 40 and 45

Continued on next page

SINGLE • PROJECTED • CASEMENTS

STANDARD • TYPES • AND • SIZES

ALL • ELEVATIONS • SHOWN ON • THIS • PAGE • ARE — OUTSIDE • ELEVATIONS –

PROJECTED • OUT • AT • SIDE

WINDOW DIMENSION *	GLASS SIZE	1'-6"	1'-9"	2'-0" Left Hand Casement	2'-0" Right Hand Casement	2'-3"	2'-6"
		15¼"	18¼"	21¼"	21¼"	24¼"	27¼"
2'-0"	20"	PSL·1620 R·1620	PSL·1920 PSR·1920	PSL·2020	PSR·2020	PSL 2320 PSR 2320	PSL·2620 PSR·2620
2'-6"	26"	PSL·1626 PSR·1626	PSL·1926 PSR·1926	PSL·2026	PSR·2026	PSL·2326 PSR·2326	PSL·2626 PSR·2626
3'-0"	32"	PSL·1630 PSR·1630	PSL·1930 PSR·1930	PSL·2030	PSR·2030	PSL·2330 PSR·2330	PSL 2630 PSR·2630
3'-6"	38"	PSL·1636 PSR·1636	PSL·1936 PSR·1936	PSL·2036	PSR·2036	PSL·2336 PSR·2336	PSL·2636 PSR·2636
4'-0"	44"	PSL·1640 PSR·1640	PSL·1940 PSR·1940	PSL·2040	PSR·2040	PSL·2340 PSR·2340	PSL·2640 PSR·2640
4'-6"	50"	PSL·1646 PSR·1646	PSL·1946 PSR·1946	PSL·2046	PSR·2046	PSL·2346 PSR·2346	PSL·2646 PSR·2646
5'-0"	56"	PSL·1650 PSR·1650	PSL·1950 PSR·1950	PSL·2050	PSR·2050	PSL·2350 PSR·2350	PSL·2650 PSR·2650

PROJECTED • OUT • AT • BOTTOM

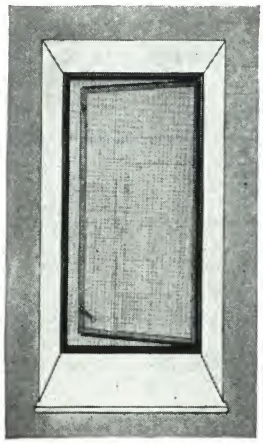
WINDOW * DIMENSION	GLASS SIZE	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"
		35¼"	41¼"	47¼"	53¼"	59¼"
1'-6"	14"	PB·3216	PB·3816	PB·4216	PB·4816	PB 5216
1'-9"	17"	PB·3219	PB·3819	PB 4219	PB·4819	PB·5216
2'-0"	20"	PB·3220	PB·3820	PB·4220	PB·4820	PB·5216

* Window Dimension equals the Masonry Opening required for one unit

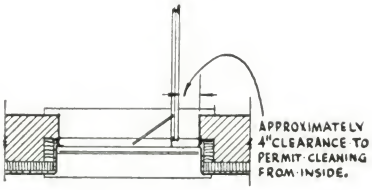
Continued on next page

SINGLE PROJECTED • CASEMENTS OUT • AT • SIDE

SCALE • FOR • DETAILS ~ 3" = 1'-0"

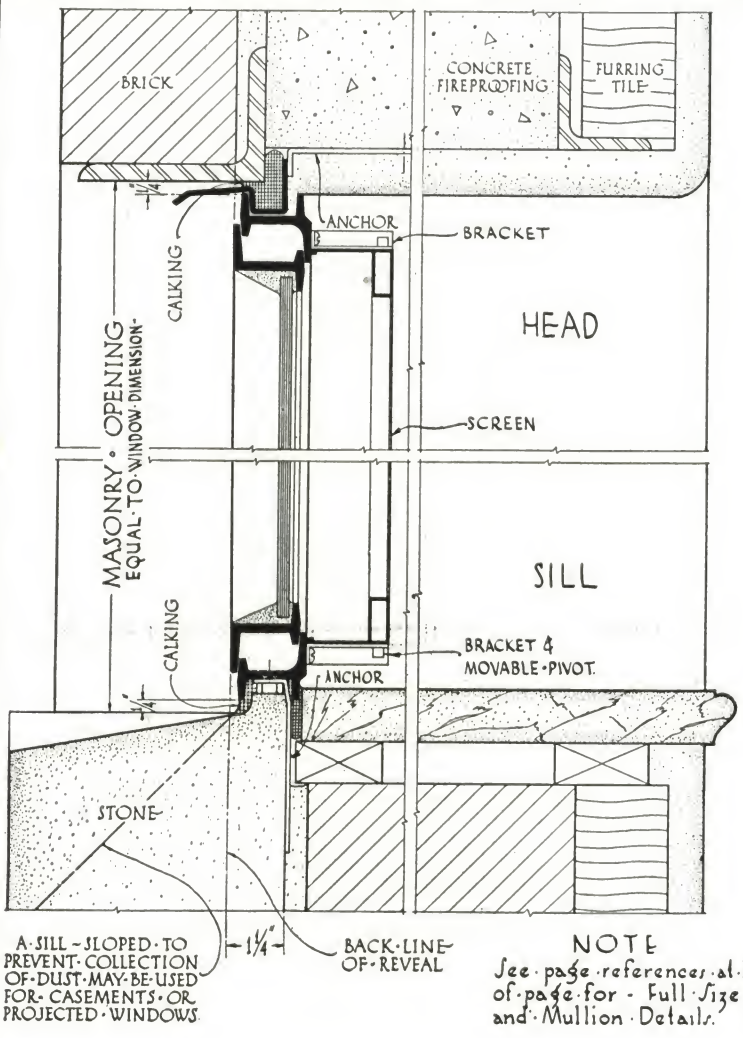


INSIDE • ELEVATION



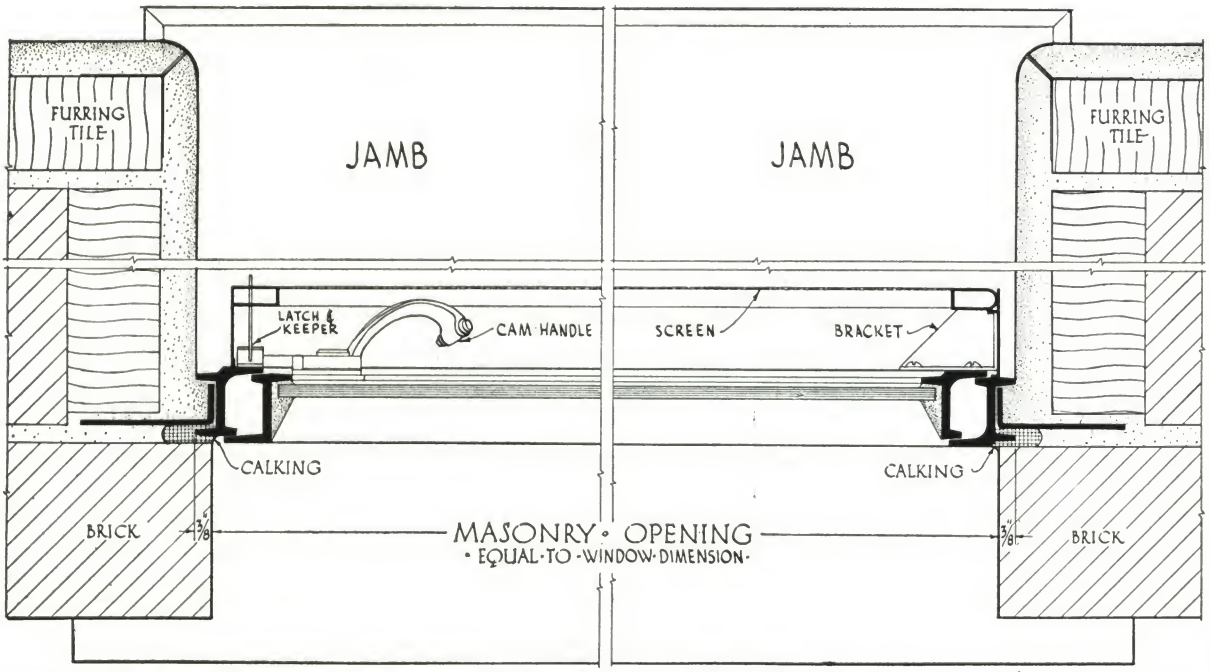
• PLAN •

SCALE 1/4" = 1'-0"



NOTE

See • page • references • at • bottom of • page • for - Full • Size • Sections and • Mullion • Details.

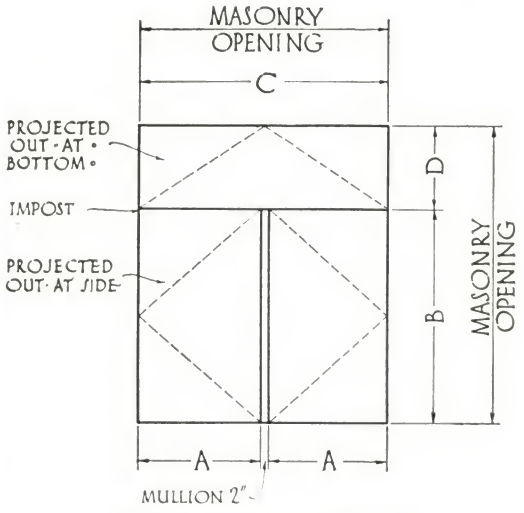


Full Size Sections on pages 46 and 47
Mullion Details on pages 40 and 45

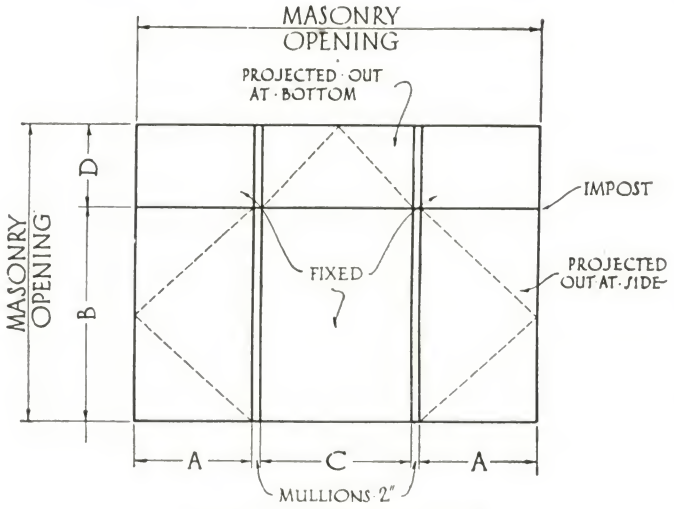
Continued on next page

WIDTHS & HEIGHTS OF MASONRY OPENINGS FOR COMPOSITE WINDOWS

TABLES GIVING MASONRY OPENING DIMENSIONS FOR TWO TYPICAL DESIGNS OF COMPOSITE WINDOWS



TYPICAL ELEVATION I



TYPICAL ELEVATION II

HEIGHTS OF MASONRY OPENINGS FOR ELEVATIONS I & II

DIMEN. B	DIMENSION D		
	1'-6"	1'-9"	2'-0"
2'-0"	3'-6"	3'-9"	4'-0"
2'-6"	4'-0"	4'-3"	4'-6"
3'-0"	4'-6"	4'-9"	5'-0"
3'-6"	5'-0"	5'-3"	5'-6"
4'-0"	5'-6"	5'-9"	6'-0"
4'-6"	6'-0"	6'-3"	6'-6"
5'-0"	6'-6"	6'-9"	7'-0"

NOTE
See Lupton page 42 for units used in combinations shown on this page.

A = Window Dimension Width of Side Projected Unit.

B = Window Dimension Height of Side Projected Unit.

C = Window Dimension Width of Bottom Projected Unit.

D = Window Dimension Height of Bottom Projected Unit.

WIDTHS OF MASONRY OPENINGS FOR ELEVATION I

DIMEN. A	DIMEN. C	MASONRY OPENING
1'-6"	3'-2"	3'-2"
1'-9"	3'-8"	3'-8"
2'-0"	4'-2"	4'-2"
2'-3"	4'-8"	4'-8"
2'-6"	5'-2"	5'-2"

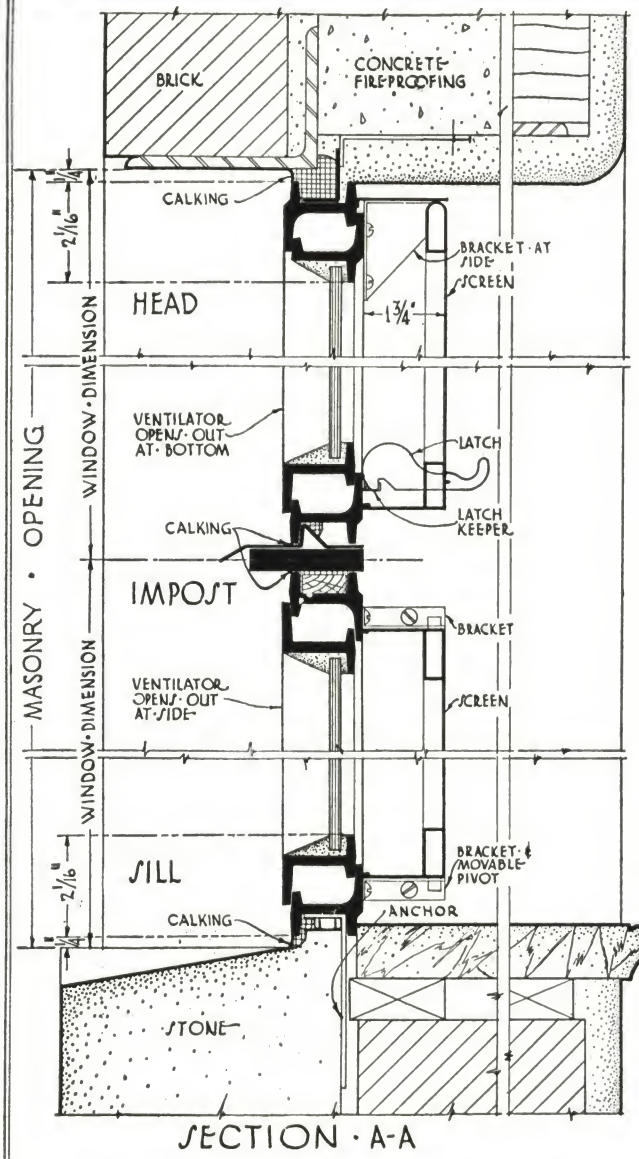
WIDTHS OF MASONRY OPENINGS FOR ELEVATION II

DIMEN. A	DIMENSION C				
	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"
1'-6"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"
1'-9"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"
2'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"
2'-3"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
2'-6"	8'-6"	9'-0"	9'-6"	10'-0"	10'-6"

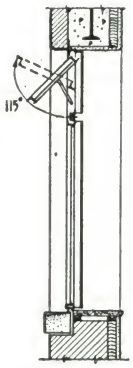
Continued on next page

COMPOSITE · WINDOWS
SINGLE · PROJECTED · CASEMENTS
COMBINED · WITH · FIXED · UNITS

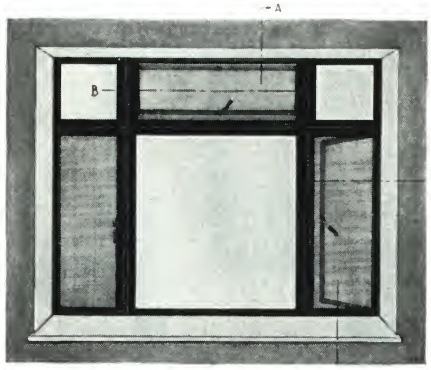
SCALE · FOR · DETAILS ~ 3" = 1'~0"



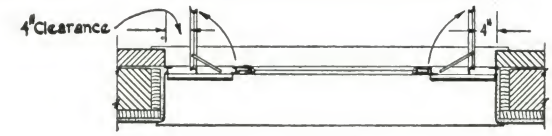
SECTION · A-A



SECTION



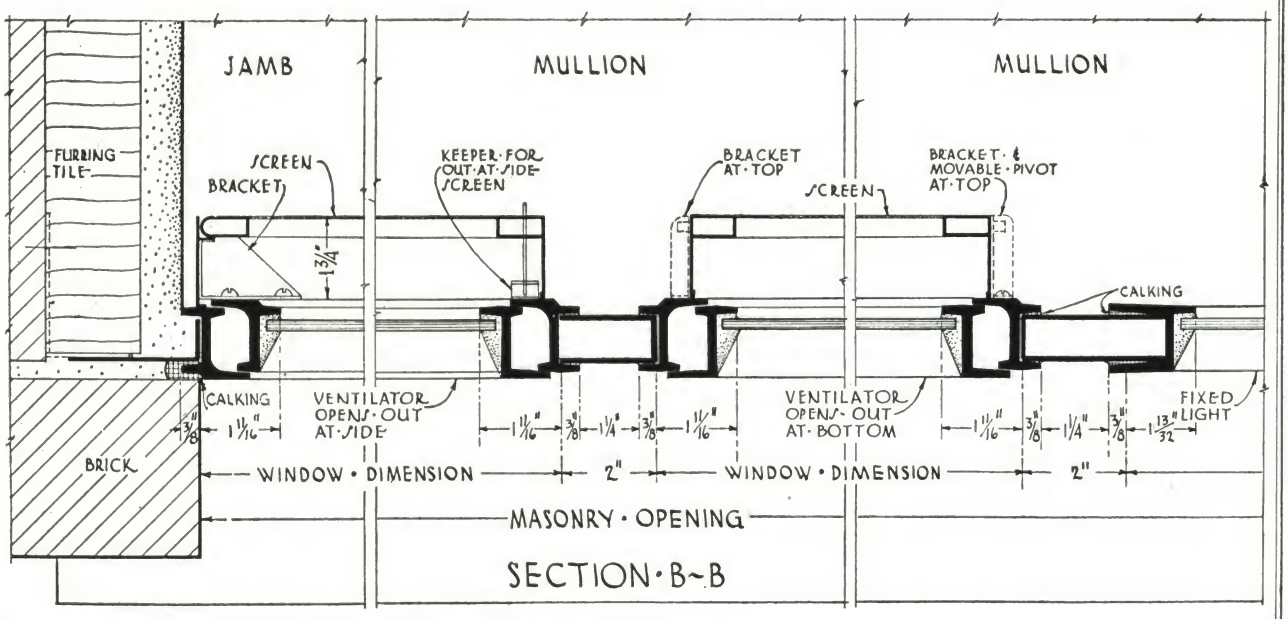
TYPICAL · INSIDE · ELEVATION



PLAN
Scale ¼" = 1'~0"

· NOTES ·

1 ~ Several · Single · Projected · Casements · can · be · combined · in · one · opening · by · using · the · impost · and · mullion · details · shown · on · this · sheet ~ Fixed · units in · sizes · to · meet · the · requirements · of · the · design · are readily · furnished · altho · not · carried · in · stock.
2 ~ Out · at · bottom · ventilators · open · approximately 115° to · permit · cleaning · from · inside · the · building.
3 ~ See page references at bottom of page, for Full-Size Sections and Sizes of Units.

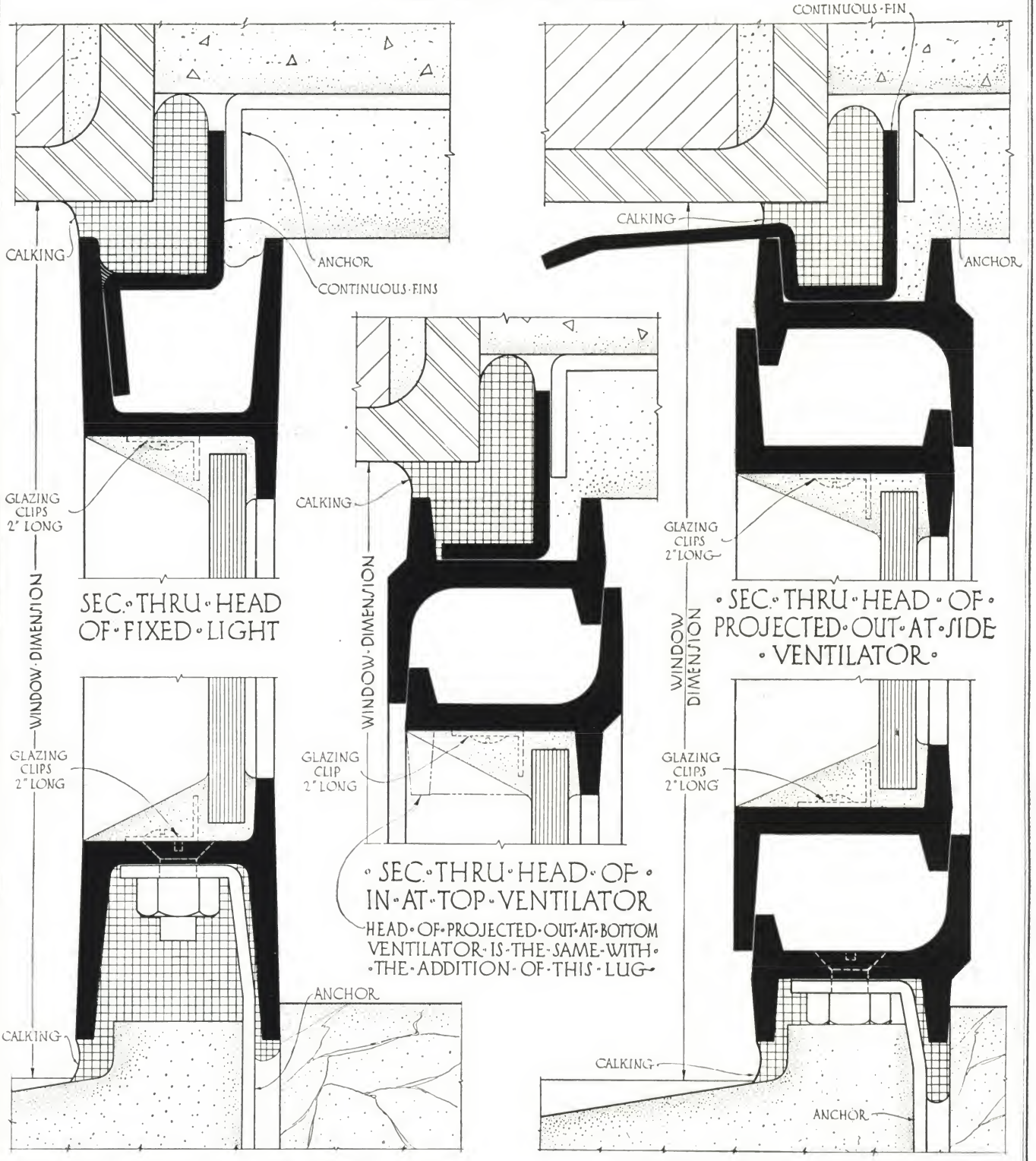


SECTION · B~B

Full Size Sections on pages 46 and 47
Sizes of units on page 42

Continued on next page

PROJECTED • CASEMENTS
• FULL • SIZE • DETAILS •



SEC. • THRU • HEAD OF • FIXED • LIGHT

• SEC. • THRU • HEAD • OF • PROJECTED • OUT • AT • SIDE • VENTILATOR •

• SEC. • THRU • HEAD • OF • IN • AT • TOP • VENTILATOR

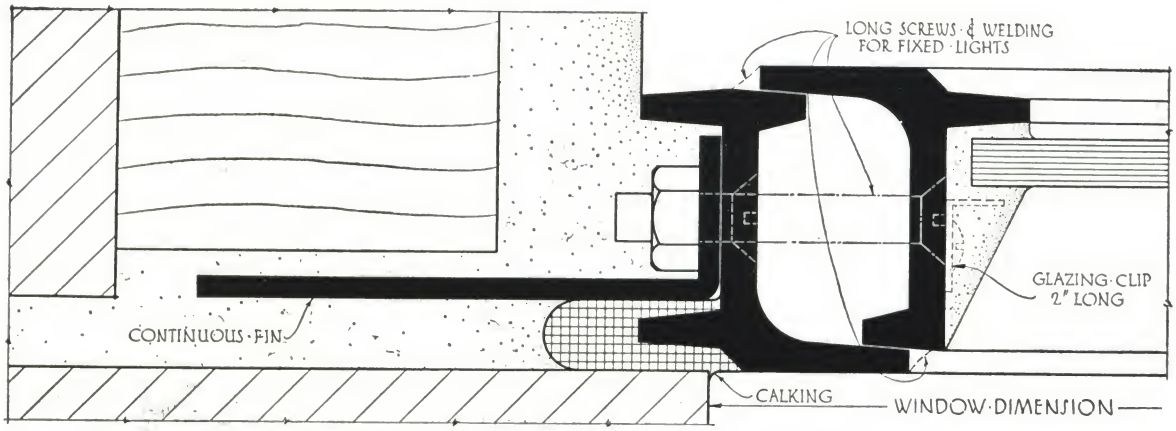
HEAD • OF • PROJECTED • OUT • AT • BOTTOM VENTILATOR • IS • THE • SAME • WITH • • THE • ADDITION • OF • THIS • LUG

SECTION • THRU • SILL • OF • FIXED • LIGHT • USED • IN • COMPOSITE • WINDOWS •

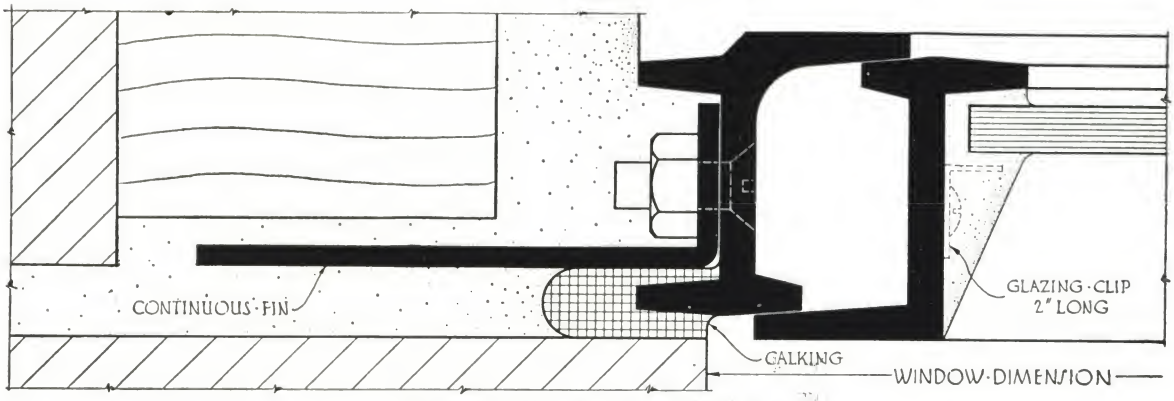
SECTION • THRU • SILL • FOR • ALL • TYPES • OF • PROJECTED • VENTILATORS

Continued on next page

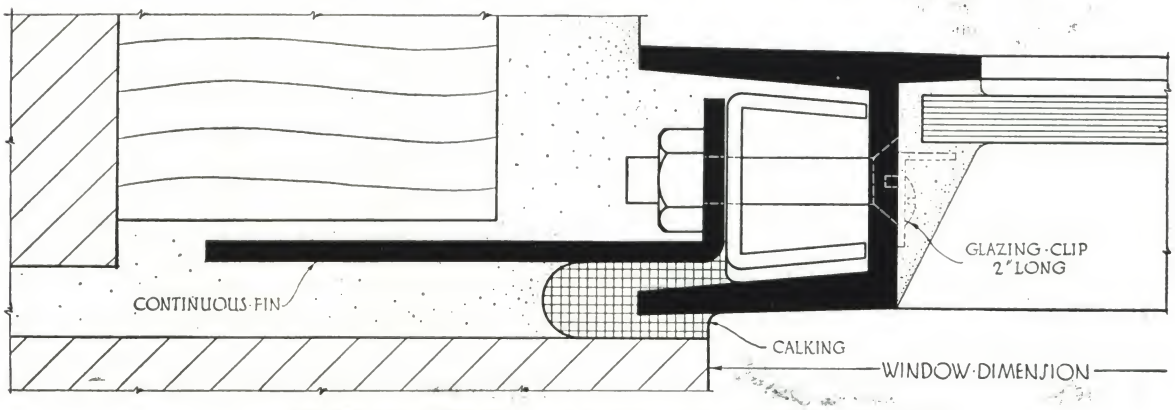
PROJECTED • CASEMENTS • FULL • SIZE • DETAILS •



SEC. THRU JAMB OF IN AT TOP VENTILATOR
PROJECTED OUT AT SIDE VENTILATOR
OR FIXED LIGHT



SECTION THRU JAMB OF
PROJECTED OUT AT SIDE VENTILATORS OR
PROJECTED OUT AT BOTTOM VENTILATOR



SECTION THRU JAMB OF FIXED LIGHT
USED IN COMPOSITE WINDOWS

Continued on next page

LUPTON RESIDENCE CASEMENTS

For all types of residences, apartment houses and similar buildings, Lupton Residence Casements possess many superior features in design and construction.

All units having a stationary transom (for protection of draperies) are provided with holes for attaching brackets for shades and draperies.

Provision has also been made for screening. Sheraton Handles (available in a variety of finishes) and malleable iron friction hinges are furnished as standard equipment on all casements. Upon special request alternate hardware or non-friction hinges and sill hardware will be furnished at extra cost.

SPECIFICATION FOR LUPTON RESIDENCE CASEMENTS

Work Included

1. Furnish where shown on drawings, Lupton Residence Casements as manufactured by DAVID LUPTON'S SONS CO., Philadelphia, Pa.

Materials

2. Ventilator and frame members, muntins, and mullion and impost bars shall be made of specially rolled steel sections.

Construction

3. All casements shall be designed for outside glazing.

4. All casements shall be straight and true with members in alignment and surfaces in a plane.

5. Ventilator and frame members shall be mitered at corners and butt welded. The frame and ventilator shall form a two-point, flat, continuous, weathering contact.

6. Muntin Bars shall be continuous from top to bottom, and from side to side between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be so interlocked at their intersections as not to decrease their ultimate strength. They shall be flush with frame members or ventilator members on the inside.

7. Mullions and bolts for attachment shall be provided wherever two or more units are placed side by side in an opening.

8. Imposts and bolts for attachment shall be provided wherever two or more units are placed one directly above the other in an opening.

9. Weather bars shall be furnished for ventilators that extend to the head and shall be rolled as an integral part of the frame member at the head.

Note: (a) Continuous anchors should be specified here if wanted. See List of Extras at end of specification.

(b) Sill and jamb anchor clips of steel should be specified here if wanted.

Hardware

10. All hardware, except hinges, shall be shipped unattached; carefully packed to prevent damage. Top-hinged ventilators shall be equipped with close-up friction hinges and shall have solid bronze transom latches supplied for locking. Side-hinged ventilators shall be equipped with extended friction hinges and shall have handles supplied for locking.

Note: If screens are to be furnished as noted on page 51 of this catalogue, the fact should be mentioned in the specification and the option number given so that the proper drilling can be furnished. If non-friction hinges or any departure from the standard hardware as described in paragraph 10 is desired, this fact should be stated. See hardware and list of extras on this page.

Calking Cement *(See page 1)*

11. The window manufacturer shall furnish non-staining elastic calking cement in quantities sufficient for application as shown on window manufacturer's standard details.

Erection *(See page 1)*

12. All casements shall be erected by (state by whom). They shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions and imposts (and continuous anchors if specified) shall be bolted securely to frames. Calking cement shall be neatly applied at points indicated on window manufacturer's standard details. Attach hardware.

Note: Unless definitely stated otherwise in order or in specification, hardware will be attached by erector when casement is erected.

Painting

13. All casements shall receive one shop coat of casement manufacturer's standard dark gray paint, oven dried.

Note: See page 1.

Glass and Glazing

Note: (See also page 1.) Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high grade steel window putty (ordinary wood sash putty must not be used).

(c) Specify that Lupton Residence Casement Windows shall be glazed from the outside. The glass set in a bed of putty and held by Lupton Standard Wire Glazing Clips.

LIST OF EXTRAS

The following are alternates and extras furnished when specified at added cost.

1. Continuous anchors of 16 gauge galvanized steel with corner fillers of 18 gauge galvanized steel for use at head and jamb.
2. Under screen operator and non-friction hinges. (This is not the same as screen option No. 3 on page 51.)
3. Solid bronze handles of the Alden Park type.
4. Handles and transom latches in alternate finishes (see below).
5. Drilling for screen option other than Option No. 1.

HARDWARE



Standard Sheraton Handle

No. 352 shown (opposite hand, No. 351)

This handle with gray painted finish is furnished unless an alternate is specified. Furnished when specified in one of the following finishes, at extra cost.

Old Coin Bronze	Polished Brass
Polished Bronze	Nickel Plate
Statuary Bronze	Imitation Bower Barff



Transom Latch No. 354

Used on all top-hinged transoms. Designed to permit application of box screens. Bronze with painted finish is standard. Polished bronze finish is furnished when specified at extra cost



Alden Park Handle

No. 271 shown (opposite hand, No. 270)

This solid bronze handle is an alternate furnished only when specified



Malleable Iron Friction Hinge

Extended Friction Hinges hold casement open in any desired position and permit cleaning of glass from inside the building

Continued on next page

LUPTON · CASEMENTS



RESIDENCE · TYPE . . . . . .

Optional Ventilating Unit

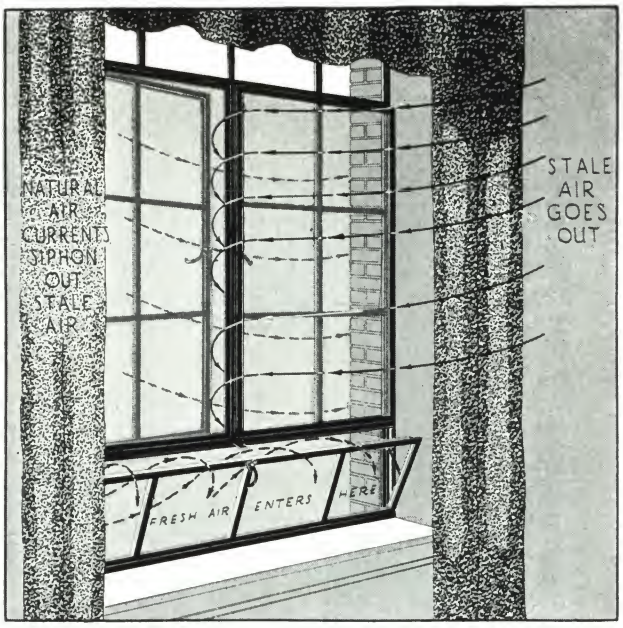
The combination of ventilators shown here is suggested for use in all rooms where a balanced inflow and outflow of air is desirable.

The outswinging leaves of Lupton Casements invite the cooling breezes that take the hardships out of summer heat. With this new ventilator added to the casement, it is possible to maintain a constant supply of fresh air, without draft, at all seasons, providing in homes the same high standard of ventilation enjoyed in office buildings equipped with Lupton Windows.

Provision has been made for attaching a fixed screen on the outside of the window. It is not necessary to remove the screen or open it during the summer season, but it is easily removed for winter storage.

When a ventilating unit is used below a side hinged casement, underscreen levers or operators such as those described and shown on pages 51, 52 and 53 cannot be used to operate the casement.

Details and Sizes—Details and standard sizes are shown on the following page.

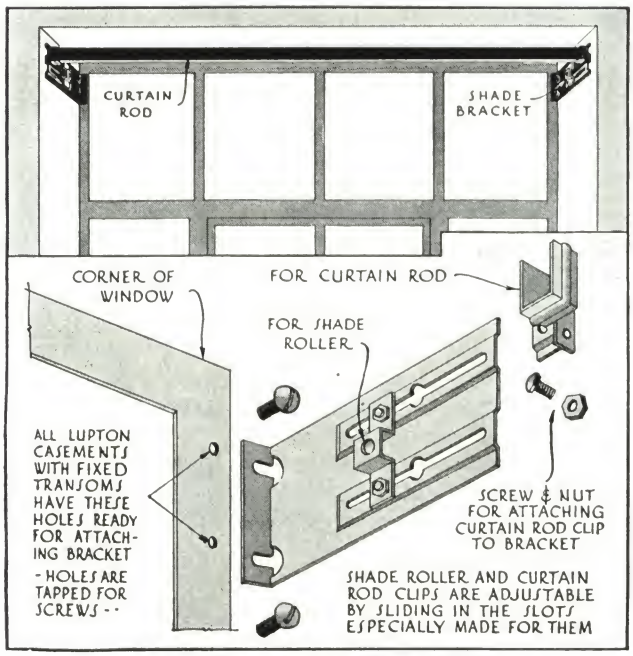


Provision for Shades and Draperies

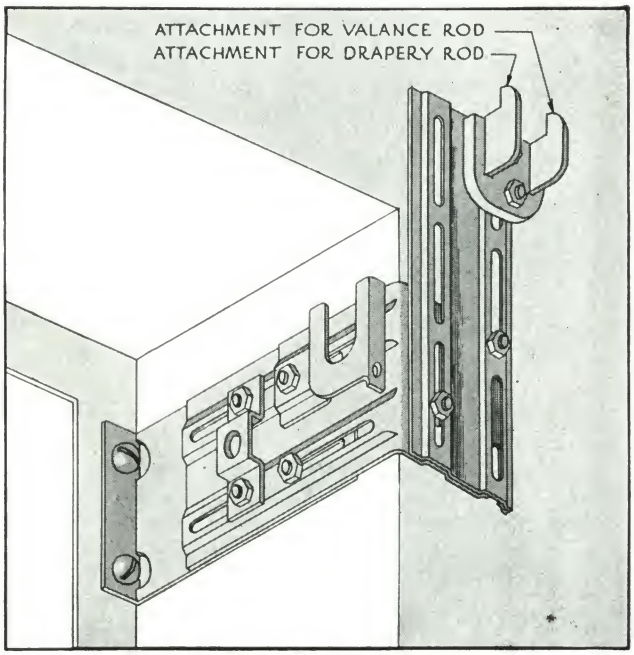
Lupton Casements are complete to the last detail of attaching shades and draperies. The type of Casement that can be both screened and shaded most satisfactorily is the one with a row of fixed lights over the ventilators. With this type of window brackets for shades and draperies are mounted on the casement in holes provided for this purpose. Wood trim is not disfigured. If desired, wood trim may be omitted and plaster returned directly to the casement frame.

Standard Attachments—Illustration below at left shows standard combination consisting of two brackets and a single rod cut to exact length. This provides for attachment of a roller shade and a single pair of curtains. It can be purchased at the time windows are purchased, through the Lupton representative.

Extra Attachments — Extra attachments are easily applied to original bracket for any changes that may be wanted. One of the many possible combinations is shown at right. It provides for roller shade, flat curtains, overdrapes and valance. Where valance is omitted and a decorative pole is to be used, a suitable ornamental end bracket of wood or metal can be furnished. Consult a Lupton representative for full details.



Standard Attachments



One of the Many Possible Combinations

Continued on next page

LUPTON · CASEMENTS
WITH · PROJECTED · IN · AT · TOP · VENTILATORS

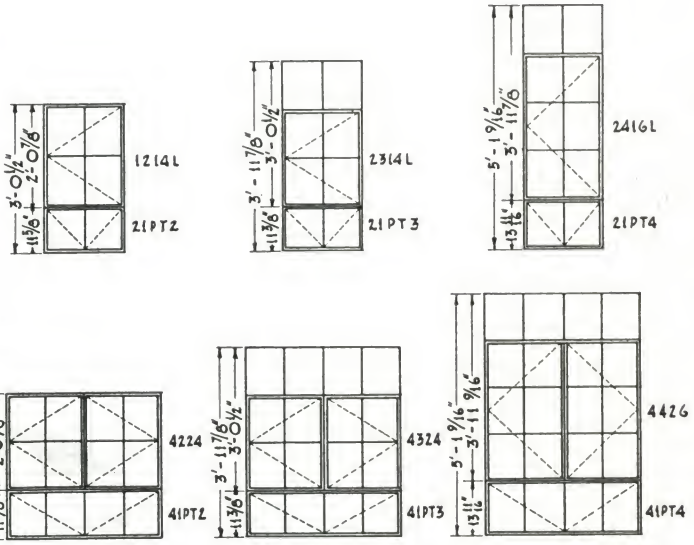


NOTES

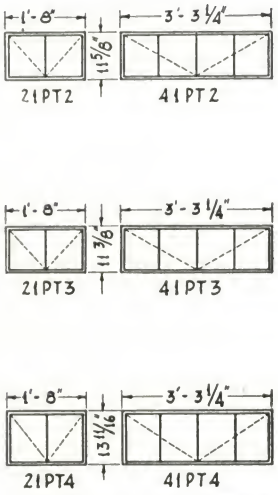
1 - SIZES - These ventilators are designed to fit under standard two and four light wide casement units and are attached to the window before shipment. In at top ventilators when required under six light wide units are special and must be attached at our factory.

2 - SCREENS - Box screens similar to those used for the Lupton No. 1 Screen Option (see page 51) have been designed for attaching on the outside of the ventilator. Under screen operators cannot be used above Project In at Top Ventilators.

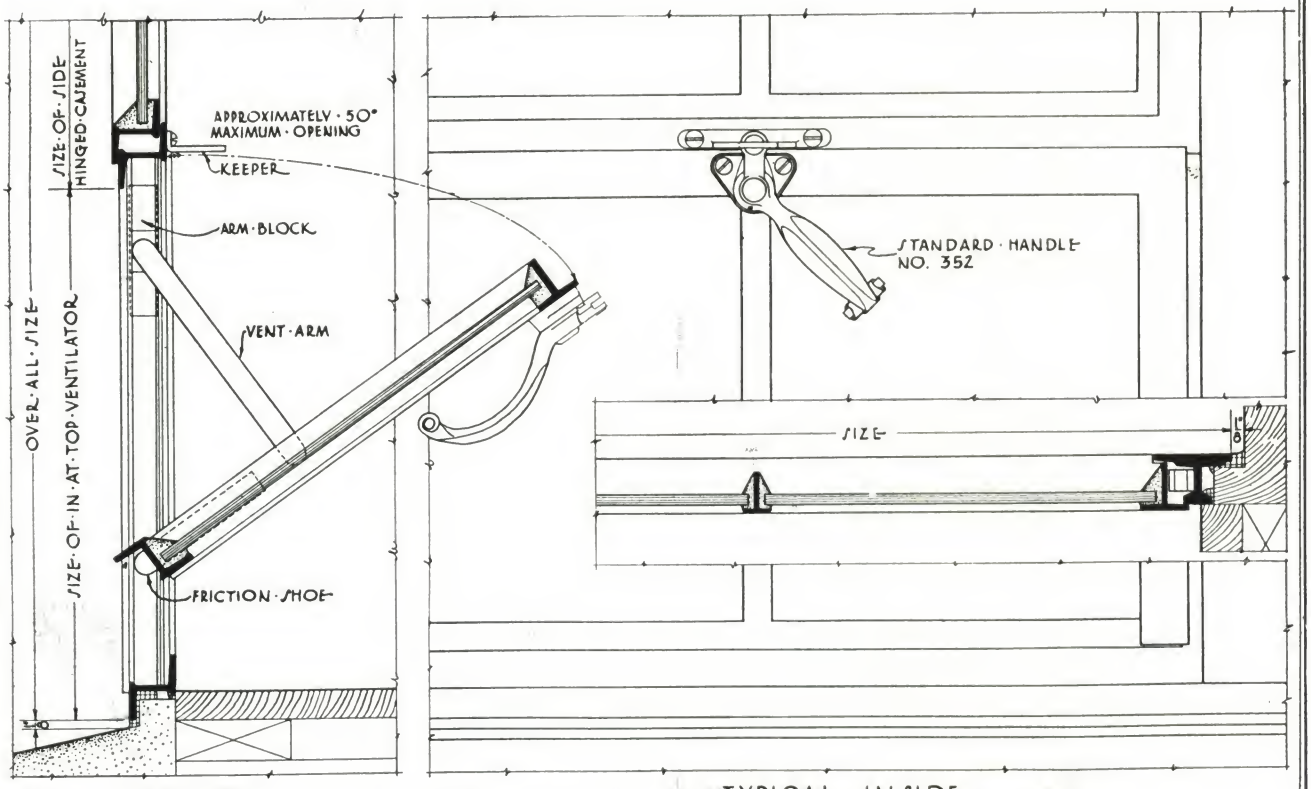
3 - MULLIONS - When Project In at Top ventilators are required in openings with steel mullions the entire window should be assembled in our factory to insure perfect operation.



IN · AT · TOP · VENTS · SHOWN · IN · COMBINATION WITH · TYPICAL · STANDARD · UNITS (See · note · 1)
OUTSIDE · ELEVATIONS.



STANDARD · IN · AT · TOP VENT · UNITS (See · note · 1)
OUTSIDE · ELEVATIONS —



See description on page 49

Continued on next page

LUPTON · CASEMENTS
TYPES · OF · SCREENS · FOR · RESIDENCE · CASEMENTS ·



Lupton Box Screen (Option No. 1)



This is the box screen that Lupton planned for use with their Residence Casements. All Residence Casements have holes in the frame for attaching this type of screen. Through its use all the beautiful and practical features of Lupton Casements are retained, including the beautiful new Sheraton Handle and practical friction hinge.

Made in sizes to protect openings 1 and 2 lights wide and 2, 3 and 4 lights high, they may be used separately or in pairs. Two neat brackets which attach to the window frame allow free movement of screen on spring pivots. Screens for 2-light wide casements are side pivoted, single-light wide casements and top-hung transoms are screened by means of a top-hung box screen similar in construction to the side-pivoted screens. A small but positive-acting gravity catch holds the screen tightly closed. The spring pivots allow the screen to be instantly removed.

Screen frame is made of formed steel, or, at a proportionately higher price, aluminum. For steel screens the frame is of one-piece tubular section rolled from 23-gauge steel, galvanized, painted gray, and wired with 16-mesh bronze wire cloth. The wire may be replaced if accidentally damaged.

Box screens applied to casements are shown on pages 52, 57, 58 and 60 to 62.

Clearances required at head, jambs and sill are shown on next page.

Aluminum Screens

The aluminum box screens are of natural finish extruded aluminum alloy with corners solidly welded and finished smooth. Wire is 16-mesh rustless copper-bronze wire and may be replaced if accidentally damaged.

Lupton Storm Windows

In localities where winters are severe, Lupton Storm Windows may be substituted for box screens, as the same brackets hold both storm windows and screens. The frame of the storm window is of formed steel with special provision for glass insertion. These windows are practical and low in cost.

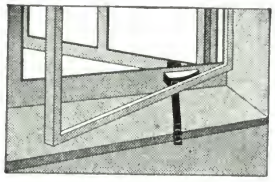


Alternates

To meet special requirements Lupton Casements may be screened by any one of the methods described below. The additional drilling required for attaching these screens will be done at the warehouse of our dealer or distributor (at slight added cost), but your choice must be stated at time of purchase.

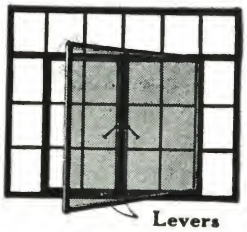
Under-screen Levers (Option No. 2-A)

Same as Option No. 1, except that screen is so placed on casement frame to allow for a Lupton lever-type under-screen operator, here illustrated. Casement is opened and closed with the screen in place. Sill detail shown on next page.



Box Screen, 4 Lights Wide
(Option No. 2-B)

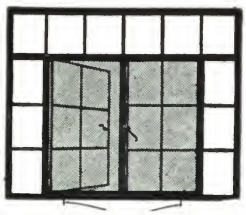
Same as Option No. 2-A, except screens are made four lights wide. One four-light wide screen may be substituted for 2 two-light wide screens as in Option No. 2-A, at any time. The same brackets act for hinging and fastening.



Levers

Close-up Screen with Win-Dor Operator
(Option No. 3)

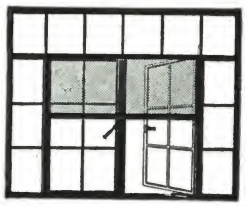
A Win-Dor Operator (screw-gear type with sill cover) operated by crank under a screen, which requires the use of thin, flat hardware, instead of Lupton Sheraton Handles. The friction feature must also be eliminated from the Lupton hinge. Used in localities where frequent storms require a similarly frequent opening and closing of windows. Details giving clearances shown on page 53.



Cranks

Roll Screens

A Roll Screen which operates screen wire in much the same way as a roller shade. Made in standard sizes to fit Lupton Casements. No field measurements or special fitting required, when used (as shown on page 59) with casements having fixed light of glass above ventilators. See page 54.



Continued on next page

LUPTON · CASEMENTS

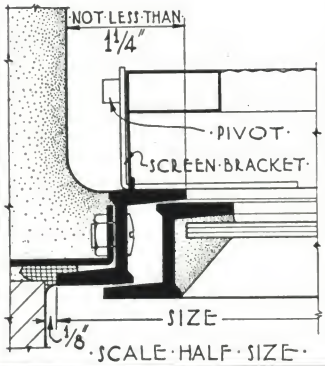
DETAILS · OF · BOX · SCREENS...

SHOWING · CLEARANCES.....



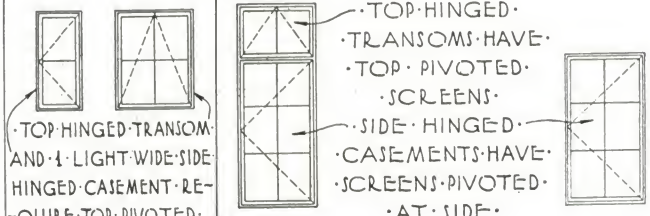
SCALE FOR DETAILS · 3"=1'-0

· BOX · SCREENS · FOR · ONE · LIGHT · WIDE — CASEMENTS · AND · ALL · TOP · HINGED · TRANSOMS ·

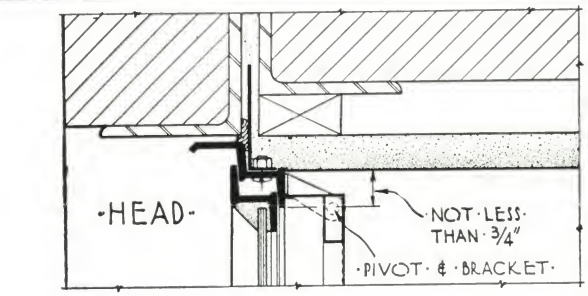


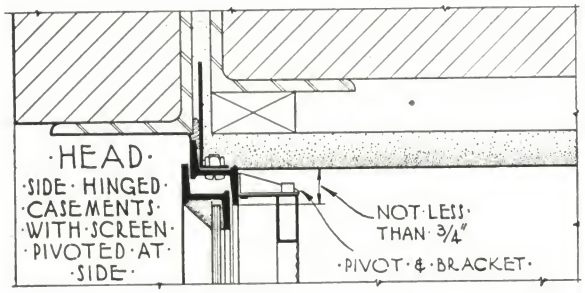
BOX · SCREENS · FOR · ONE · LIGHT · WIDE · CASEMENTS · OR · TOP · HINGED · TRANSOMS · ARE · PIVOTED · AT · TOP. EXTRA · CLEARANCE · MUST · BE · ALLOWED · AT · BOTH · JAMBS · FOR · THE · PROJECTION · OF · THE · PIVOTS · AS · SHOWN · IN · DIAGRAM · AT · LEFT · AND · IN · THE · TWO · JAMB · DETAILS · BELOW.

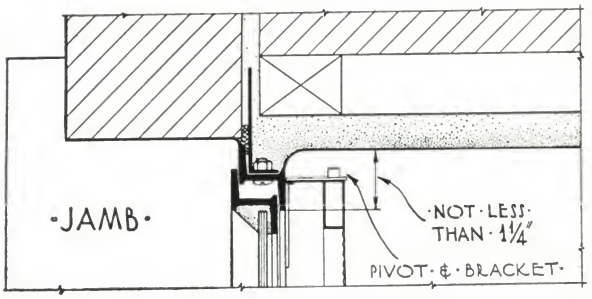
· ELEVATIONS · SHOWING · USE · OF · TOP · PIVOTED · AND · SIDE · PIVOTED · BOX · SCREENS ·

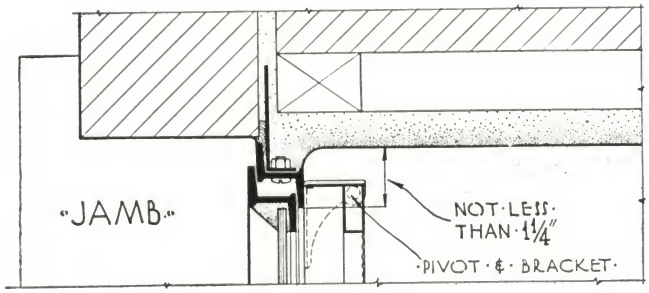


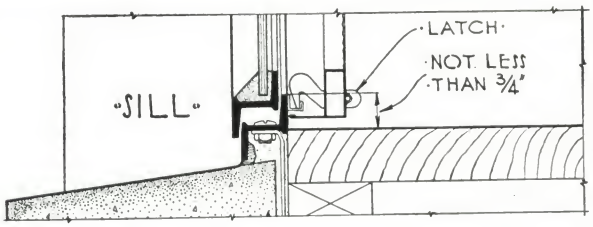
· BOX · SCREENS · FOR · 2 · OR · 4 · LIGHT · WIDE · SIDE · HINGED · CASEMENTS ·

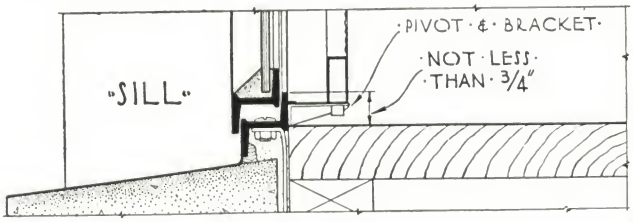


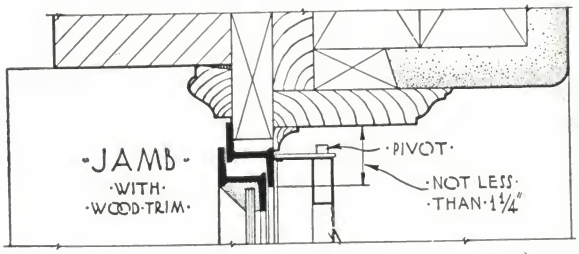


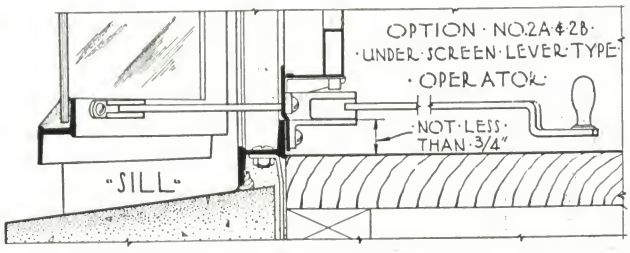












See description on page 51

Continued on next page

LUPTON · CASEMENTS
DETAILS · OF · WINDOR · SCREENS SHOWING · CLEARANCES.....

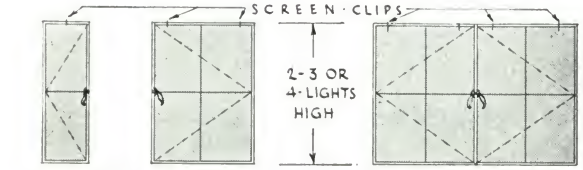


SCALE FOR DETAILS · 3"=1'-0"

WINDOR · SCREEN · COMBINATION OPTION · NO. 3 _ _ _ _ _ _

WINDOR · COMBINATION · SCREEN · AND OPERATOR · CAN · BE · APPLIED · TO · ANY LUPTON · SIDE · HINGED · CASEMENT. ~

INSIDE · ELEVATIONS OF · TYPICAL · UNITS

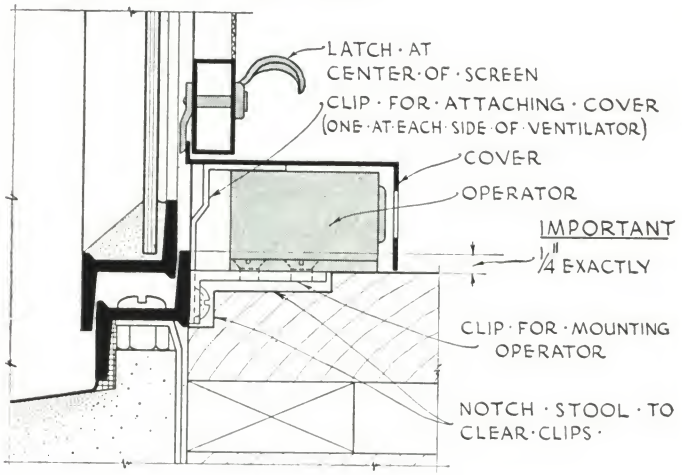


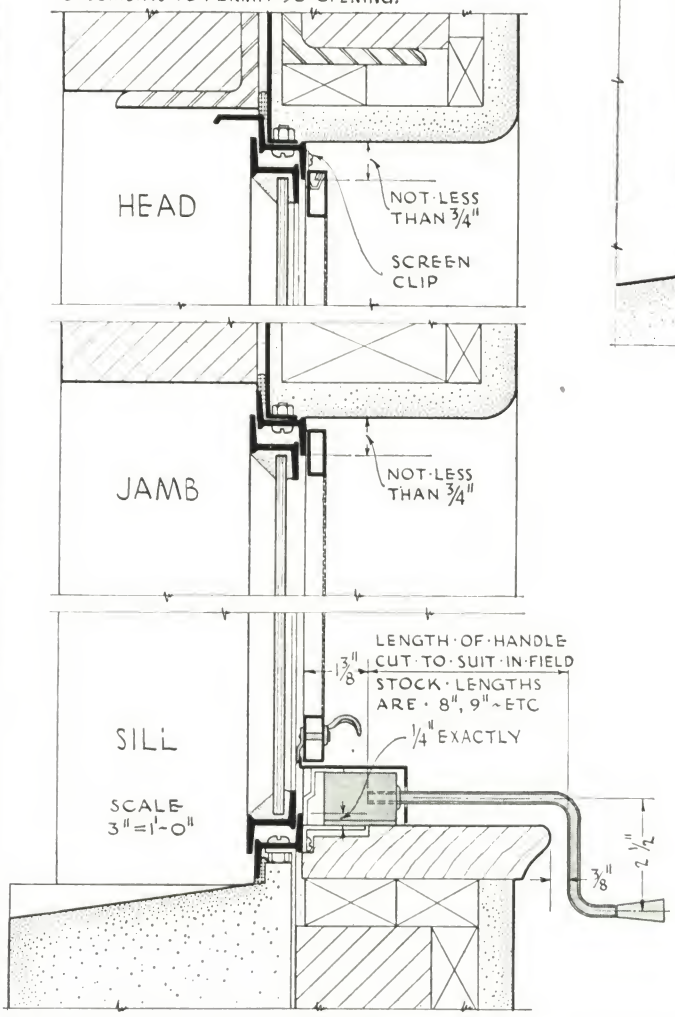
LUPTON STANDARD HANDLE MUST BE REPLACED BY THE ONE SHOWN AT THE RIGHT. ⟶
HANDLE IS MALLEABLE IRON PAINTED BLACK ~ OR SOLID BRONZE POLISHED AS SPECIFIED.



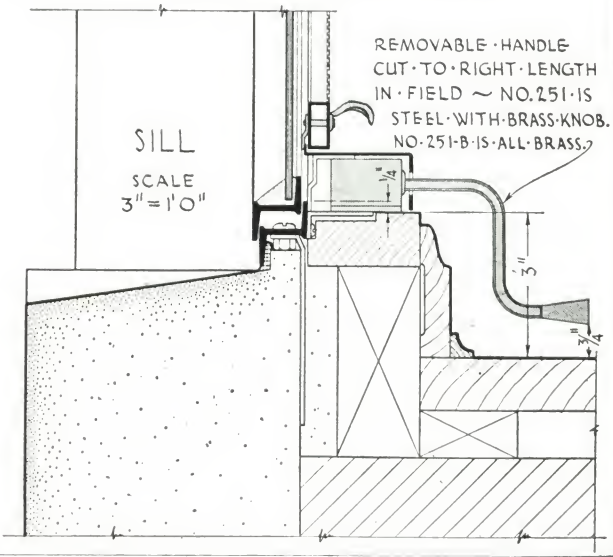
CLOSE UP HINGES SHOULD BE SPECIFIED ON ONE LIGHT WIDE CASEMENTS TO PERMIT 90° OPENING.

HALF · SIZE · SILL · DETAIL · SHOWING · NOTCHING OF · STOOL · FOR · CLIPS.





WIDE · STOOLS · MAY · BE · DESIGNED · AS · SHOWN BELOW · TO · AVOID · USING · LONG · HANDLES.

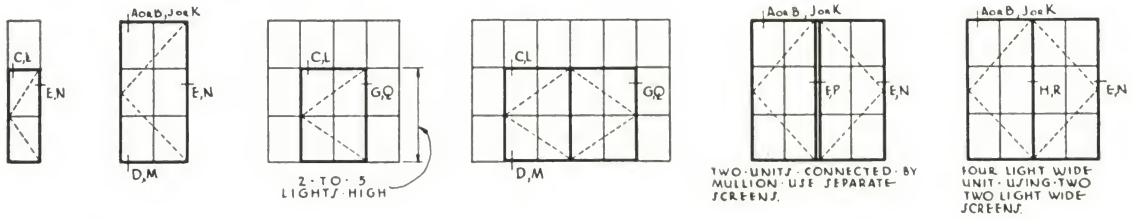


See description on page 51

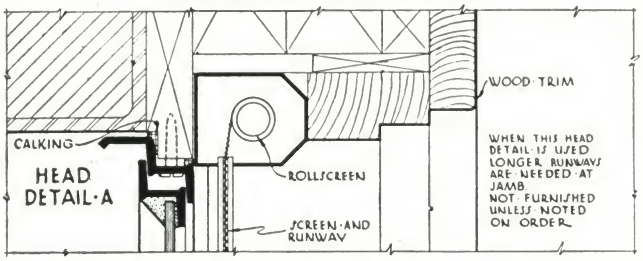
LUPTON · CASEMENTS
DETAILS · OF · ROLLSCREENS....
SHOWING · CLEARANCES.....

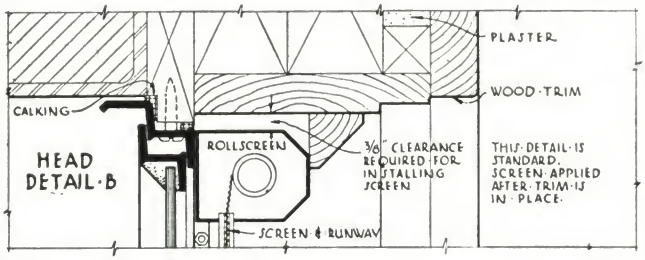


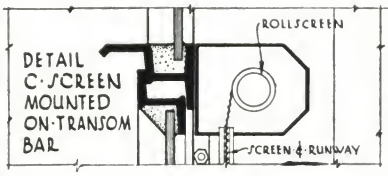
SCALE FOR DETAILS · 3"=1'-0"

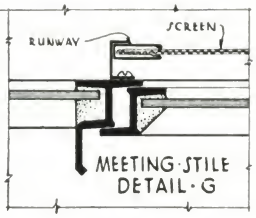


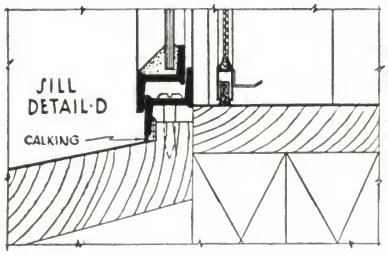
JAMESTOWN · ROLLSCREEN

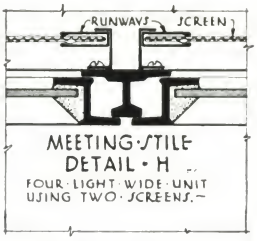


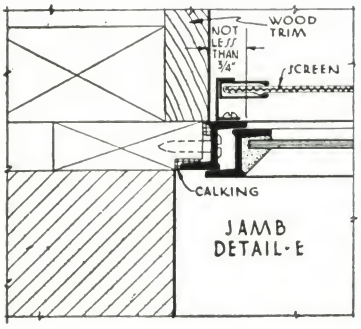


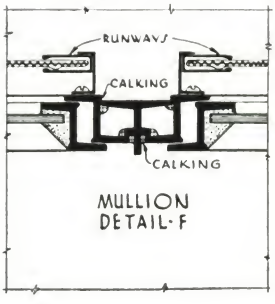




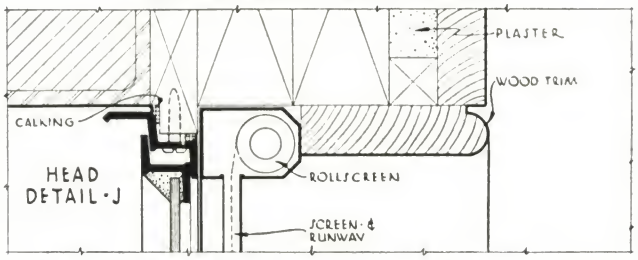


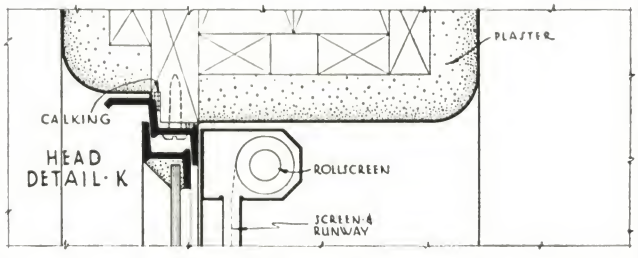


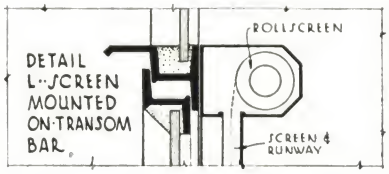


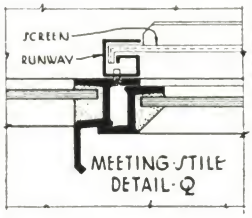


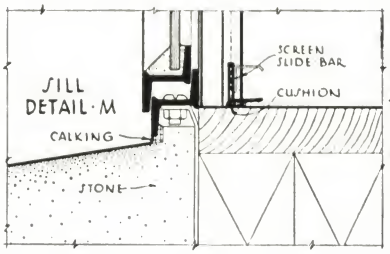
METAL · CRAFT · ROLLSCREEN

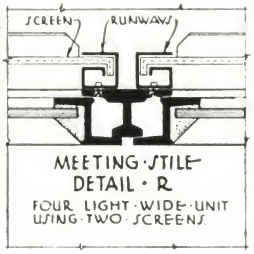


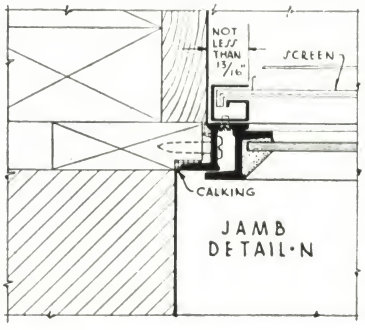


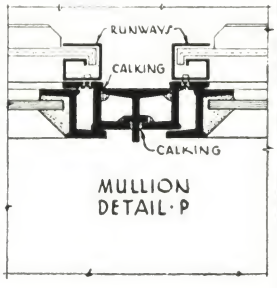












See Description on Page 51

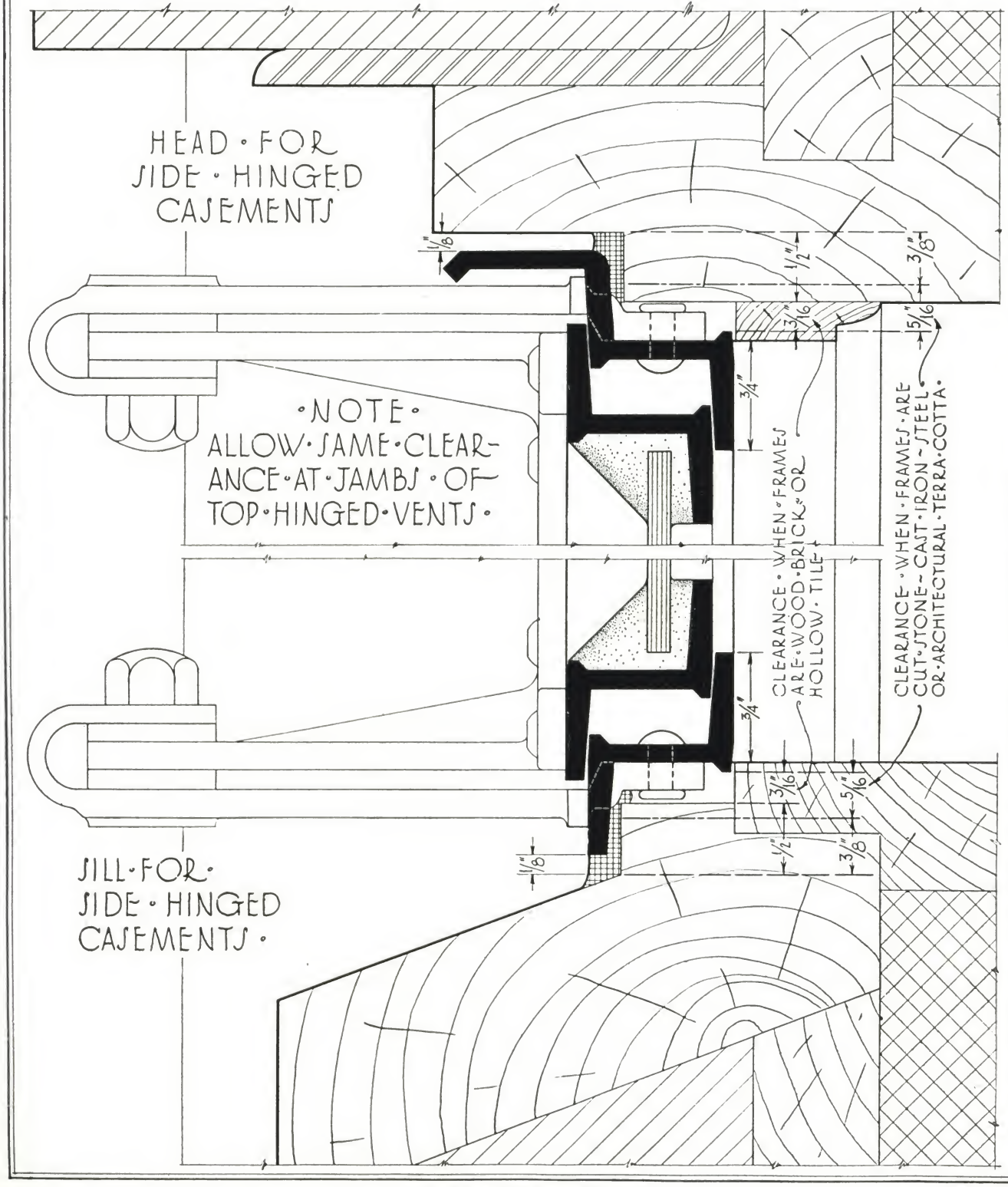
Continued on next page

LUPTON · CASEMENTS

DETAIL · OF · RABBETT · SHOWING CORRECT · DEPTH · TO · CLEAR · HINGE



SCALE FULL SIZE



See text on page 48

LUPTON · CASEMENTS

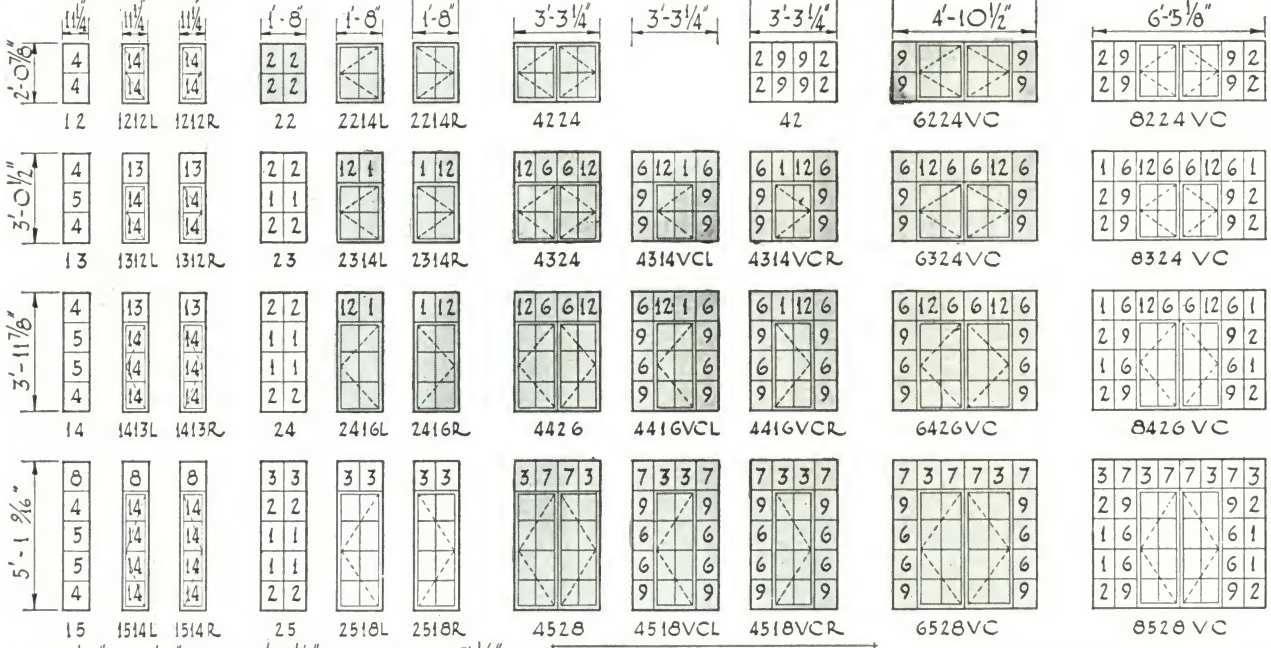
STANDARD · TYPES · AND · SIZES

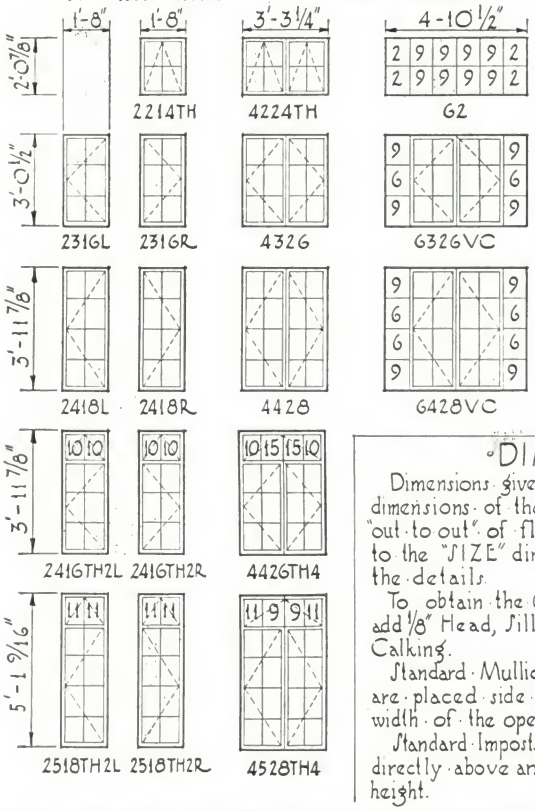


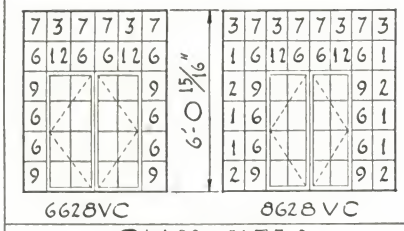
SIZES · SHADED · ARE · CARRIED · IN · STOCK

NOTE · ALL · ELEVATIONS · SHOWN · ON · THIS PAGE · ARE · OUTSIDE ELEVATIONS









· NOTES ·

1. All units are viewed from outside.
2. A right hand window swinging from left to right is indicated by dotted lines converging toward the right



3. A left hand window swinging from right to left is indicated by dotted lines converging toward the left.



4. A transom opening out at the bottom is indicated by dotted lines converging toward the top.



· DIMENSIONS ·

Dimensions given are in each case the overall dimensions of the unit. They are measured "out to out" of flange and correspond to the "SIZE" dimension shown in the details.



To obtain the Opening Dimension add ⅛" Head, Sill, and Jambs for Calking.

Standard Mullions (used when two or more units are placed side by side in an opening) add ¼" to the width of the opening.

Standard Imposts (used when units are placed one directly above another) add ¼" to the opening height.

GLASS · SIZES

All lights of glass are 8½" x 11" except those marked otherwise.

Lights marked	1	are	9" x 11"
" "	2	"	9" x 11½"
" "	3	"	9" x 13"
" "	4	"	9½" x 11½"
" "	5	"	9½" x 11"
" "	6	"	9¼" x 11"
" "	7	"	9¼" x 13"
" "	8	"	9½" x 13"
" "	9	"	9¼" x 11½"
" "	10	"	8½" x 9¼"
" "	11	"	8½" x 11½"
" "	12	"	9" x 10¾"
" "	13	"	9½" x 10¾"
" "	14	"	8¼" x 11"
" "	15	"	9¼" x 9¼"

See text on page 48

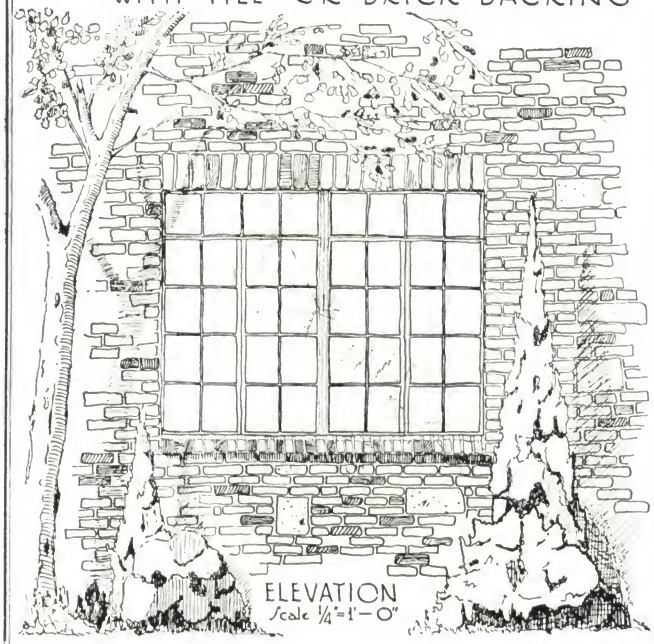
Continued on next page

LUPTON · CASEMENTS

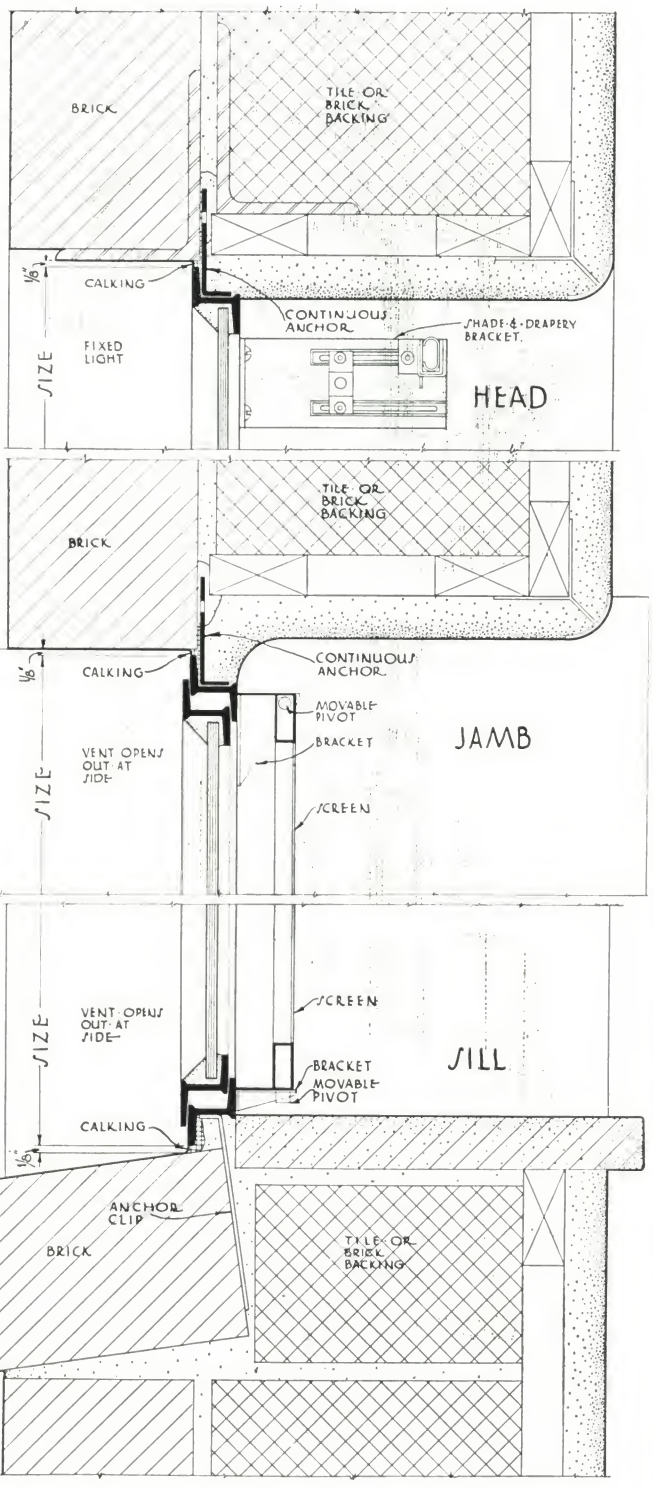
DETAILS · OF · INSTALLATION

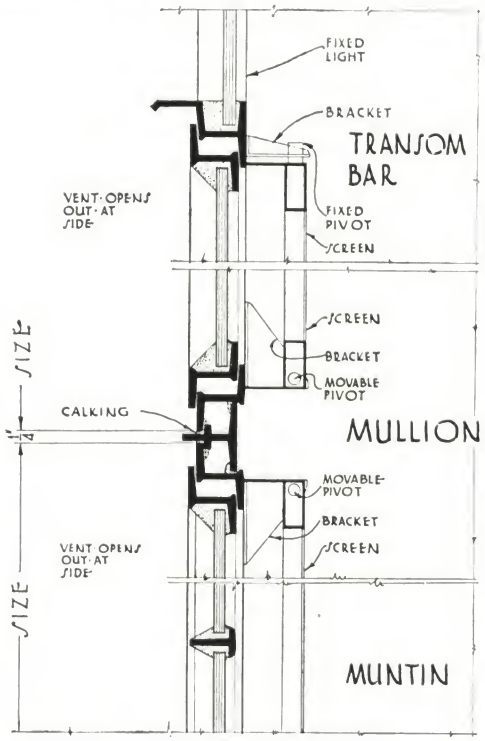


IN · BRICK · WALLS
WITH · TILE · OR · BRICK · BACKING



SCALE · FOR · DETAILS
3" = 1'-0"





This detail shows the use of continuous anchors at head and jambs, the recommended practice for setting casements in brick or tile walls. Casement is shown equipped with Box Screens and shade brackets. If ventilator extends to the head, shade brackets cannot be attached. See pages 48 to 56 for description, hardware, sizes, screens, etc.

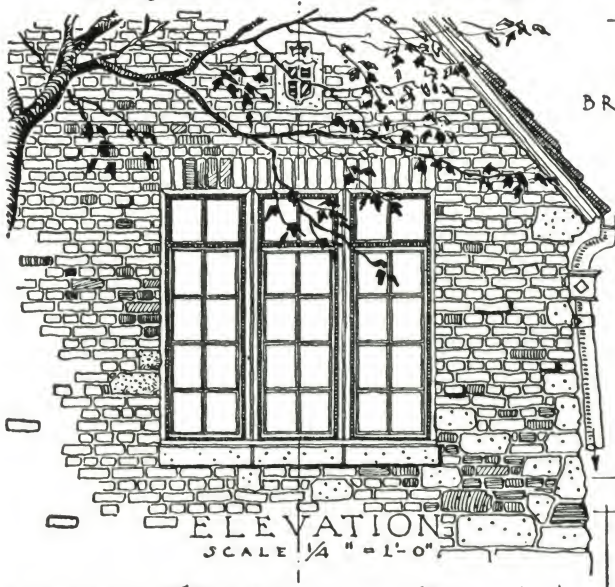
Continued on next page

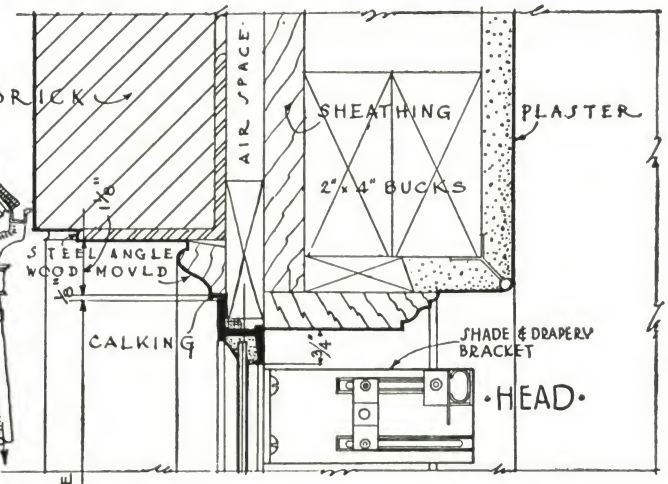
LUPTON · CASEMENTS

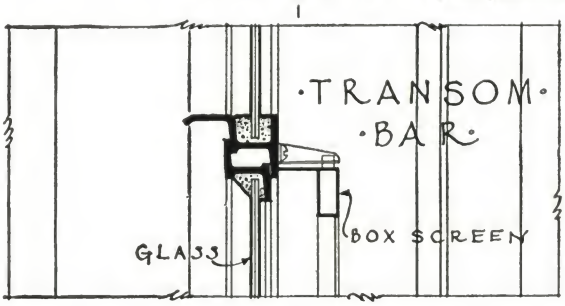
DETAILS · OF · INSTALLATION

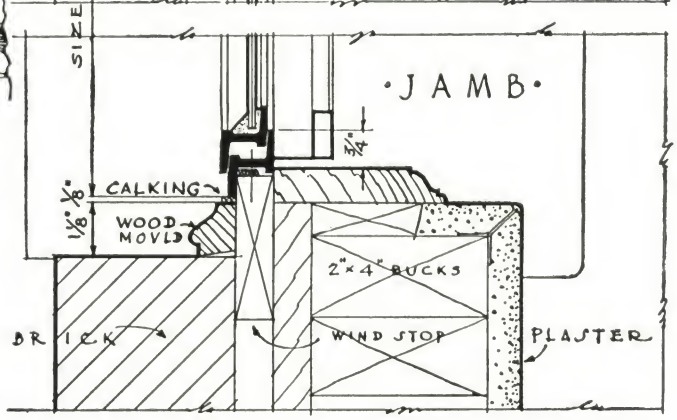


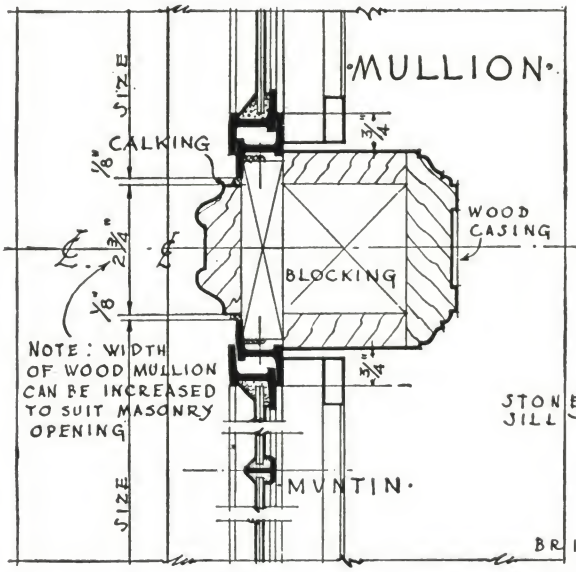
BRICK · VENEER · WALLS · SCALE FOR DETAILS - 3" = 1'-0"

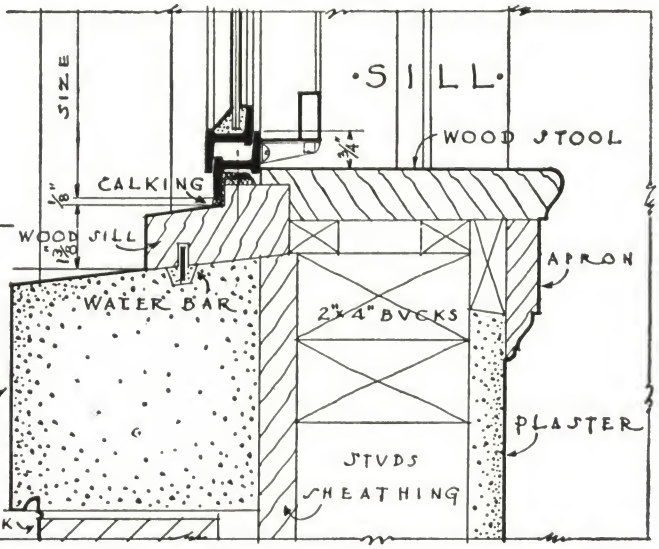












This detail shows casement set in brick veneer walls. Casement is shown equipped with Box Screens and shade brackets. If ventilator extends to the head, shade brackets cannot be attached. See pages 48 to 56 for description, hardware, sizes, screens, etc.

Continued on next page

LUPTON · CASEMENTS

DETAILS · OF · INSTALLATION

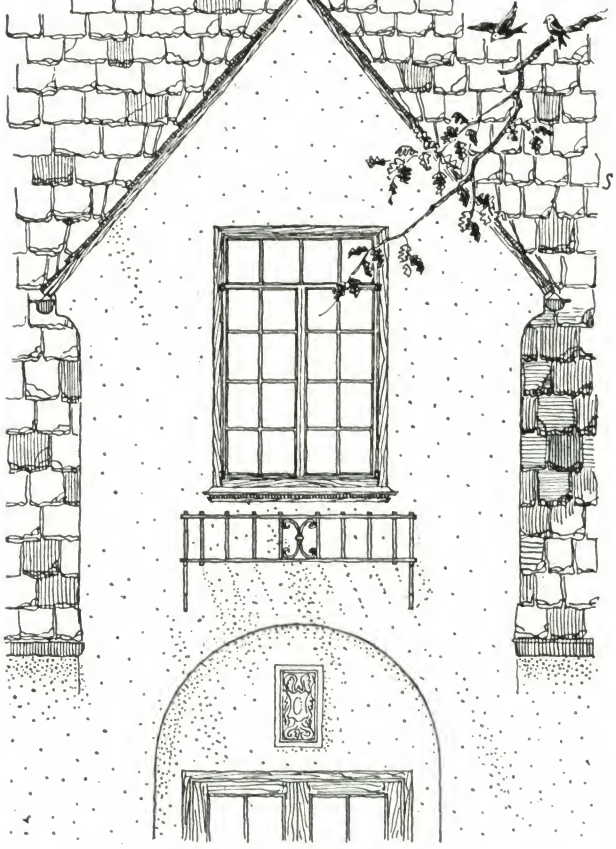
· SECOND · STORY · WINDOW ·



SCALE FOR DETAILS - 3" = 1'-0"

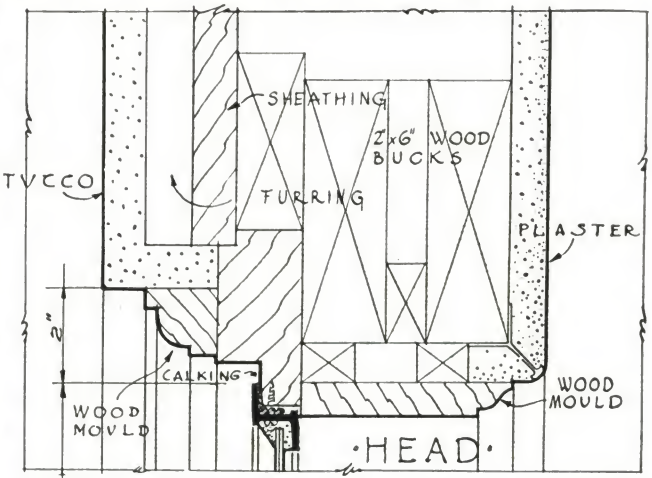
RESIDENCE · OF · MR · R · W · McKINNON · EVANSTON · ILLINOIS

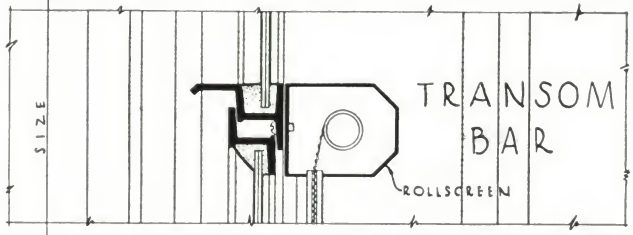
· ERNEST · MAYO & MAYO · ARCHITECTS ·

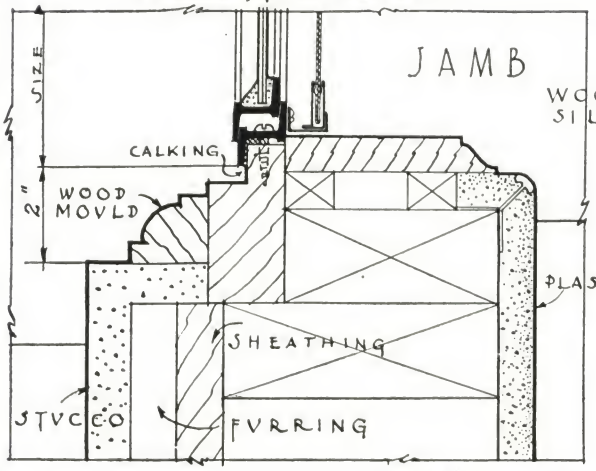


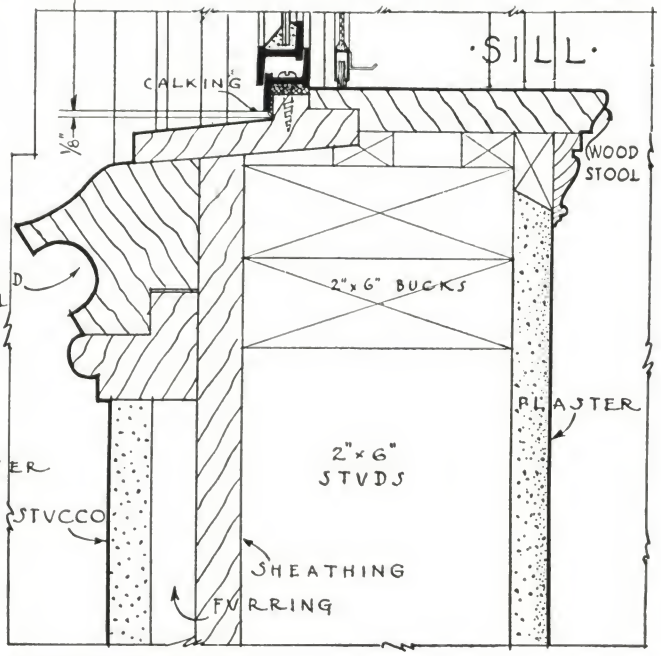
· ELEVATION ·

SCALE ¼ INCH = 1 FOOT









Details modified to show application of rollscreens.

Casement is shown with rollscreen attached to transom bar, permitting shade brackets to be attached to casement. Rollscreens may be concealed in the lintel if desired. See pages 48 to 56 for description, hardware, sizes, screens, etc.

Continued on next page

LUPTON · CASEMENTS

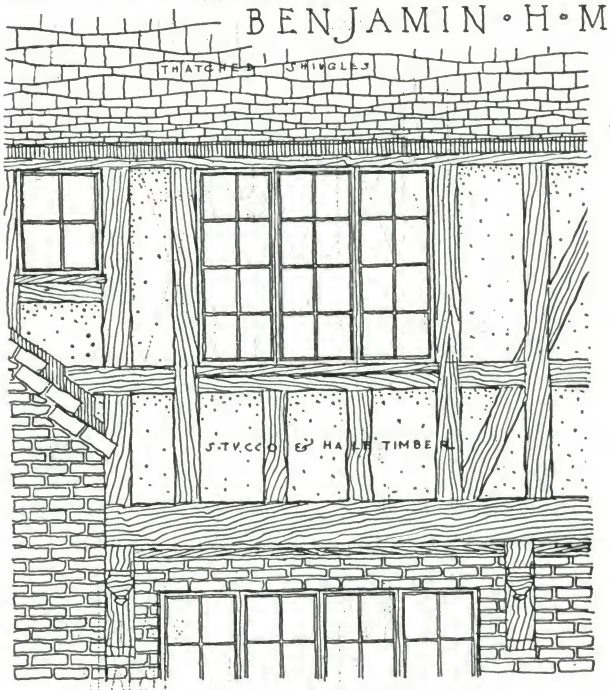
DETAILS · OF · INSTALLATION



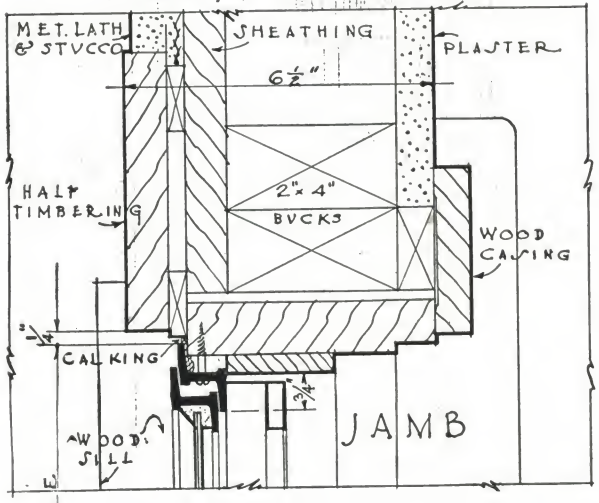
· WINDOW · IN · HALF · TIMBERED · WALL · SCALE FOR DETAILS-3"-1'-0"

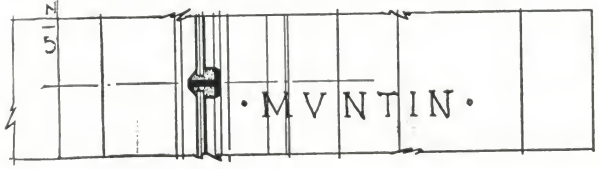
RESIDENCE · OF · MR · M · R · GLASER · GLENCOE · ILLINOIS

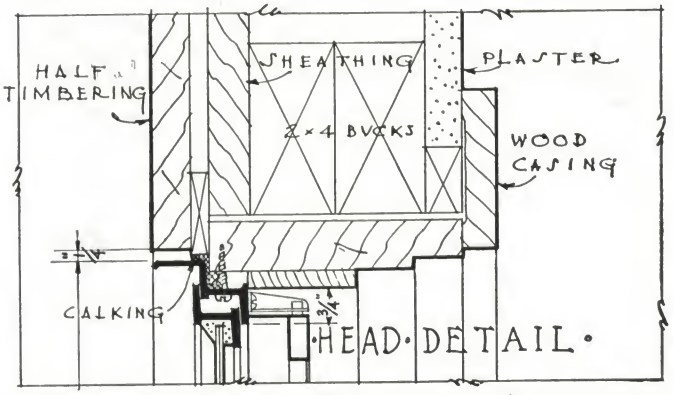
BENJAMIN · H · MARSHALL · · ARCHITECT · ·

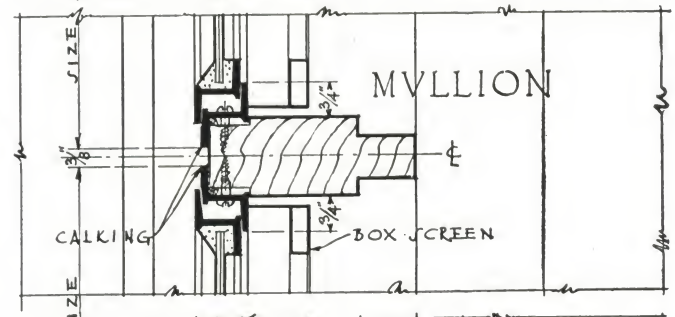


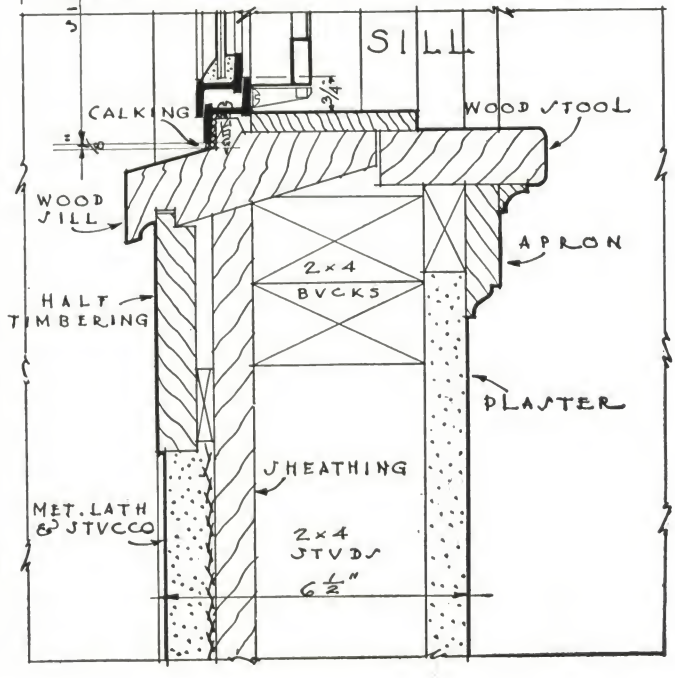
· ELEVATION ·
SCALE 1/4 INCH = 1 FOOT











Details · modified · to · show · new · type · head drip · and · clearance · required · for · screens.

When ventilators extend to head as shown in this detail, shade brackets cannot be attached to casement.
See pages 48 to 56 for description, hardware, sizes, screens, etc.

Continued on next page

LUPTON · CASEMENTS

DETAILS · OF · INSTALLATION

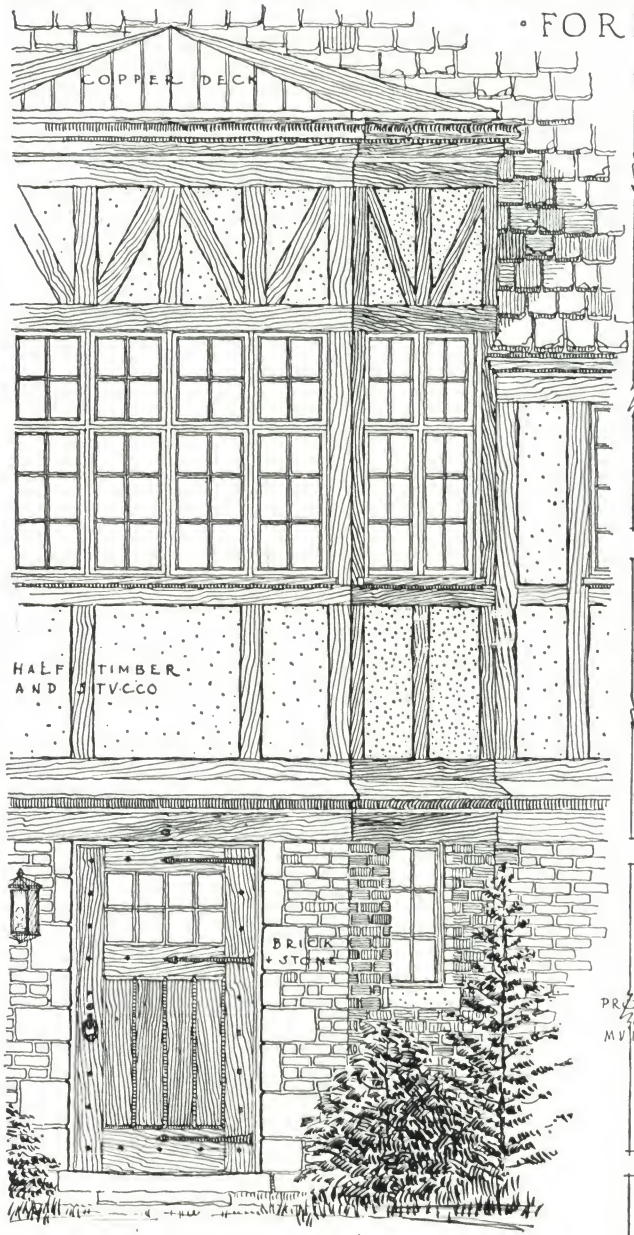
· BAY · WINDOW · IN · STAIR · HALL



SCALE FOR DETAILS - 3" = 1'-0"

RESIDENCE · OF · MR · GEORGE · C · WARREN · JR · SUMMIT · N.J.

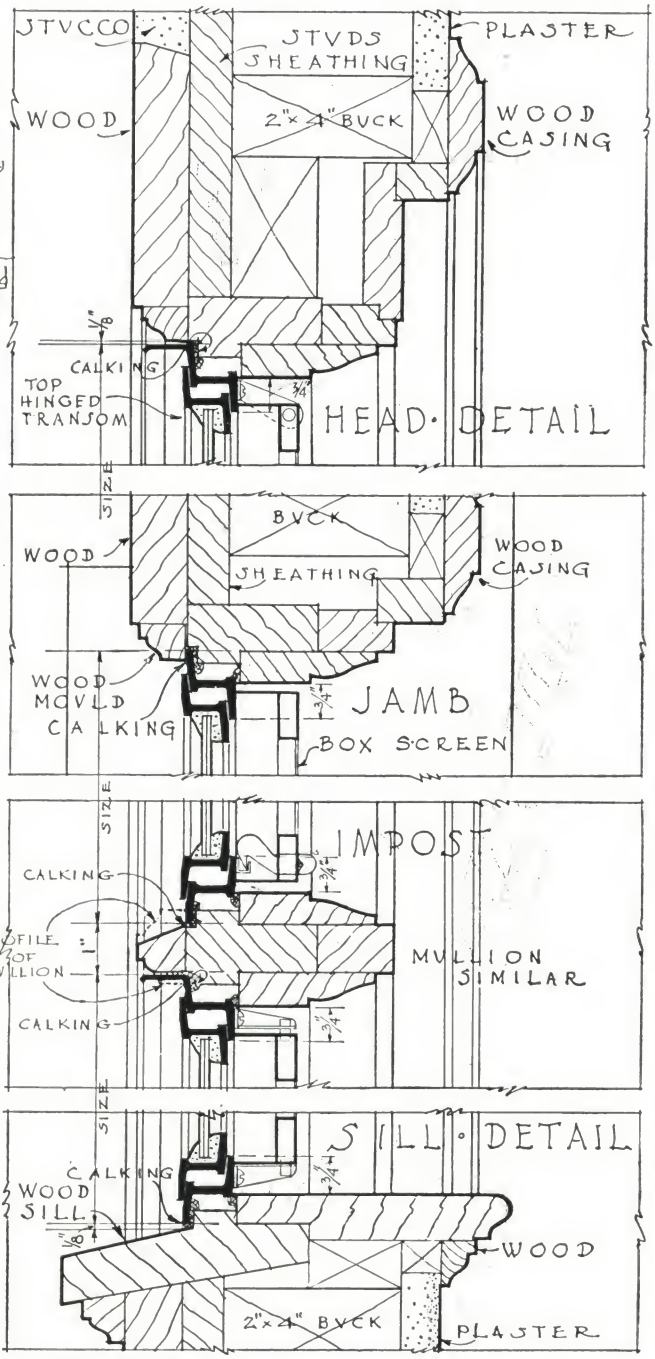
· FORMAN & LIGHT · ARCHITECTS ·



· ELEVATION ·

SCALE 1/4 INCH = 1 FOOT ·

NOTE:
DETAILS MAY BE MODIFIED TO ACCOMODATE ROLLING TYPE SCREENS



Details modified to show application of rollscreens.

When ventilators extend to head as shown in this detail, shade brackets cannot be attached to casement.
See pages 48 to 56 for description, hardware, sizes, screens, etc.

Continued on next page

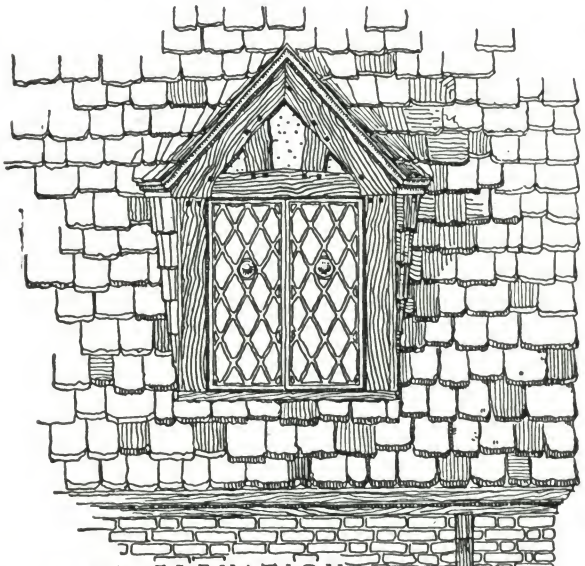
LUPTON · CASEMENTS

DETAILS · OF · INSTALLATION

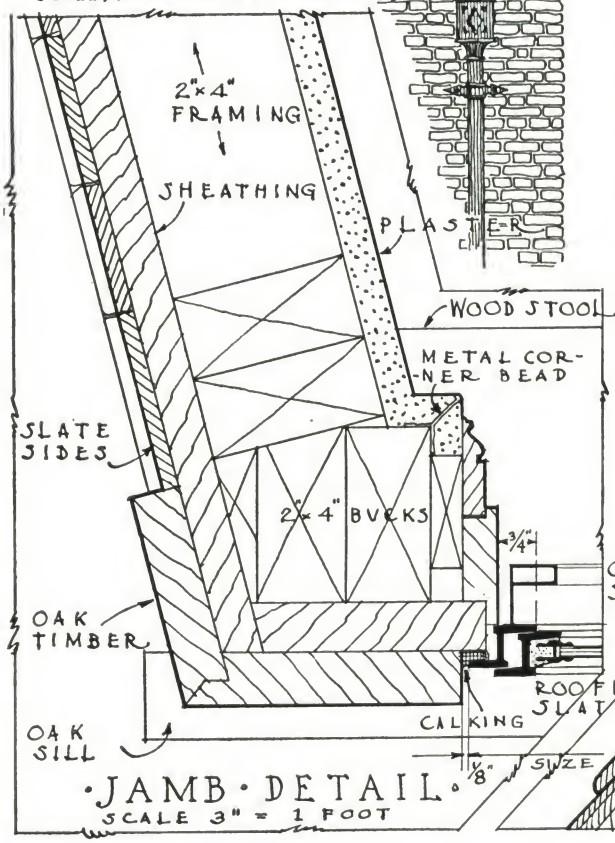
·FOR·A· DORMER· WINDOW·



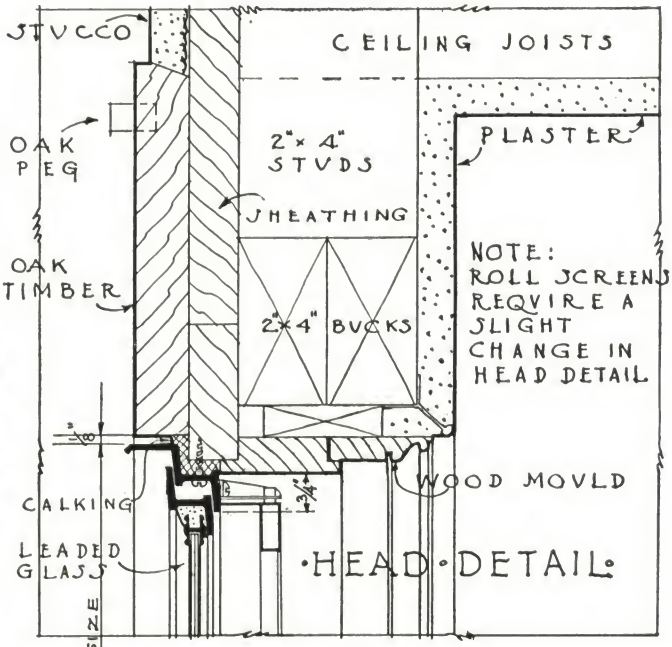
SCALE FOR DETAILS
3" = 1'-0"



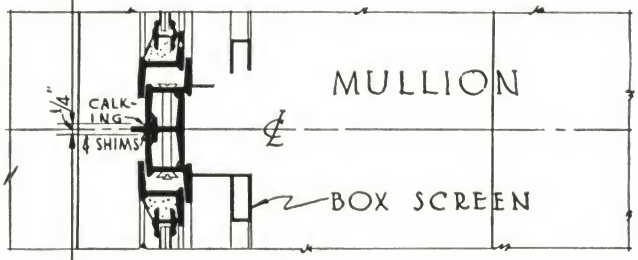
SCALE ¼"=1'-0" ELEVATION

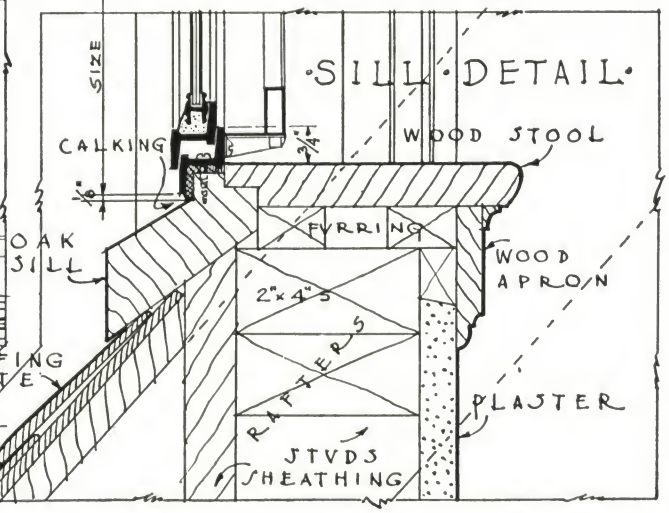


·JAMB·DETAIL·
SCALE 3" = 1 FOOT



·HEAD·DETAIL·





Muntins may be omitted for the use of leaded glass at no extra cost. Lupton does not furnish leaded glass. When ventilators extend to head, shade brackets cannot be attached to casement. See pages 48 to 56 for description, hardware, sizes, screens, etc.

Continued on next page

LUPTON · CASEMENTS

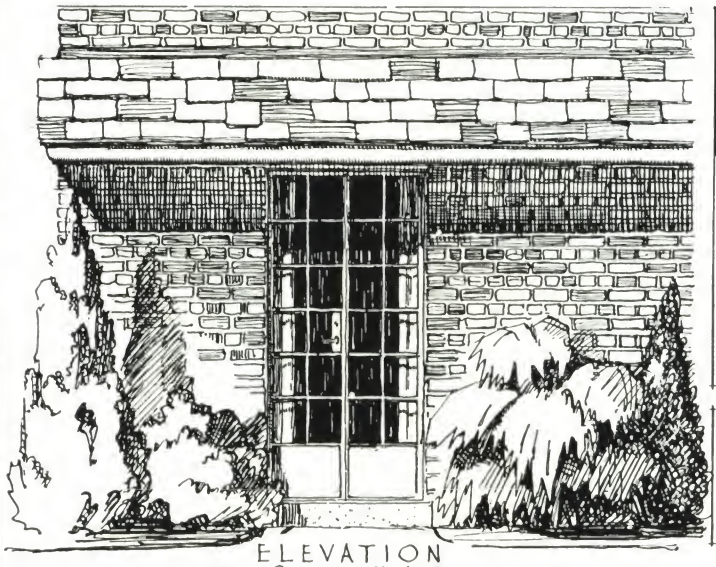
DETAILS · OF · INSTALLATION



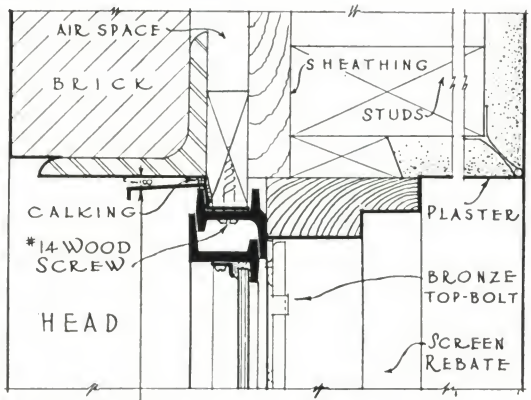
STANDARD CASEMENT DOORS

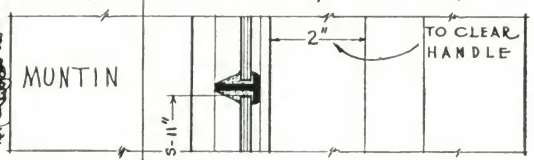
INSTALLATION IN BRICK VENEERED WALLS

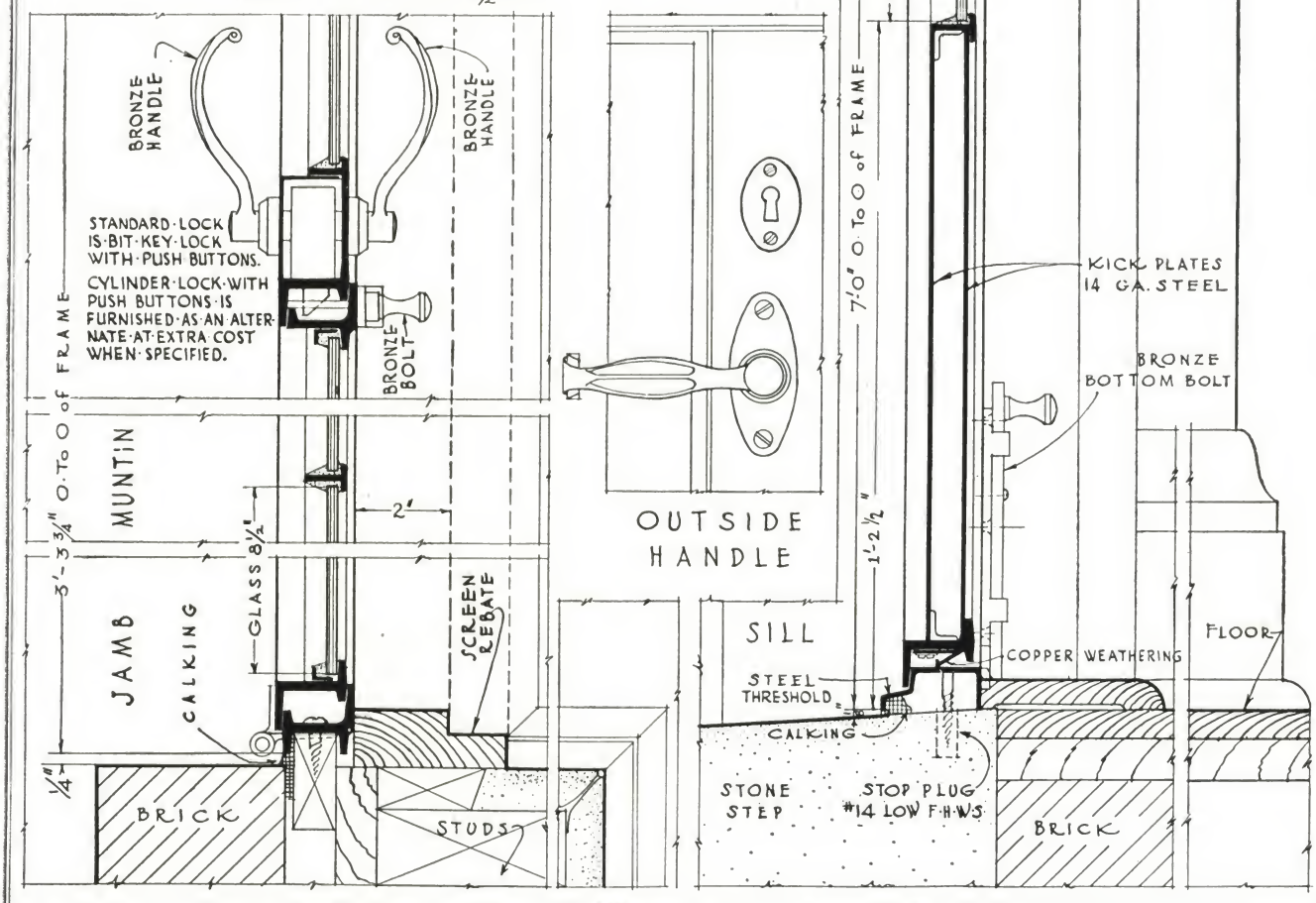
SCALE for DETAILS 3" = 1'-0"



ELEVATION
SCALE 1/4"-1'-0"
NOTE — ALL GLASS 8½" x 11"





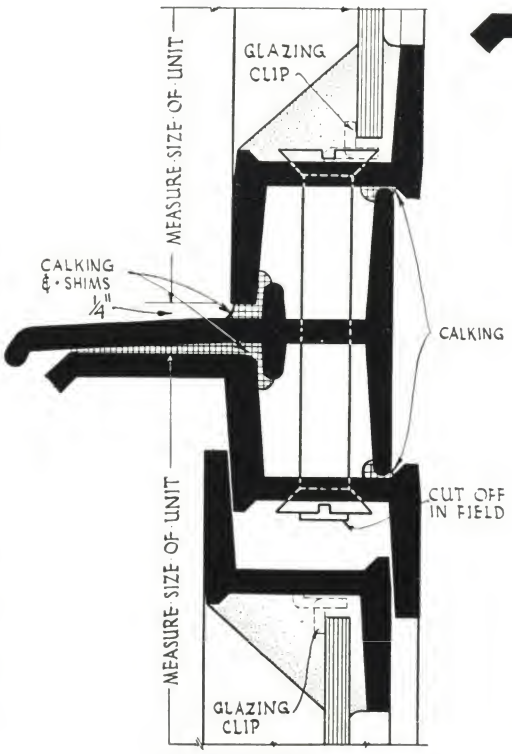


Standard casement doors are made in one size and design only, as shown in detail above. Other types of casement doors are described on pages 18 to 21

LUPTON · CASEMENTS

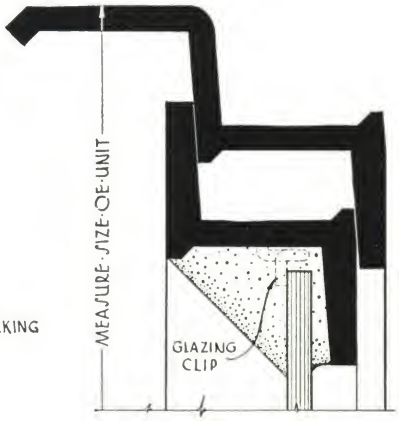
FULL · SIZE · SECTIONS





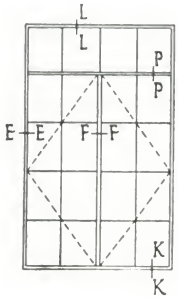
IMPOST

FIXED · UNIT SHOWN OVER · VENTILATOR · UNIT
SIMILAR CONSTRUCTION · USED · BETWEEN · TWO
FIXED · UNITS OR · TWO · VENTILATOR UNITS.



HEAD

FOR VENTILATOR UNIT

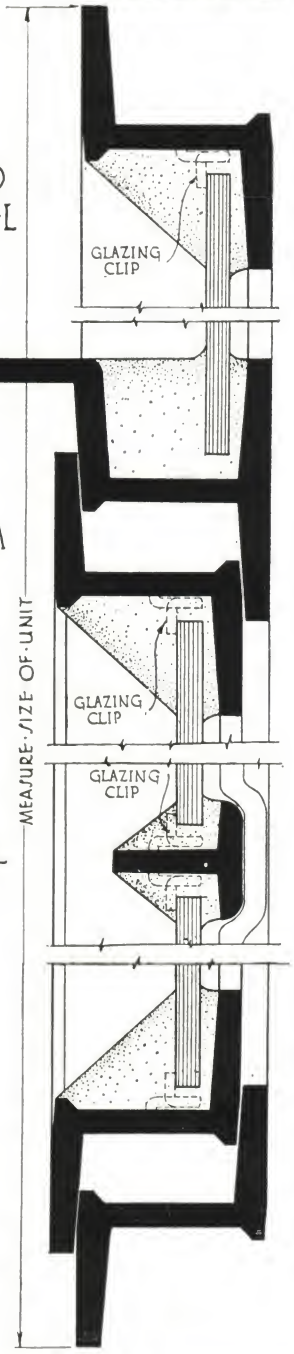


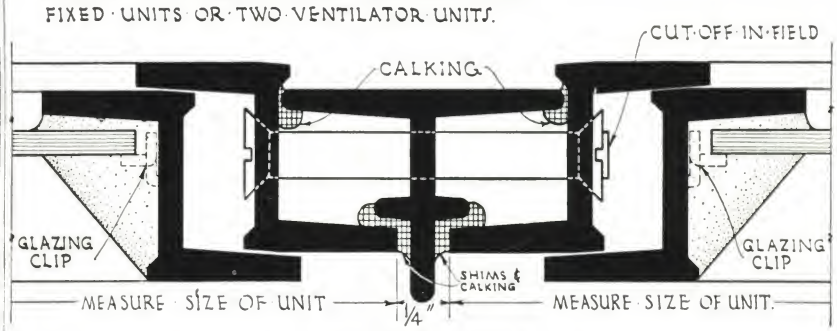
HEAD
SEC · L-L

TRANSOM
BAR
SEC · P-P

HORIZONTAL
MUNTIN

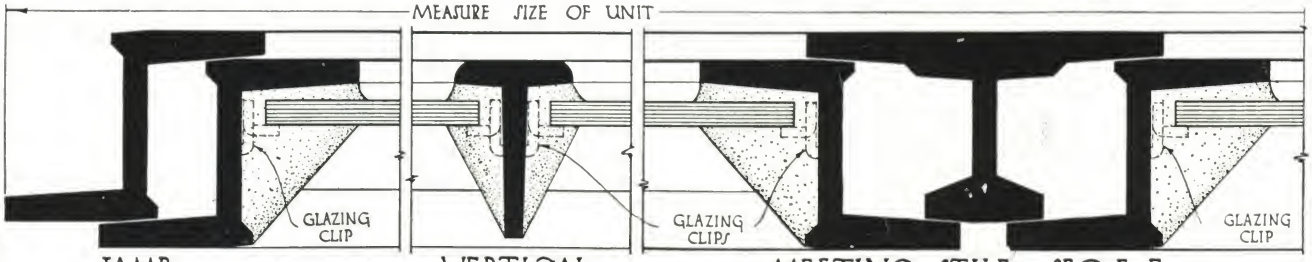
SILL
SEC · K-K





·MULLION·

TWO · VENTILATOR · UNITS · SHOWN · SIDE · BY · SIDE.
SIMILAR · MULLION · USED · BETWEEN · TWO · FIXED · UNITS,
OR · BETWEEN · A FIXED · UNIT · AND · A VENTILATOR · UNIT.



JAMB
SEC · E-E

VERTICAL
MUNTIN

MEETING-STILE · SEC · F-F
BETWEEN · TWO · VENTILATORS

Continued on next page

LUPTON BASEMENT WINDOWS

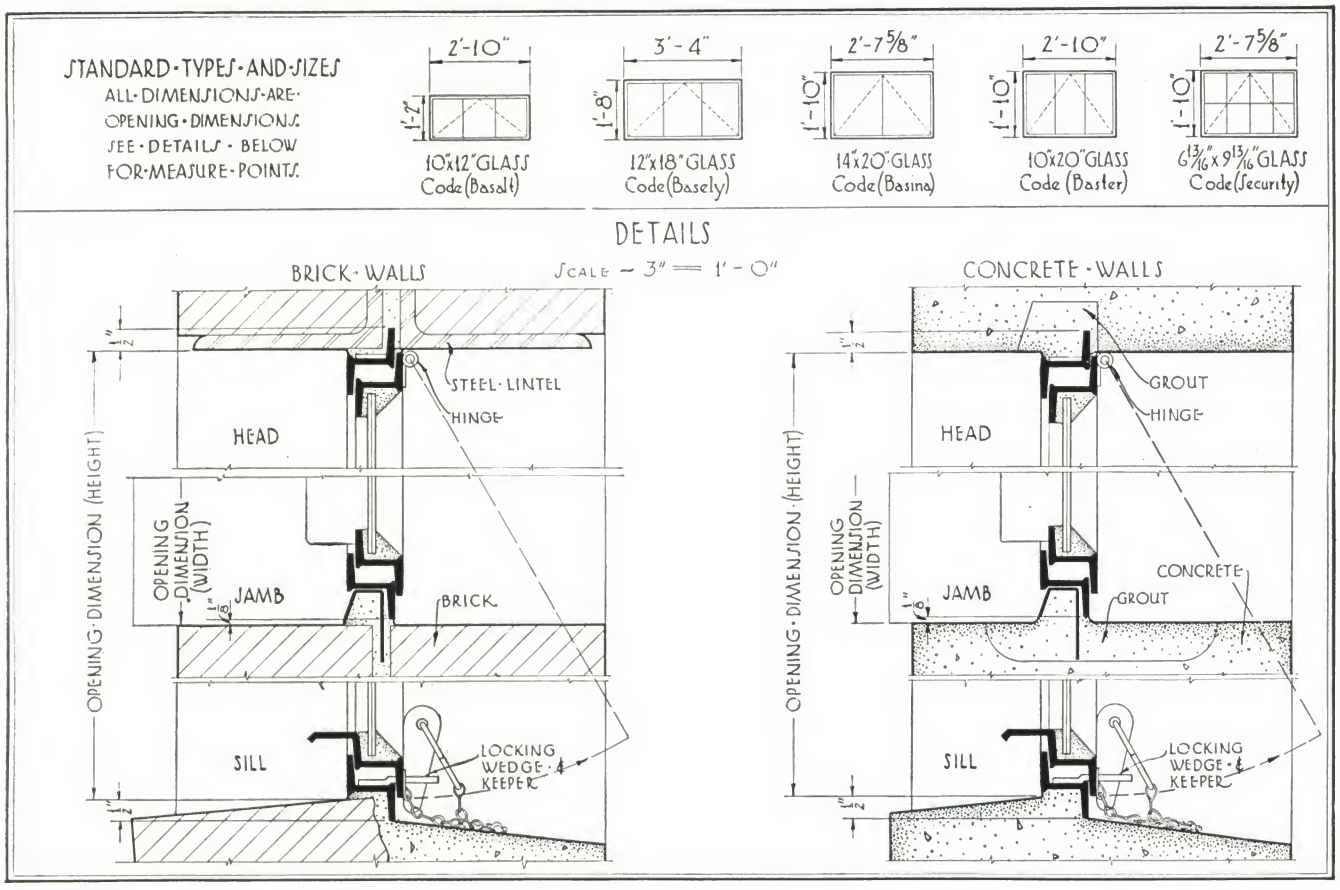
These windows give maximum light and ventilation and are carried in stock by Lupton Dealers. Made of the same steel sections as Lupton Residence Casements with welded corners and a bottom rail specially shaped to exclude moisture. Split hinge pins permit removal of ventilators from inside.

Security Type Window has small glass lights that keep out intruders. It can be locked closed or about 5 in. open. Hinge pins in Security Windows cannot be removed.

Provision is made for attaching screens.

Windows are painted gray and have steel locking pegs.

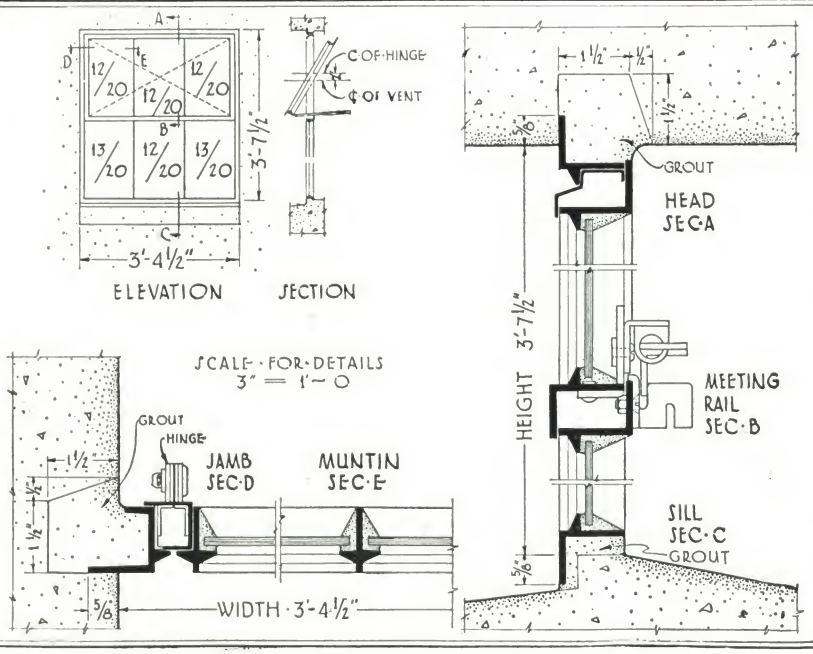
Padlocks are not furnished by Lupton.



LUPTON UTILITY WINDOW

This window is designed to afford maximum light in small buildings, private garages and basements that are high above grade. The pivoted ventilator at the top of the window, swinging out at bottom and in at top, supplies fresh air without interfering with space requirements. Windows are glazed on the inside. Ventilators are equipped with a standard angle-iron stay bar and holder for hand operation and are painted gray.

Illustration shows details of an installation in a concrete wall; details for pivoted windows shown on pages 87 to 90 may be followed when setting in other types of walls.



Continued on next page.

LUPTON ARCHITECTURAL PROJECTED WINDOWS

Some buildings, or parts of buildings, because of limits in cost or because of other restrictions will not permit the use of the casement windows previously described.

In such cases, Lupton Architectural Projected Windows, made of medium weight sections, will often fill the requirements of good ventilation and lighting with entire satisfaction.

Opening sizes, glass sizes and wall details are the same for both inside and outside glazed windows.

Note: *Architectural Projected Windows are made in the same fifty standard sizes as the Projected Casements described on page 33 and the Double Hung Windows described on page 72.*

SPECIFICATION FOR LUPTON ARCHITECTURAL PROJECTED WINDOWS

Work Included

1. Furnish and install where shown on drawings, Lupton Steel Architectural Projected Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Materials

2. Frame members shall be heavy, specially designed, solid steel channel section.

3. Ventilator members shall be specially designed, solid steel angle sections.

4. Muntins shall be specially designed, solid steel cruciform section 1⅜ in. deep.

5. Vertical mullions shall be formed steel plate.

Note: *Structural steel members forming Imposts are not furnished by the window manufacturer.*

Construction

Note: *Specify whether windows are to be inside or outside glazed.*

6. Both Frames and Ventilators shall be assembled by tenoned, riveted and welded joints at the corners. Continuous, two-point, flat contact weathering shall be provided between ventilators and frames.

7. Muntin Bars shall be attached to frame members by tenoned, riveted joints and shall be so interlocked at their intersections that the strength and rigidity at the intersection is increased.

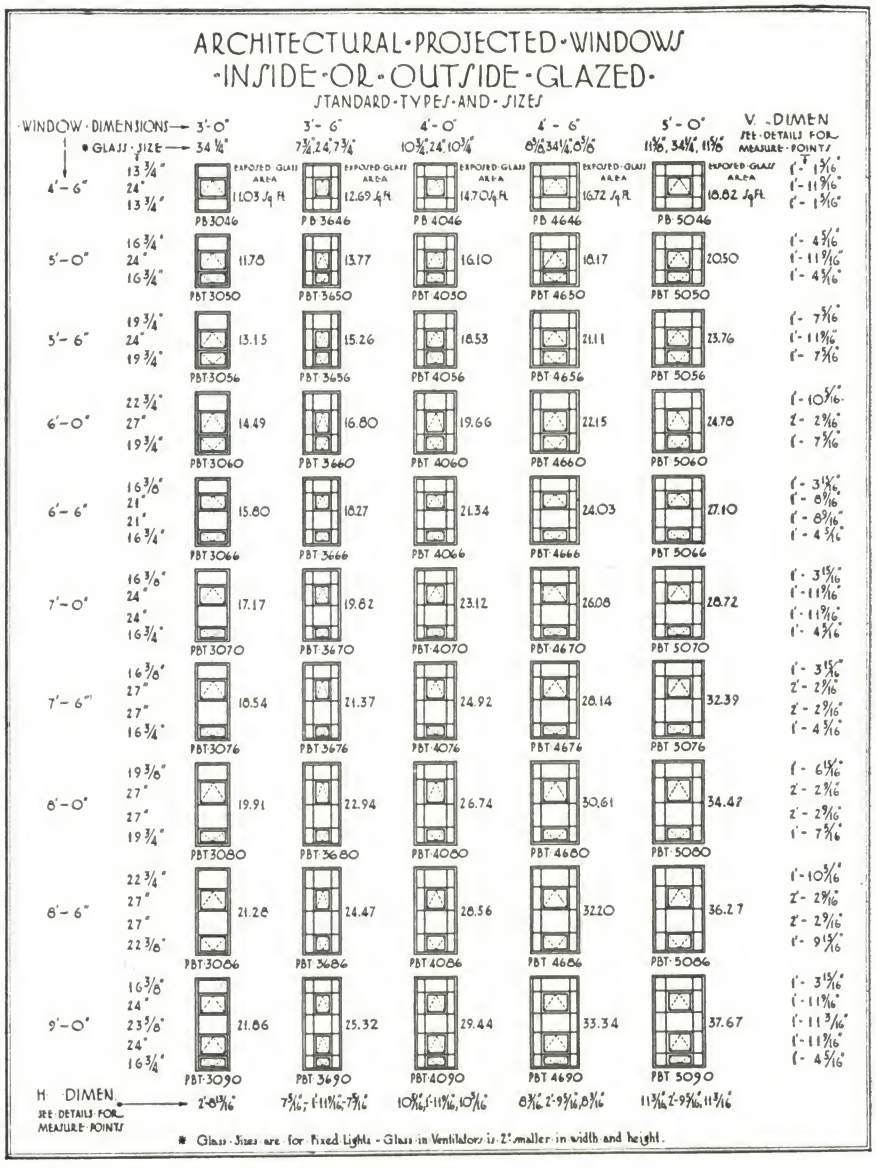
8. Vertical Mullions and bolts for attachment shall be provided where two or more windows are placed side by side.

9. Anchor Clips of 13-gauge steel for jamb, sill and head shall be furnished and applied in field.

10. Each ventilator shall be accurately pivoted on two ventilator arms of solid steel. The connections between the ventilator arms and the window frames shall be made by steel arm blocks.

11. Each ventilator shall be equipped with two brass friction shoes, sliding vertically in the ventilator jambs to guide the ventilator and prevent rattling. Each shoe shall be equipped with a rustproofed, flat steel spring attached to the ventilator to insure constant pressure at the jambs.

12. Universal Clip shall be an angle clip 1⅛ in. x 1 in., 2 in. long riveted to the ventilator frame to provide for attaching cam handle.



Standard sizes reduce costs of windows, lintels, sills, shades, awnings and screens

Continued on next page

Hardware

13. All handles shall be bronze.

Note: Specify polished or natural finish as desired.

14. All bronze hardware (listed below) shall be shipped unattached, carefully packed to prevent damage until applied for use.

Note: The following hardware is standard:

For Projected-Out-at-Bottom Ventilators

Bronze Cam Handle—when handle is within reach from floor.

Bronze Ring Type Cam Handle and Bronze Pull Down Ring—when handle is beyond reach from floor.

For Projected-In-at-Top Ventilators

Bronze Cam Handle.

Erection *(See page 1)*

15. All Architectural Projected Windows shall be erected in prepared openings by the window contractor unless otherwise specified.

16. All Architectural Projected Windows shall be set plumb and true, properly aligned and securely anchored before glazing. Mullions shall be bolted securely to Frames.

Note: Specify calking if desired. See note at end of specification.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Architectural Projected Windows. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

Painting *(See page 1)*

17. All Architectural Projected Windows shall receive one shop coat of window manufacturer's standard dark gray paint, oven-dried.

Note: See page 1.

Glass and Glazing

Note: (See also page 1.) Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify a high-grade steel window putty (ordinary wood sash putty must not be used).

(c) Specify that Lupton Architectural Projected Windows shall be glazed from the outside, the glass shall be set in a bed of putty, and held by Lupton standard wire glazing clips.

or (d) Specify that Lupton Architectural Projected Windows shall be glazed from the inside, the glass shall be set in a bed of putty and held by continuous glazing stops.

CALKING

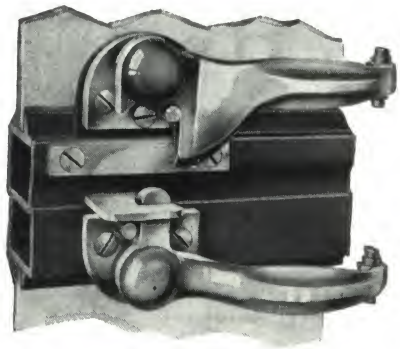
Calking furnished at added cost:

1. When specified non-staining elastic calking cement will be furnished for calking at head, jambs and sill.

2. Erectors will apply this calking cement at time of erection at the points indicated in the standard details, only when such application is specified.

HARDWARE FOR LUPTON ARCHITECTURAL PROJECTED WINDOWS

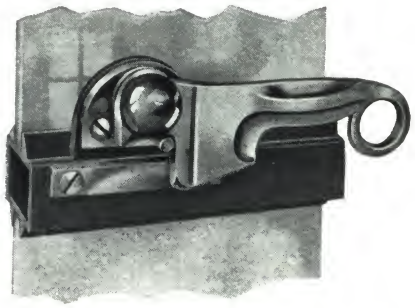
Handles and pull-down rings are bronze with natural bronze finish or bronze highly polished, as specified



Cam Handle No. 268
(at top)

Used on Projected-Out-at-Bottom ventilators within reach from floor. Mounted on universal clip riveted to frame of ventilator.

Lower handle No. 266 shown in combination with No. 268 and illustrates its application at meeting rail condition.



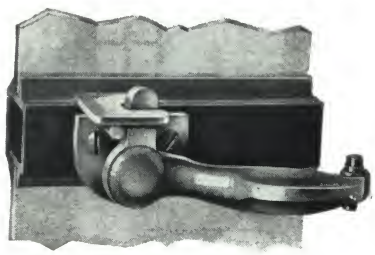
Ring Type Cam Handle No. 328

Used at center of Projected-Out-at-Bottom ventilators beyond reach from floor. For pole operation. Mounted on universal clip riveted to frame of ventilator.



Pull-down Ring No. 358

Used on Projected-Out-at-Bottom ventilators. For pole operation.



Cam Handle No. 266

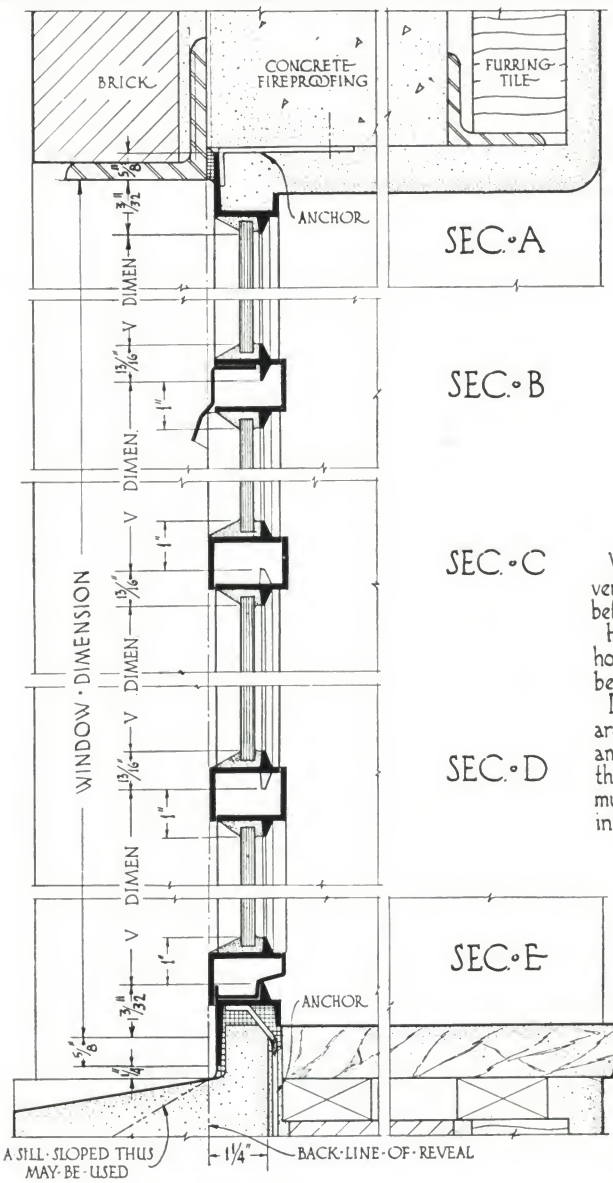
Used on Projected-In-at-Top ventilators. Steel keeper welded to frame

A special is an odd size between two less expensive standards

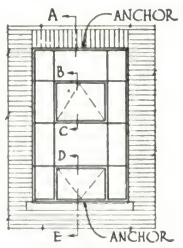
Continued on next page

ARCHITECTURAL • PROJECTED • WINDOWS • OUTSIDE • PUTTY • GLAZED

SCALE • FOR • DETAILS – 3″ = 1′-0″



• NOTE •
Ventilators open to positions indicated by dotted lines to permit cleaning from inside the building



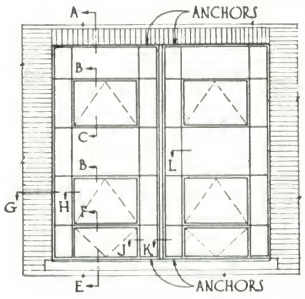
• ELEVATION • VENTILATORS CLOSED



• SECTION • VENTILATORS OPEN

V. Dimens. are the vertical distances – between sight lines.
H. Dimens. are the horizontal Distances between sight lines.
Dimensions given are for fixed lights and are measured to the flanges of the muntin bars as shown in details.

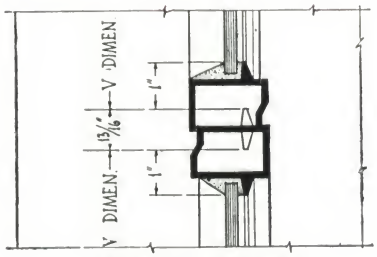
SCALE ⅛″ = 1′-0″



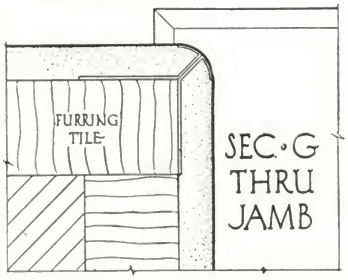
• ELEVATION • VENTILATORS • CLOSED



• SECTION • VENTILATORS OPEN



SEC. • F • THRU MEETING • RAIL



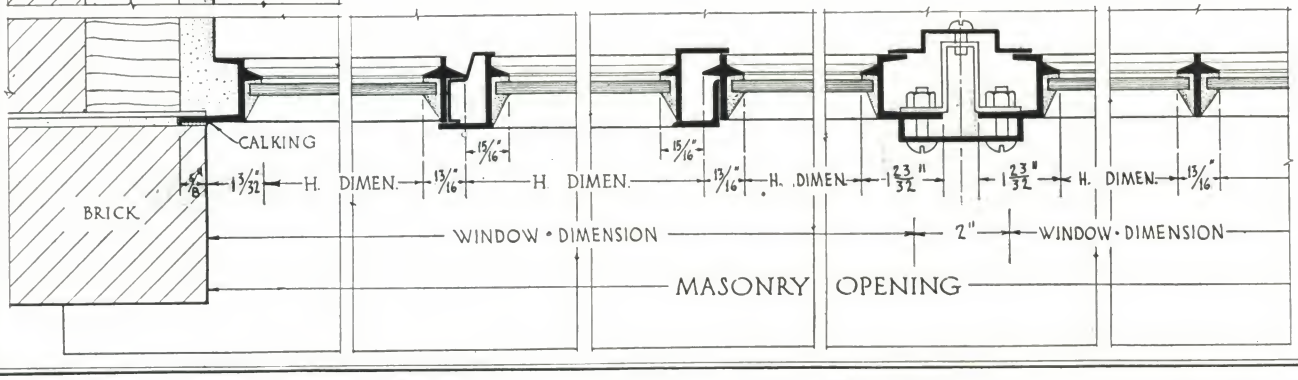
SEC. • G THRU JAMB

SEC. • H

SEC. • J

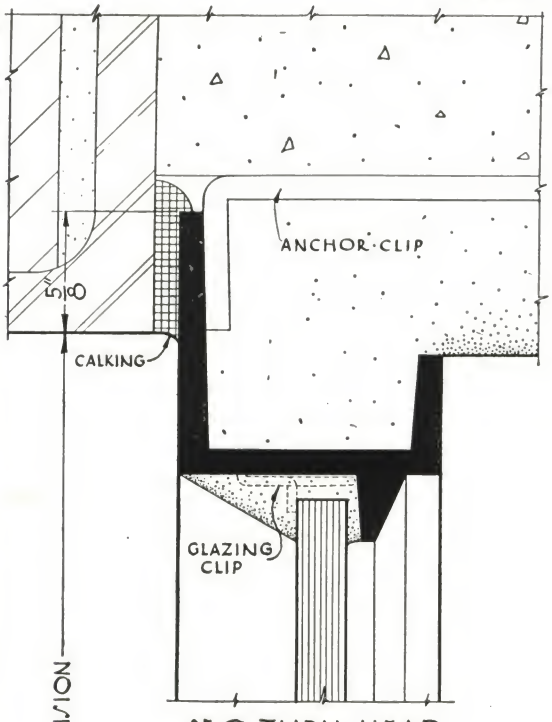
SEC. • K • THRU MULLION

SEC. • L • THRU MUNTIN

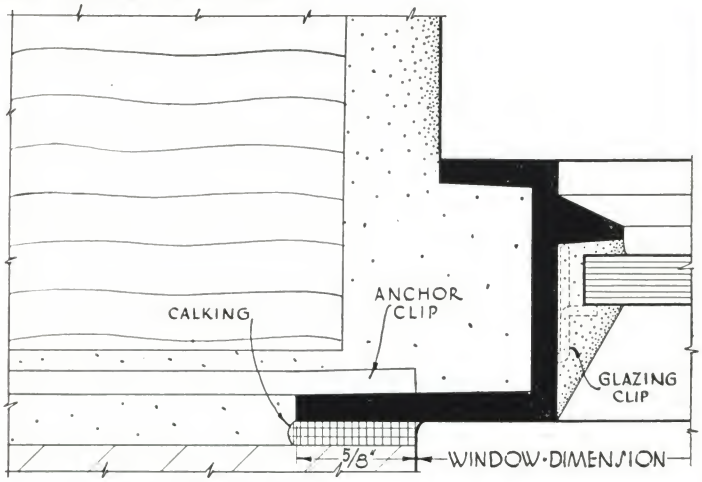


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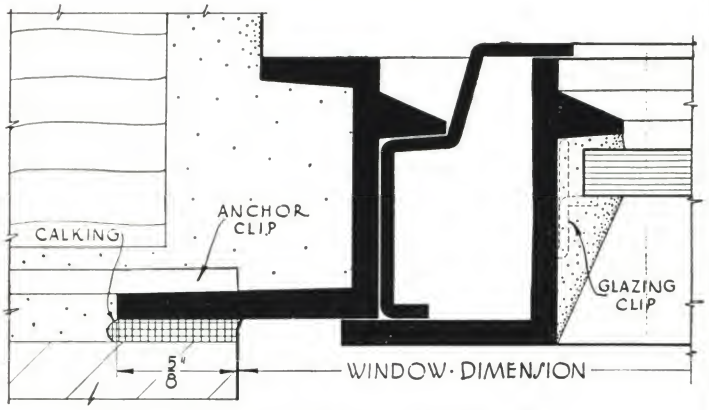
ARCHITECTURAL · PROJECTED · WINDOWS
OUTSIDE · PUTTY · GLAZED
FULL · SIZE · SECTIONS



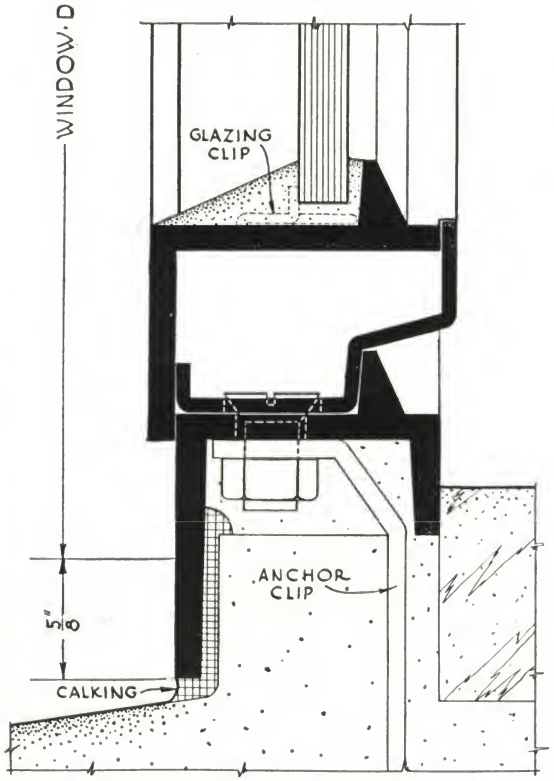
SEC · THRU · HEAD



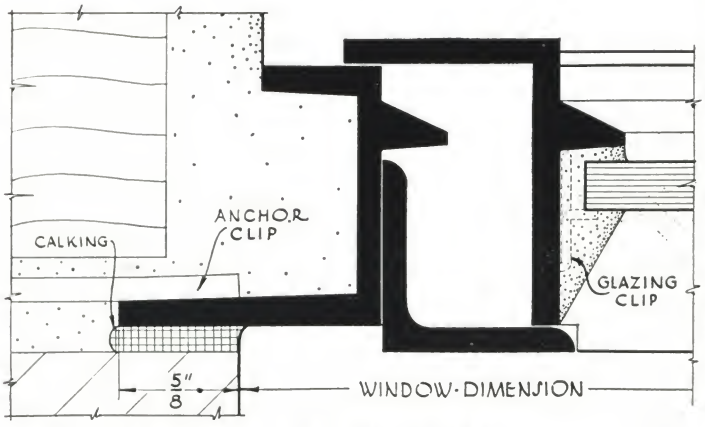
SECTION · THRU · JAMB
OF · FIXED · LIGHT



SECTION · THRU · JAMB · OF
BOTTOM · PROJECTED · OUT · VENTILATOR



SECTION · THRU · SILL · OF
IN · AT · TOP · VENTILATOR

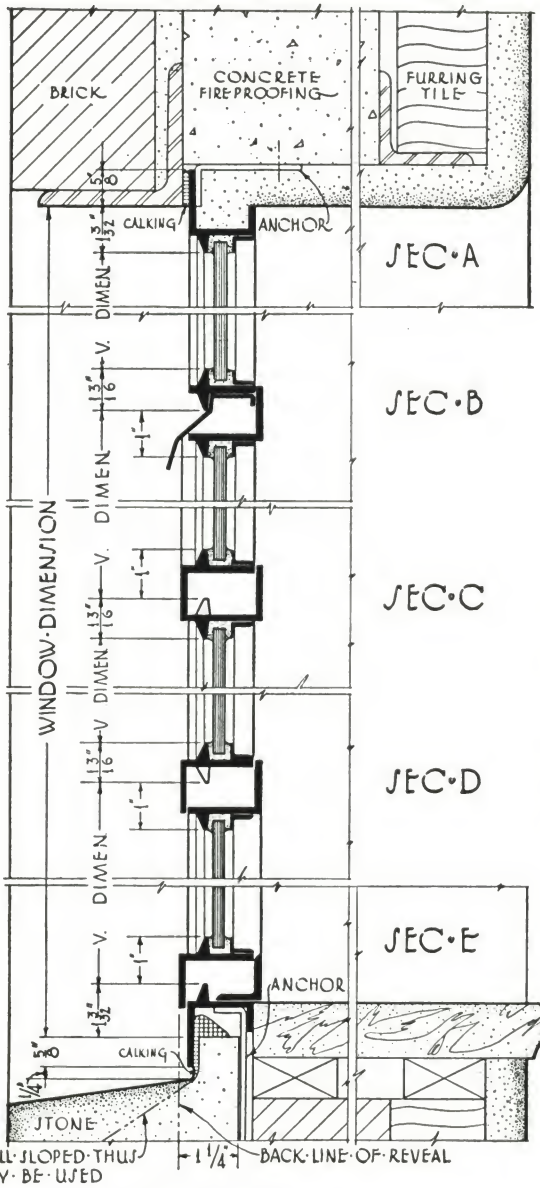


SECTION · THRU · JAMB
OF · IN · AT · TOP · VENTILATOR

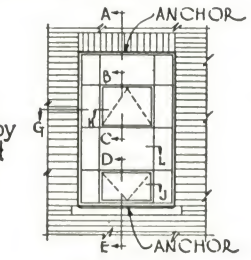
Continued on next page

ARCHITECTURAL PROJECTED WINDOWS INSIDE GLAZED

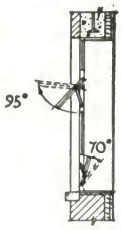
SCALE FOR DETAILS ~ 3" 1'-0"



NOTE
Ventilators open to positions indicated by dotted lines to permit cleaning from inside the building.

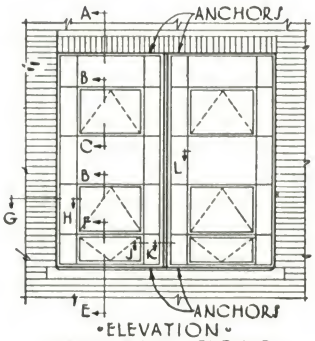


ELEVATION VENTILATORS CLOSED

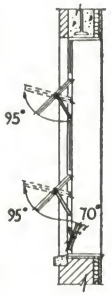


SECTION VENTS OPEN

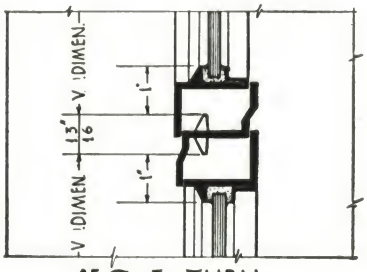
V. Dimens. are the vertical distances between sight lines.
H. Dimens. are the horizontal distances between sight lines.
Dimensions given are for fixed lights and are measured to the flanges of the muntin bars as shown in the details.



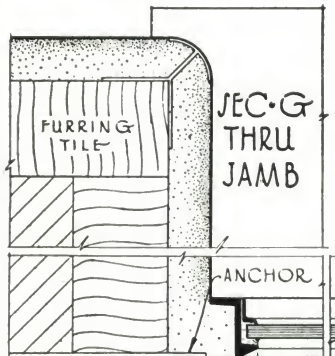
ELEVATION VENTILATORS CLOSED



SECTION VENTS OPEN



SEC F THRU MEETING RAIL



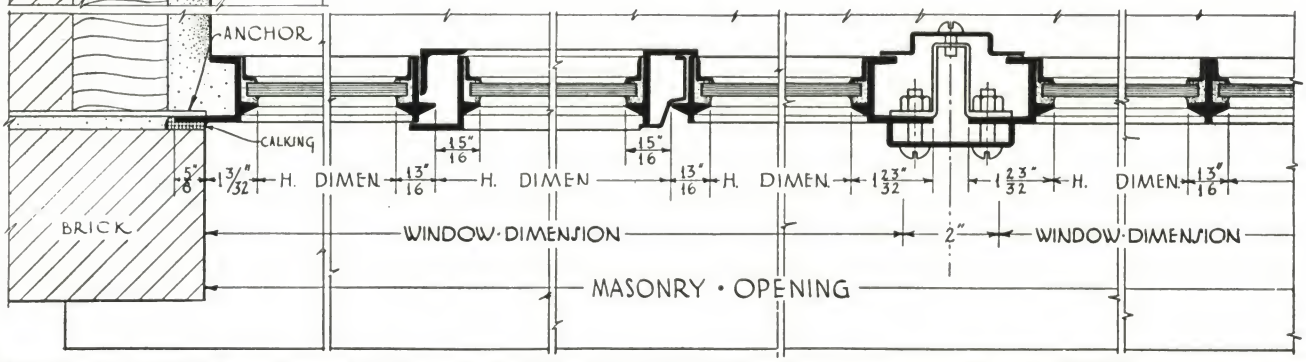
SEC G THRU JAMB

SEC H

SEC J

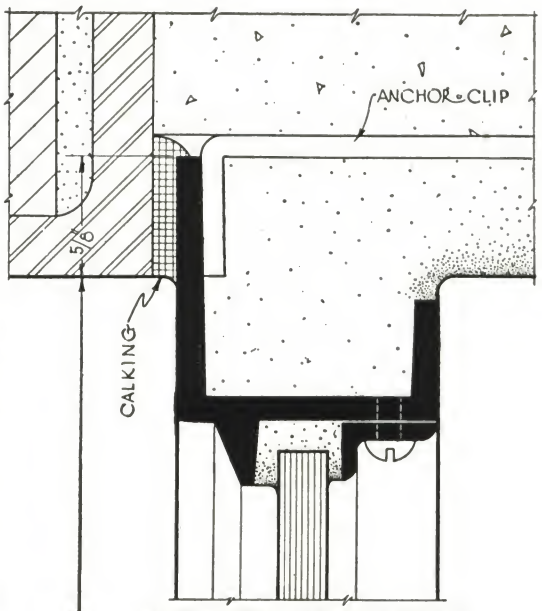
SEC K THRU MULLION

SEC L THRU MUNTIN

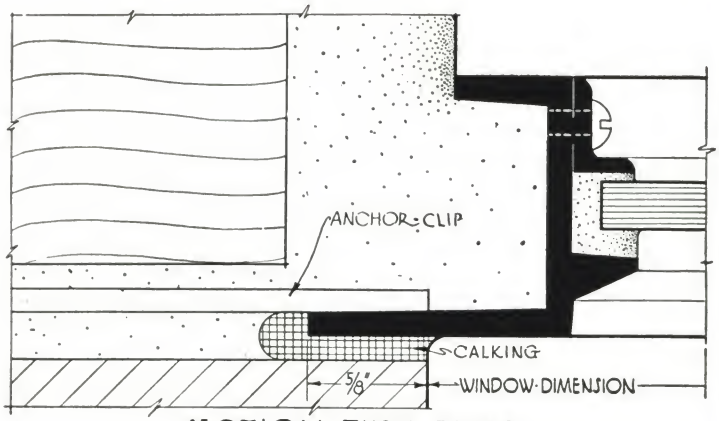


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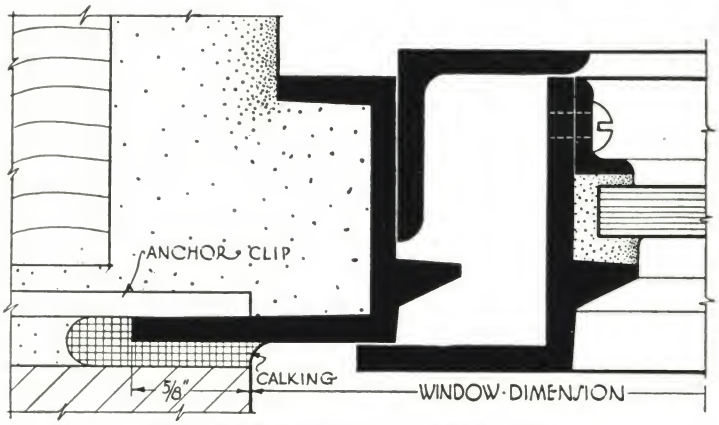
ARCHITECTURAL • PROJECTED • WINDOWS
INSIDE • GLAZED • WITH • GLAZING • ANGLES
FULL • SIZE • SECTIONS



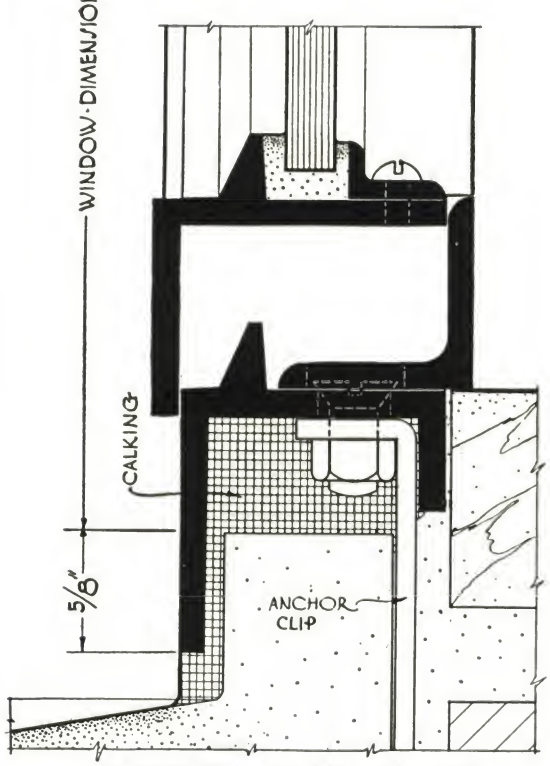
SECTION • THRU • HEAD



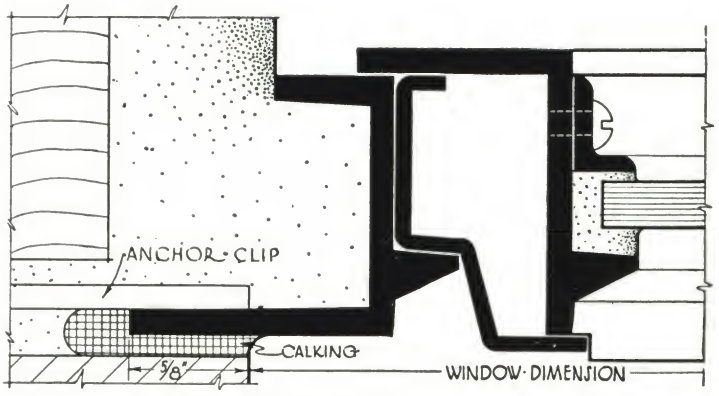
SECTION • THRU • JAMB
OF • FIXED • LIGHT



SECTION • THRU • JAMB • OF
PROJECTED • OUT • AT • BOTTOM • VENTILATOR



SECTION • THRU • SILL • OF
PROJECTED • IN • AT • TOP • VENTILATOR



SECTION • THRU • JAMB • OF
PROJECTED • IN • AT • TOP • VENTILATOR

Continued on next page

LUPTON DOUBLE HUNG WINDOWS

These windows are so designed as to permit the sash to slide up and down easily and at the same time to prevent excessive air infiltration. The frames and sash are made of zinc-coated steel plate. They are furnished with or without muntins. Standard practice includes weather-stripping at jambs and sill but we furnish, at extra cost, additional weather-stripping at head and meeting rail when it is so specified. There are two types, E and F, each in fifty sizes.

Windows without muntins are standard. With muntins arranged as shown on page 73 the window is a "listed special." Muntins arranged any other way make the window special.

[*Note: These windows are made in the same fifty standard sizes as the Projected Casements described on page 33 and the Architectural Projected Windows described on page 66.*]

SPECIFICATION FOR LUPTON DOUBLE HUNG WINDOWS (Types E and F)

Work Included

1. Furnish and install where shown on drawings, Lupton Steel Double Hung Windows manufactured by DAVID LUPTON'S SONS CO., Philadelphia, Pa.

Materials

2. Sash members shall be of 14 gauge on windows up to 4 ft. 0 in. wide, and 13 gauge on windows over 4 ft. 0 in. wide. Glazing strips shall be 14 gauge for all rails except bottom rail. The glazing strip for the bottom rail shall be 13 gauge. All sash members shall be cold galvanized strip steel.

3. Frame members (E Type) — Head, head cover, jamb box and removable jamb piece shall be made of 20 gauge and the sill of 16 gauge. All frame members shall be hot galvanized, dull-coated steel sheets.

4. Frame members (F Type)—The head shall be made of 16 gauge, the head cover of 16 gauge, the sill of 13 gauge, the jamb box proper of 14 gauge and the removable jamb piece of 16 gauge. All frame members shall be hot galvanized, dull-coated steel sheets.

5. Parting Strips shall be made of 16 gauge cold galvanized strip steel.

6. Muntin Bars shall be made of 16 gauge cold galvanized strip steel.

7. Muntin Glazing Strips shall be made of 14 gauge cold galvanized strip steel.

Construction

8. Sash members shall be designed with flanges to enter groove in head and jamb boxes. The bottom rail of the lower sash shall form a double contact with the sill member. The meeting rail shall interlock. The sash members shall be mitered and arc welded at all corners.

9. Frame members—The head (exclusive of cover) and sill shall each be made of one piece of steel. The jamb box shall consist of three parts: (1) the box proper, (2) a removable piece for access to weights, (3) a parting strip. The removable piece and the parting strip shall each be in two sections with the joint at the level of the meeting rail. The sash weights shall be separated by a division strip. The frame members shall be coped to fit each other at corners and arc welded.

10. Muntin bars shall be spotwelded to sash members.

11. Muntin Glazing Strips shall be attached to muntins with low round-head machine screws.

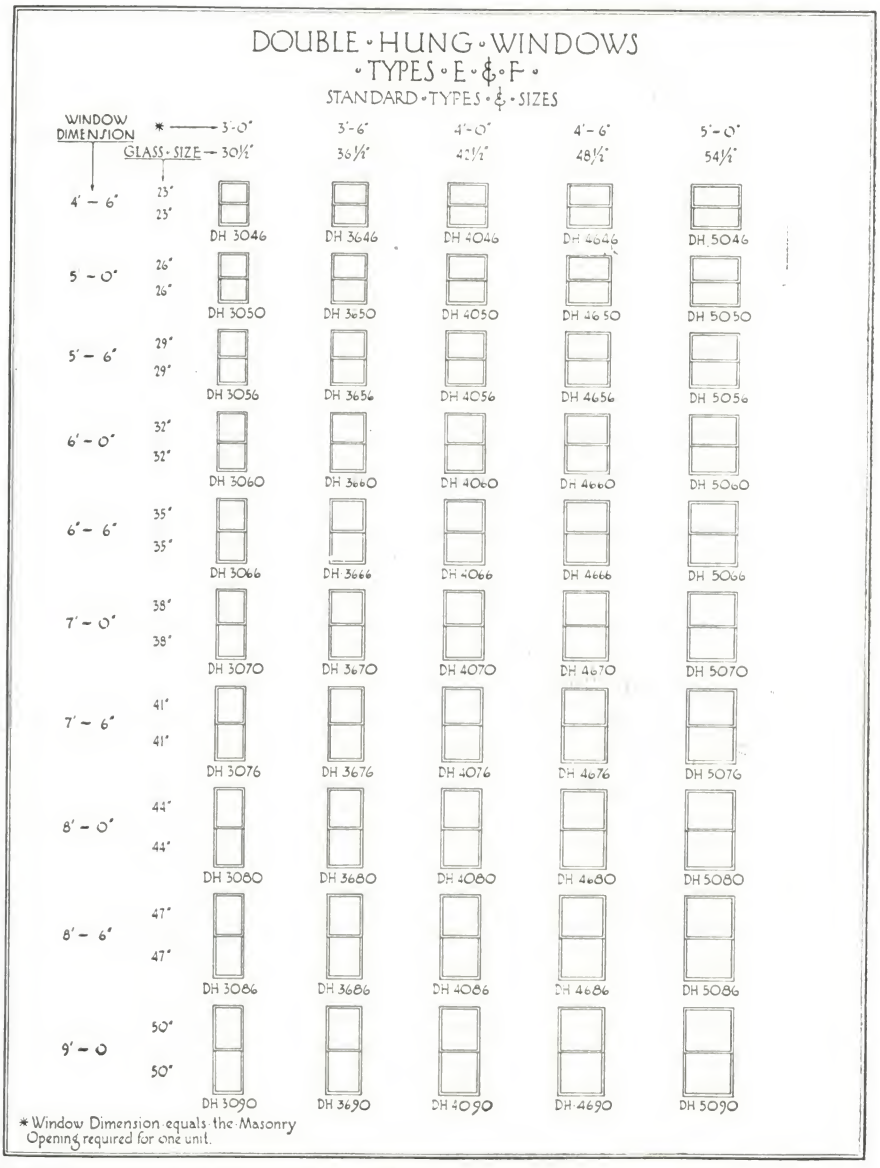
12. Weather Stripping of 22 gauge steel, galvanized, shall be furnished for the jambs and a sponge-rubber weather-strip shall be furnished at sill.

Note: Additional spring bronze weathering at head and meeting rail is furnished when specified at slight added cost.

Attached Hardware

13. Each window shall be equipped with four pulleys machined from cold-rolled steel. The pulleys shall have oilless bearings and shall be set in a 13 gauge steel pulley pan. The sash chain shall be American Chain Co. No. 130 Galvanized Sash Chain.

14. The Glazing Strip for the bottom rail of the lower sash shall act as a continuous lift.



Standard sizes cost less than specials

Continued on next page

Unattached Hardware

15. The following hardware shall be shipped unattached and carefully packed to prevent damage until applied for use.

16. Meeting Rail Locks shall have cam action and shall be malleable iron with cold galvanized Lupton No. 70 finish.

17. Pull-Down Handle shall be malleable iron, cold galvanized Lupton No. 70 finish, for attaching to lower rail of top sash.

18. Pull-Down Socket shall be malleable iron, cold galvanized Lupton No. 70 finish, for attaching to upper rail of top sash for pole operation.

Calking

Note: (See page 1.) Calking is not done by Lupton, but when specified, non-staining elastic calking cement is furnished by Lupton at added cost.

Erection

Note: (See page 1.) Lupton Double Hung Windows (Types E and F) are shipped assembled with the sash raised and wired to the head. The chain is wired tight inside the jamb box, and the sash weights are shipped unattached.

19. All Lupton Double Hung Windows shall be erected in prepared openings by the window contractor, unless otherwise specified. They shall be set plumb and true, securely fastened in place and properly adjusted before glazing.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Lupton Double Hung Windows, and that all mortar, grouting, pointing, etc., shall be done by the mason contractor after windows have been erected.

Painting

20. All windows shall receive one coat of window manufacturer's standard gray galvanized metal primer in the factory.

Note: See page 1.

Glass and Glazing

Note: (See also page 1.) Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel window putty (ordinary wood sash putty must not be used).

(c) Specify that all Lupton Steel Double Hung Windows shall be glazed from the inside; that all glass shall be set in a bed of putty and held by 14 gauge glazing strips attached with low round-head machine screws.

REQUIREMENTS FOR UNDERWRITERS' LABELS

1. Both Types E and F Windows may be labeled.

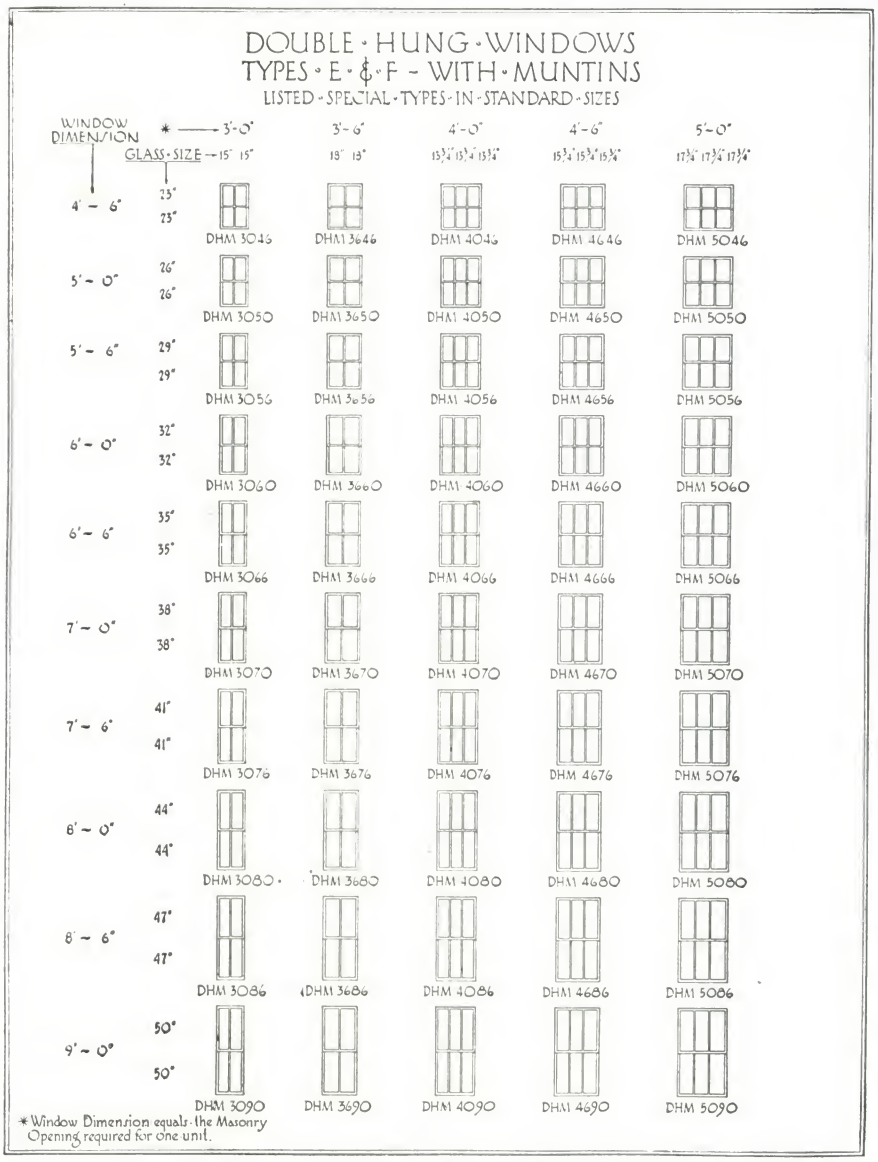
2. Maximum size of unit is 6 ft. 0 in. wide and 10 ft. 0 in. high.

3. Multiple unit openings require mullions anchored at head and sill.

4. The maximum exposed glass area for a single light is 720 sq. in., with a maximum horizontal dimension of 48 in. and a maximum vertical dimension of 54 in.

5. Sash locks must be malleable iron.

6. Weather-stripping at head, meeting rail, and sill is optional.



For quick deliveries, use standard sizes

Note

When ordering Underwriters' Labeled Windows it is important that the following information be given:

1. Groupings of units in masonry openings. By this is meant the number and size of units in each masonry opening.

2. Detail of head, sill and jamb conditions.

This information is required by the Underwriters before the windows can be labeled.

GAUGES OF METAL USED IN TYPES E AND F WINDOWS

Frames

	Type E	Type F
Head	20 Gauge	16 Gauge
Head Cover	20 Gauge	18 Gauge
Jamb Box	20 Gauge	14 Gauge
Removable Jamb Piece	20 Gauge	16 Gauge
Sill	16 Gauge	13 Gauge

Material — Hot galvanized dull-coated steel sheets.

Sash

Sash Members up to 4 ft. 0 in. wide	14 Gauge	14 Gauge
Sash Members over 4 ft. 0 in. wide	13 Gauge	13 Gauge
Glazing Strips, except bottom rail	14 Gauge	14 Gauge
Glazing Strip for bottom rail	13 Gauge	13 Gauge

Material—Cold galvanized strip steel.

Parting Strips

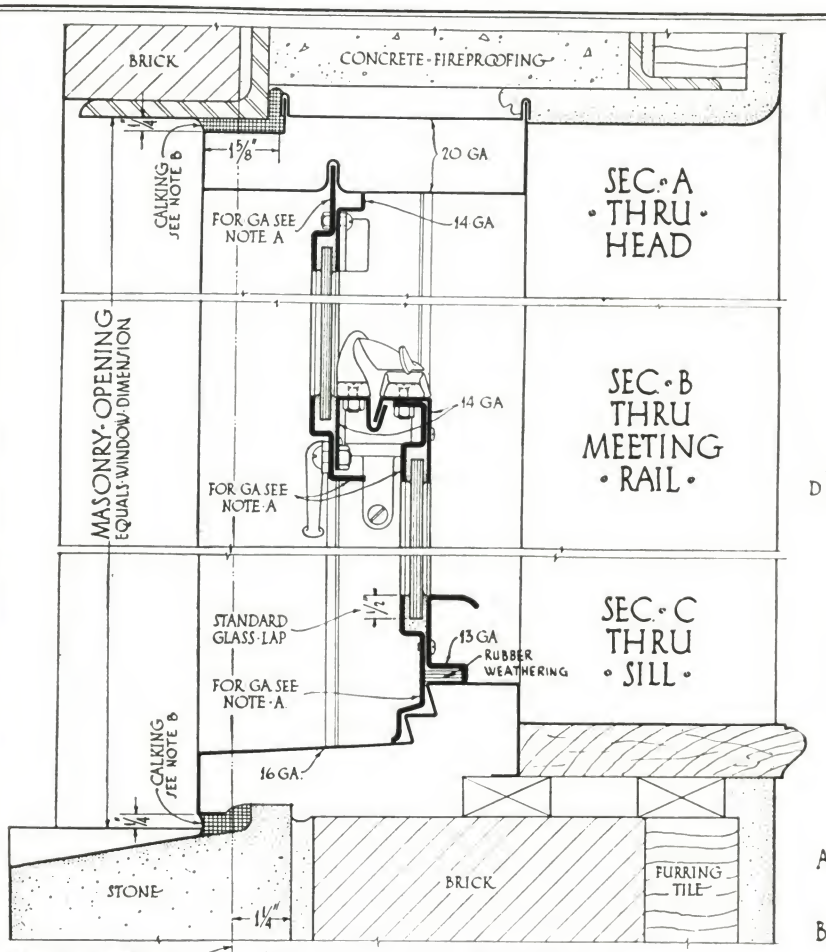
	16 Gauge	16 Gauge

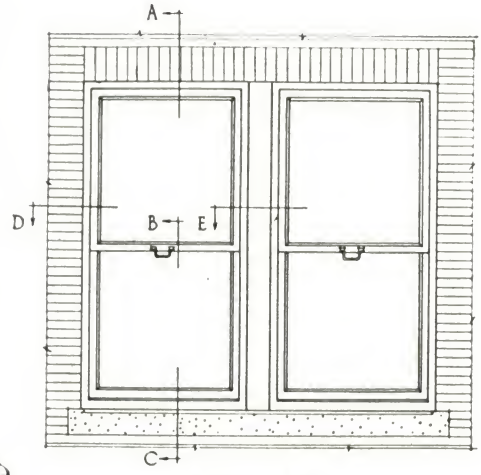
Material—Cold galvanized strip steel.

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DOUBLE·HUNG·WINDOWS DETAILS ~ TYPE·E

SCALE·FOR·DETAILS ~ 3"=1'-0"





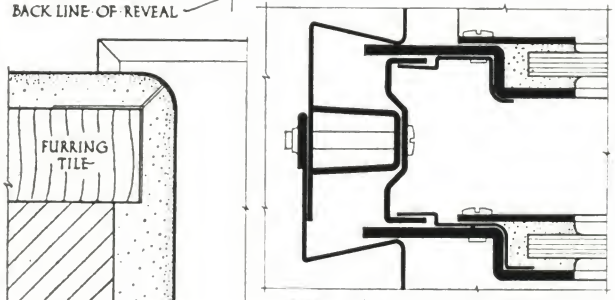
ELEVATION
SCALE ~ 1/4"~1'-0"

NOTES

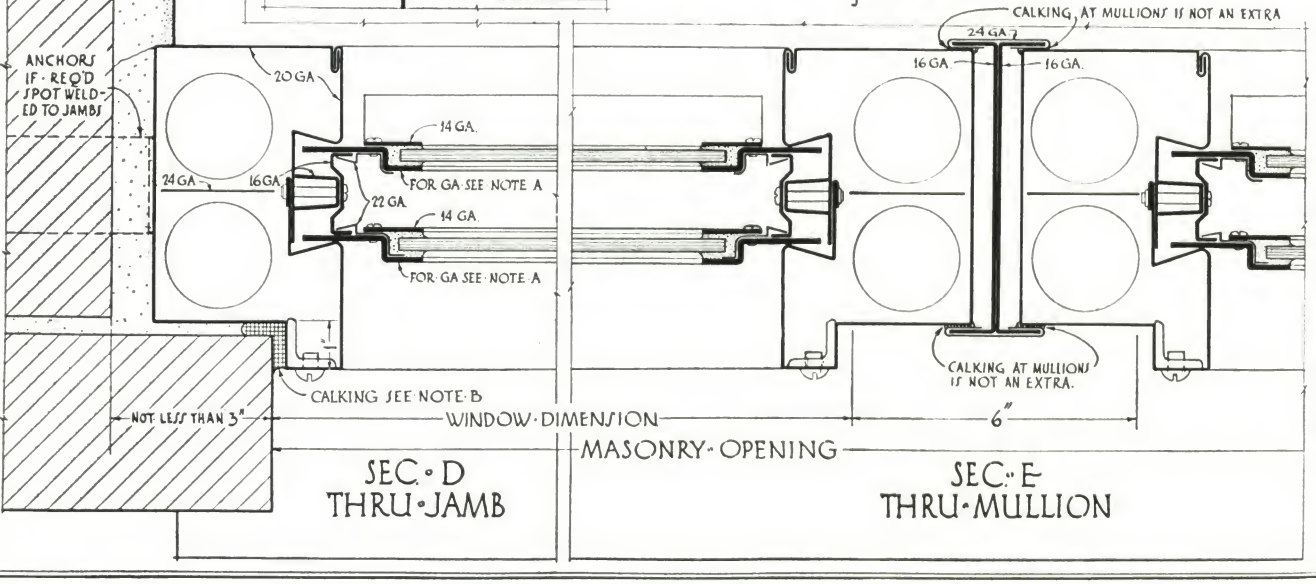
A· Sash rails are 14 Ga on windows up to and including those 4'-0" wide.
Sash rails are 13 Ga on windows over 4'-0" wide.

B· Extras furnished on both E & F windows at an ~ additional cost

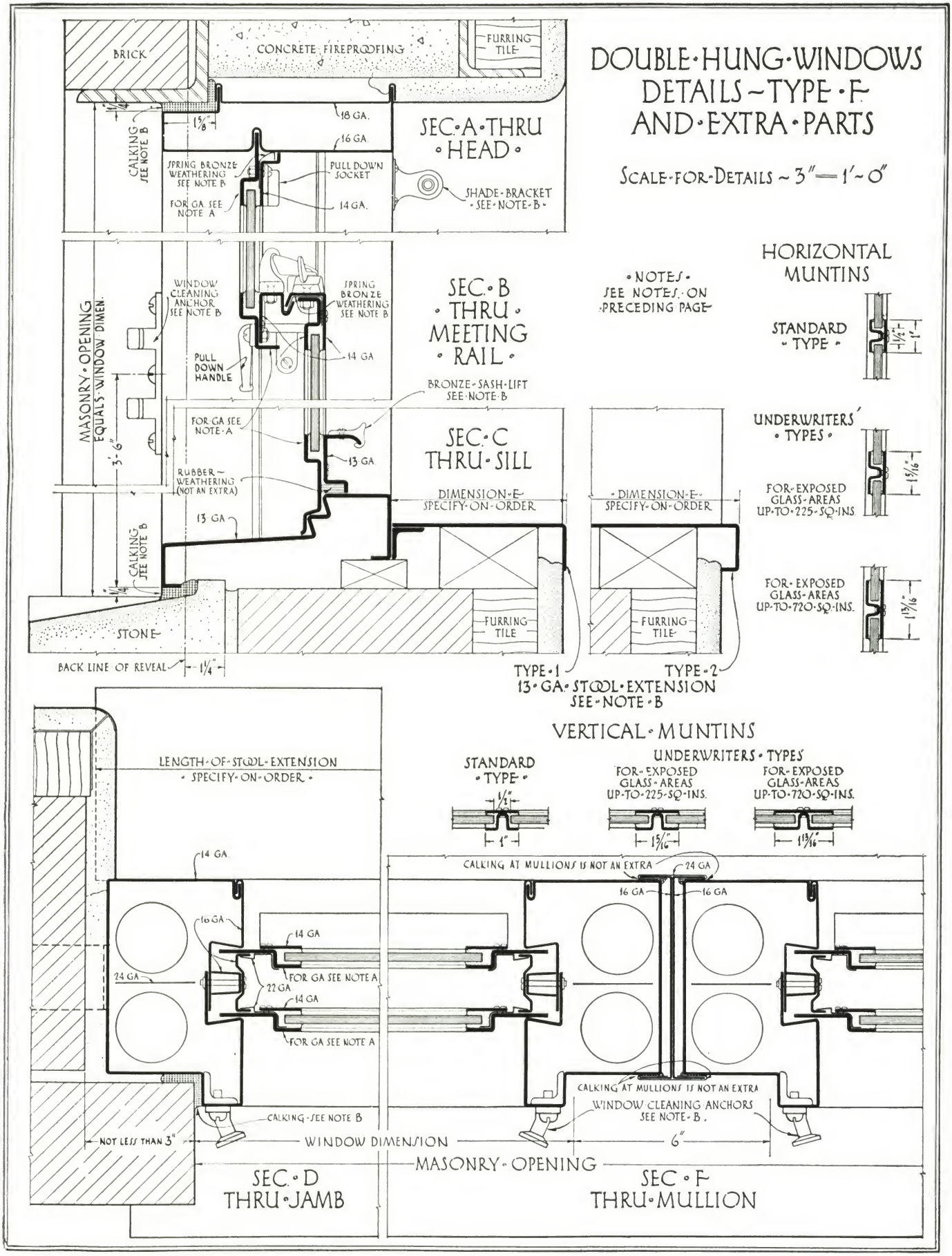
1· Solid bronze hardware· Lupton #34 finish polished and lacquered.
2· Spring bronze weathering at head and meeting rail.
3· Solid bronze sash lift
4· 13 Ga. Stool Extension
5· Non staining, elastic calking cement at head jambs and sill.
6· Muntins.
7· Dickey No. 1 F.L. cleaning anchors.
8· Columbia shade roller bracket (nickel finish).
9· Underwriters Label ~ Requirements for Labeled Windows are listed on Lupton page 73



HALF·SIZE·DETAIL · SHOWING · WEATHERING AT · JAMB



Continued on next page



Continued on next page

LUPTON COMMERCIAL PROJECTED WINDOWS

for Sidewalls of Industrial Buildings

Commercial Projected Windows in construction and application are essentially the same as Lupton Pivoted Windows The ventilators, however, are balanced on two steel vent arms, friction shoes holding them open at any reasonable opening without the use of stay bar, etc. See page 79.

Wall opening sizes, glass sizes, wall details, etc., are same as for Pivoted Windows. See pages 77 to 80 and 86 to 91.

Screens—Metal screens with 16 mesh bronze wire can be furnished for all standard units. They are applied or removed from the interior. See page 79.

Shade Brackets—Windows may also be equipped with shade brackets similar to those shown on page 49.

Explosion Type Window—See page 93.

Aluminum Windows—Commercial Projected Windows are now available in Aluminum. (See page 93.)

SPECIFICATION FOR LUPTON COMMERCIAL PROJECTED WINDOWS

Work Included

1. Furnish and install where shown on drawings Lupton Commercial Projected Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Materials

2. Sections shall be of specially designed, hot rolled, solid steel.

3. Frame Members shall be angle sections.

4. Muntins shall be special cruciform section 1⅜ in. deep.

5. Vertical mullions shall be hot-rolled, solid T-Bar section.

Note: Structural Steel members forming imposts are not furnished by the window manufacturer.

Construction

6. All Commercial Projected Windows shall be designed for inside glazing.

7 Both frames and ventilators shall be assembled by tenoned, riveted joints at the corners. Ventilators shall be welded at corners. Continuous, two point flat contact weathering shall be provided between ventilators and frames.

8. Muntin bars shall be continuous from top to bottom, and from side to side, between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be so interlocked as not to decrease their ultimate strength at the intersection.

9. Vertical mullions shall be provided with bolts for frame attachment where two or more windows are placed side by side in the same opening.

10. Steel Clips shall be furnished to attach window to steel structure in types to cover all possible conditions.

11. Sill anchor clips shall be furnished. At least one clip shall be used for each two lights in the width of a unit.

12. Each ventilator shall be accurately pivoted on two Ventilator Arms of solid steel. The connections between the Ventilator Arms and the Window Frames shall be made by steel arm blocks.

13. Each ventilator shall be equipped with two brass friction shoes, sliding vertically in the Ventilator Jambs to guide the Ventilator and prevent rattling. Each shoe shall be equipped with a rust-proofed, flat steel spring attached to the Ventilator to insure constant pressure at the Jambs.

14. Universal Clips—An angle clip 1⅛x1 in., 2 in. long shall be riveted to the ventilator frame.

Note: The Universal Clip allows any type of Lupton Commercial Projected Window hardware to be attached to the ventilator before or after glazing.

Hardware

15. All hardware (listed below) shall be of malleable iron and shall be shipped unattached, carefully packed to prevent damage until applied for use.

16. Provide the following hardware:

For open out ventilators—Ring Type Cam Handle and Pull Down Ring.

For open in ventilators—within reach from floor—Cam Handle with straight grip.

For open in ventilators—beyond reach from floor—Spring catch.

Note: If screens are wanted specify metal screens with 16 mesh bronze wire furnished by window manufacturer for attachment to windows.

Erection *(See page 1)*

17 All Commercial Projected Windows shall be erected by window contractor in prepared openings, unless otherwise specified.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Lupton Commercial Projected Windows. All grouting, pointing, etc. should be done by the mason contractor after the windows are set.

18. Lupton Commercial Projected Windows shall be set plumb and true, properly aligned and securely anchored before glazing. All ventilators shall be properly adjusted before glazing.

19. All hardware shall be applied under window manufacturer's directions.

Painting

20. All windows shall receive one shop coat of window manufacturer's standard, dark gray paint, oven-dried.

Note: See page 1.

Glass and Glazing

21. Furnish standard wire glazing clips, four to each light.

Note: (See also page 1.) Specify glass and glazing under proper heading elsewhere in specification.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel window putty (ordinary wood sash putty must not be used).

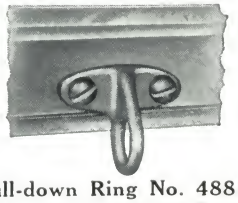
(c) Specify that Lupton Commercial Projected Windows shall be glazed from the inside; the glass set in a bed of putty and held by Lupton standard wire glazing clips, four to each light.

STANDARD HARDWARE

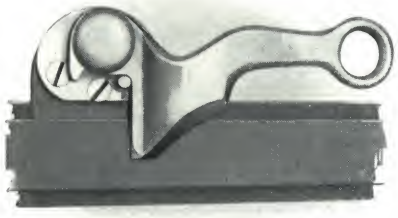
Malleable iron hardware (illustrated) is furnished unless otherwise specified.



Cam Handle No. 308
Used at top of Projected-In-at-Top Ventilators



Pull-down Ring No. 4881
Use at top of all Projected-Out-at-Bottom Ventilators



Ring Type Cam Handle No. 141
Used at bottom of all Projected-Out-at-Bottom Ventilators. Mounted on universal clip

Hardware Alternates

Furnished only when specified.

For Projected-In-at-Top ventilators beyond reach from floor—Malleable Iron Spring Catch No. 5, Keeper No. 7.

Bronze hardware in standard or alternate types can be furnished at added cost when specified.

Continued on next page

Ordering Commercial Projected Windows

Standard and stock sizes and designs are shown on page 78. Any sizes or designs other than those shown are special and require detailing in engineering department, take more time for delivery and cost more.

Underwriters' labeled windows in standard or stock sizes are *special*. See page 92.

Information Required

In ordering Standard or Stock Windows, time will be saved by giving us complete information on the following points:

(1) Shipping date desired (on non-stock sizes allow time for assembling).

(2) List windows and openings, giving the following information:

(a) Number of openings.

(b) Sizes of openings (see table at right and page 78 for standard sizes).

(c) Glass size (12x18 in. or 14x20 in.).

(d) Quantity of each type of unit in each opening.

(e) Catalogue numbers of each type of unit in each opening. A method of doing this is illustrated below.

(3) Height of sill from floor. This will tell us whether any change in standard hardware is required.

(4) Whether or not ventilators are to be screened.

(5) Kind of wall fastenings required. This depends on the wall construction. See details on pages 87 to 91. Specify the type of attachments desired for head, jambs and sill. Drawing on page 91 shows number and location of anchors. When you do not specify type of wall fastenings the anchor 2472 or 1739 is furnished at sill only.

(6) Whether or not windows are to bear Underwriters' labels.

(7) Whether or not windows are to be drilled for shade brackets.

METHOD OF LISTING WINDOWS

Number of openings	Size of opening †Width	Size of opening Height	Glass size	Number of units	Catalog No.	Number of units	Catalog No.
(Where there is only one unit used in an opening) 2	3′-8″	6′-10⅜″	14″x20″	1	34161		
(Where there are two or more units of the same catalog number in one opening) 3	11′-4″	6′-10⅜″	14″x20″	3	34161		
(Where there are two or more units and list each number separately thus: 2	12′-6¾″	6′-10⅜″	14″x20″	2	34161	1	44141

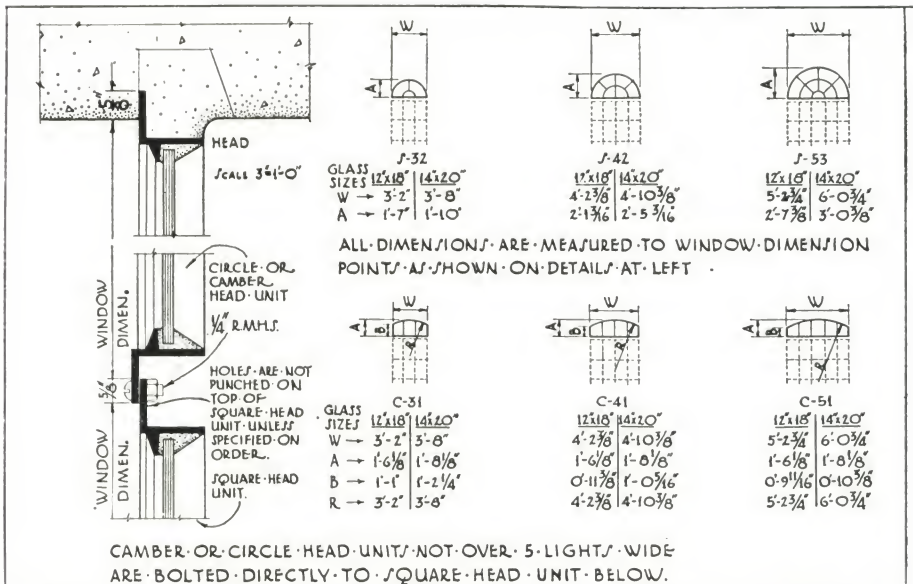
†Get this dimension from diagrams of sizes (page 78) in case of a single opening, or from the table of widths on this page in case of multiple openings.

TABLE OF STANDARD OPENING WIDTHS
Commercial Projected Windows

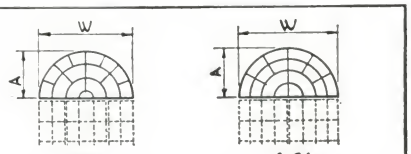
12″ x 18″ glass Widths of openings	Total number of units	No. of lights per unit Position of each number indicates position of unit in opening	Total number of lights	Total number of mullions	14″ x 20″ glass Widths of openings
2′ 1⅝″	1	2	2	None	2′ 5⅝″
3′ 2″	1	3	3	"	3′ 8″
4′ 2⅜″	1	4	4	"	4′ 10⅜″
5′ 2¾″	1	5	5	"	6′ 0¾″
6′ 6″	2	3, 3	6	1	7′ 6″
8′ 6¾″	2	4, 4	8	1	9′ 10¾″
9′ 10″	3	3, 3, 3	9	2	11 4″
10′ 7½″	2	5, 5	10	1	12′ 3½″
10′ 10⅜″	3	3, 4, 3	10	2	12′ 6⅜″
11′ 10¾″	3	3, 5, 3	11	2	13′ 8¾″
11′ 10¾″	3	4, 3, 4	11	2	13′ 8¾″
12′ 11⅛″	3	4, 4, 4	12	2	14′ 11⅛″
13′ 2″	4	3, 3, 3, 3	12	3	15′ 2″
13′ 11½″	3	4, 5, 4	13	2	16′ 1½″
13′ 11½″	3	5, 3, 5	13	2	16′ 1½″
14′ 11⅞″	3	5, 4, 5	14	2	17′ 3⅞″
15′ 2¾″	4	3, 4, 4, 3	14	3	17′ 6¾″
16′ 0¼″	3	5, 5, 5	15	2	18′ 6¼″
17′ 3½″	4	4, 4, 4, 4	16	3	19′ 11½″
18′ 6¾″	5	3, 3, 5, 3, 3	17	4	21′ 4¾″
19′ 4¼″	4	4, 5, 5, 4	18	3	22′ 4¼″
20′ 7½″	5	5, 3, 3, 3, 5	19	4	23′ 9½″
21′ 5″	4	5, 5, 5, 5	20	3	24′ 9″
21′ 7⅞″	5	4, 4, 4, 4, 4	20	4	24′ 11⅞″
22′ 8¼″	5	4, 4, 5, 4, 4	21	4	26′ 2¼″
22′ 8¼″	5	3, 5, 5, 5, 3	21	4	26′ 2¼″
23′ 8⅝″	5	5, 4, 4, 4, 5	22	4	27′ 4⅝″
23′ 11½″	6	3, 4, 4, 4, 4, 3	22	5	27′ 7½″
24′ 9″	5	4, 5, 5, 5, 4	23	4	28′ 7″
26′ 0¼″	6	4, 4, 4, 4, 4, 4	24	5	30′ 0¼″
26′ 9¾″	5	5, 5, 5, 5, 5	25	4	30′ 11¾″
28′ 1″	6	5, 4, 4, 4, 4, 5	26	5	32′ 5″
28′ 1″	6	3, 5, 5, 5, 5, 3	26	5	32′ 5″
29′ 4¼″	7	3, 3, 5, 5, 5, 3, 3	27	6	33′ 10¼″
30′ 1¾″	6	4, 5, 5, 5, 5, 4	28	5	34′ 9¾″
31′ 5″	7	3, 5, 5, 3, 5, 5, 3	29	6	36′ 3″

HEIGHTS OF OPENINGS

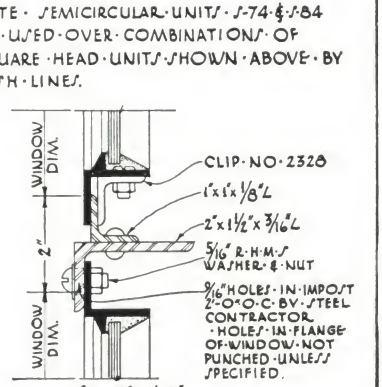
12″ x 18″ glass Lights high	12″ x 18″ glass Height of openings	14″ x 20″ glass Lights high	14″ x 20″ glass Height of openings
1	1′ 7¼″	1	1′ 9¼″
2	3′ 1⅝″	2	3′ 5⅝″
3	4′ 8″	3	5′ 2″
4	6′ 2⅜″	4	6′ 10⅜″
5	7′ 8¾″	5	8′ 6¾″
6	9′ 3⅛″	6	10′ 3⅛″
7	10′ 9½″	7	11′ 11½″



STANDARD SIZES AND ATTACHMENT DETAILS FOR STANDARD CAMBER AND CIRCLE HEAD UNITS USED WITH COMMERCIAL PROJECTED WINDOWS.

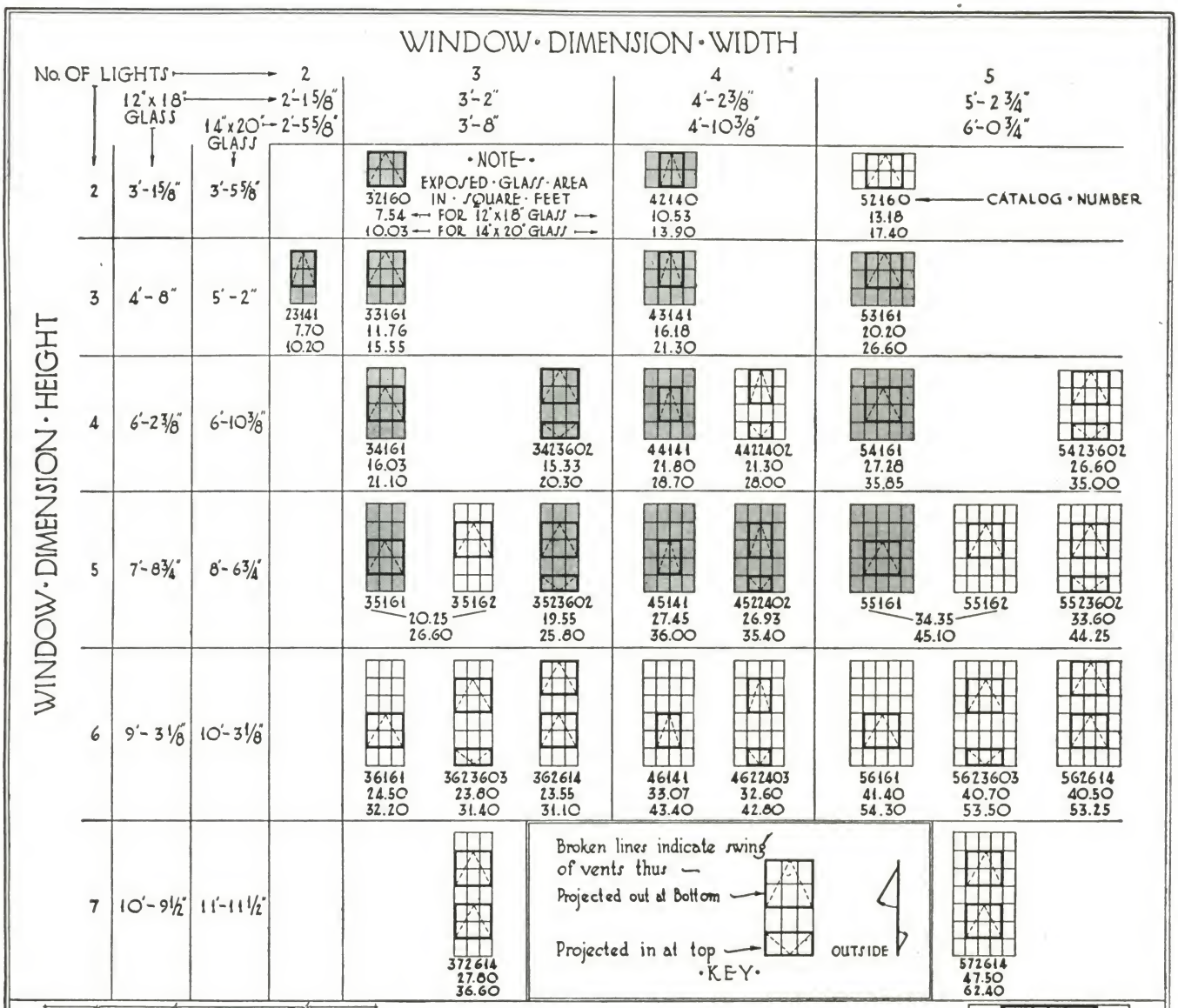


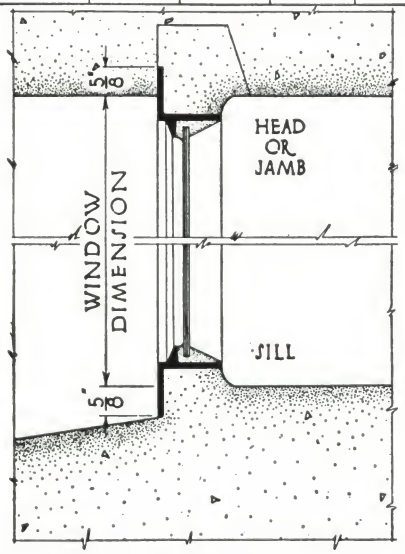
NOTE: SEMICIRCULAR UNITS J-74 & J-84 ARE USED OVER COMBINATIONS OF SQUARE HEAD UNITS SHOWN ABOVE BY DASH LINES.



IMPOST TYPE 1
FOR USE WITH J-74 & J-84.

Continued on next page





Shaded Units are dealer stock windows.

Dimensions—The window dimension of a unit is the same as the masonry or structural opening required for that unit. See sketch at left for measure points.

Mullions—Mullion details and dimensions are the same as for Pivoted Windows. See page 86.

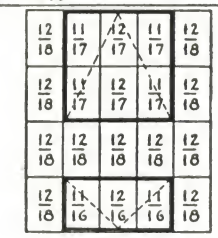
Imposts—Imposts are the same as for Pivoted Windows. See page 86.

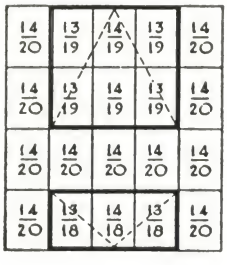
Glass—Glass in fixed lights is full 14x20 or 12x18 in. in size. Border lights in ventilators are reduced as shown in diagrams at right to allow 1 in. for weathering.

Anchoring—For method of anchoring see pages 86 to 91 incl.

Note: Dimensions of units, and the sizes and positions of ventilators must be exactly as shown in the diagrams; otherwise the window is a special. Windows can be listed using the method outlined on page 77. Use 14x20-in. glass in preference to 12x18-in. glass. The four and six-light projected out-at-bottom vents may be replaced by projected in-at-top vents if specified at no added cost, but a longer time must be allowed for delivery.

Special Glass Sizes—Window dimensions of units with special size glass are obtained as follows: Add 3/8 in. to glass size for fixed lights (width or height as required), multiply by the number of lights and add 7/8 in.



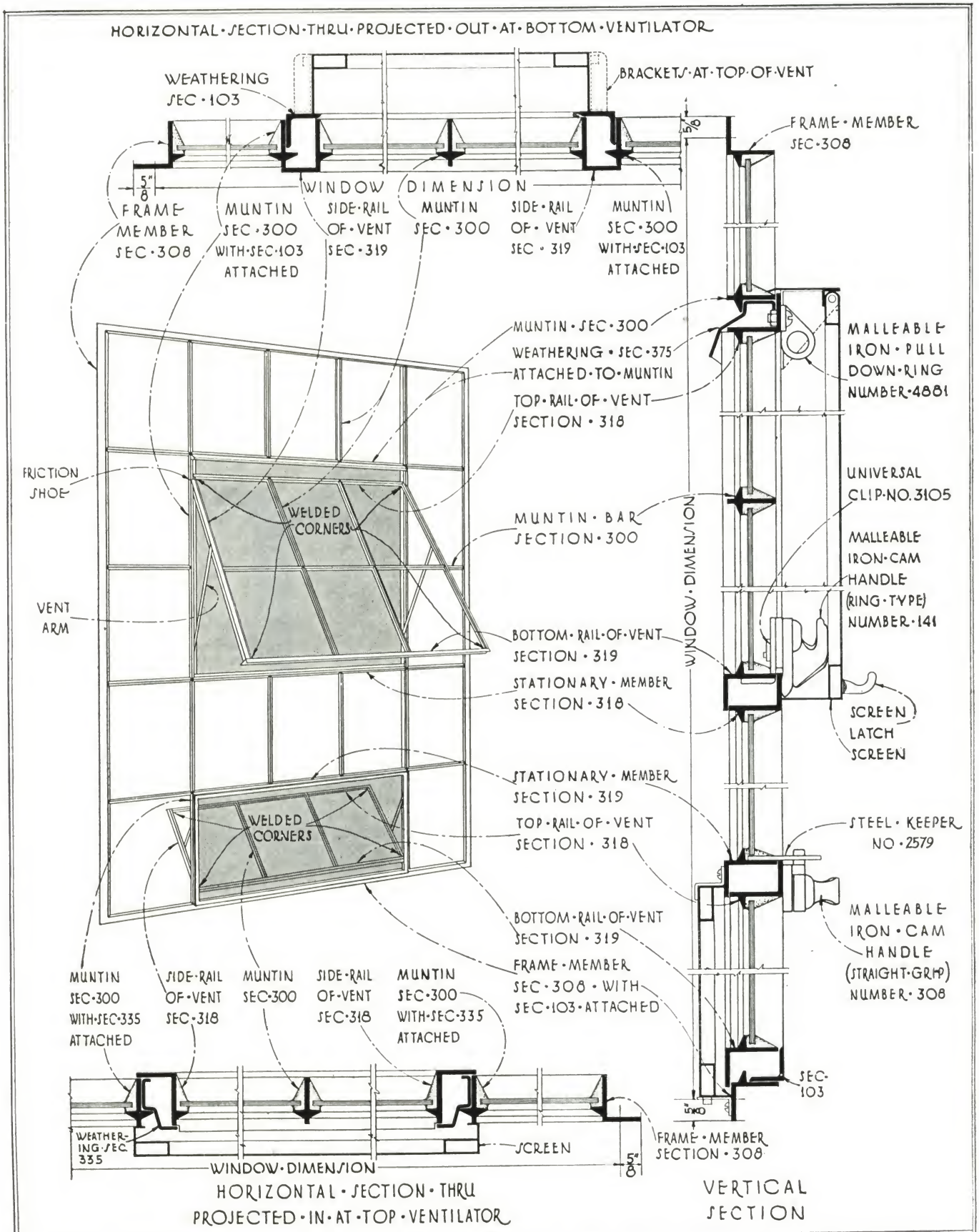


NO SCALE

LUPTON · COMMERCIAL · PROJECTED · WINDOWS STANDARD · TYPES · AND · SIZES

PLATE · NO. K-2 JULY – 1929

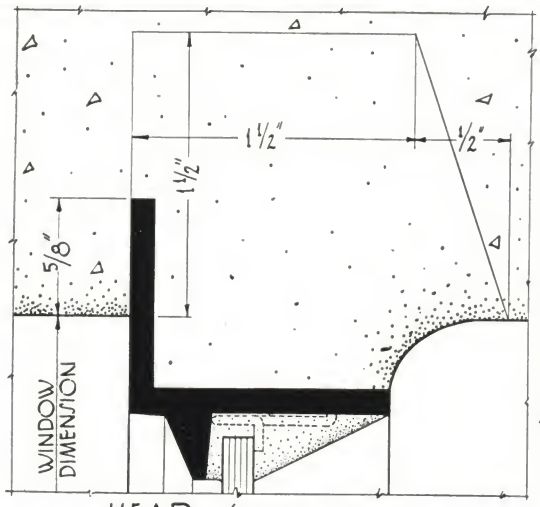
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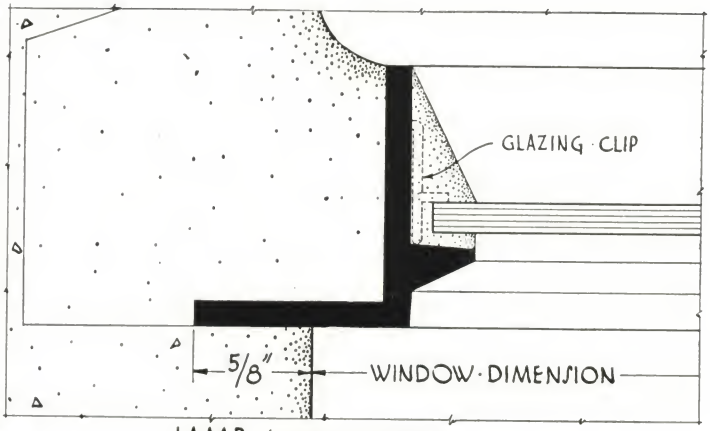
SCALE FOR·DETAILS 3"=1'-0"	LUPTON·COMMERCIAL·PROJECTED·WINDOWS DETAILS·OF·WINDOW·CONSTRUCTION	PLATE — NO. K-1 JUNE — 1930

Continued on next page

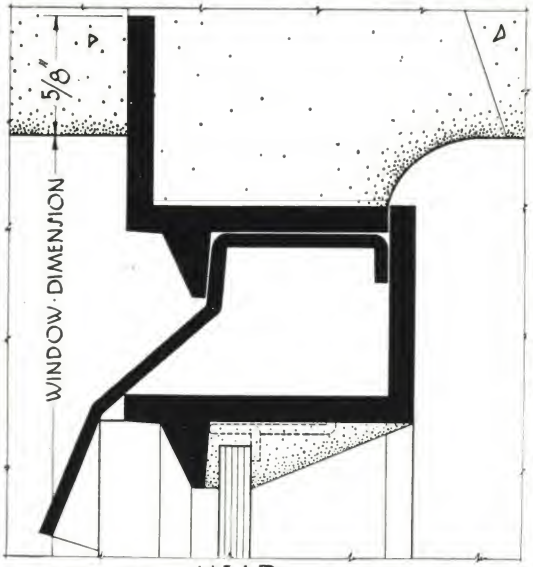
COMMERCIAL·PROJECTED·WINDOWS
FULL·SIZE·SECTIONS



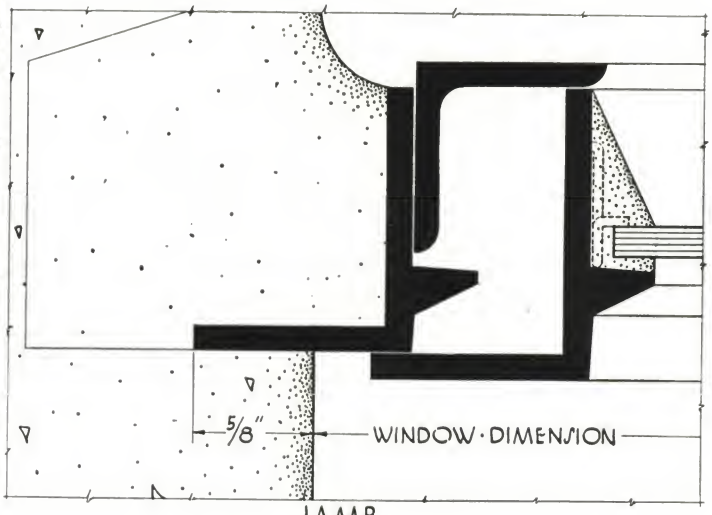
HEAD (FIXED·LIGHT)



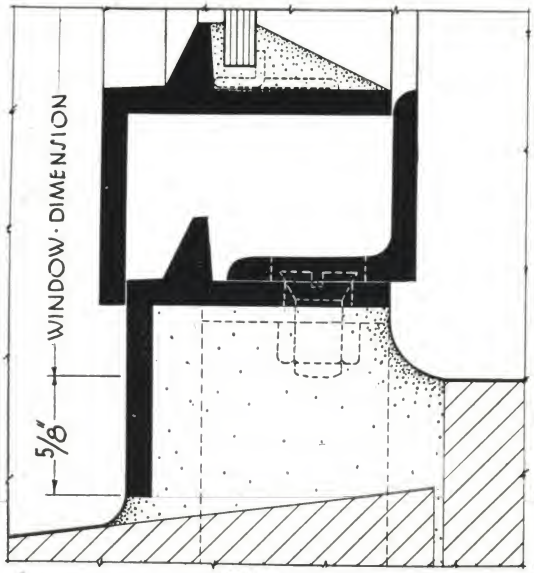
JAMB (FIXED·LIGHT)



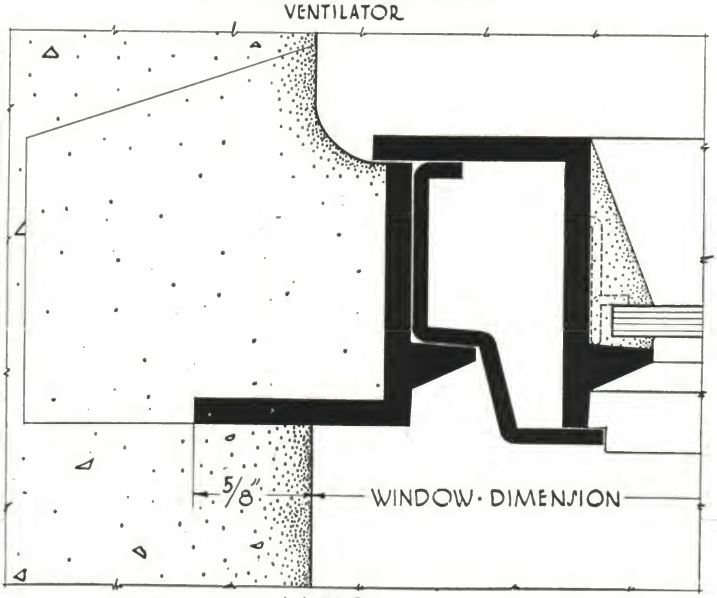
HEAD
PROJECT·OUT·AT·BOTTOM
VENTILATOR



JAMB
PROJECT·OUT·AT·BOTTOM
VENTILATOR



SILL
PROJECT·OUT·AT·BOTTOM
OR ~ PROJECT·IN·AT·TOP·VENTILATOR



JAMB
PROJECT·IN·AT·TOP
VENTILATOR

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LUPTON STEEL PIVOTED WINDOWS

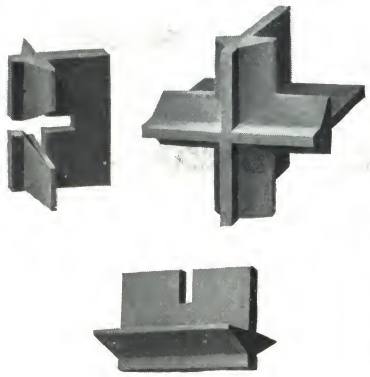
For Sidewalls of Industrial Buildings

Types, sizes and designs of Lupton Pivoted Windows presented in the following pages represent the standard practices of the steel window industry relative to this product. They have been found to fill all ordinary requirements. Departures from standard practice should be avoided as they increase cost and delay shipments. If, however, it is necessary to use special windows, ventilators should not exceed 4 lights in width or 2 lights in height (5 ft. 0 in. wide x 3 ft. 6 in. high).

Screens—Flat metal screens with 16-mesh bronze wire can be furnished for all standard units. They are applied or removed from the interior. Screened ventilators are equipped with friction pivots that hold them open without aid of stay bar. Operating hardware is shown on next page.

Shade Brackets—Windows may also be equipped with shade brackets similar to those shown on page 49.

Aluminum Windows—Pivoted Windows are now available in Aluminum. (See page 93.)



Muntin Joint

Combines most effective placing of metal with the least possible deformation. The greater the external pressure, the tighter is the lock of the intersecting members. There is less opportunity for moisture to enter and cause corrosion.



Hinge

Hinge is integral with the weathering members, and is reinforced with steel plates riveted to the weathering members. There are no spacers, hence the hinge pins cannot sag.

SPECIFICATION FOR LUPTON STEEL PIVOTED WINDOWS

Work Included

1. Furnish where shown on drawings Lupton Steel Pivoted Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Materials

2. Sections shall be specially designed, hot-rolled, solid steel.

3. Frame members shall be angle sections.

4. Muntins shall be special cruciform section 1⅜ in. deep.

5. Vertical Mullions shall be hot-rolled, solid T-Bar section.

Note: Structural Steel Members forming Imposts are not furnished by the window manufacturer.

Construction

6. All Steel Pivoted Windows shall be designed for inside glazing.

7. Both Frames and Ventilators shall be assembled by tenoned, riveted joints at the corners. Continuous, two-point, flat contact weathering shall be provided between Ventilators and Frames.

8. Muntin Bars shall be continuous from top to bottom, and from side to side, between frame members or ventilator members. They shall be attached to frame members or ventilator members by tenoned, riveted joints and shall be so interlocked as not to decrease their ultimate strength at the intersection.

9. Vertical Mullions shall be provided with bolts for frame attachment where two or more windows are placed side by side in the same opening.

10. Steel Clips shall be furnished to attach window to steel structure in types and lengths to cover all possible conditions.

11. Sill Anchor Clips shall be furnished. At least one clip shall be used for each two lights in the width of a unit.

12. All Ventilators shall be horizontally pivoted. Ventilator pivot shall be integral with weathering to insure permanent alignment. The pivot shall be located 2 in. above center.

Note: Pivot may be located at a different point if so specified. The window then becomes "special."

13. Standard Pivots—Ventilators shall be held in place at the pivots with $\frac{5}{16}$-in. flat head iron rivets and shall operate freely and easily. Or, if friction pivots are wanted, specify.

14. Friction Pivots—Pivots shall be friction type and shall hold vents at various degrees of opening without aid of stay bar. Friction shall be furnished by steel and brass plates clamped in a malleable iron yoke by a cadmium plated bolt.

Note: Friction pivots are always used with screens.

15. Universal Clips—An angle clip $1\frac{15}{16}$x1 in., 2 in. long, shall be riveted to the ventilator frame.

Note: The Universal Clip allows any type of Lupton Pivoted Window hardware to be attached to the ventilator before or after glazing.

Hardware

16. All hardware (listed below) shall be shipped unattached, carefully packed to prevent damage until applied for use.

17. (Standard)—Provide stay bar and stay bar clip for ventilators within reach from floor, provide spring catch, chain, chain roller guide and chain clip for vents beyond reach from floor.

18. (Alternate—Used with friction pivots.) Provide ventilators with Ring Type Locking Handles. Where vents are beyond reach from floor provide Pull-down Rings in addition to handles.

19. (Alternate—Used with screens.) Provide flat metal screens with 16-mesh bronze wire, an exterior screen above the pivot and an interior screen below the pivot. Provide locking handles on vents within reach from floor and spring catches on vents beyond reach from floor.

Mechanical Operators

Note: Mechanical operators are covered in a separate specification.

Erection *(See page 1)*

20. All Steel Pivoted Windows shall be erected by (state by whom), in prepared openings, unless otherwise specified.

Note: Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the installation details for Lupton Steel Pivoted Windows. All grouting, pointing, etc., should be done by the mason contractor after the windows are set.

21. Windows shall be set plumb and true, properly aligned and securely anchored before glazing. All Ventilators shall be properly adjusted before glazing.

22. All hardware shall be applied under window manufacturer's directions.

Painting

23. All windows shall receive one shop coat of window manufacturer's standard, dark gray paint, oven-dried.

Note: See page 1.

Glass and Glazing

24. Furnish standard wire glazing clips, four to each light.

Note: (See also page 1.) Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high grade steel window putty (ordinary wood sash putty must not be used).

(c) Specify that Lupton Steel Pivoted Windows shall be glazed from the inside, the glass set in a bed of putty, and held by Lupton Standard Wire Glazing Clips.

Use standard sizes for quicker deliveries—lower costs

Continued on next page

HARDWARE FOR LUPTON STEEL PIVOTED WINDOWS



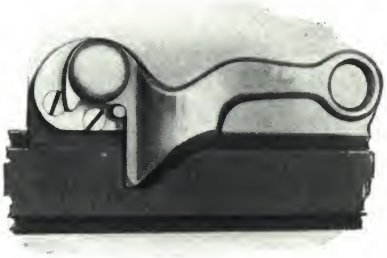
View Showing Two Ventilators in a Unit, One Above the Other

The lower ventilator is operated by Lupton Stay Bar, the upper by Spring Catch and Chain.



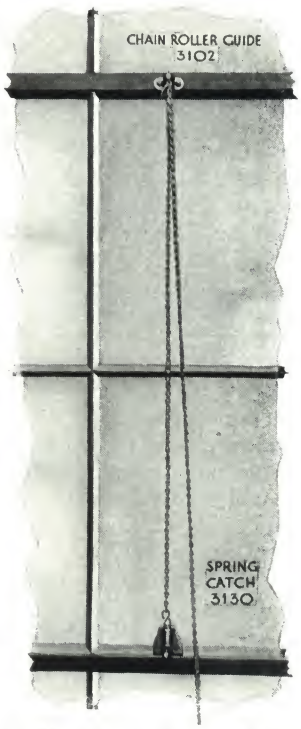
Locking Handle No. 308

Used at top of ventilators equipped with screens when top of vent is within reach from floor. When beyond reach from floor a spring catch is used instead. Malleable iron painted. Polished, solid bronze, at added cost, when specified.



Ring Type Locking Handle No. 141

Used instead of stay bar on ventilators equipped with friction pivots. Malleable iron painted. Polished, solid bronze at added cost when specified.



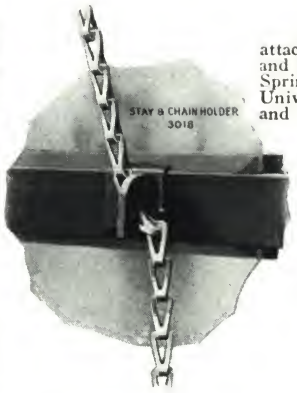
A Ventilator Operated by Lupton Spring Catch and Chain

View shows Chain Roller Guide attached to top members of ventilator and Spring Catch to bottom member. Spring Catch is mounted on the Universal Clip. Both Spring Catch and Guide are of steel.



Pull Down Ring No. 4881

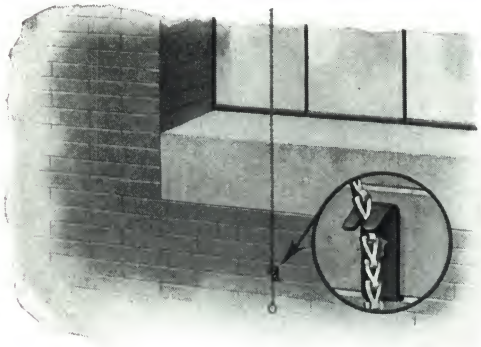
Used with locking handle No. 141 on ventilators equipped with friction hinges when handle is beyond reach from floor. Mounted on top rail of ventilator. Malleable iron painted. Polished, solid bronze, at added cost, when specified.



At left:

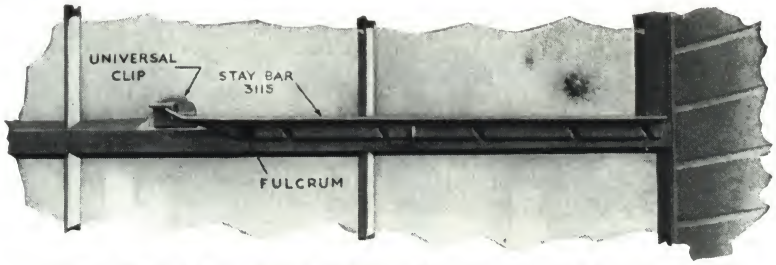
Clip No. 3018

Steel Clip holds either Stay Bar or Chain.



Wall Clip No. 2365

Steel Clip used as alternate to Stay and Chain Holder No. 3018.



Lupton Stay Bar in Close Position Mounted on the Universal Clip

Near its attached end the steel angle Stay Bar is pressed out to form a fulcrum. The fulcrum causes the ventilator to be drawn up tightly against the frame and locked when the Stay Bar is inserted in the clip provided to hold it. Five notches are provided for holding the ventilator at various degrees of opening.

Standard Hardware—***Where Sill Height Is Not Specified***—We supply Lupton Stay Bars with all single ventilators. A stay bar is furnished with the lower ventilator of a unit having two ventilators. A spring catch and 12 ft. of chain are furnished for the upper ventilator.

Where Sill Height Is Specified—We furnish spring catch and chain operation only for ventilators whose bottom edges are more than 6 ft. above the floor. Where necessary, a special clip No. 2365 is furnished to fasten the chain to the wall below the window.

Alternate Hardware—Any desired change from the Standard hardware as described above must be noted on the order.

Friction Pivots—These pivots hold ventilators open without stay bars, chain or adjusters. Operation of ventilator is by means of the locking handle shown in illustration. Where ventilator is beyond reach a pull-down ring is used in addition to handle for pole operation. Any pivoted ventilator can be equipped with friction pivots (at added cost) when specified.

Window Cleaners' Anchors—Where window cleaners' anchors are ordered, Dickey Safety Anchors will be furnished, unless others are specified.

Continued on next page

Ordering Pivoted Windows

Standard and stock sizes and designs are shown on page 84. Any sizes or designs other than those shown are special and require detailing in engineering department, take more time for delivery and cost more.

Underwriters' labeled Pivoted Windows in standard or stock sizes are not special.

Information Required

In ordering Standard or Stock Windows, time will be saved by giving us complete information on the following points:

(1) Shipping date desired (on non-stock sizes allow time for assembling).

(2) List windows and openings, giving the following information:

(a) Number of openings.
(b) Sizes or openings (see table at right and page 84 for standard sizes).
(c) Glass size (12x18 in. or 14x20 in.).
(d) Quantity of each type of unit in each opening.
(e) Catalogue numbers of each type of unit in each opening. A method of doing this is illustrated below.

(3) Height of sill from floor. This will tell us whether any change in standard hardware is required.

(4) Whether or not ventilators are to be screened.

(5) Kind of wall fastenings required. This depends on the wall construction. See details on pages 87 to 91. Specify the type of attachments desired for head, jambs and sill. Drawing on page 91 shows number and location of anchors. When you do not specify type of wall fastenings the anchor 2472 or 1739 is furnished at sill only.

(6) Whether or not windows are to bear Underwriters' labels.

(7) Whether or not shade brackets are wanted.

METHOD OF LISTING WINDOWS

Number of openings	Size of opening †Width	Size of opening Height	Glass size	Number of units	Catalog No.	Number of units	Catalog No.
(Where 2	there is on 3′-8″	ly one uni 6′-10⅜″	t used in a 14″x20″	n openin g) 1	34161		
(Where openin 3	there are t g) 11′-4″	wo or mor 6′-10⅜″	e units of 14″x20″	the same 3	catalog 34161	number i	n one
(Where list ea 2	there are t ch numbe 12′-6¾″	wo or mor r separatel 6′-10⅜″	e units an y thus: 14″x20″	d more t 2	han one 34161	catalog n 1	umber 44181

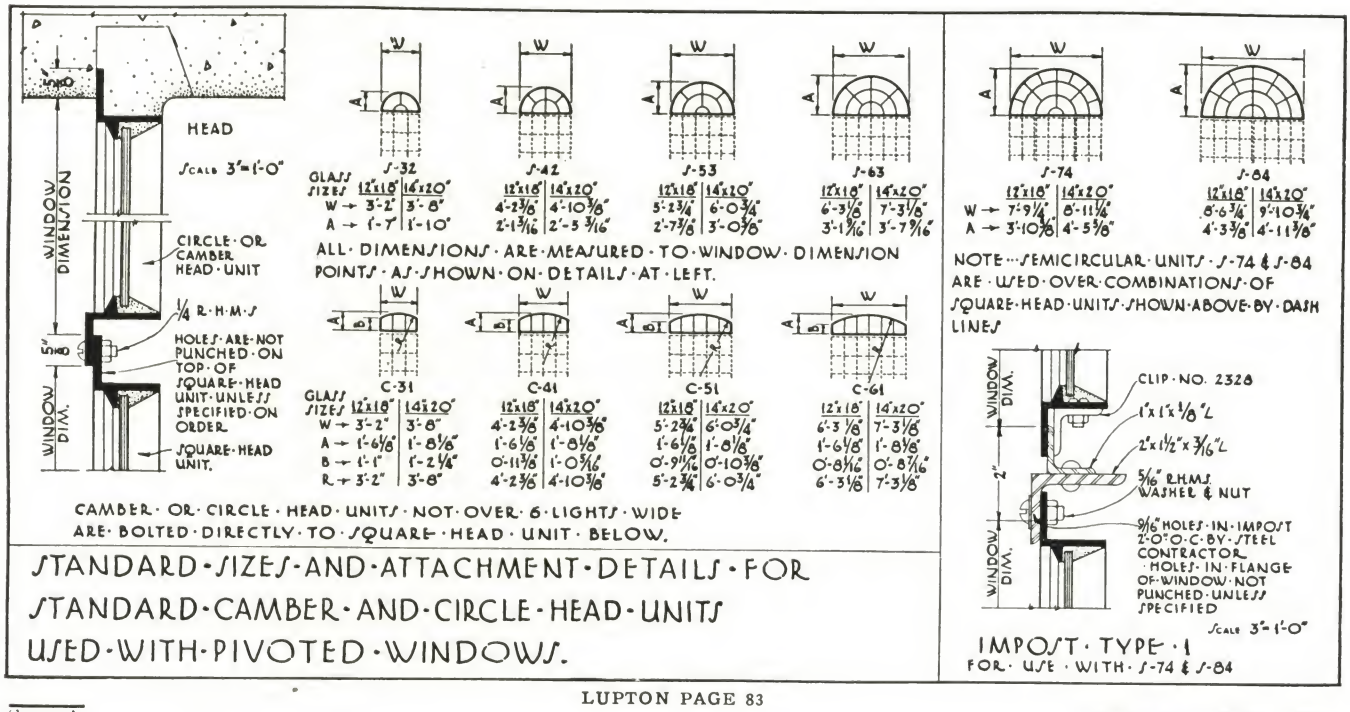
†Get this dimension from diagrams of sizes (page 84) in case of single opening, or from the table of widths on this page in case of multiple openings.

TABLE OF STANDARD OPENING WIDTHS
Pivoted Windows

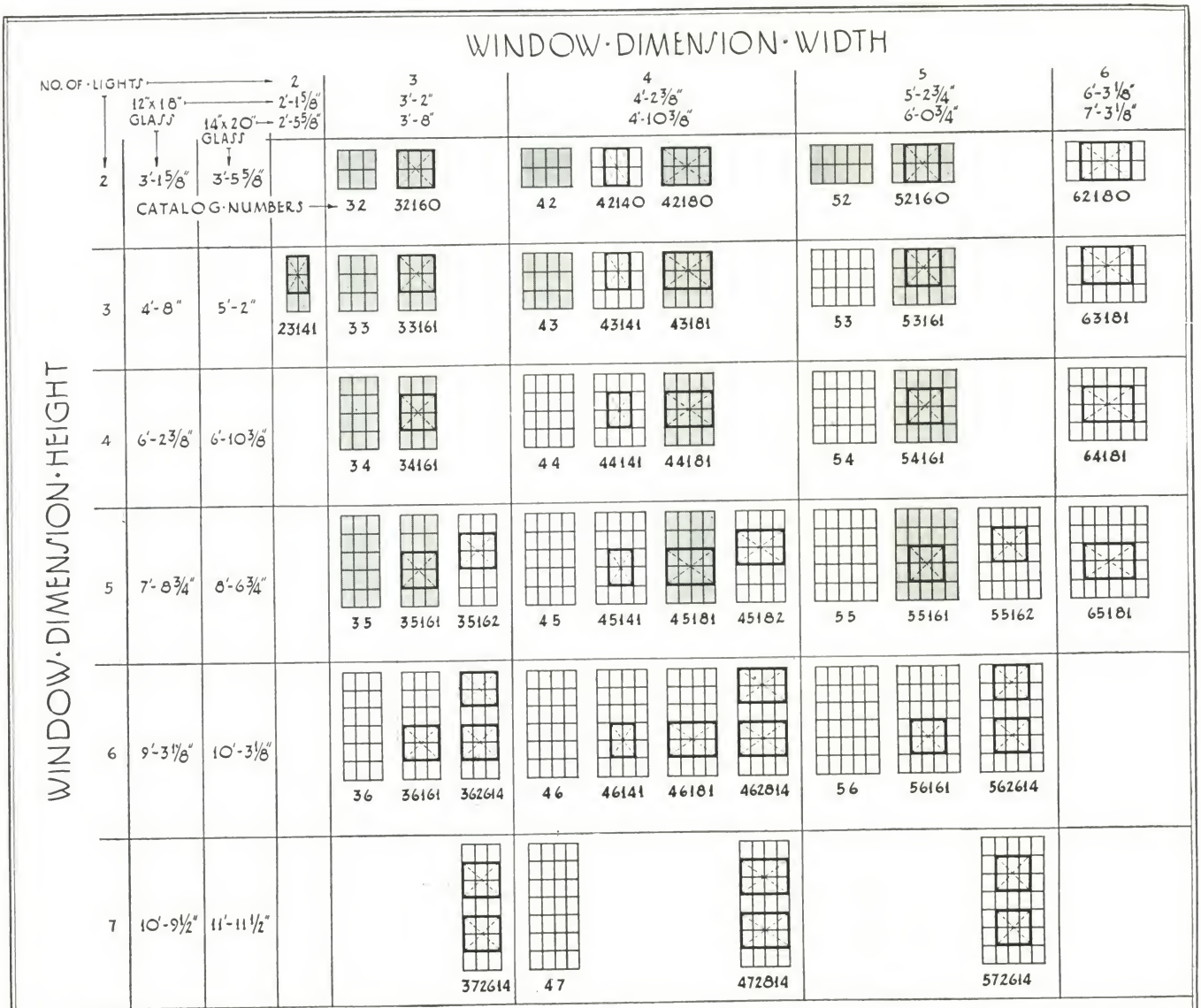
12″ x 18″ glass Widths of openings	Total number of units	No. of lights per unit Position of each number indicates position of unit in opening	Total number of lights	Total number of mullions	14″ x 20″ glass Widths of openings
2′ 1⅝″	1	2	2	None	2′ 5⅝″
3′ 2″	1	3	3	"	3′ 8″
4′ 2⅜″	1	4	4	"	4′ 10⅜″
5′ 2¾″	1	5	5	"	6′ 0¾″
6′ 3⅛″	1	6	6	"	7′ 3⅛″
6′ 6″	2	3, 3	6	1	7′ 6″
8′ 6¾″	2	4, 4	8	1	9′ 10¾″
9′ 10″	3	3, 3, 3	9	2	11′ 4″
10′ 7½″	2	5, 5	10	1	12′ 3½″
10′ 10⅜″	3	3, 4, 3	10	2	12′ 6⅜″
11′ 10¾″	3	3, 5, 3	11	2	13′ 8¾″
11′ 10¾″	3	4, 3, 4	11	2	13′ 8¾″
12′ 8¼″	2	6, 6	12	1	14′ 8¼″
12′ 11⅛″	3	4, 4, 4	12	2	14′ 11⅛″
13′ 11½″	3	4, 5, 4	13	2	16′ 1½″
13′ 11½″	3	5, 3, 5	13	2	16′ 1½″
14′ 11⅞″	3	4, 6, 4	14	2	17′ 3⅞″
14′ 11⅞″	3	5, 4, 5	14	2	17′ 3⅞″
15′ 2¾″	4	3, 4, 4, 3	14	3	17′ 6¾″
16′ 0¼″	3	5, 5, 5	15	2	18′ 6¼″
16′ 0¼″	3	6, 3, 6	15	2	18′ 6¼″
17′ 0⅝″	3	5, 6, 5	16	2	19′ 8⅝″
17′ 0⅝″	3	6, 4, 6	16	2	19′ 8⅝″
17′ 3½″	4	4, 4, 4, 4	16	3	19′ 11½″
18′ 1″	3	6, 5, 6	17	2	20′ 11″
19′ 1⅜″	3	6, 6, 6	18	2	22′ 1⅜″
19′ 4¼″	4	3, 6, 6, 3	18	3	22′ 4¼″
19′ 4¼″	4	4, 5, 5, 4	18	3	22′ 4¼″
20′ 7½″	5	5, 3, 3, 3, 5	19	4	23′ 9½″
21′ 5″	4	5, 5, 5, 5	20	3	24′ 9″
21′ 5″	4	4, 6, 6, 4	20	3	24′ 9″
21′ 7⅞″	5	4, 4, 4, 4, 4	20	4	24′ 11⅞″
22′ 8¼″	5	4, 4, 5, 4, 4	21	4	26′ 2¼″
22′ 8¼″	5	3, 5, 5, 5, 3	21	4	26′ 2¼″
23′ 5¾″	4	5, 6, 6, 5	22	3	27′ 1¾″
23′ 8⅝″	5	5, 4, 4, 4, 5	22	4	27′ 4⅝″
23′ 11½″	6	3, 4, 4, 4, 4, 3	22	5	27′ 7½″
24′ 9″	5	4, 5, 5, 5, 4	23	4	28′ 7″
25′ 6½″	4	6, 6, 6, 6	24	3	29′ 6½″
25′ 9⅜″	5	3, 6, 6, 6, 3	24	4	29′ 9⅜″
26′ 0¼″	6	4, 4, 4, 4, 4, 4	24	5	30′ 0¼″
26′ 9¾″	5	5, 5, 5, 5, 5	25	4	30′ 11¾″
27′ 10⅛″	5	5, 5, 6, 5, 5	26	4	32′ 2⅛″
28′ 1″	6	5, 4, 4, 4, 4, 5	26	5	32′ 5″
28′ 1″	6	3, 5, 5, 5, 5, 3	26	5	32′ 5″

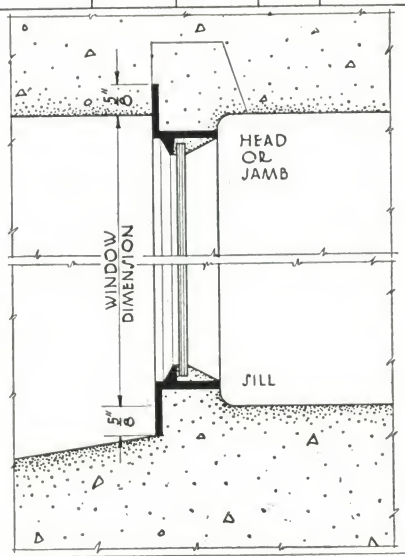
HEIGHTS OF OPENINGS

12″ x 18″ glass Lights high	12″ x 18″ glass Height of openings	14″ x 20″ glass Lights high	14″ x 20″ glass Height of openings
1	1′ 7¼″	1	1′ 9¼″
2	3′ 1⅝″	2	3′ 5⅝″
3	4′ 8″	3	5′ 2″
4	6′ 2⅜″	4	6′ 10⅜″
5	7′ 8¾″	5	8′ 6¾″
6	9′ 3⅛″	6	10′ 3⅛″
7	10′ 9½″	7	11′ 11½″



Continued on next page





Shaded units are dealer stock windows.

Dimensions—The window dimension of a unit is the same as the masonry or structural opening required for that unit. See sketch at left for measure points.

Mullions—Mullion details and dimensions are the same as for Commercial Projected Windows. See page 86.

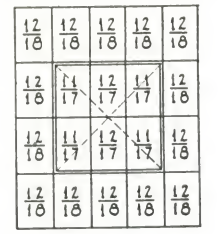
Imposts—Imposts are the same as for Commercial Projected Windows. See page 86.

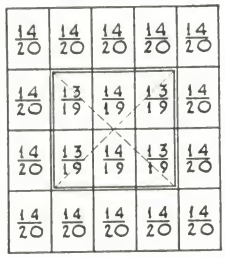
Glass—Glass in fixed lights is full 14x20 or 12x18 in. in size. Border lights in ventilators are reduced as shown in diagrams at right to allow 1 in. for weathering.

Anchoring—For method of anchoring see pages 87 to 91.

Note: Dimensions of units, and the sizes and positions of ventilators must be exactly as shown in the diagrams; otherwise the window is a special. Windows can be listed using the method outlined on page 83. Use 14x20-in. glass in preference to 12x18-in. glass. The four and six-light projected out-at-bottom vents may be replaced by projected in-at-top vents if specified at no added cost, but a longer time must be allowed for delivery.

Special Glass Sizes—Window dimensions of units with special size glass are obtained as follows: Add ⅜ in. to glass size for fixed lights (width or height as required), multiply by the number of lights and add ⅞ in.



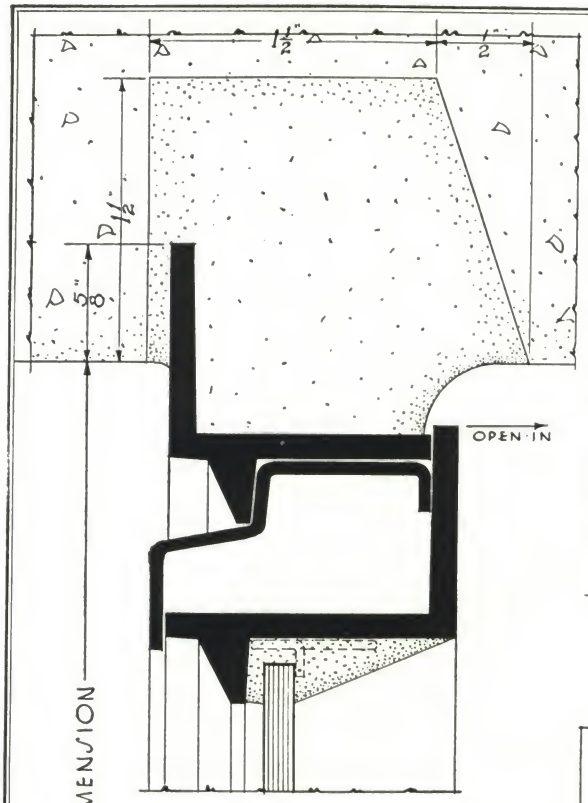


NO SCALE

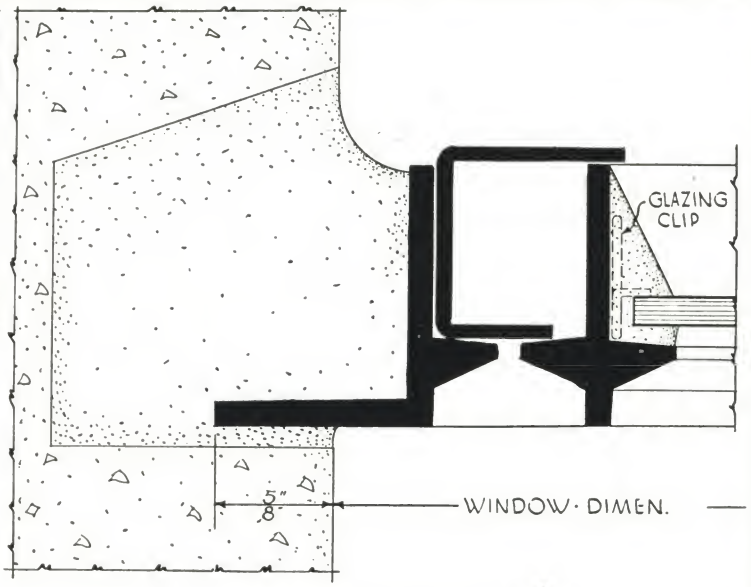
LUPTON · PIVOTED · WINDOWS
STANDARD · TYPES · AND · SIZES

PLATE · NO. J – 2
MAY · 1930

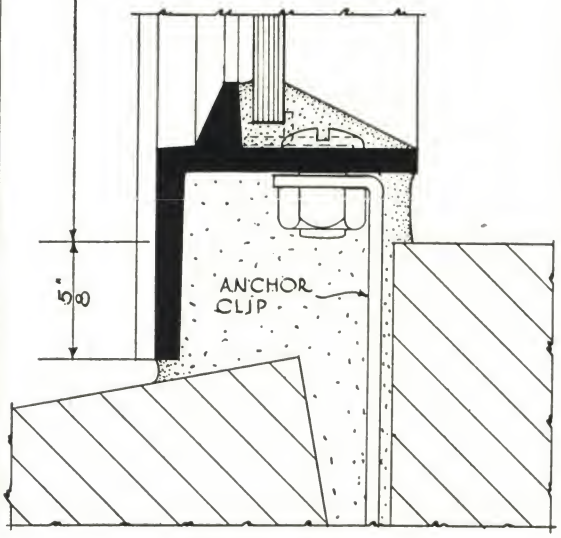
Continued on next page



HEAD
WITH VENT



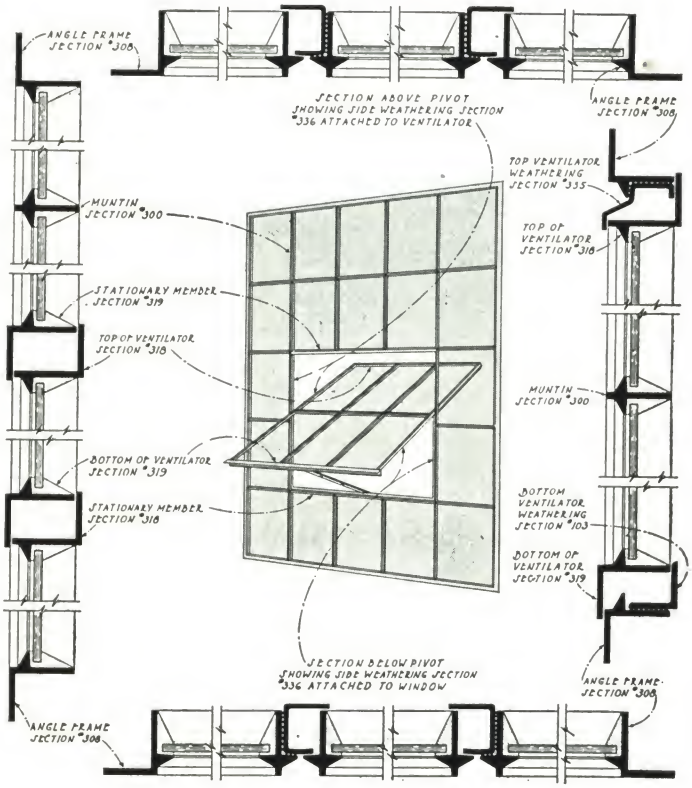
JAMB (WITH VENT)



SILL (FIXED LIGHT)

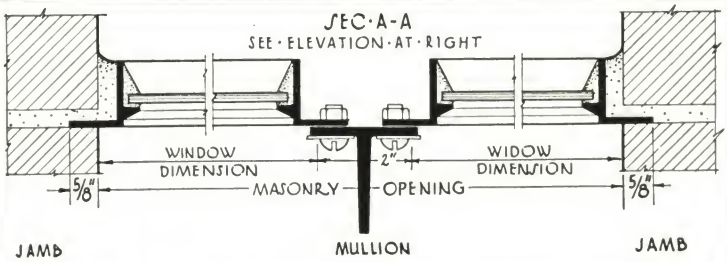
CONSTRUCTION OF WINDOW

SCALE - 3"=1'-0"

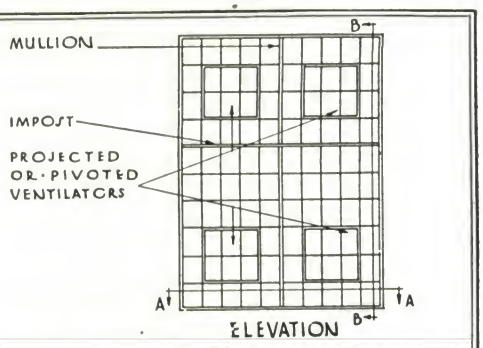


SCALE FULL SIZE	LUPTON PIVOTED WINDOWS FULL SIZE SECTIONS	PLATE NO. J-3 MAY 1930.

Continued on next page

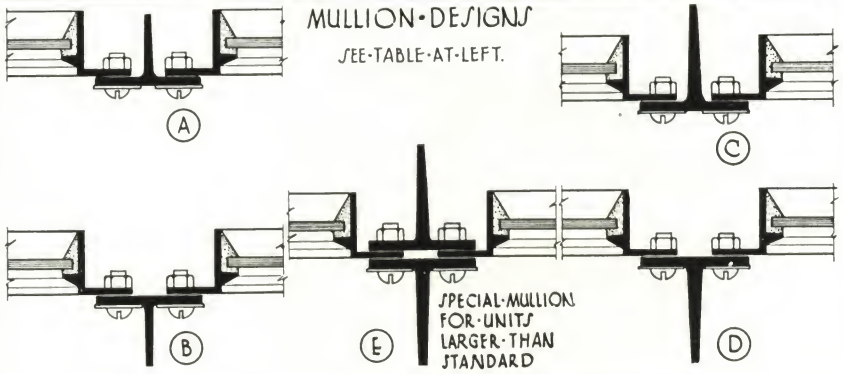


IN·MULTIPLE·UNIT·OPENINGS — EACH·MULLION·ADDS·2" TO·THE·SUM·OF·THE·WINDOW·DIMENSIONS

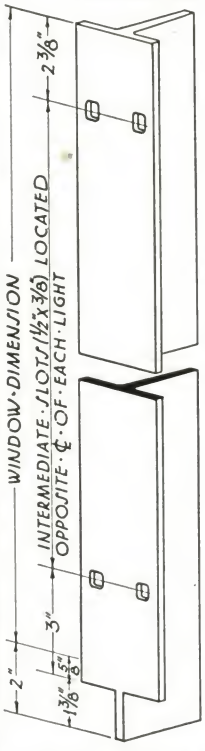


TABLE·SHOWING·LIMITS·OF·MULLION·DESIGN

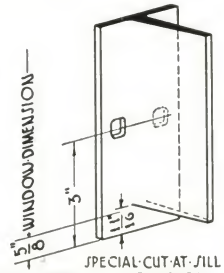
LIGHTS HIGH	12"x18" GLASS				14"x20" GLASS			
LIGHTS WIDE	3	4	5	6	3	4	5	6
2	A	A	A	A	A	A	A	A
3	A	A	A	A	A	A	A	A
4	A	A	A	A	A	A	A	B
5	B	B	B	B	B	B	B	C
6	C	C	C	C	D	D	D	D
7	D	D	D	D	D	D	D	E



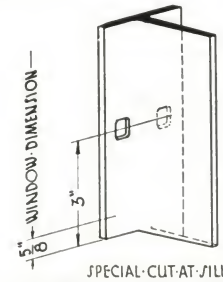
MULLION·CUTS STANDARD·AND·SPECIAL



STANDARD·END·CUT·FOR MULLIONS
STEM·PROJECTS·1 3/8" BEYOND·BOTTOM·OF WINDOWS·AND·IS·IMBEDDED·IN·THE·SILL. THIS TYPE·IS·ALWAYS·FURNISHED·UNLESS·OTHERWISE SPECIFIED.



SPECIAL·CUT·AT·SILL
USED·WHERE·MULLION·STEM TURNS·IN.
1-AT·IMPOSTS - TYPES·2,3,4,5&6 (SEE·TABLE·AT·RIGHT)
2 AT·CUT·STONE·SILLS·OR WOOD·SILLS·WHEN·NOTCHING OF·SILLS·IS·UNDESIRABLE FURNISHED·ONLY·WHEN SPECIFIED.



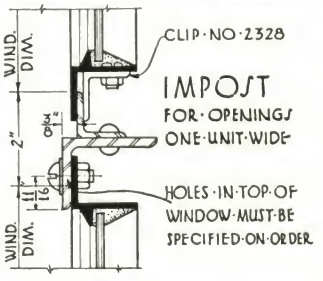
SPECIAL·CUT·AT·SILL
USED·WHERE·MULLION·STEM TURNS·OUT.
1- AT·IMPOSTS· TYPES·3&5 (SEE·TABLE·AT·RIGHT)
2-AT·CUT·STONE·SILLS·OR WOOD·SILLS·WHERE NOTCHING·OF·SILLS·IS UNDESIRABLE. FURNISHED·ONLY·WHEN SPECIFIED.

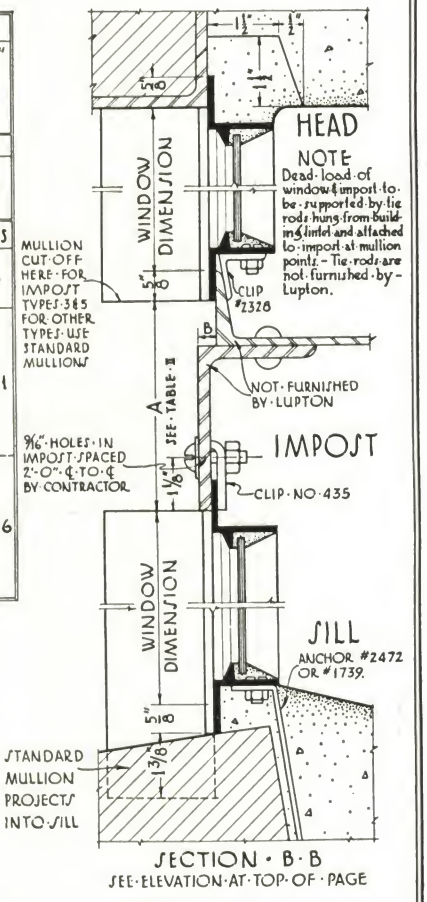
IMPOST·DESIGNS

SCALE·FOR·DETAILS 3"=1'-0"

TABLE·II

TYPE	12"x18" GLASS NO. OF LIGHTS WIDE	DESIGN OF IMPOST	A DIM	B DIM	14"x20" GLASS NO. OF LIGHTS WIDE
	USED·FOR·SINGLE·UNIT·OPENINGS·ONLY				
1	3·TO·6	TWO·ANGLES ONE·2½"x1½"x3/16" ONE·1"x1"x1/8"	2"	3/8"	3·TO·6
	USED·FOR·BOTH·SINGLE·AND·MULTIPLE·UNIT·OP'NGS				
2	3·TO·9	TWO·ANGLES 2½"x2½"x3/16	5"	3/8"	3·TO·8
3	10·TO·13	TWO·ANGLES 2½"x2½"x3/16 ONE·6"x¼"PLATE —OR— ONE·4"CHANNEL ONE·ANGLE 3½"x2½"x¼"	5¼"	3/8"	9·TO·11
4			5¼"	½"	
5	14·TO·18	TWO·ANGLES 3"x3"x5/16" ONE·6"x¼"PLATE —OR— ONE·6"CHANNEL ONE·ANGLE 4"x3"x5/16"	6⅛"	½"	12·TO·16
6			6⅛"	½"	





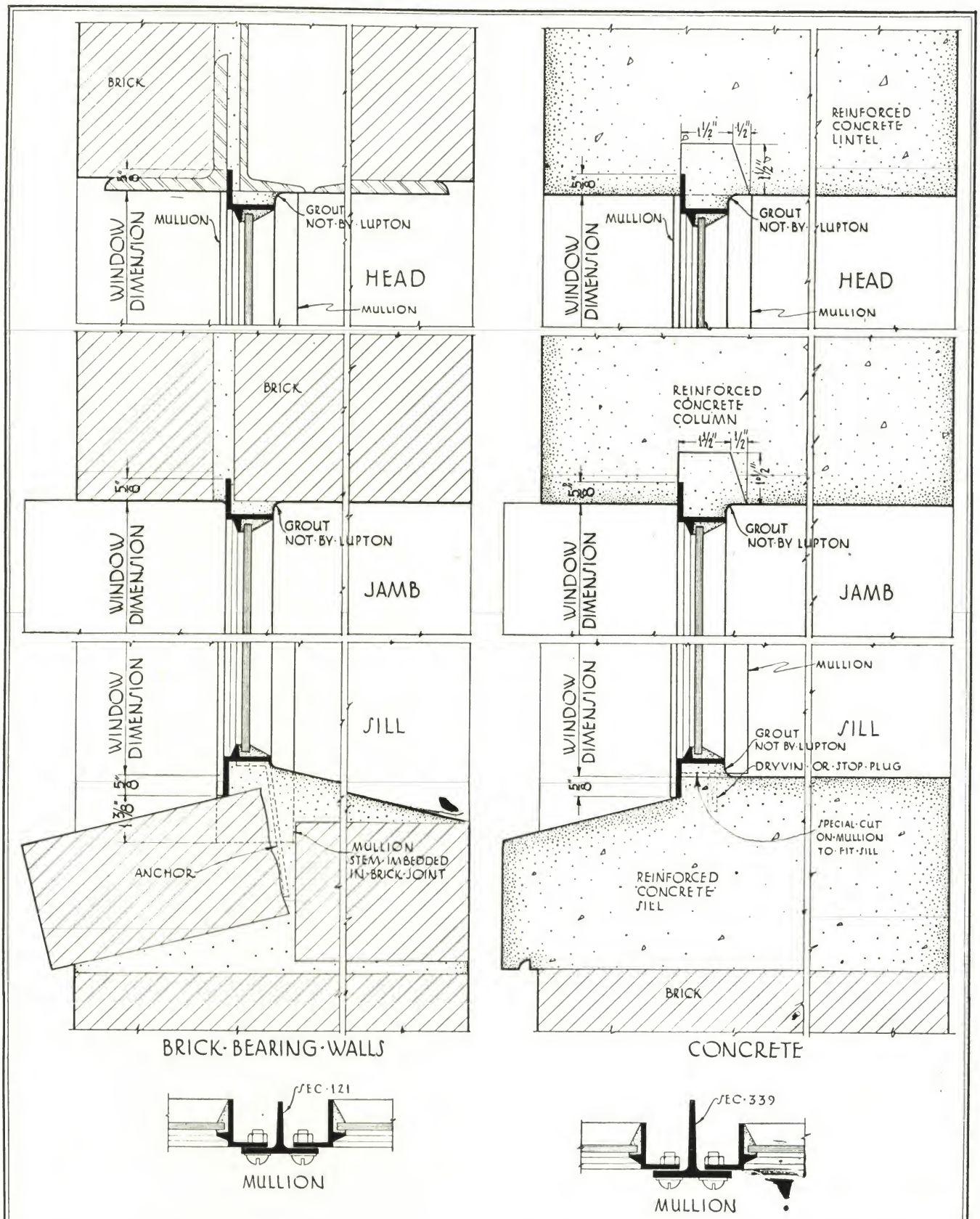
SCALE FOR·DETAILS 3"=1'-0"

DETAILS·OF·MULLIONS·AND·IMPOSTS

LUPTON·COMMERCIAL·PROJECTED·OR·PIVOTED·WINDOWS

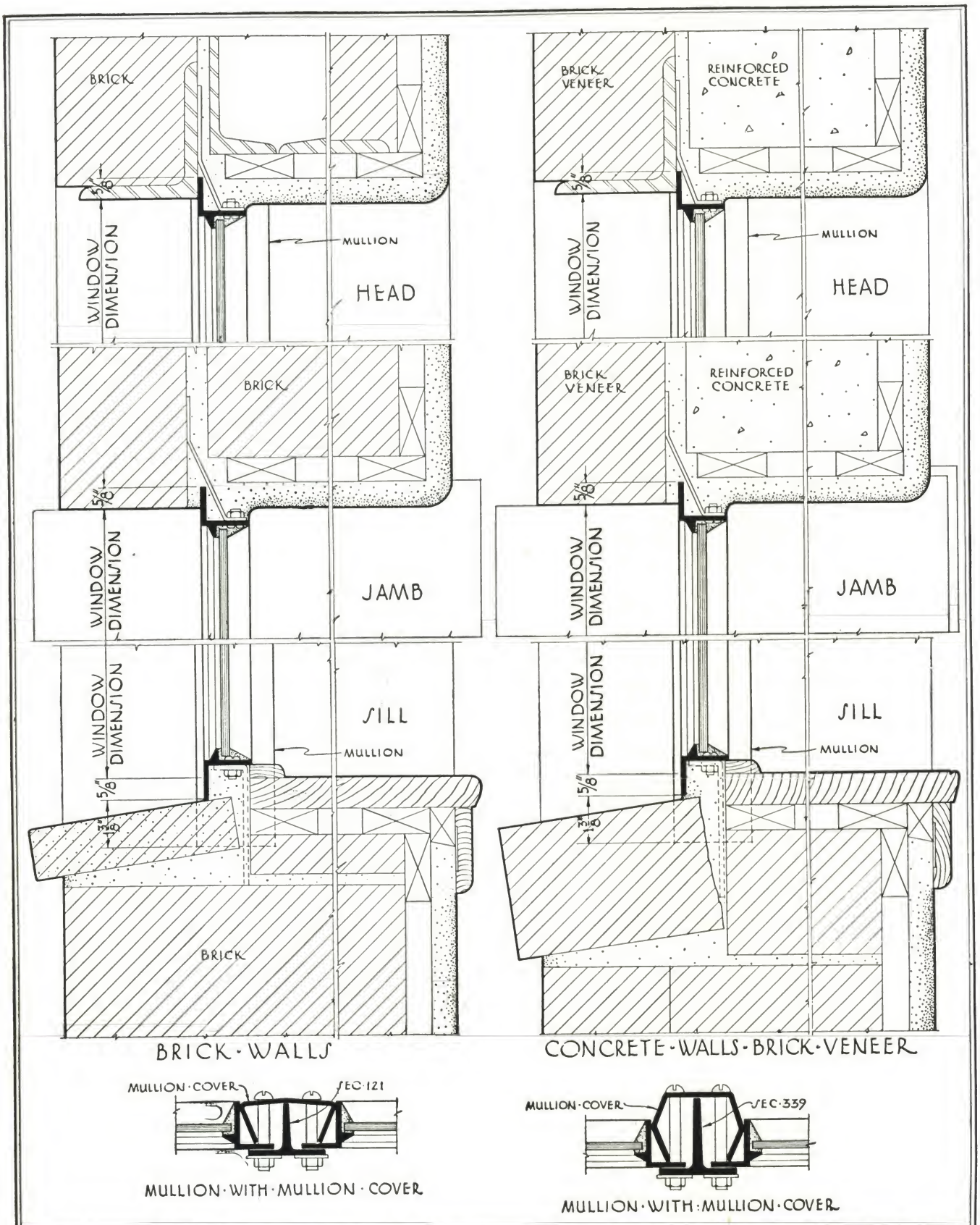
PLATE NO. JK·20 AUGUST 1930

Continued on next page

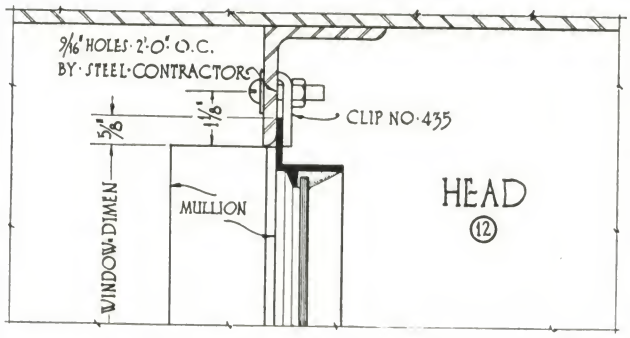


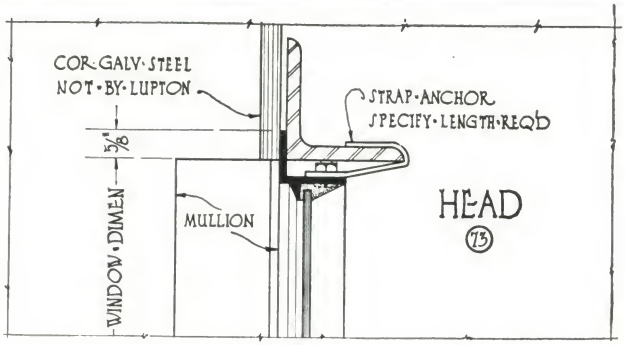
SCALE FOR DETAILS 3" = 1'-0"	INSTALLATION-BRICK WALLS-CONCRETE WALLS LUPTON COMMERCIAL PROJECTED OR PIVOTED WINDOWS	PLATE NO. JK-18 JUNE — 1930.

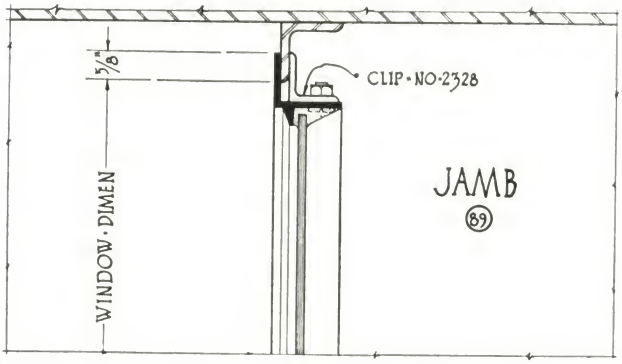
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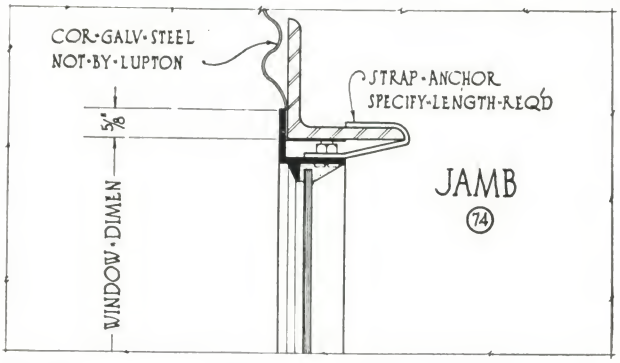


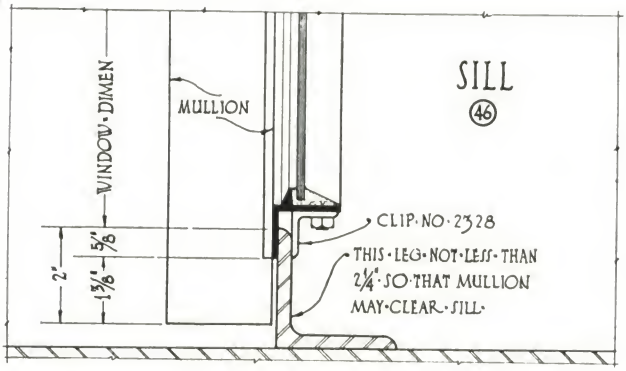
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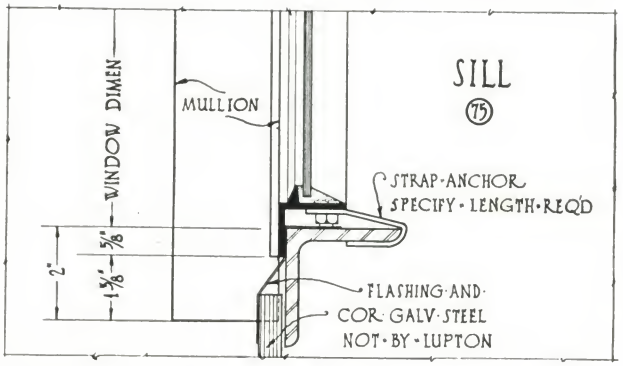


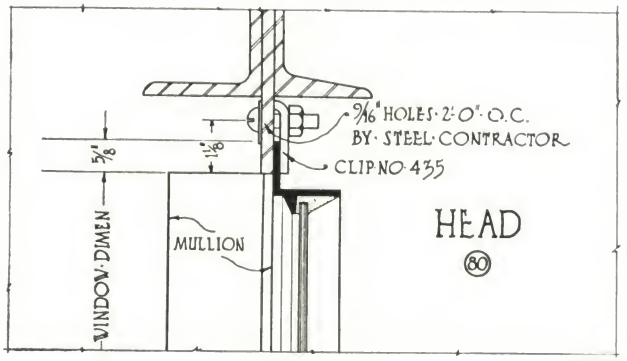


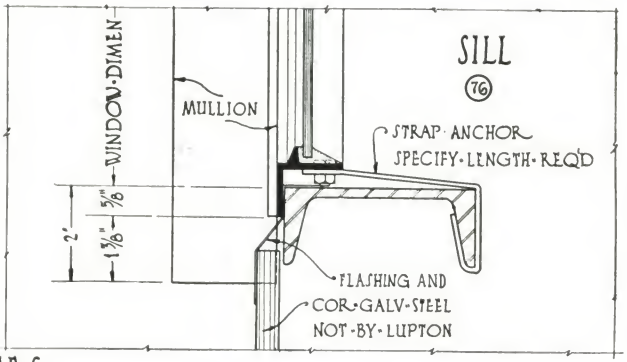












NOTES

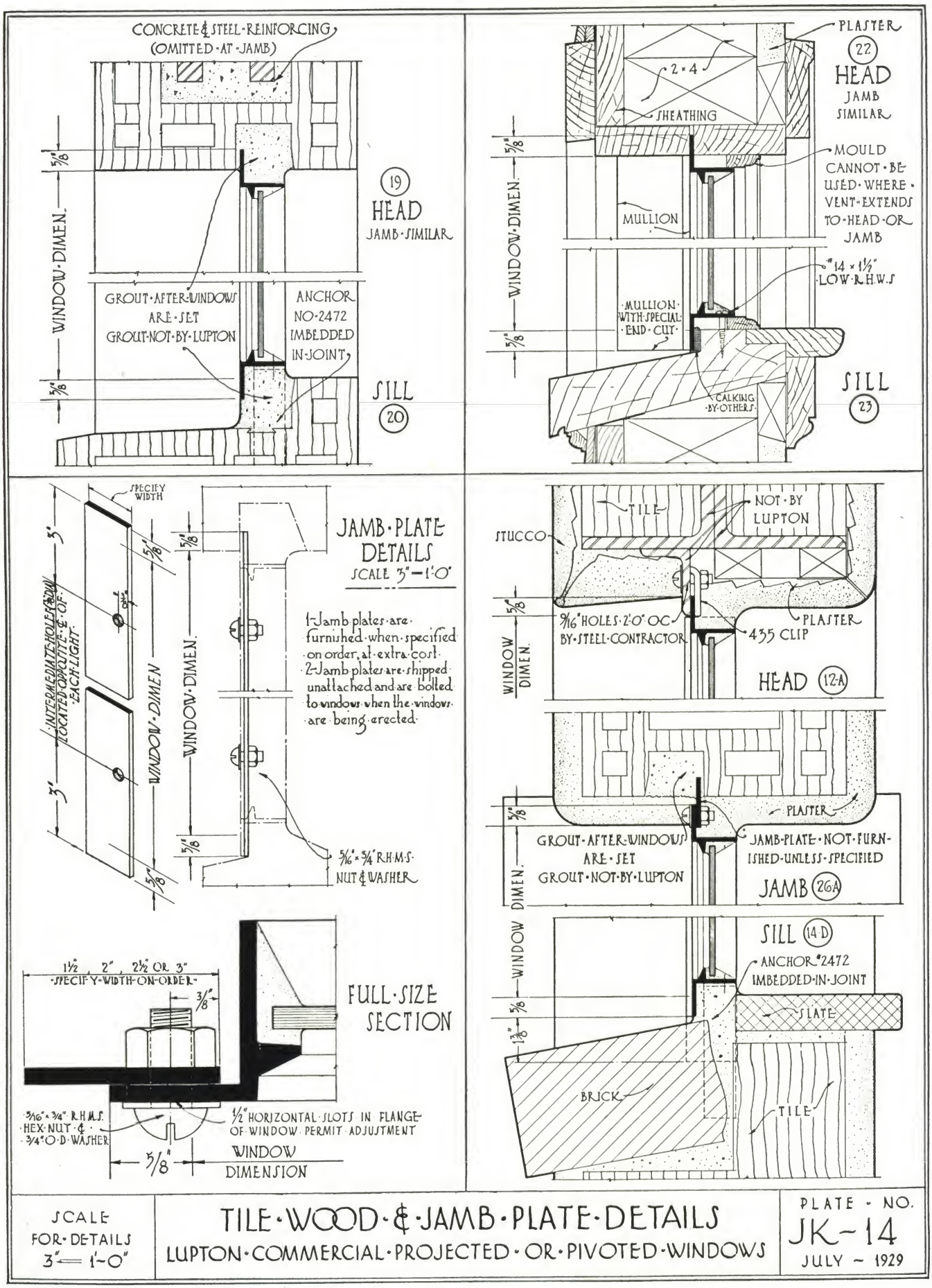
1. – Structural steel members are not furnished by Lupton.

2. – Mullion stems should always be turned outside when used in steel frames; otherwise a special notch is required at the sill.

3. – Numbers in circles, thus (75), are for designating the method of anchoring and the type of structural steel construction at the head, jamb or sill.

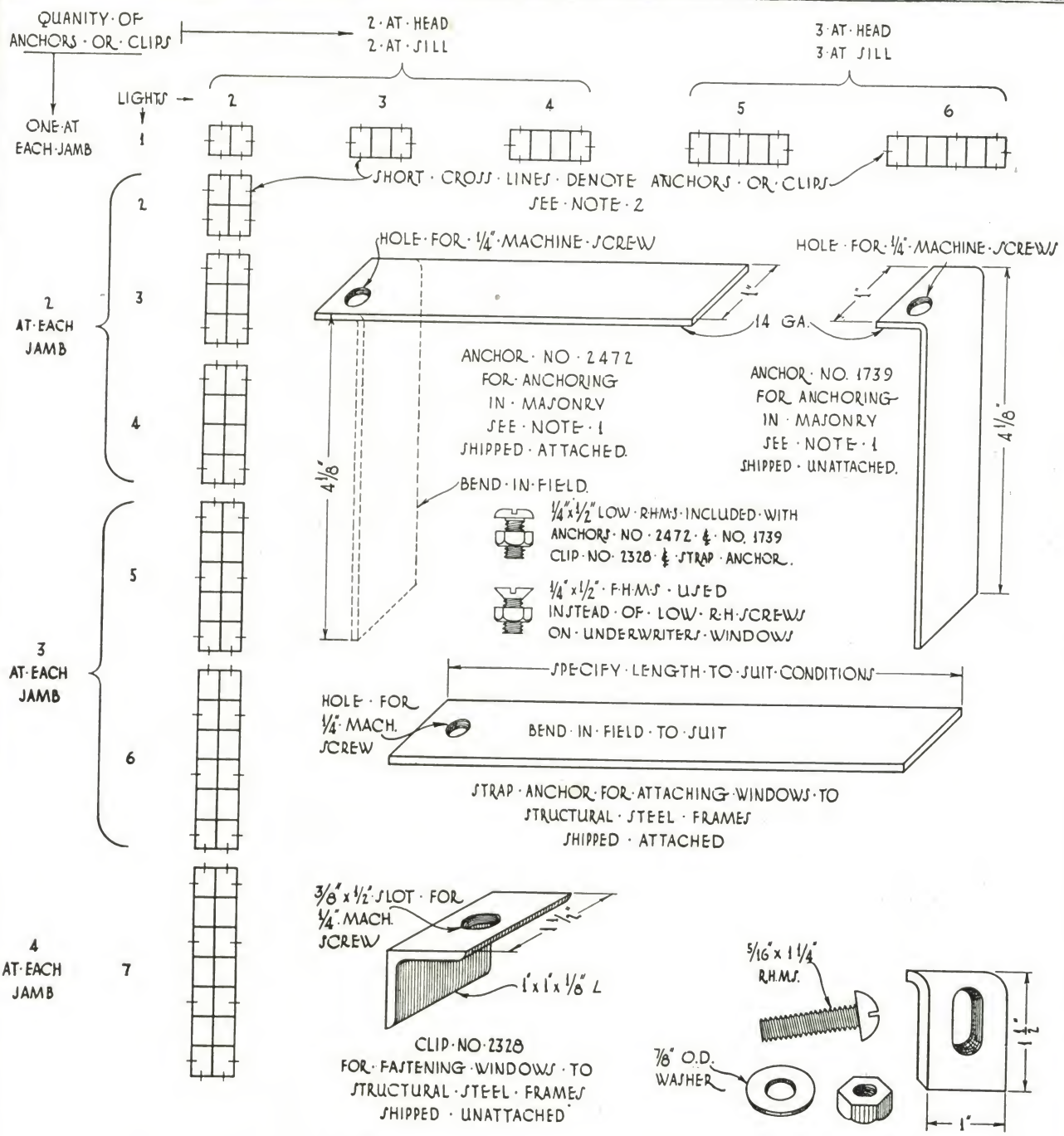
SCALE FOR DETAILS 3" = 1'-0"	INSTALLATION IN STRUCTURAL STEEL FRAMES LUPTON COMMERCIAL PROJECTED OR PIVOTED WINDOWS	PLATE NO. JK – 13 JUNE – 1930.

Continued on next page



SCALE FOR DETAILS 3" = 1'-0"	TILE · WOOD · & JAMB · PLATE · DETAILS LUPTON · COMMERCIAL · PROJECTED · OR · PIVOTED · WINDOWS	PLATE · NO. JK-14 JULY ~ 1929

Continued on next page



NOTES

1. If no method of anchoring is specified anchors No. 2472 or 1739 are furnished for the sill only. Usually anchors No. 2472 are furnished attached to the windows, but in some cases where quick delivery is required anchors No. 1739 are shipped loose with the hardware.

2. When anchoring, other than that described in Note 1, is required it must be specified in the order. Quantities of anchors are furnished as indicated by the diagrams at the top, and at the left side of this sheet; except as described in Note 3.

3. Where #435 clips are to be used, and we are informed that the steel contractor will punch holes 2'-0" O. C. a clip is furnished for each hole.

SCALE HALF-SIZE	DETAILS OF CLIPS AND ANCHORS LUPTON COMMERCIAL PROJECTED OR PIVOTED WINDOWS	PLATE NO. JK – 15 JULY – 1929

Continued on next page

COMMERCIAL PROJECTED AND PIVOTED WINDOWS

With Underwriters' Labels

Lupton PHILADELPHIA UNDERWRITERS LABORATORIES, INC. INSPECTED FIRE WINDOW FRAME NO.S. A 100

Lupton Underwriters' Pivoted Windows are furnished only when specified in bid and mentioned in contract

Wherever wire glass is to be used for fire protection it is advisable to specify Underwriters' Labelled Windows.

Lupton Dealer Stock and Standard Windows, when fitted with special hardware and glazing angles, may receive underwriters' labels.

Where immediate delivery is essential, stock windows may be altered at slight extra cost to receive labels before shipment from our Philadelphia, Cleveland or Chicago warehouses. *Windows cannot be altered to receive labels after shipment.*

It is important to give complete information with the order. The underwriters' inspector will not label windows until he receives the following data: (1) number and size of the units in each masonry opening, (2) details at head, jambs and sill. The latter is required so that proper anchoring connections may be furnished.

THE UNDERWRITERS' REQUIREMENTS

Opening Sizes

1. Single Unit openings may not exceed 84 sq. ft. area. Neither width nor height may exceed 12 ft.

2. Multiple unit openings may not exceed 12 ft. in height. Opening width is not limited, but no unit may exceed 7 ft. in width.

Glass Sizes

3. Maximum exposed glass area of single light is 350 sq. in. Maximum dimensions measured tip to tip of glazing angles are 48 ft. horizontally, 54 in. vertically.

Note: Glass in standard units is less than this.

Ventilators

4. All projected ventilators must open out.

5. Hinges for pivoted vents must have stop lugs limiting opening to 135°.

6. No more than two ventilators may be used in a unit.

7. Maximum area of one ventilator is 20 sq. ft. Maximum dimensions are 5 ft. horizontally, 4 ft. vertically. (See detail for measure point.)

Note: The maximum size recommended by us is 41x38 in. which is a ventilator 3 lights wide, 2 lights high, 14x20 in. glass.

Hardware

8. All hardware must be malleable iron.

9. Projected ventilators may be operated by gravity type handle (No. 141, page 76) or spring catch. Beyond reach from floor handle or spring catch may be operated by chain, or a pull down ring (No. 4481, page 76) may be used for pole operation.

10. Pivoted ventilators may be operated by spring catch and chain or gravity type handle (No. 141, page 82) and chain. Chain arrangement is same as used for standard windows with addition of a fusible link (see page 82, and detail on this page). With the approval of the local inspection board, stay bars may be used instead of handles or spring catches.

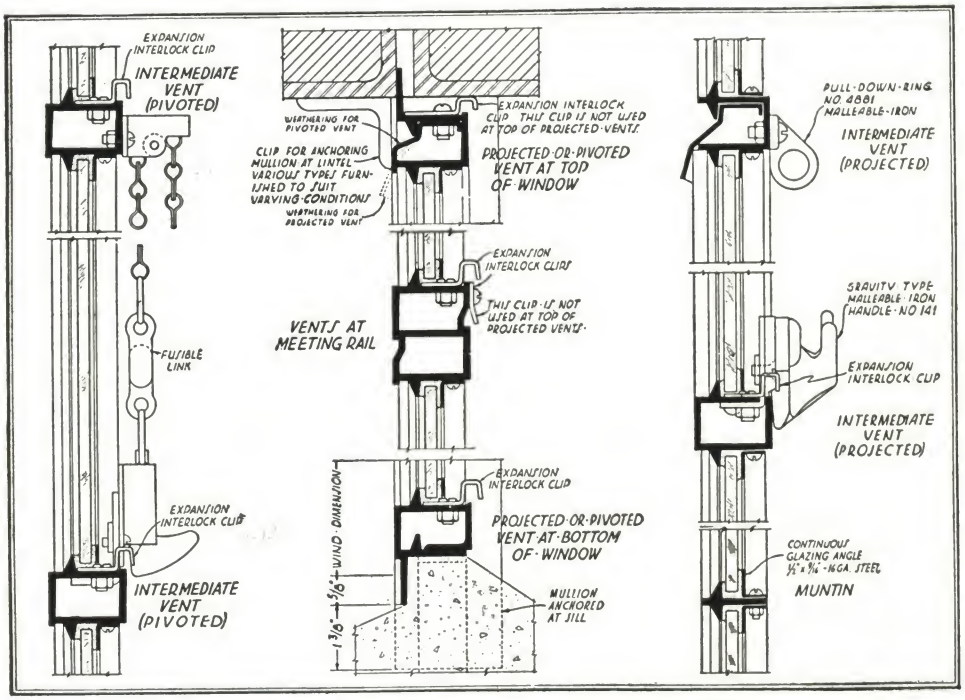
Mullions

11. Mullions must be 339 section anchored at head and sill by means of clips, bolts or embedded in the masonry. (See page 86.)

Construction of Units

12. Construction is the same as for the Lupton Standard Commercial Projected or Pivoted Windows with addition of glazing angles and expansion interlocks. (See detail on this page.)

13. Curved or splayed head units cannot be labeled.



Details of Special Features (Scale 3" = 1' 0")

Glazing Angles

14. Glazing angles ($\frac{9}{16}$x½x$\frac{1}{16}$ in.) must be fastened to the window sections with steel screws. The $\frac{9}{16}$ in. leg is to be upstanding.

Note: Small lights up to 100 sq. in. area may have $\frac{5}{8}$ in. upstanding leg.

Glass

15. Glass must be ¼ in. thick wire glass.

Anchoring

16. Windows must be anchored by embedding the window flange in the masonry or by using any of the clips or anchors illustrated on page 91. Spacing of anchors is different from the standard spacing of anchors shown on page 91 and is as follows:

At Head or Sill—One not more than 8¼ in. from each end of frame member and one approximately at center of each light.

At Jamb—One not more than 12 in. from each end of frame member and one approximately at center of each light.

Continued on next page

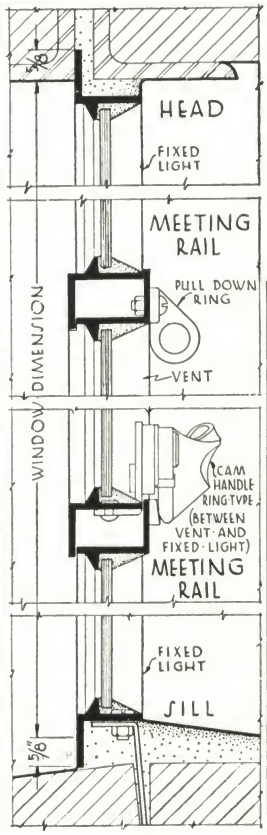
ALUMINUM WINDOWS—INDUSTRIAL TYPE

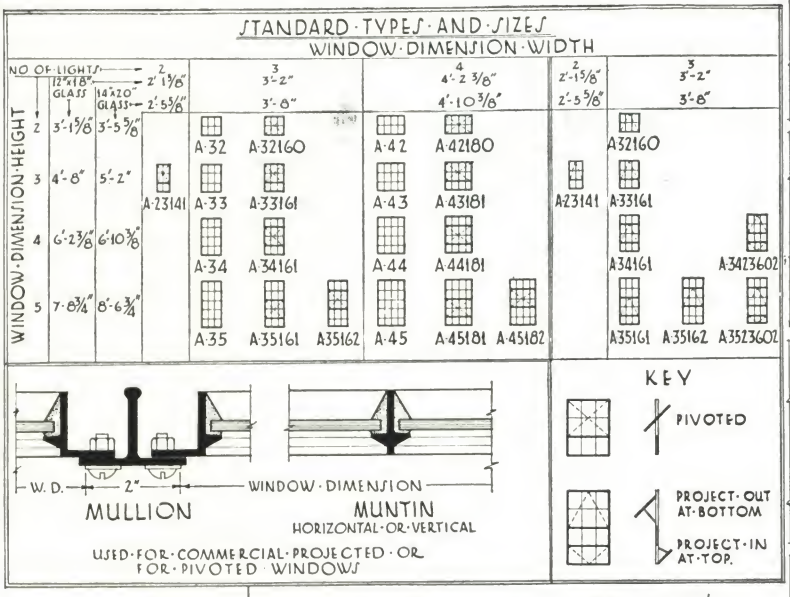
Made in Pivoted and Commercial Projected types. Sections, glass sizes, wall details and anchoring are same as for steel windows. See pages 86 to 91. Available sizes are shown in diagrams. Ventilators must extend the full width of units.

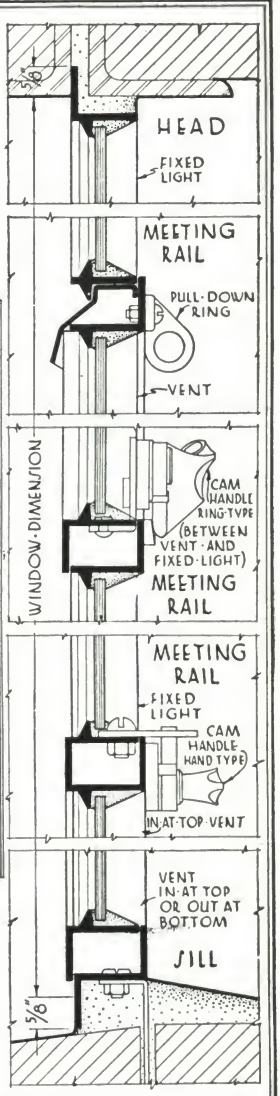
Muntin intersections are welded and in the projected type corners of frames and ventilators are welded. Pivoted vents have cadmium plated malleable iron friction hinges, projected vents have white bronze friction shoe with sherardized coil spring and anti-cling insert.

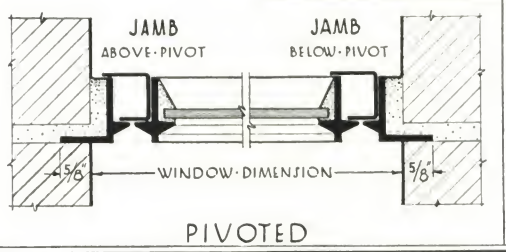
Locking hardware is all of white bronze with dull lacquered finish same as for Aluminum Casements. See pages 27 and 28.

Windows have natural extruded aluminum finish. (For finish of windows and general properties of aluminum, see page 26.)

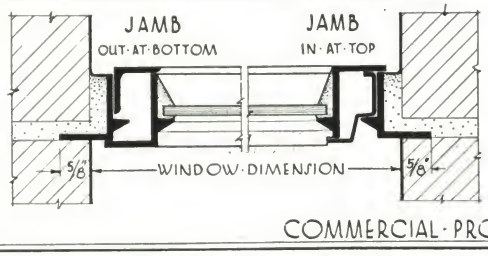








PIVOTED



COMMERCIAL PROJECTED

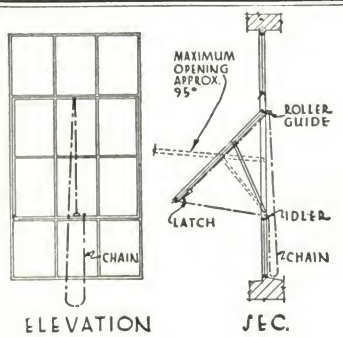
EXPLOSION RELEASING LATCH FOR COMMERCIAL PROJECTED WINDOWS

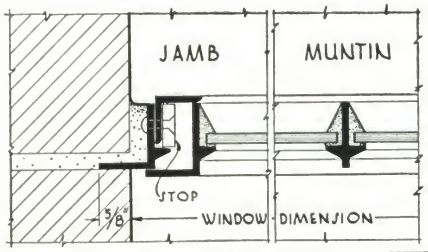
Commercial Projected Windows equipped with explosion releasing latch operate automatically to relieve internal explosive pressure. Used wherever explosion hazard is present as in film storage rooms, etc.

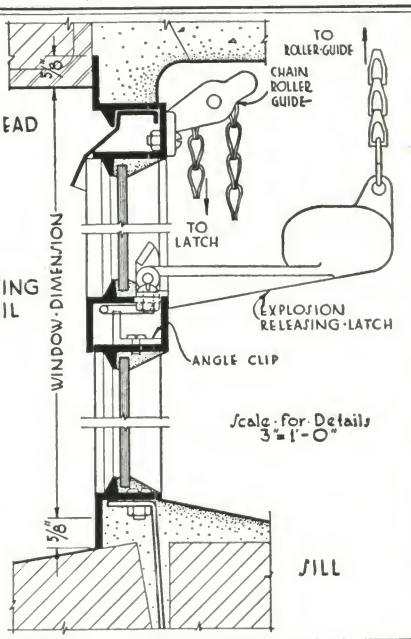
Construction of the window is the same as for the standard Commercial Projected Window except that a special friction shoe is used. Opening sizes, glass sizes and anchoring details are same as for Standard Commercial Projected Windows. See pages 76 to 80 and 86 to 91. Glass must be ¼ in. thick wire glass.

Normally the window is operated by the hand chain shown in illustration. Under explosive pressure however, the vent will open and remain open until closed by hand.

Patent Pending







Continued on next page

LUPTON PIVOTED WINDOW OPERATING DEVICES

Two types of operators are available for simultaneous operation of a group of pivoted ventilators.

Tension Type—The Tension type is similar to the tension operator described on pages 102 to 104, and is recommended for use where the length of run or number of ventilators exceeds the limits of the Torsion operator. It can be manually or electrically operated.

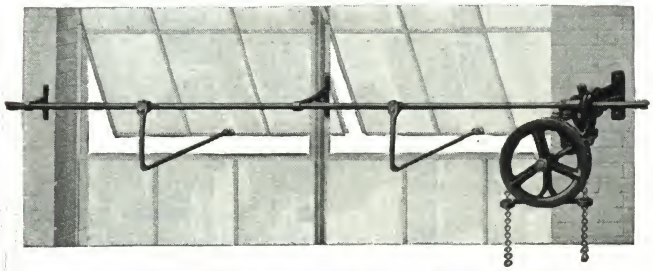
Torsion Type—Torsion type operators are either lever type or rack and pinion type. Limits of each type are given in the table at right.

LIMITS OF OPERATION—TORSION OPERATORS

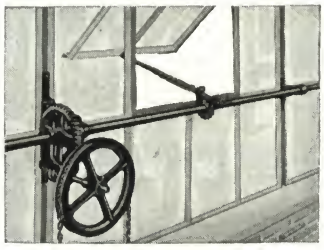
Limits	Lever type		Rack and pinion type
	½-in. shaft	1-in. shaft	
Maximum length of horizontal shaft....	20 ft.	*80 ft.	*160 ft.
Maximum number of 6 light vents.....	6	12	24

*Power to be located in center of run.

Lever type is hand operated. Rack and pinion type can be operated by hand or motor. In both types power is applied through a worm and gear to a horizontal shaft of standard, black wrought iron pipe supported in adjustable malleable iron brackets attached to walls or window mullions. Worm and gear can be open type or enclosed in oil tight case. See details on this page and page 96.



Lever Type Operator with Hand Chain Control



Rack and Pinion Type Operator

SPECIFICATION FOR LUPTON PIVOTED WINDOW OPERATOR—LEVER TYPE

Work Included

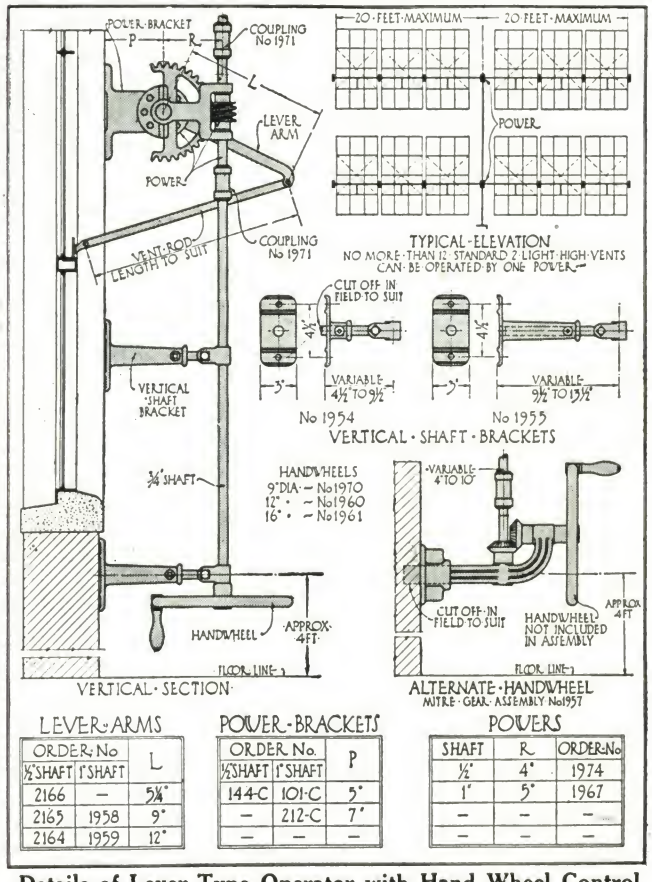
1. Furnish and install where shown on drawings Lupton Operating Device, manufactured by David Lupton's Sons Company, Philadelphia, Pa.

Materials and Construction

2. Power shall be a machine cut steel worm operating a gray cast iron segment worm gear assembled with a gray cast iron yoke and mounted on a malleable iron supporting bracket adapted to rigid attachment to building construction, or, by means of extension clips, to window mullion. The hub of the segment gear shall be drilled to fit the power transmission line and shall be tightly secured to it with set screws so as to rotate the line on the gear axis.

Note: There are two types of power shaft; 1 in. and ½ in. The larger will operate runs up to 40 ft. on each side of power, and no more than 12 average size ventilators. The smaller will operate runs up to 10 ft. on either side of power and no more than 6 average size ventilators.

3. Power shaft shall be standard black wrought iron pipe joined into a continuous line by standard threaded pipe couplings, screwed tight and secured by two ¼ in. steel pins.

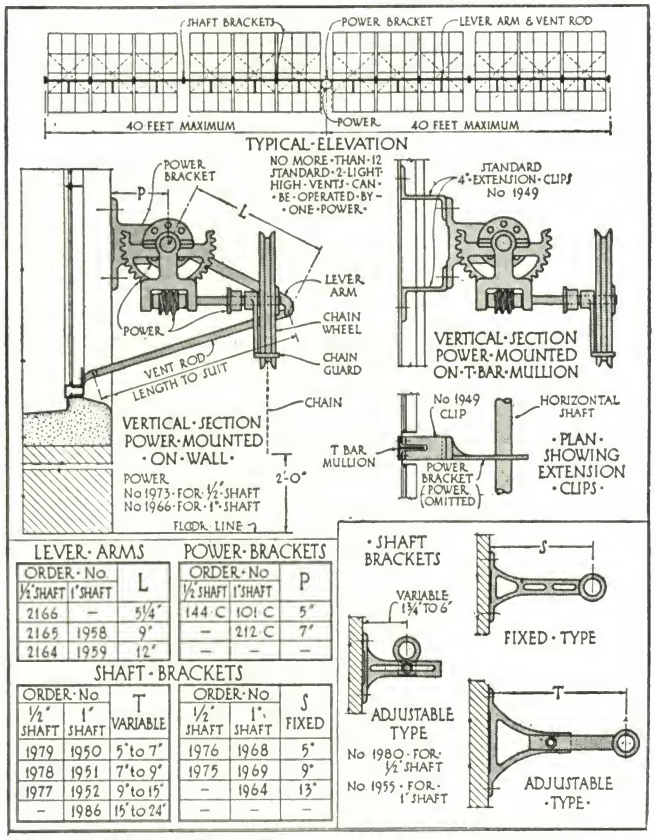


LEVER ARMS		
ORDER No ½" SHAFT	ORDER No 1" SHAFT	L
2166	—	5¼"
2165	1958	9"
2164	1959	12"

POWER BRACKETS		
ORDER No ½" SHAFT	ORDER No 1" SHAFT	P
144-C	101-C	5"
—	212-C	7"
—	—	—

POWERS		
SHAFT	R	ORDER No
½"	4"	1974
1"	5"	1967
—	—	—
—	—	—

Details of Lever Type Operator with Hand Wheel Control
Scale ¾ in. = 1 ft.
Similar handwheel and vertical shaft can be used for rack and pinion operator



LEVER ARMS		
ORDER No ½" SHAFT	ORDER No 1" SHAFT	L
2166	—	5¼"
2165	1958	9"
2164	1959	12"

POWER BRACKETS		
ORDER No ½" SHAFT	ORDER No 1" SHAFT	P
144-C	101-C	5"
—	212-C	7"
—	—	—

SHAFT BRACKETS					
ORDER No ½" SHAFT	ORDER No 1" SHAFT	T VARIABLE	ORDER No ½" SHAFT	ORDER No 1" SHAFT	S FIXED
1979	1950	5" to 7"	1976	1968	5"
1978	1951	7" to 9"	1975	1969	9"
1977	1952	9" to 15"	—	1964	13"
—	1986	15" to 24"	—	—	—

Details of Lever Type Operator with Hand Chain Control
Scale ¾ in. = 1 ft.
A similar method of control can be used for rack and pinion operator

Continued on next page

4. Shaft shall be supported by malleable iron brackets attached to the window mullions or to the building construction.

5. Steel operating arms (one to each ventilator) shall be rigidly clamped to the shaft.

6. Connection between the operating arm and the ventilator shall be made by a steel vent rod and a malleable iron bracket mounted on the ventilator. Pivot pins at both ends of the vent rod shall be bronze.

Note: Specify operation by chain or by vertical steel shaft.

7. *Chain Operation*—Power shall be operated by No. 9 Register hand chain, operating over a chain wheel and guided by a guard. Both wheel and guard shall be gray iron castings. Wheel shall be accurately drilled, mounted in worm shaft and securely held by a setscrew. Chain shall terminate approximately 2 ft. above the floor.

Note: Where building construction makes it impractical to hang the chain directly vertical from the power (as in monitor window installations) single and double chain idlers may be specified (at added cost).

8. *Steel Shaft Operation*—Power shall be operated by a vertical ¾ in. round, cold rolled steel shaft, coupled directly to the worm shaft with a malleable iron coupling. The shaft shall be supported by adjustable malleable iron brackets spaced not over 6 ft. apart, one bracket always being placed at the lower end of the shaft, approximately 4 ft. above the floor.

Note: Lower end of shaft may be terminated in either one of two ways, specify which.

9(a). *(Wheel in horizontal plane.)* A gray iron hand wheel and handle shall be mounted on the lower end of the shaft.

9(b). *(Wheel in vertical plane.)* The shaft shall be directly connected by a malleable iron coupling to a pair of miter gears of cut machine steel assembled with a gray iron hand wheel and handle on an adjustable malleable iron bracket.

Note: When specified a gray cast iron housing is furnished for the miter gears at added cost.

Note: Where building construction makes it necessary, universal joints for the vertical shaft may be specified (at added cost). The angle between two adjacent lengths of shaft must not be less than 135°.

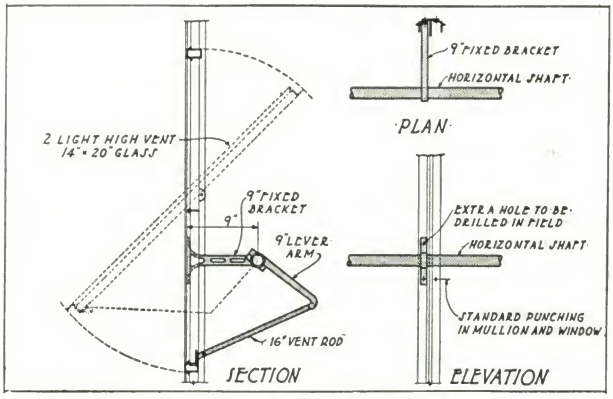
Erection

10. All operating devices shall be erected and adjusted to proper working order by the window contractor.

Painting

11. All operating devices shall have one coat of manufacturer's standard, dark gray paint, oven dried and applied before shipment.

Note: The following should be provided for in the paint specifications—one coat of red lead and oil should be applied after erection followed by one or more coats of finishing paint as required.



Application of Lever Type Operator
Scale ½" = 1' 0"

SPECIFICATION FOR LUPTON PIVOTED WINDOW OPERATOR—RACK AND PINION TYPE

Work Included

1. Furnish and install where shown on drawings Rack and Pinion Type Operating Device, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Materials and Construction

2. Power—

Note: There are three types of powers as follows:

2(a). Power shall be a worm and gear having a 40 to 1 ratio. Worm to be cut from steel, worm wheel to be cast iron with cast teeth and fastened to the horizontal shaft with two setscrews. Worm and wheel shall be held in mesh by a cast iron yoke.

2(b). Power shall be a worm and gear having a 26 to 1 ratio. Worm to be cut from steel and provided with a thrust bushing. Worm wheel to be cast steel with cut teeth and fastened to the horizontal shaft with two ¼ in. diameter steel pins. Both worm and gear shall be enclosed in an oil tight case.

2(c). Power shall be a worm and gear having a 60 to 1 ratio. Worm to be cut from steel and to be provided with two Nice ball bearings. Worm wheel to be cast iron with cut teeth and attached to horizontal shaft with two ⅜ in. diameter steel pins. Worm and wheel shall be enclosed in an oil tight cast iron case.

3. Power shall be mounted on a malleable iron bracket adapted to rigid attachment to building construction or by means of clips to window mullion.

4 and **5. Power Shaft**—See specification for Lupton Operating Device Lever Type—paragraphs 3 and 4.

Note: ½ in. pipe is not used for the rack and pinion operator. In addition to the 1 in. standard pipe, 1 in. extra heavy and 1 in. double extra heavy pipe may be used.

6. One rack and pinion shall be provided for each ventilator. Rack shall be of 1x⅜ in. steel channel punched with slots to mesh with a malleable iron pinion clamped with one bolt to the horizontal shaft so tightly as to withstand a pull of 300 lb. on a 2 in. radius.

7. Rack and pinion shall be held in mesh by two 13 gauge steel yokes with two brass bushed steel rollers.

8. Rack shall be—

Note: Racks may be straight or curved and may be attached at top or bottom of center pivoted ventilators. Specify type and where attached.

9. A malleable iron hinge shall be provided for attaching the rack to the ventilator. Hinge shall be adjustable so that all vents may fit tight when closed.

10 to 14. Operation—

Note: See specification for Lever Type Operating Device, paragraphs 7 to 9(b) inclusive, at top of this column.

Note: Power described under paragraph 2(c) may be operated by motor, specify as follows:

15. Power shall be operated by a motor bolted to the base of power and geared to power with a spur gear. Limit switch shall be attached to power. Push button with open, closed and stop buttons and a motor control panel as well as limit switch shall be furnished by manufacturer and operator.

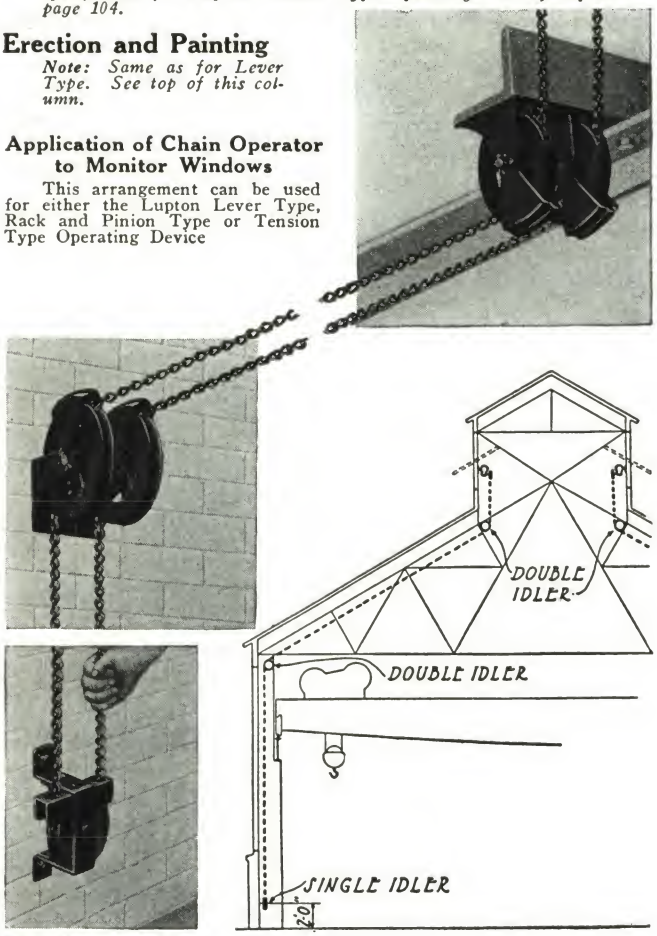
Note: Conduit wiring and line switch are to be furnished by the electrical contractor. See "Electrical Construction" under specification for Lupton Tension Type Operating Device, Lupton page 104.

Erection and Painting

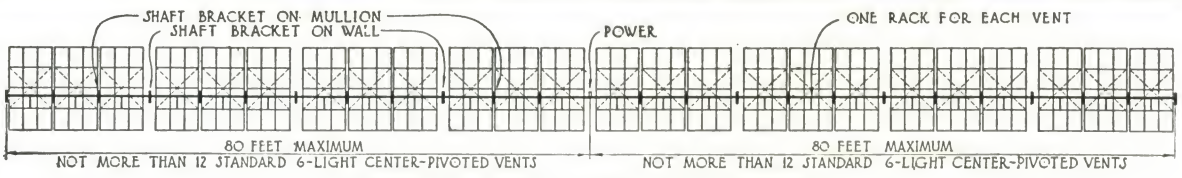
Note: Same as for Lever Type. See top of this column.

Application of Chain Operator to Monitor Windows

This arrangement can be used for either the Lupton Lever Type, Rack and Pinion Type or Tension Type Operating Device



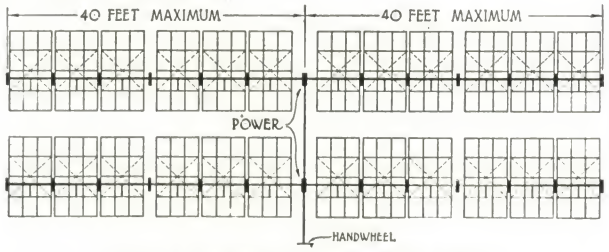
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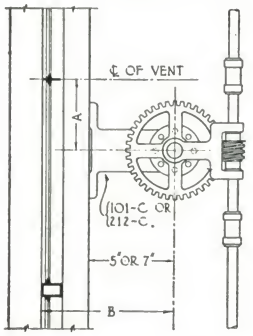
ELEVATION OF TYPICAL HAND CHAIN OPERATION

LIMITS

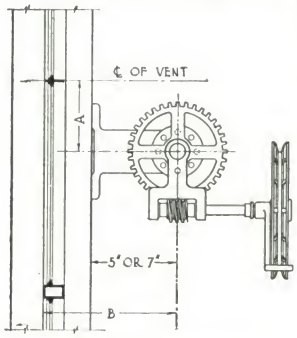
Center Pivoted (vents pivoted 2 ins above center)
Not over 24 standard vents - See diagrams at right
Top Pivoted (vents pivoted 4 ins from top)
Limits are ½ those shown for Center Pivoted
Continuous Windows (vertical top hinged
* 3 ft. high - 100 ft., 4 ft high - 90 ft, 5 ft high - 60 ft, 6 ft high - 40 ft.



TYPICAL ELEVATION OF MULTIPLE BANK HANDWHEEL OPERATION

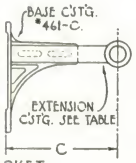


HANDWHEEL OPERATION



HAND CHAIN OPERATION

USING EXTENSION C'STG. NO.	'C' VARIABLE
215-C	14" to 16½"
460-C	12" to 14½"
113-C	9" to 12"
111-C	7⅛ to 9½"



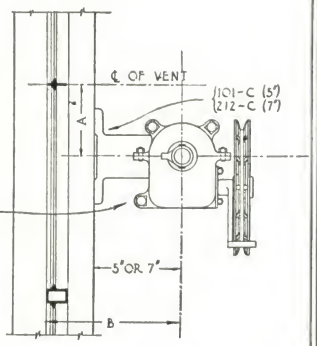
SHAFT BRACKET

POWERS WITH FULL WORM GEAR

VERTICAL SHAFT & HANDWHEEL SAME AS FOR L.O.D.
SCALE ¾" — 1'-0"

NOTE POWERS ARE MOUNTED ON *101-C (5") OR *212-C (7") LOD POWER BRACKETS ATTACHED TO WALL - WHERE POWERS ARE TO BE ATTACHED TO MULLIONS 4-INCH EXTENSION CLIPS *1949 ARE USED, SAME AS FOR L.O.D.

TYPE "LA" POWER
IN OIL TIGHT CASE
HAND CHAIN OPERATION

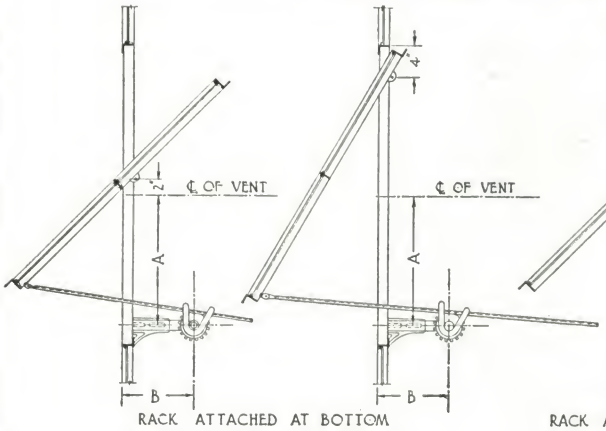


HAND WHEEL OPERATION USES SAME SHAFT & HANDWHEELS AS LUPTON OPERATING DEVICE
SCALE ¾" — 1'-0"

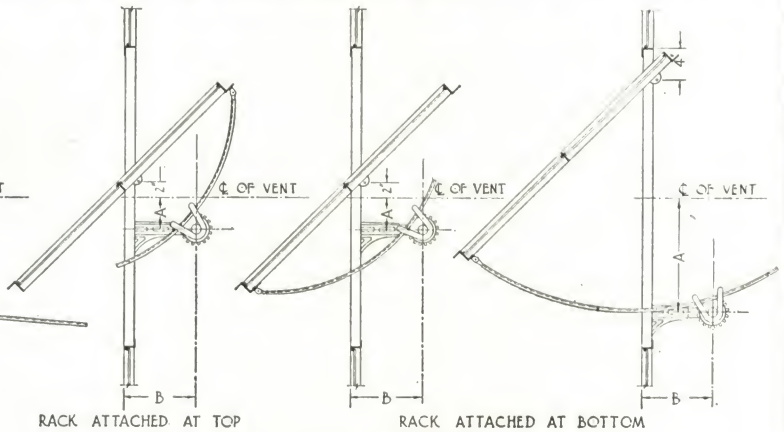
* When applied to Continuous Windows, shaft is 1" Double Extra Strong pipe, Power is at center of run and Racks are 10'-0" apart.

GLASS SIZE	STRAIGHT RACK 60° MAX. OPG.				CURVED RACK FOR CENTER PIVOTED WINDOWS - 60° MAX. OPG.				CURVED RACK FOR TOP PIVOTED WINDOWS					
	LOCATION OF ℄ OF SHAFT		LENGTH OF RACK		LOCATION OF ℄ OF SHAFT		LENGTH OF RACK		LOCATION OF ℄ OF SHAFT		LENGTH OF RACK (34" RAD)	MAX OPG.	LENGTH OF RACK (22" RAD)	MAX. OPG.
	A	B	CENTER PIVOTED	TOP PIVOTED	A	B	I *	II *	A	B				
12" x 18"	15⅜"	9⅜"	28"	38½"	4"	9⅜"	27"	27"	14⅜"	9⅜"	39"	60°	39"	55°
		13⅜"	32"	42½"		13⅜"	27"	31"		13⅜"	43"	60°		
14" x 20"	16⅜"	9⅜"	28"	42½"	4"	9⅜"	27"	27"	15⅜"	9⅜"	43"	60°	43"	55°
		13⅜"	32"	46"		13⅜"	31"	31"		13⅜"	47"	60°		

* I RACK ATTACHED AT TOP OF VENT II RACK ATTACHED AT BOTTOM



RACK ATTACHED AT BOTTOM
STRAIGHT RACK OPERATION



RACK ATTACHED AT TOP
RACK ATTACHED AT BOTTOM
CURVED RACK OPERATION

SCALE	CONSTRUCTION & APPLICATION RACK & PINION OPERATOR LUPTON MECHANICAL OPERATOR	PLATE - NO M - 1 AUGUST-1929
AS SHOWN		

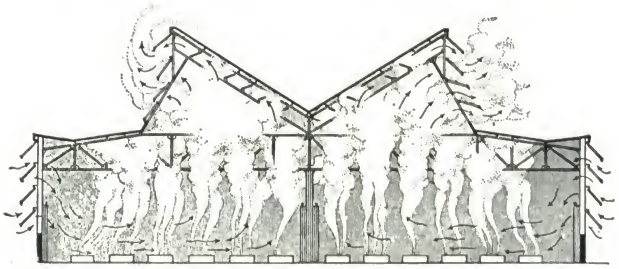
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LUPTON V-TYPE ROOF DESIGN

The Lupton V-type Roof Design was primarily evolved to supply needed ventilation and daylight to foundries and similar buildings in which heat and gases are produced as a result of manufacturing processes.

Its remarkable efficiency both in ventilation and light distribution, has led to its adoption in many manufacturing buildings in various industries, regardless of size. These include automobile, rubber, glass and airplane factories in addition to a great number of foundries and buildings devoted to the metal manufacturing industries.

It corrects the faults of other roof designs, in that it quickly and thoroughly clears any size building of heat, foul air, or smoke. It provides large outlets arranged to receive the ascending air and heat currents with minimum lateral draft. There is no place anywhere within the steep planes of the V-shaped portion for stale air to be pocketed.



Cross-section of Typical Lupton V-type Roof Used in a Foundry Showing Ventilation Features

While ventilation and lighting are the primary functions of the Lupton V-type Roof, it gives maximum weather protection, because it incorporates the use of top hung continuous windows which are in themselves a weather protecting element.

The Ventilation Features—The old style monitor type roof proves faulty in several ways. Its outlets are too small for free discharge of individual heat streams. The center pivoted monitor windows allow rain and snow to blow over them, and cross winds to enter, chilling the warm monitor and causing down drafts. Consequently the windows need much closing and opening and have no ventilating value except under the most favorable conditions.

Lupton V-type Roof Design gives complete ventilation where the monitor failed. It provides for proper relation of fresh air inflow to stale air elimination. Buildings of unusual width are satisfactorily ventilated by the use of several V-shaped roof bays with Lupton A-Frames located between them. The lower the roof, in a heat producing building, the better. Such a roof need not be higher than is required for crane clearance.

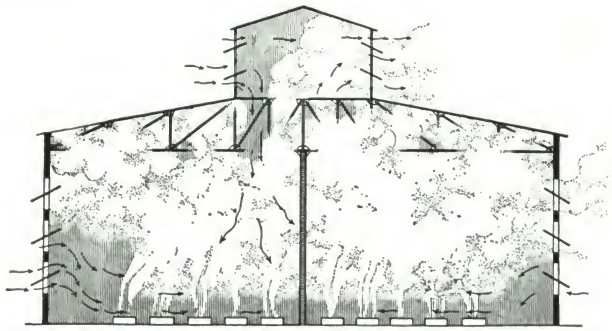


Ford Motor Company, Lincoln Division, Detroit, Mich.
ALBERT KAHN, Architect. WALBRIDGE, ALDINGER CO., Contractors

Two large V-shaped bays with an A-frame between them. All hung with Lupton Continuous Windows. Each line of windows is 842 ft. long and controlled by a single Lupton tension type operating device, motor driven. Lupton has equipped Ford plants in Jacksonville, Fla.; Norfolk, Va.; Dallas, Texas; Los Angeles, Cal., and Louisville, Ky.

The Lighting Features—The superiority in the lighting features of the Lupton V-type Roof Design is the result of carefully planned construction. The continuous windows in the sides of the truss permit lighting through a wider angle than other roof construction. A portion of light strikes the slopes of the roof, which results in a breaking up of light rays and a more widely spread diffusion of light. The combination of crossing rays produces an even lighting throughout the entire building.

There is no necessity of locating the building or its roof design in a theoretical position for interior lighting, for the lighting is from practically all sides, hard shadows are absent and workers can see clearly even when facing the window because of the light from behind.

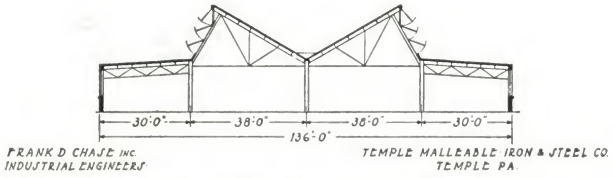


Cross-section of Typical Old Style Foundry

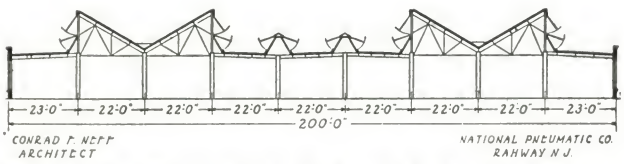
Owing to the light distribution, this type of roof requires less glass area than a saw-tooth roof for equally effective lighting, thus saving fuel. Investigations show that added cost of steel for a Lupton V-type Roof will be more than offset by a few years' fuel saving.

Fuel losses can be reduced and the average summer temperature decreased by the use of a suitable insulation between the roof slab and weatherproof covering. Exposed cement tile should be avoided.

Engineering Service—Lupton V-type Roof Design is not a stock design. For its correct and most efficient use, the proportions of trusses and A-Frames should be worked out for each particular case. Lupton Engineering service is available, to study your problem without obligation, and give our recommendations to insure a better lighted and ventilated building.



Cross-section Showing Lupton V-type Roof



Cross-section Showing Two V-shaped Bays with A-Frames Between Them. The A-Frames Provide Inlets for Fresh Air in Wide Buildings

Continued on next page

LUPTON CONTINUOUS WINDOWS

These windows are designed for lighting and natural ventilation in roofs and sidewalls of industrial buildings where mass control of ventilation is necessary and desirable. Units can be joined end to end, by means of weatherproof expansion joints, to form a continuous window for openings as long as 1000 feet. Long runs such as this can be operated by a single motor driven operating device as described on page 103. When the windows are opened, there is formed over the opening a continuous awning of glass and steel that effectively prevents the entrance of rain, thus permitting ventilation in stormy weather. Storm panels are provided at the ends of runs to keep the rain out at these points.



Lupton A-Frame in Roof, with Two Lines of Lupton Continuous Windows in the Sides

This is one of several uses for this type window

In Roofs—Their most effective use is in the Lupton V-type Roof construction described on page 97, for industrial buildings with heat processes. The Lupton "A" Frame is the most inexpensive, practical ventilating skylight for roof lighting of other types of buildings. When furnished with Lupton Continuous Windows, sawtooth and monitor roofs give the best results of which they are capable.

In Sidewalls—They can be used either in short lengths between pilasters or in long runs hung outside the wall columns.

Operation—Short runs (50 to 100 ft. depending on length of window) may be operated by the Rack and Pinion Operator described on page 94. For longer runs the Lupton Tension Type Operator described on page 102 should be used.

Members—Are solid one piece rolled steel sections. The sill member (section 360) is especially designed to shed water even when the window is open. Full size sections are shown on page 101.



Sill Member Section 360

Welded Assembly—At the joints the members are coped and solidly oxy-acetylene welded along the entire length of contact, making the unit a single rigid piece. There is no possibility of loosening joints with resultant cracked putty and broken glass.

Expansion Joints—Expansion joints are provided between units to allow for unavoidable inaccuracies in building construction and variations in length due to temperature. A section through an expansion joint is shown on page 100, Fig. 4. The frame member of one unit (section 326) overlaps the frame member (section 350) of the adjacent unit. The units are held together by an "expansion plate" and bolted as shown.

Sizes of Units and Openings—There are four standard heights of units: 3 ft., 4 ft., 5 ft. and 6 ft. These are overall dimensions. Clear heights of openings, from head girt to sill girt for any unit, are 1½ in. less than the overall height of unit. These heights must be carefully maintained in placing steel work, see details page 100.

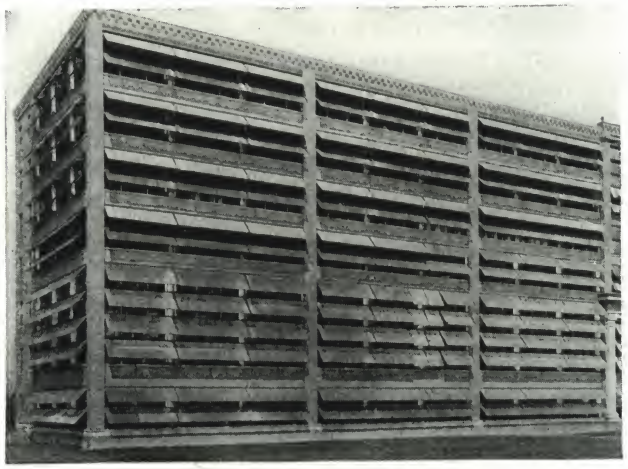
Standard units are 20 ft. long with muntins approximately 2 ft. 0 in. center to center. Shorter length units, 10 ft., 12 ft., 14 ft., 16 ft., 18 ft. long, are used at the ends of runs as needed to suit the openings.

Storm and End Panels—End panels 2-ft. long are usually used at ends of both stationary and operated runs in roofs. Storm panels attached to end panels and underlapping the operated windows for a distance of 2 ft., are desirable if windows are to remain open in stormy weather. See page 100, Fig. 4.

Overall length of window is always even feet; no odd feet or inches. See page 100, Fig. 4. To these even feet dimensions must be added not less than 1½ in. at each end (more if desired) for clearance and end flashings. Thus opening lengths are expressed as 84 ft. 3 in., 136 ft. 3 in., etc. Clearances exceeding 1½ in. at each end must be filled out with additional flashing.

In the Side Walls—Between pilasters, special width units and glass are sometimes necessary. The end rails of formed plate (section 326) overlap special plate weathering furnished by us, see details page 100, Fig. 3. Width of opening is specified by architect. Weathering is of standard overall width (5½ in.) and is located to project from the masonry from 1½ to 3½ in. This gives an allowable variation of 4 in. in width of unit and saves needless glass cutting.

Weathering is set in pilasters by general contractor before the face brick or concrete is applied. We furnish a sketch showing its location and that of the two holes to be punched by the general contractor in the head girt angle to carry it.



Firestone Tire & Rubber Co., Akron, Ohio, Mechanical Building

OSBORN ENGINEERING CO., Engineers

By using Lupton Continuous Windows it is possible to work close to the windows without need of shutting them in case of rain. Every third column breaks the lines of windows. Other columns are spaced on 20 ft. centers and are set inside windows. Upper and lower lines of windows, each 56 ft. long, are connected in pairs and opened simultaneously by Lupton Tension Type Operating Device with hand chains.

Continued on next page

Standard Glass Sizes—Standard glass heights are 3 in. less than the standard or overall heights of the units, i. e.:

No. 3 Unit 3 ft. high.....33 in. glass
No. 4 Unit 4 ft. high.....45 in. glass
No. 5 Unit 5 ft. high.....57 in. glass
No. 6 Unit 6 ft. high.....69 in. glass

Standard lights are 23 and 24 in. wide, these widths being combined as needed to make the desired length of unit.

In ordering glass for replacement, the width and height for each light must be specified.

In ordering new units, only the nominal length of the units need be specified.

Steel Work Required—Structural Steel Work required for the installation of Lupton Continuous Windows and Continuous Window Operators, described in the Specifications and shown in the details for these products, is not furnished by Lupton. We furnish drawings showing punching in girt angles for attaching hinges, but the punching is done by the steel contractor.

Clearances Required—Clearances for hinges, overlap at sill, and operators must be strictly maintained. They must be kept free of rivets and other obstructions. All structural steel supporting windows must be straight and true, and must be directly attached to steel columns to avoid faulty alignment due to use of brick walls for support.

All estimates are based on our standard construction as shown in details. Extras will be charged for any special construction necessitated by departure from dimensions and clearances here indicated.

Flashings—All joints in sill and intermediate girt angles, all storm panels and end panels require flashings as shown by details on pages 100 and 101.

We do not furnish these flashings; they should be supplied by the sheet metal contractor. We will not be responsible for the weatherproofness of Lupton Continuous Windows where flashings are omitted.

Windows between pilasters require special end weathering in jambs which we furnish. See Detail on page 100, Fig. 3, for dimensions needed, covering both window and weathering.

Power House Type Windows

Power House Type Windows are made of the same sections as the regular Lupton Continuous Windows. The units, however, are shorter than generally used for continuous windows and are set one above the other in as many tiers as required for the needed height. The structural steel frame in which the units are set is furnished by Lupton. Glass is held securely by glazing angles, which are continuous along the muntins and vertical side rails.

Both the window and operator usually have to be designed to meet special conditions and therefore a Lupton representative should be consulted for details.

SPECIFICATION FOR LUPTON CONTINUOUS WINDOWS

Work Included

1. Furnish and install where shown on drawing, Lupton Continuous Windows, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Materials

2. Frame Members.

Note: Structural steel members forming frame are not furnished by window contractor. They should be specified under the proper heading elsewhere in the specifications of other trades. The members required are shown on the details and are as follows:

(a) A continuous girt angle at the head, to which the hinges are bolted. This angle should not be smaller than 3x3 in., ¼ in. to ⅜ in. thick. (Punching for hinges is not done by window contractor.)

(b) A continuous member at the sill. The face of this girt (usually an angle or a channel) should be in the same plane as the face of the girt angle at the head.

(c) A continuous girt angle between upper and lower lines of windows where one line is placed directly above the other. This member should be the same size as girt angle at head when windows above and below are both vertical or both sloping, but when windows above are vertical and windows below are sloping, the leg to which hinges for lower windows are bolted, should be at least 4 in. long.

3. Window Sections—Top rail, bottom rail and end rail shall be special hot rolled solid steel sections. Bottom rail shall be patented sill section No. 360.

Overlapping end rail shall be 13 gauge steel plate, formed.

4. Muntins shall be special hot rolled steel T section.

5. Jamb weathering of 13 gauge steel plate, formed, shall be furnished (but not installed) by the window contractor where the window extends between pilasters.

6. Flashings.

Note: Under proper heading elsewhere in specifications of other trades, specify sheet metal flashing at joints of and over gaps between girts, and condensation gutters (where required). These are not furnished by the window manufacturer.

7. Steel Clips shall be furnished for storm panels and stationary windows.

8. Glazing wedges shall be of galvanized pressed steel.

Construction

9. All Lupton Continuous Windows shall be designed for outside glazing.

10. All windows shall be straight and true with members in alignment and surfaces in a plane. All joints shall be rigid and tight. Members shall be coped, fitted together and oxy-acetylene welded along their entire length of contact so that their ultimate strength at the juncture will not be decreased.

11. The windows shall be hung on malleable iron hinges with heavy bronze pins.

12. Muntins shall be continuous from top to bottom of window. Joints at top and bottom rails shall be oxy-acetylene welded.

Mechanical Operators

Note: These are covered in other specifications.

Erection *(See page 1)*

13. All Lupton Continuous Windows shall be erected in prepared openings by the window contractor. They shall be set plumb and true, properly aligned, securely attached to structural members and properly adjusted before glazing.

Note: (a) Include under the proper heading elsewhere in specifications of other trades, that all structural steel members that come in contact with Lupton Continuous Windows shall form straight parallel lines and shall be located, punched and flashed in accordance with the Lupton Continuous Window details. Where there is a deflection, structural members shall be straightened in the field by the structural steel contractor before windows are erected.

(b) Include in the masonry specification that all masonry openings shall be accurately constructed in accordance with the Lupton Continuous Window details and that all mortar grouting, pointing, etc., shall be done by the mason contractor after windows have been erected.

Painting *(See page 1)*

14. All Lupton Continuous Windows shall receive one shop coat of window manufacturer's standard, dark gray paint, oven dried.

Continued on next page

Glass and Glazing

Note: (See also page 1.) Glass and Glazing should be included under the proper heading elsewhere in the specifications of other trades.

(a) Specify vertical ribbed glass ¼ in. thick. (Ribs to be placed on the side least exposed to dust.)

(b) Specify special L. C. W. putty.

(c) Specify that glass shall be set in a bed of putty and secured by steel glazing wedges supplied by the window manufacturer. Four wedges per light shall be used on windows 3 or 4 ft. high and six wedges per light shall be used on windows 5 or 6 ft. high.

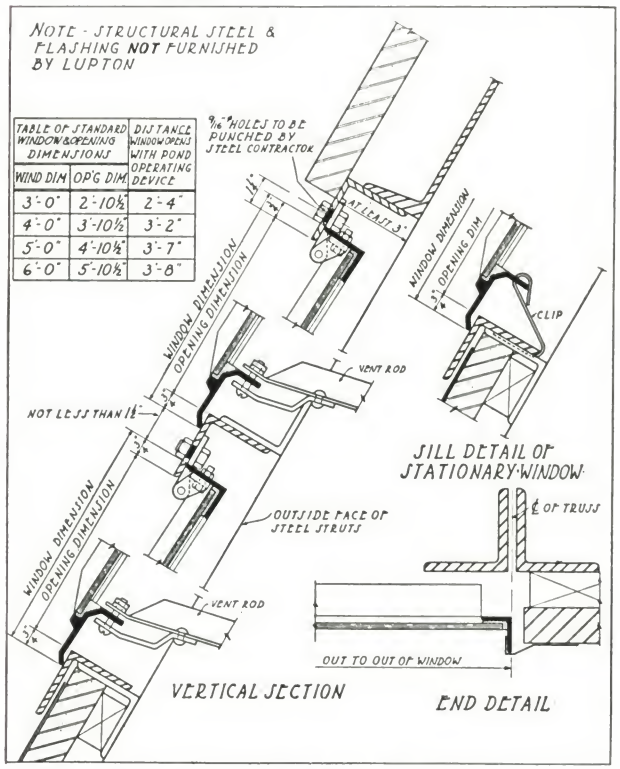


Fig. 1. Details of Sloping Windows
Scale 1½" = 1' 0"

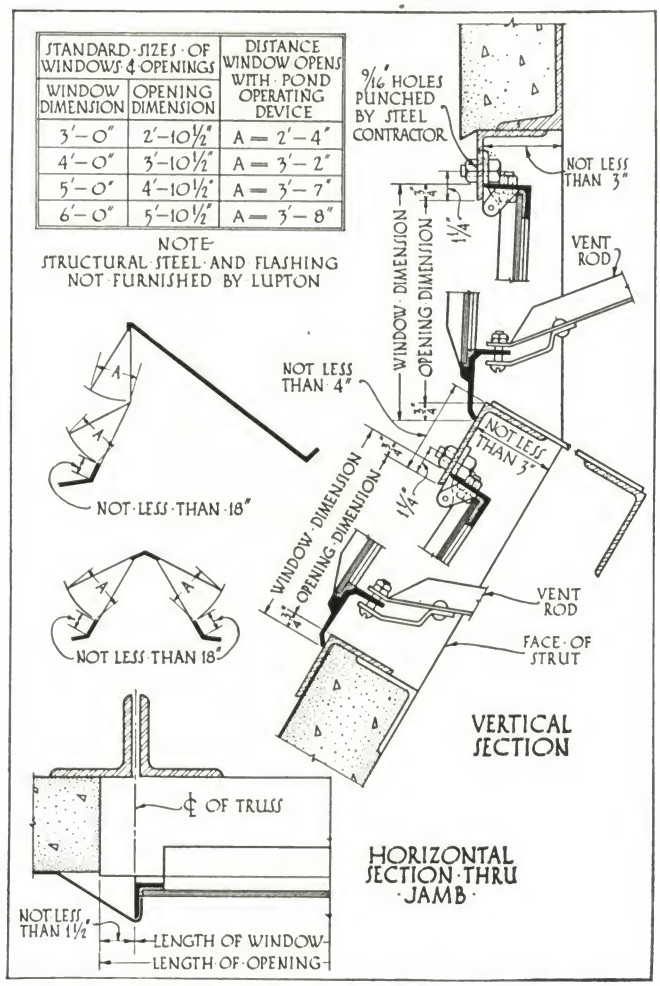


Fig. 2. Details of Vertical and Sloping Windows
Scale 1½" = 1' 0"

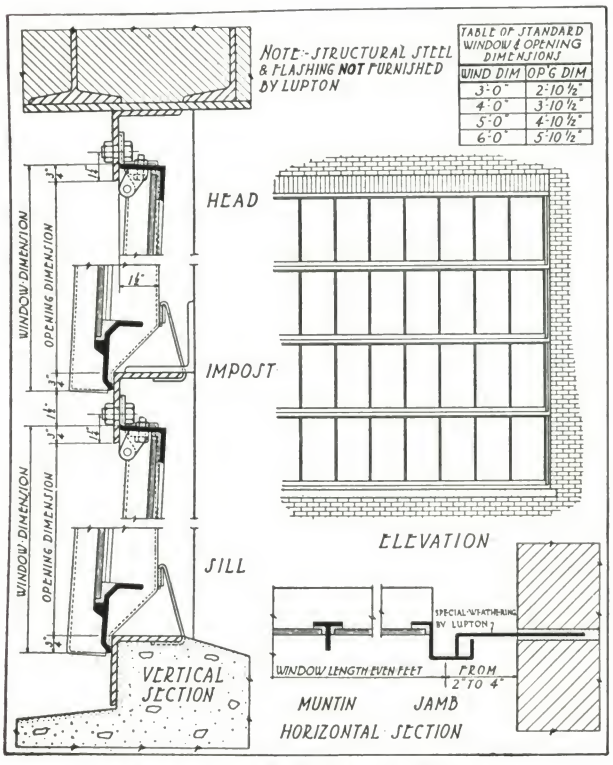


Fig. 3. Details of Sidewall Windows
Scale 1½" = 1' 0"

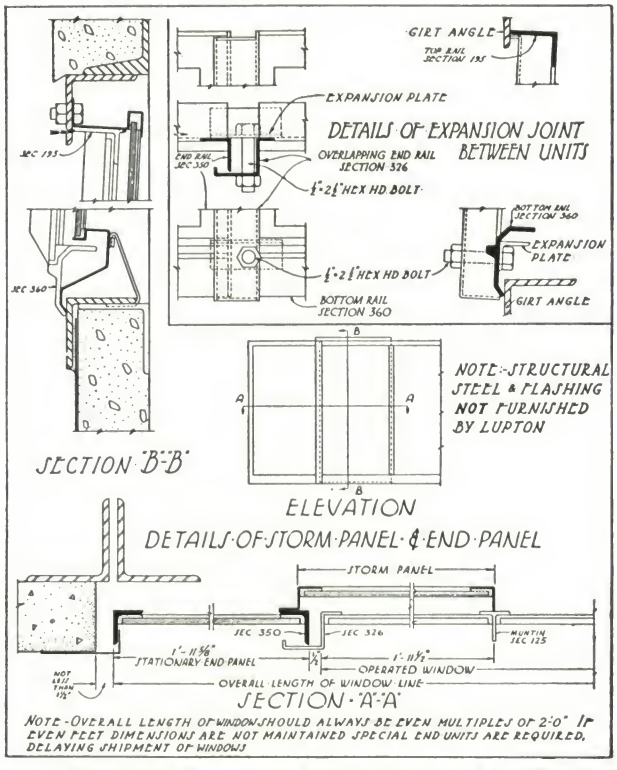
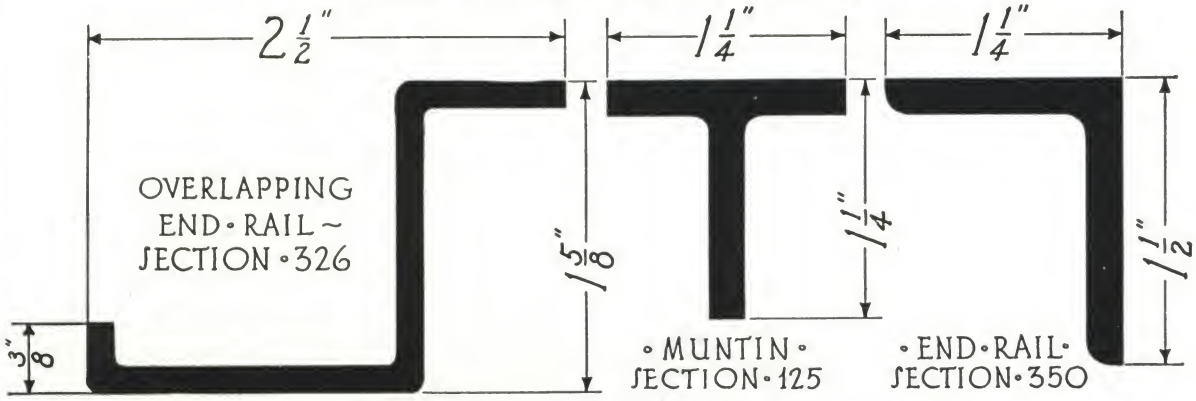


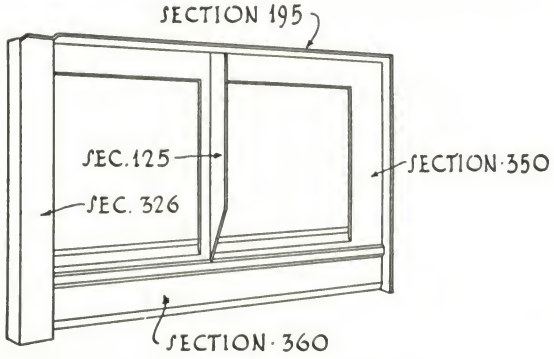
Fig. 4. Details of Expansion Joint, Storm Panel and End Panel
Scale 1½" = 1' 0"

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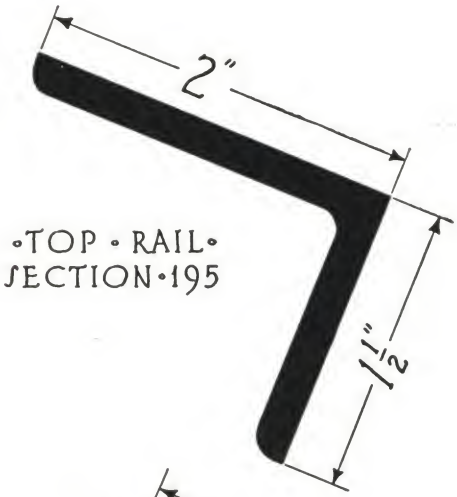
•LUPTON•CONTINUOUS•WINDOWS•
•FULL•SIZE•SECTIONS•



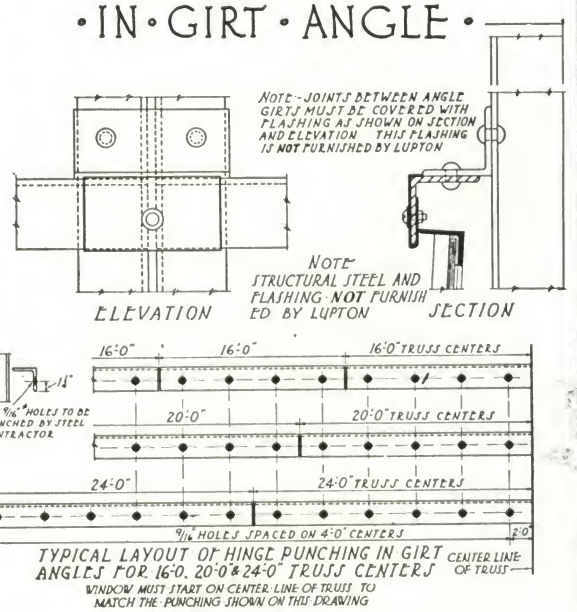
HORIZONTAL•SECTION

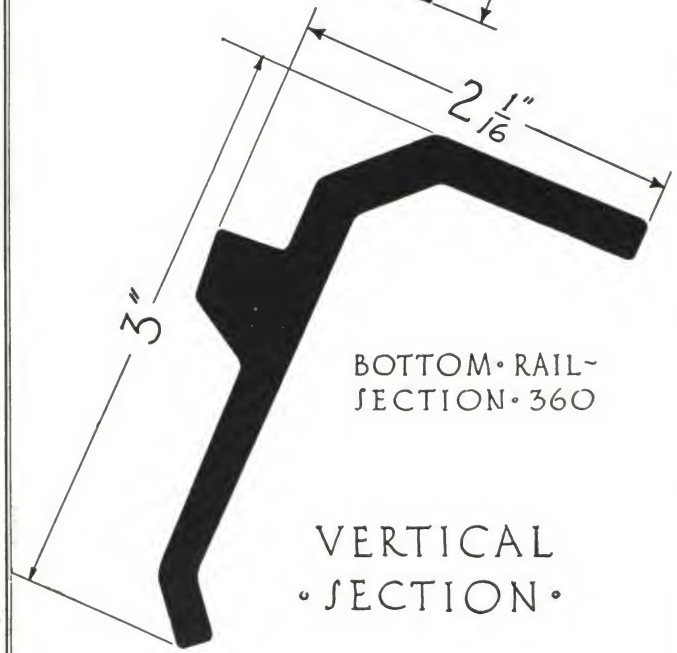


•DIAGRAM•OF•UNIT•
•VIEWED•FROM•OUTSIDE



HINGE•PUNCHING•AND FLASHING•OF•JOINT •IN•GIRT•ANGLE•





VERTICAL •SECTION•

Continued on next page

LUPTON CONTINUOUS WINDOW OPERATING DEVICES

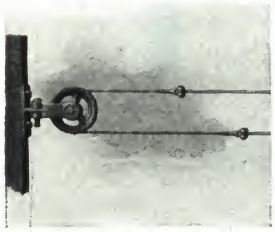
Rack and Pinion Type

This type operator is described on pages 94 to 96. Designed primarily to operate pivoted windows, it will operate satisfactorily and economically short runs of continuous windows (70 to 100 ft., depending upon height of window).

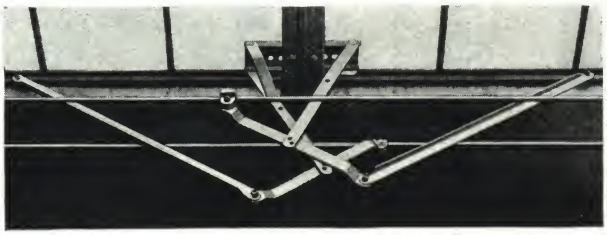
Tension Type

The Lupton Tension Type Operating Device is the type usually specified in connection with Lupton Continuous Windows. It permits operation of extremely long lines of windows. Power is applied by hand chain or motor through worm and gear and transmitted by a double line of steel rods always in tension. Motion is transferred to the windows through pairs of operating arms arranged to eliminate useless stresses, friction and lateral thrust against the transmitting rods.

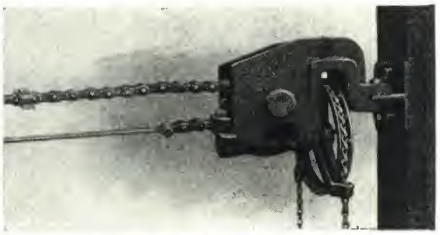
In a modified form it may be used to operate pivoted windows in groups exceeding the limits of the Rack and Pinion Operator.



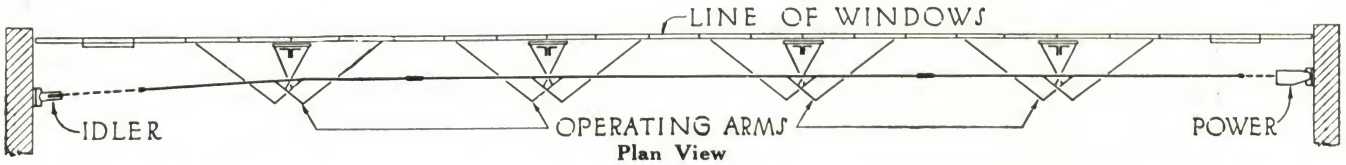
Idler



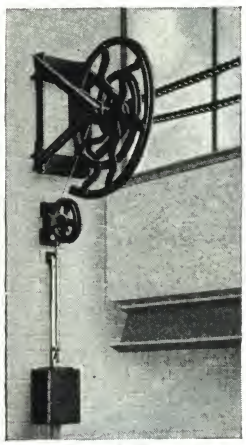
Operating Arms (Window in Closed Position)



Hand Operated Power



Plan View



Spiral and Counterweight
Can be used instead of idler

Structural Work Required

All structural supports for Lupton Tension Type Operating Device are furnished by structural contractor. This includes supports for power and for operating arms attached to transmission rods. Lupton furnishes detail blue prints as needed.

Spirals and Counterweights

Spirals and counterweights used in place of idlers, reduce the number of powers required as indicated in table below. They are recommended for use on long lines of motor operated windows as they prevent overload on motor when starting with window part way open, and keep motor load and speed substantially uniform.

MAXIMUM LENGTHS OF RUNS IN FEET—WITH AND WITHOUT SPIRALS

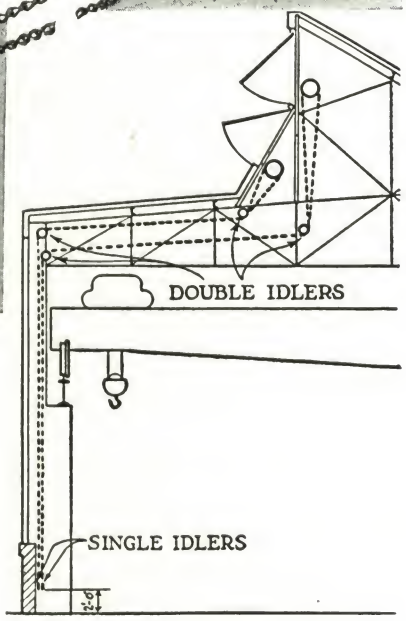
Height of window	Hand operation		Motor operation	
	Vertical	60° slope	Vertical	60° slope
With Idler				
3 ft.	300	194	792	512
4 ft.	190	132	500	346
5 ft.	176	116	463	304
6 ft.	166	100	438	263
With Spiral and Counterweight				
3 ft.	500	323	1320	854
4 ft.	317	220	833	577
5 ft.	294	193	772	506
6 ft.	276	167	730	438

DEGREE OF OPENING WITH TENSION TYPE OPERATOR
3-ft. high top-hung continuous windows 46° or 28 in.
4-ft. high top-hung continuous windows 47° or 38 in.
5-ft. high top-hung continuous windows 42° or 43 in.
6-ft. high top-hung continuous windows 36° or 44 in.

Single and Double Idlers
Used where hand chain must be operated from a position not directly under the power









Continued on next page

Motor Driven Power

Lupton Tension Type Operating Device, Motor Driven, ventilates the large industrial plant with the same precision and completeness as it does the small plant, by co-ordinated, uniform control.

The ideal ventilating result is obtained by operating all the windows by motors, with switches so located that both inlets and outlets may be regulated by the same person, preferably the foreman or shop superintendent. To control the air change or to open or close the windows for any reason then requires only the pushing of a button.

If certain bays require separate control, their switchboards can be located accordingly. Sometimes the floor space is divided between different departments having different ventilating requirements. The molding floor, the core departments, and the cleaning floor of a foundry, for example if under one roof, should each have its own window control.

In ventilating large buildings, one of two general purposes obtains. These are:

(1) To centralize and make easy the control of windows in buildings of unusual size, where the opening of short runs of windows by hand would take too long and possibly be neglected.

(2) To operate many windows quickly, as in a large foundry in winter, when it is desired to open them for a few minutes to get rid of the smoke without unnecessary loss of heat.

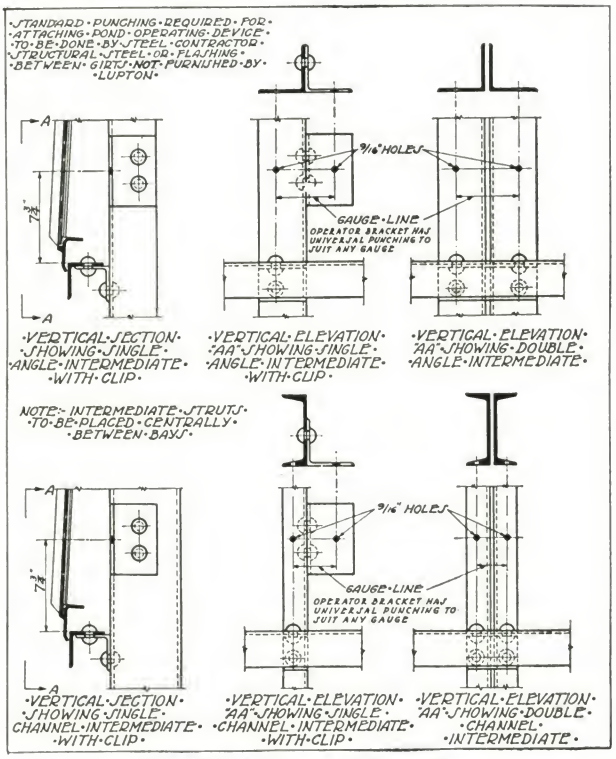
Both of these purposes are satisfactorily accomplished by Lupton Tension Type Operating Device, Motor Driven.

Explosion Type Operator

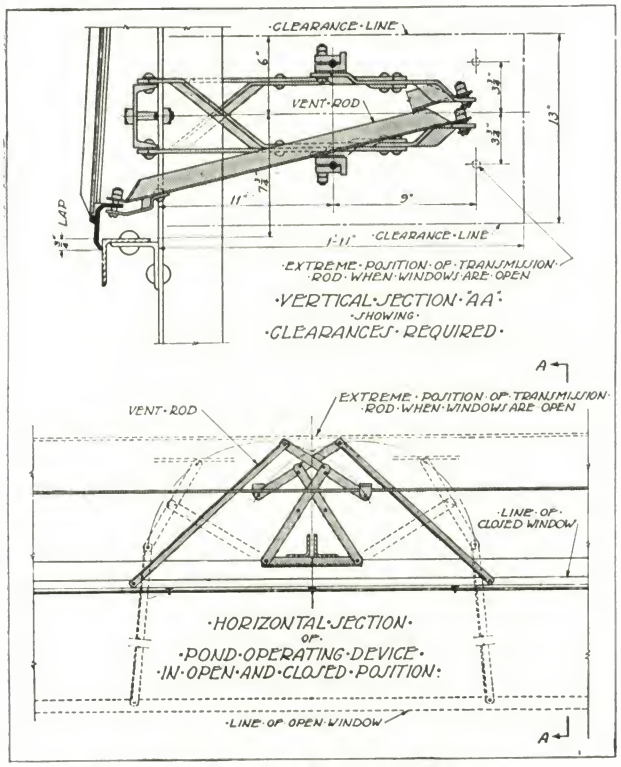
Pat. No. 1747271

The explosion type operator is for use in chemical or rubber process buildings, granaries or other industrial buildings where explosion hazards are more or less unavoidable. The explosion operators are made in two types to operate Lupton Continuous Windows. The counterweighted type can be adjusted to operate automatically at any desired atmospheric pressure. The pressure type operator requires the explosive pressure to open the windows. It is recommended for storage buildings where there are no workmen. Both operators continue to hold windows open after explosion has occurred, allow the poisonous gases and smoke to escape and insure a quick change of air.

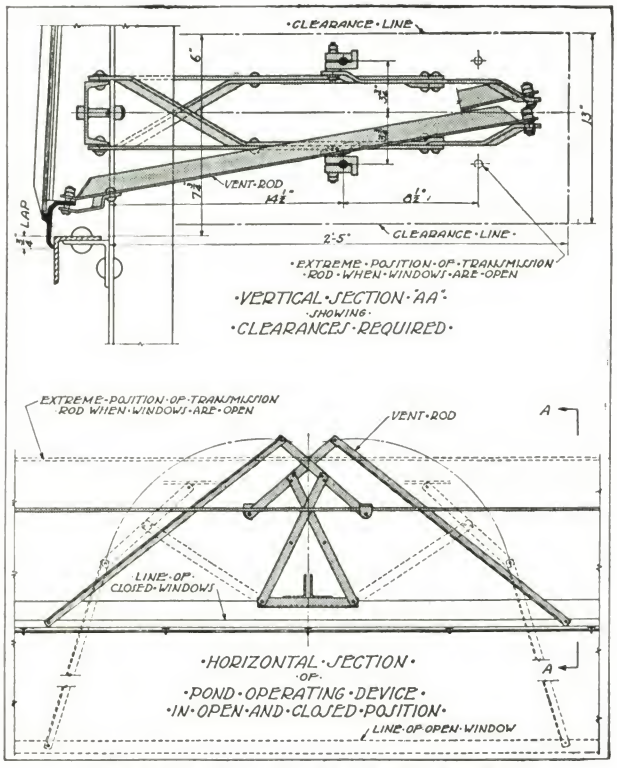
Note: See also page 93 for an explosion releasing latch for small projected ventilators used in film storage rooms, etc.



Details of Clips and Punching
Scale ¾" = 1' 0"



Operating Arm for 3 and 4-ft. Windows
Scale 1" = 1' 0"



Operating Arm for 5 and 6-ft. Windows
Scale 1" = 1' 0"

Continued on next page

SPECIFICATION FOR LUPTON TENSION TYPE OPERATING DEVICE

Work Included

1. Furnish and install where shown on drawings Lupton Tension Type Operating Device, manufactured by DAVID LUPTON'S SONS CO., Philadelphia, Pa.

Material and Construction

Note: Structural Steel supports for Lupton Tension Type Operating Device are not furnished by the window contractor. These consist of uprights (angles, channels or tees) for attaching the operating arms.

For windows 5 or 6 ft. high the center spacing of the supports should not be less than 7½ ft., nor more than 16 ft.; for windows 3 ft. or 4 ft. high, the spacing should not be less than 6½ ft. nor more than 15 ft. Trusses on 20 ft. centers, with one intermediate usually make the most economical arrangement for steel work.

2. Power—The operating power unit shall consist of a machine cut steel worm shaft mounted in ball-bearings operating a machine cut worm wheel. For manually operated powers the worm wheel shall be a steel casting made integrally with the sprocket wheel. For electrically operated powers the worm wheel shall have a bronze rim with cut teeth. Bearings shall be phosphor bronze. The power unit shall be assembled in a dust-proof, grease packed, cast steel case. The worm shall lock the window in any position.

3. Power Brackets—Power units shall be mounted on brackets made of structural steel angles, trussed to the building construction and designed to withstand the lateral stresses caused by operating the windows.

Transmission Line

4. Transmission line shall consist of 2 lines of solid round steel rods. (*Note:* Specify ½ in. or ¾ in. diameter as required by conditions.) Where joints occur rods shall have the ends hot headed and securely clamped in malleable iron couplings so as to develop the maximum tensile strength of the rods.

5. At the end of the run the two rods shall be connected by a sprocket chain passing over the sprocket wheel in the power unit.

6. Forged steel turnbuckles shall be furnished to adjust the transmission line.

7. The rods shall not be run through guides, rollers or other bearings.

8.

Note: There are two ways of terminating the end of the run opposite the power.

(A) With an idler, (B) With a spiral and counter weight. Specify which one is desired.

(A) At the end of the run opposite the power unit the two rods shall be connected by a ⅜ in. steel wire cable passing over an idler wheel. Bearing in idler shall be phosphor bronze.

(B) At the end of the run opposite the power unit the two rods shall be connected by a sprocket chain passing over a sprocket wheel of steel cast integrally with a spiral. A weight shall be attached to the spiral by means of a steel wire cable in such a way that as the windows open the weight shall exert increasing force on the transmission line and balance a part of the load.

Operating Arms

9. Operating arms shall be mounted in pairs on a 4 in. channel bracket. Bracket shall be rigidly bolted to structural steel supports furnished by others. Arms shall be of flat steel specially constructed to form a rigid T shape and so arranged that all back thrust from the windows shall be transformed into tension in the transmission line.

The stem of the T shall be pivoted to the 4 in. channel bracket. Of the other two extremities of the T, one shall be pivoted to a malleable iron clamp, securely fastened to the transmission rod, and one shall be pivoted to a steel vent rod (of 1¼x1¼x⅛ in. angle) in turn pivoted to the flange of the bottom rail of the window. All bearings in the operating arms shall be phosphor bronze.

Note: Specify either manual or electrical operation.

Manual Operation

10. Manual operation power unit shall be operated by a No. 9 Register hand chain passing over a chain wheel mounted on the worm shaft and secured to it by a setscrew. Chain shall be guided by a suitable guard.

Note: Where building construction makes it impractical to hang the chain directly vertical from the power (as in monitor window installations) single and double chain idlers may be specified (at added cost).

Electrical Operation

11. Electrical operation power shall be operated by an electrical power unit operating a sprocket and silent chain. Sprocket shall be mounted on the worm shaft secured to it by a steel key. Electrical unit shall be located beneath the power unit and securely bolted to it.

Note: Immediately following this specification include specification for Electrical Equipment.

Erection *(See page 1)*

12. All operating devices shall be erected and adjusted to proper working order by the window contractor.

Painting

13. All operating devices shall have one coat of manufacturer's standard, dark gray paint, oven dried and applied before shipment.

Note: The following should be provided for in the paint specifications. One coat of red lead and oil should be applied after erection, followed by one or more coats of finishing paint as required.

SPECIFICATION FOR ELECTRICAL EQUIPMENT

Work Included

1. The Operating Device manufacturer shall furnish wiring diagram and complete electrical equipment for Lupton Tension Type Operating Device as hereinafter specified.

Electrical Equipment

2. Motors—Motors shall be of type best adapted to the power equipment, of high torque and ample horsepower.

Note: The motors for Lupton Tension Type Operating Device operate on A. C., 220 or 440 volts, 60 cycle, 3-phase, and are especially wound for high starting torque. They are furnished from stock, which avoids delay. Motors with other current characteristics require from four to six months to deliver.

3. Power Connections—Motors shall be connected to power by means of sprockets and silent chains.

4. Reversing Switches—Standard magnetic reversing switches shall be enclosed in steel boxes and so designed, that the movement of the ventilator either in opening or closing may be stopped or started at any point by manipulation of push buttons.

5. Limit Switches—Limit switches shall be positive in action and rigidly attached to the power to form an integral part of the power unit. All limit switches shall be enclosed yet accessible for adjustment so as to positively limit the motion of the ventilator in either direction.

6. Push Button Stations—Push button stations "open," "close" and "stop" shall be of rugged construction to withstand hard usage. Buttons shall be recessed in cover so that they cannot be accidentally operated.

Electrical Construction

Note: The following provisions should be made in the Electrical Specifications.

The Electrical Contractor shall install magnetic reversing switches and push button stations and shall furnish and install safety type, line switches. He shall also furnish all conduit, fittings and wire and do all wiring between the electrical equipment furnished by the Window Operator Manufacturer and that furnished by himself in accordance with the wiring diagram furnished by the Window Operator Manufacturer. All materials and workmanship shall meet the requirements of the National Electric Code and all Local and State Inspection Bureaus.

Conduit shall be galvanized or black enameled, approved by Underwriters' Laboratories, Inc. Wire shall be rubber covered N. E. C. Exposed conduit shall be run in a systematic, sightly manner, paralleled with structural features of the building and rigidly and neatly secured. Where walls are plastered conduit shall be concealed.

The Electrical Contractor shall carry fire, workmen's compensation, and public liability insurance. He shall guarantee his work for a period of one year after completion. Defects in the work and material furnished by him developing during the above named period shall be promptly and satisfactorily made good at his expense.

Continued on next page

LUPTON STEEL INDUSTRIAL DOORS

Lupton's Steel Industrial Doors are built to withstand, successfully, the constant and sometimes rough usage given them in buildings used for industrial purposes. Lupton Doors of this type have been rendering unfailing service during a period of many years, proving beyond question their investment value. Doors are of steel tubing with all joints solidly oxy-acetylene welded to give strength and rigidity and to prevent corrosion of the inside due to entrance of moisture. This method of construction prevents warping or sagging and gives assurance that doors will open and close as easily after a long period of use as when they were first installed.

Lupton Industrial Doors are made in a wide range of sizes and are suitable for exterior or interior use in factories, work shops, forge shops, chemical process buildings, boiler and pump houses, garages, automobile service and repair shops, power houses, warehouses, freight offices and car barns. Equipped with Panic Hardware they are suitable for exit doors in many types of buildings.

Aside from their industrial applications they have been found suitable for use in hospital and school service buildings, in gymnasiums, swimming pool buildings and in dairies.

SPECIFICATION FOR LUPTON STEEL INDUSTRIAL DOORS

Work Included

1. Furnish and install where shown on drawings Steel Industrial Doors, manufactured by David Lupton's Sons Co., Philadelphia, Pa.

Material and Construction

2. Frames—

Note: Frames are furnished for swing doors only, and only when specified.

Frames for swing doors shall be made of 4 in. structural channel. Top corners shall be bolted together by means of clips. Jambs to be braced at bottom by structural angles to preserve square lines of frame during shipment.

3. Doors made of 1½x2⅝ in. tube shall have 1½x½ in. structural channel stops at head and jambs.

Doors of larger tubing shall have stops of 1½x½ in. channel at head and of 1½x1½ in. structural angle at jambs. Stops shall be attached to frames with round head drive screws not over 9 in. on centers.

4. Anchors of $\frac{3}{16}$ in. steel plate bent in Z shape shall be attached to jambs of frame not over 3 ft. 0 in. on centers.

5. Doors up to and including those 10 ft. 0 in. in height shall have rails and stiles of 1½x2⅝ in. x 14 gauge welded steel tubing.

6. Doors over 10 ft. 0 in. in height shall have rails and stiles of 3x2 in. x 14 gauge welded steel tubing.

7. Rails and stiles shall be mitered at corners—welded and ground flush.

8. All doors shall have a 14 gauge steel panel insert in the lower part of the door and standard rolled steel window glazing panel in the upper portion, both panels to be attached to the rails and stiles by sheet metal screws.

9. Astragals for double doors shall be 14 gauge steel plate.

Hardware

10. Hinges for swing doors made of 1½x2⅝ in. tube shall be Stanley ball bearing butts. Three hinges for doors up to and including those 8 ft. 0 in. high, four hinges for doors over 8 ft. 0 in. high.

11. Hinges for swing doors made of 3x2 tube shall be Allith-Prouty strap hinges. Three per leaf.

12. Track, track brackets and roller bearing trolleys shall be furnished for slide doors.

Note: Locks, bolts, latches, door stops and stay rollers should be listed here if required. See next page.

Butt Hinges are manufactured by Stanley Hardware Co., and locks are manufactured by Sargent. Other hardware is manufactured by Allith-Prouty Co. All hardware wherever possible is fitted in the factory and shipped unattached, except in the case of single hinged doors with frames where frame, door and hinges are shipped assembled together.

Erection

13. Lupton Steel Industrial Doors shall be erected by (state by whom) in accordance with details furnished by door manufacturer. Frames for swing doors shall be set plumb and square and securely anchored to the building construction. Slide doors shall be hung from tracks securely fastened to building construction. They shall be adjusted to give satisfactory operation. Hardware shall be applied according to door manufacturer's directions.

Note: See page 1.

Note: Where slide doors are hung outside on exterior wall flashing is required. This flashing is not supplied by Lupton.

Painting

14. All doors shall receive one shop coat of door manufacturer's dark gray paint, oven dried.

Note: See page 1.

Glass and Glazing

15. Glazing stops of ½x$\frac{5}{16}$ in. rolled steel angle section shall be furnished, shipped attached.

Note: (See also page 1.) Specify glass and glazing under proper heading elsewhere in specifications.

(a) Do not specify single thickness glass.

(b) Specify high-grade steel window putty (ordinary wood sash putty must not be used).

(c) Specify that Lupton Steel Industrial Doors shall be glazed from the inside; that the glass shall be set in a bed of putty and held by Lupton Glazing angle-stops.

Continued on next page

LUPTON STEEL INDUSTRIAL DOORS *(Continued)*

Sizes and Types

Door units are made in standard and stock sizes and types as illustrated on next page. The shaded units are carried in stock for quick delivery.

Door units are used interchangeably as swing or slide doors. The sizes given on next page are opening dimensions and are less for slide doors than for swing doors to provide overlap at head and jambs.

Large Doors

Where doors larger than 10x10 ft. are required, it is economical to use, if possible, doors of the following dimensions:

Swing Doors

Single doors, widths.....3 ft. 3 ft. 6 in. 4 ft. 5 ft. 6 ft.
Double doors, widths.....6 ft. 7 ft. 8 ft. 10 ft. 12 ft.
Heights of Single and Double Swing Doors of Any Width Listed Above
11 ft. 12 ft. 13 ft. 14 ft. 15 ft.

Slide Doors

Single doors, widths..2 ft. 10 in. 3 ft. 4 in. 3 ft. 10 in. 4 ft. 10 in. 5 ft. 10 in.
Double doors, widths .5 ft. 10 in. 6 ft. 10 in. 7 ft. 10 in. 9 ft. 10 in. 11 ft. 10 in.
Heights of Single and Double Slide Doors of Any Width Listed Above
10 ft. 10½ in. 11 ft. 10½ in. 12 ft. 10½ in. 13 ft. 10½ in. 14 ft. 10½ in.

Ordering

Always use standard or stock sizes for lower cost and quicker delivery. Designs and sizes must be exactly as shown in size diagrams and details on following pages, otherwise doors are special.

Note that frames are furnished for swing doors only and only for doors 10x10 ft. or less in size. Single doors with frames are shipped assembled with frames. Double doors with frames are assembled in factory for inspection and then taken apart for shipment.

Glass is not included with doors but glazing angles are furnished shipped attached.

In ordering be sure to give following information:

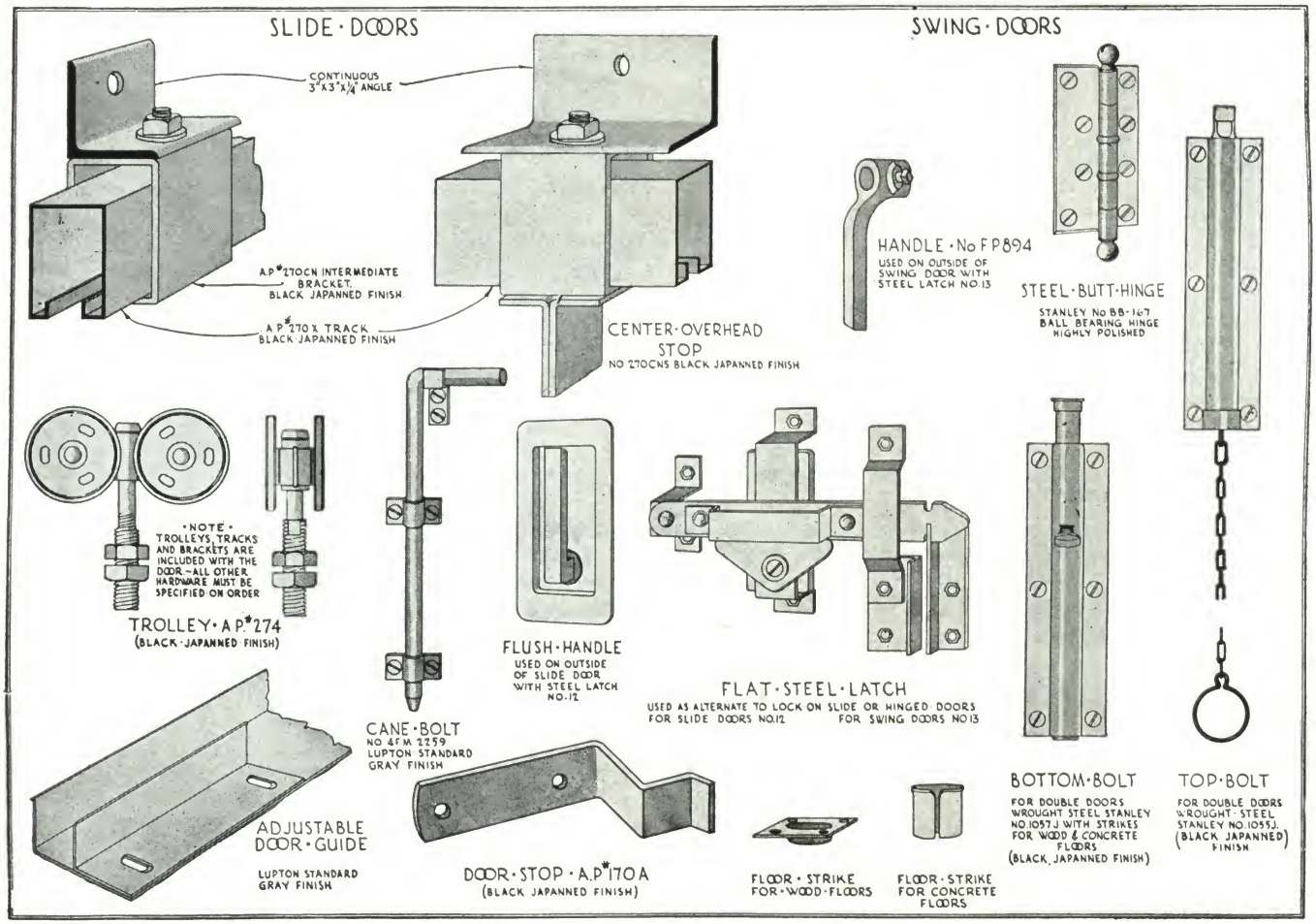
1. Size and quantity (use Opening Size as shown on Plate R-1).
2. State whether doors are swing or slide, open in or open out, right hand, left hand or double. (See key for hand of doors on pages 108 and 109.)
3. Specify frames for swing doors if they are wanted. (Frames are not furnished for slide doors or for doors over 10x10 ft.)
4. Specify whether Flat Steel Latch or Mortise Lock is desired.

(If mortise lock is specified, state whether one cylinder and thumb latch, or two cylinders are required and if cylinders are to be master keyed.)

5. Specify any special hardware required such as door checks, panic hardware or bronze butts.

HARDWARE

Standard hardware is shown in illustration. Mortise cylinder locks are not shown but can be furnished when specified for single or double, swing or slide doors. Locks can be equipped with either one cylinder and thumb latch, or two cylinders. Cylinders can be master keyed. When specified doors can be equipped with Sargent Door Checks and Von Duprin Panic Hardware. Doors more than 10x10 ft. are equipped with Allith Prouty Strap Hinges. Wherever possible, hardware is fitted in factory and shipped unattached; except in case of single swing doors in frames. In this case door, frame and hinges are shipped assembled together.



Continued on next page

SINGLE · DOORS ~ SWING & SLIDE

OPENING SIZES		SWING · DOORS →	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"
		SLIDE · DOORS →	2'-4"	2'-10"	3'-4"	3'-10"	4'-10"
SWING DOOR	SLIDE DOOR	GLASS SIZE →	11 3/4"	14 3/4"	11 3/4"	13 3/4"	13 1/4"
7'-0"	6'-10 1/2"	16"					
7'-6"	7'-4 1/2"	19"					
8'-0"	7'-10 1/2"	22"					
10'-0"	9'-10 1/2"	34"					

DOUBLE DOORS ~ SWING & SLIDE

OPENING SIZES		SWING · DOORS →	5'-0"	6'-0"	7'-0"	8'-0"	10'-0"
		SLIDE · DOORS →	4'-10"	5'-10"	6'-10"	7'-10"	9'-10"
SWING DOOR	SLIDE DOOR	GLASS SIZE →	11 3/4"	14 3/4"	11 3/4"	13 3/4"	13 1/4"
7'-0"	6'-10 1/2"	16"					
7'-6"	7'-4 1/2"	19"					
8'-0"	7'-10 1/2"	22"					
10'-0"	9'-10 1/2"	34"					

Dealer Stock Doors—Doors shown shaded are dealer stock doors.

Dimensions—Dimensions given above are opening dimensions.

See plates R-2 and R-3 for measure points.

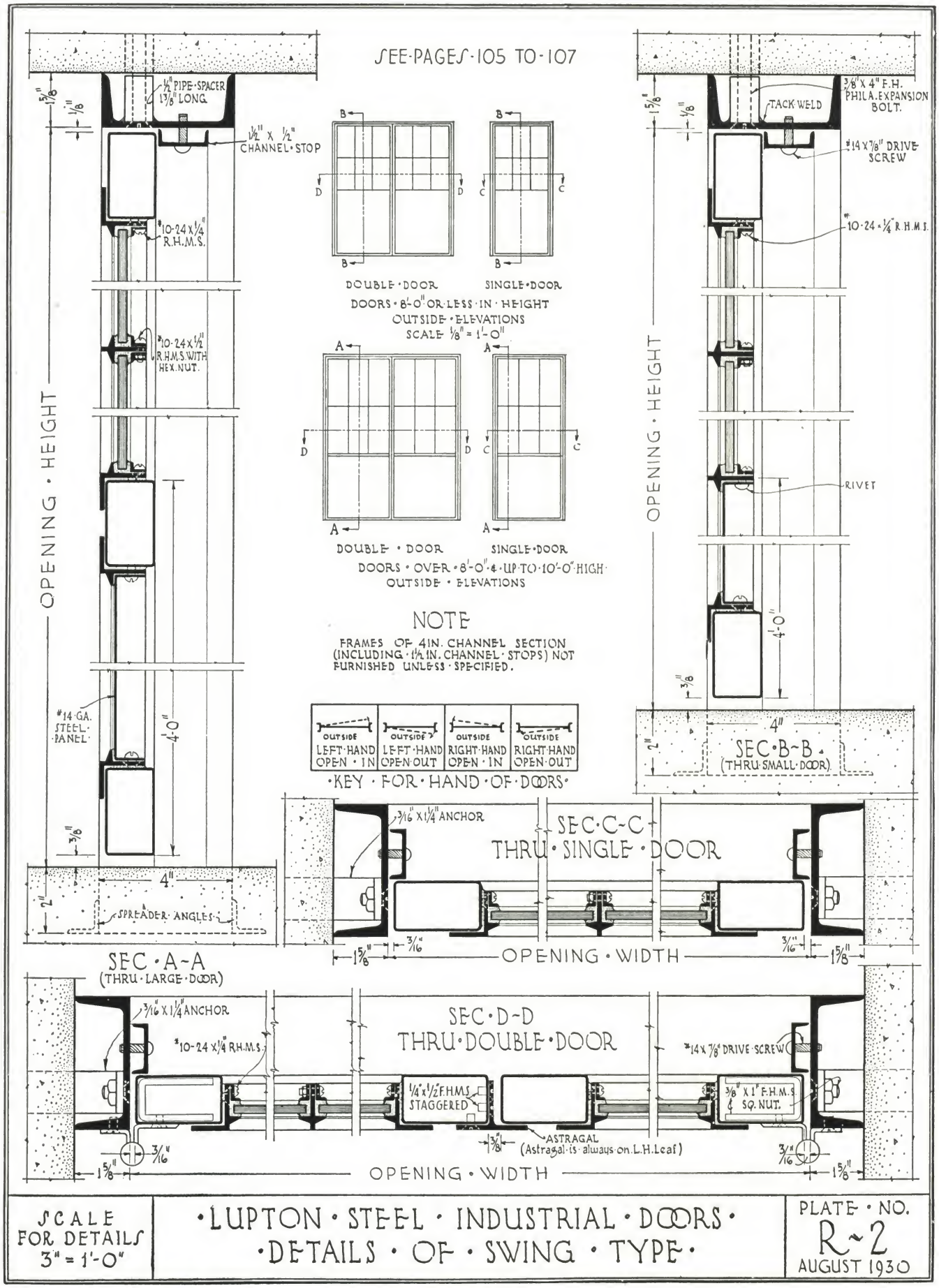
Large Doors—Doors larger than those shown above are made of larger tubing. See page 106 for sizes.

SCALE 0 5 10 FT.

LUPTON STEEL INDUSTRIAL DOORS
STANDARD TYPES & SIZES

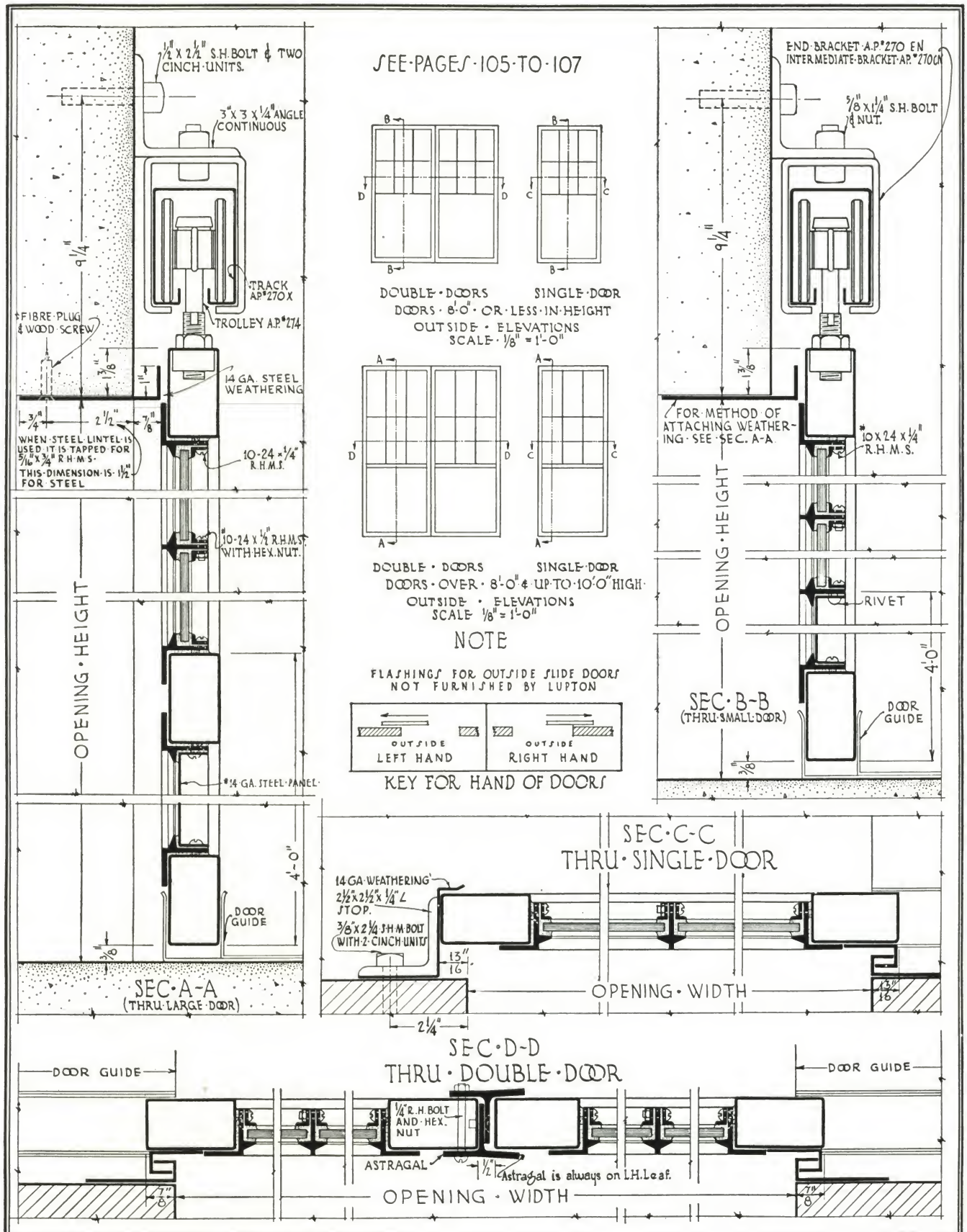
PLATE NO. R-1
AUGUST · 1930

Continued on next page



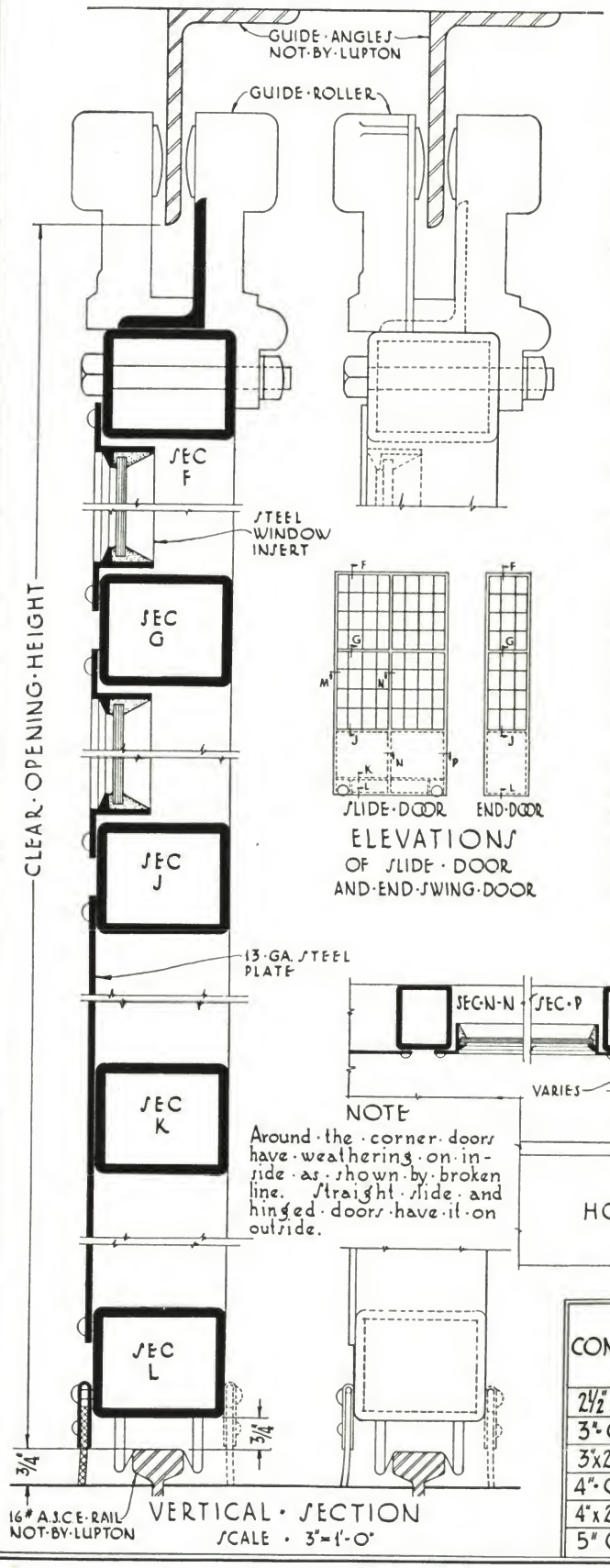
SCALE FOR DETAILS 3" = 1'-0"	•LUPTON • STEEL • INDUSTRIAL • DOORS• •DETAILS • OF • SWING • TYPE•	PLATE • NO. R~2 AUGUST 1930

Continued on next page



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LUPTON AIRPLANE HANGAR DOORS



These doors are built by skilled workmen to satisfy the exacting requirements of the airplane industry. Made in two types, Straight Slide Type and Around-the-Corner Type.

Sizes—Standard opening heights range from 12 to 30 ft. Larger doors of the same design can be furnished when required.

Width of a door unit is approximately 10 ft. Hinged end units for use with around-the-corner doors, are approximately 4 or 5 ft. as required. It is desirable to make the total width of opening some multiple of 10 ft. (40, 50, etc.)

Construction—Doors are made of steel tubing (shown in detail) or structural steel channel as specified. All joints between frame members are solidly welded and the exposed part of the weld ground flush.

Glazing—Glazing panels are glazed inside with putty. Glass is held by steel wire glazing clips.

Pilot or Pass Doors—Pilot doors are provided where required. They are made of 1½x2⅝-in. steel tubing and are equipped with cylinder locks.

Hardware—Weight of door is carried on two bottom rollers running on 16 lb. A.S.C.E. rails. Doors are guided at top by two double rollers bearing on a structural steel angle. Bottom rollers have Timken bearings and Alemite fittings for lubrication. A ball thrust bearing is used to pivot rollers for around-the-corner doors.

Cane bolts are furnished for slide doors and drop into holes drilled in track. Cremone bolts are furnished for locking hinged end doors. Bumpers at top and bottom of door are furnished at ends of tracks. Travel of doors is limited by stops at top of door. Slide doors have pull handles for convenience in operation.

CONSTRUCTION	CLEAR·OPENING HEIGHT	CENTER TO·CENTER OF·TRACK
2½"x2½"·TUBE	12'-0" TO 18'-0"	5¼"
3"·CHANNEL	12'-0" TO 18'-0"	6"
3"x2½"·TUBE	18'-6" TO 22'-0"	6"
4"·CHANNEL	18'-6" TO 22'-0"	7"
4"x2½"·TUBE	22'-6" TO 30'-0"	7"
5" CHANNEL	22'-6" TO 30'-0"	8"

Continued on next page

LUPTON STEEL COMMERCIAL DOORS

Lupton Commercial Doors are designed for use as exterior or interior doors for garages, manufacturing plants, etc., where inexpensive steel doors are desirable. Lighter in construction than Industrial Doors they are, within their size limits, a practical and economical product.

Sizes—Doors are made only in stock sizes shown at right.

Construction—Stiles and rails are made of 18 gauge steel, mitered and welded at corners of door and the welds ground flush. The lower part of door has a 16 gauge steel panel and the upper part is made to receive glass.

Frames—Frames are furnished for swing doors only and only when specified. They are made of steel plate. Flat steel anchors are provided at jambs and an expansion bolt at head.

Hardware—All necessary hardware (shown below) is included with doors except Hook Back No. 101 which must be specified if required. In ordering swing doors specify whether Mortise Lock or Lever Latch is desired.

Erection—(See page 1) Door frames must be set plumb and square, securely anchored to building. Tracks for slide doors must be level and anchored securely.

Swing doors are drilled in shop for hinges and when Lock No. 97 is ordered doors are mortised and drilled to receive it. All other drilling must be done in field.

Single doors with frames are shipped assembled in frames. Double doors are shipped separately from frames.

Glazing—(See page 1) See table at right for glass sizes. Orders for doors do not include glass, but steel glazing stops are furnished, shipped attached. Always use steel window putty and glaze after doors are erected.

Painting—(See page 1).

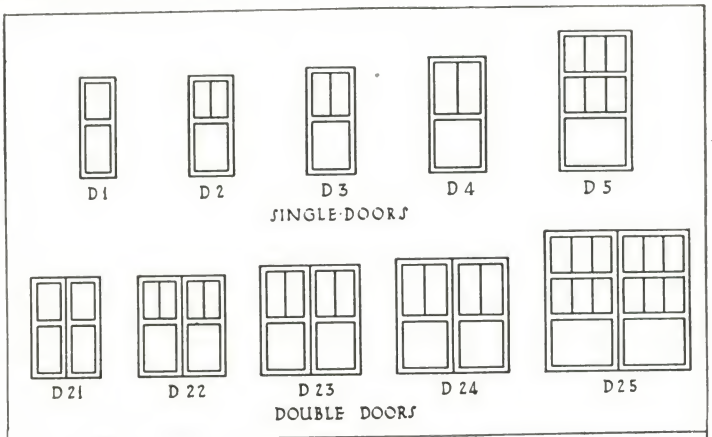
Ordering—When ordering give the following information:

1. Symbol numbers of doors required (D-1, D-2, etc.).
2. Quantity of each type required.
3. Whether doors are to swing or slide and whether right or left hand. (See "Key for Hand of Doors" on next page.) If swing doors are ordered state also,

a. Type of lock desired (No. 97 or No. 98).

b. If frames are required, give Door Frame Marks (see table at right).

c. Whether or not Hook Backs are required.



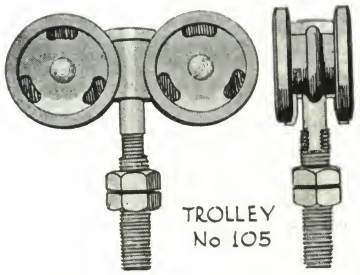
STANDARD SIZES

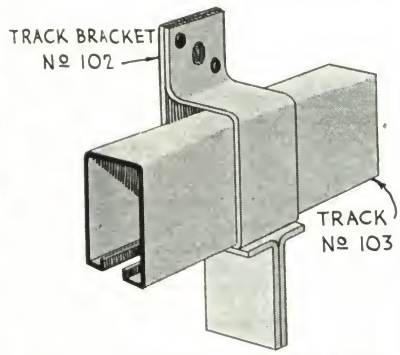
DOOR MARK	DOOR FRAME MARK	SLIDE TYPE OPENING WIDTH	SLIDE TYPE OPENING HEIGHT	SLIDE TYPE CATALOG NO. OF ASTRAGAL	SWING TYPE OPENING WIDTH	SWING TYPE OPENING HEIGHT	SWING TYPE CATALOG NO. OF ASTRAGAL	BOTH TYPES GLASS SIZES
D-1	DF-1	2'-3"	6'-10½"		2'-6"	7'-0"		1 - 19⅞" X 30½"
D-2	DF-2	2'-9"	6'-10½"		3'-0"	7'-0"		2 - 12⅝" X 30½"
D-3	DF-3	3'-3"	7'-4½"		3'-6"	7'-6"		2 - 15⅝" X 36½"
D-4	DF-4	3'-9"	7'-10½"		4'-0"	8'-0"		2 - 18⅝" X 42½"
D-5	DF-5	4'-9"	9'-10½"		5'-0"	10'-0"		6 - 16¼" X 30¾"
D-21	DF-21	4'-9"	6'-10½"	*2035	5'-0"	7'-0"	*2392	2 - 19⅞" X 30½"
D-22	DF-22	5'-9"	6'-10½"	*2035	6'-0"	7'-0"	*2392	4 - 12⅝" X 30½"
D-23	DF-23	6'-9"	7'-4½"	*2036	7'-0"	7'-6"	*2393	4 - 15⅝" X 36½"
D-24	DF-24	7'-9"	7'-10½"	*2037	8'-0"	8'-0"	*2394	4 - 18⅝" X 42½"
D-25	DF-25	9'-9"	9'-10½"	*2038	10'-0"	10'-0"	*2395	12 - 16¼" X 30¾"

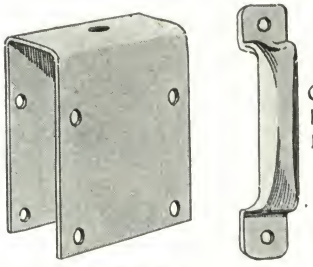
Standard, Stock Sizes and Types

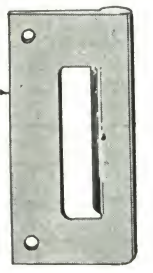
HARDWARE

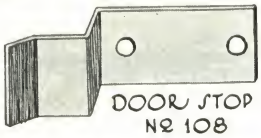
SLIDE DOORS

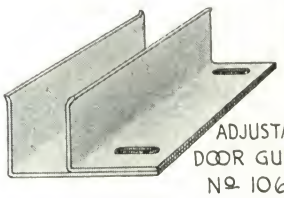






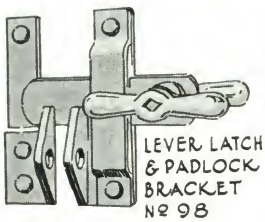




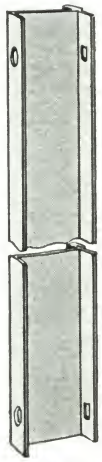


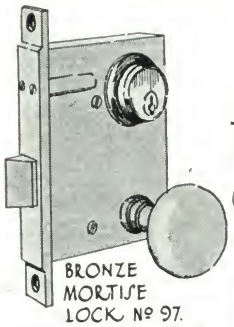


SWING DOORS



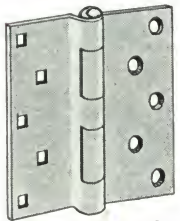










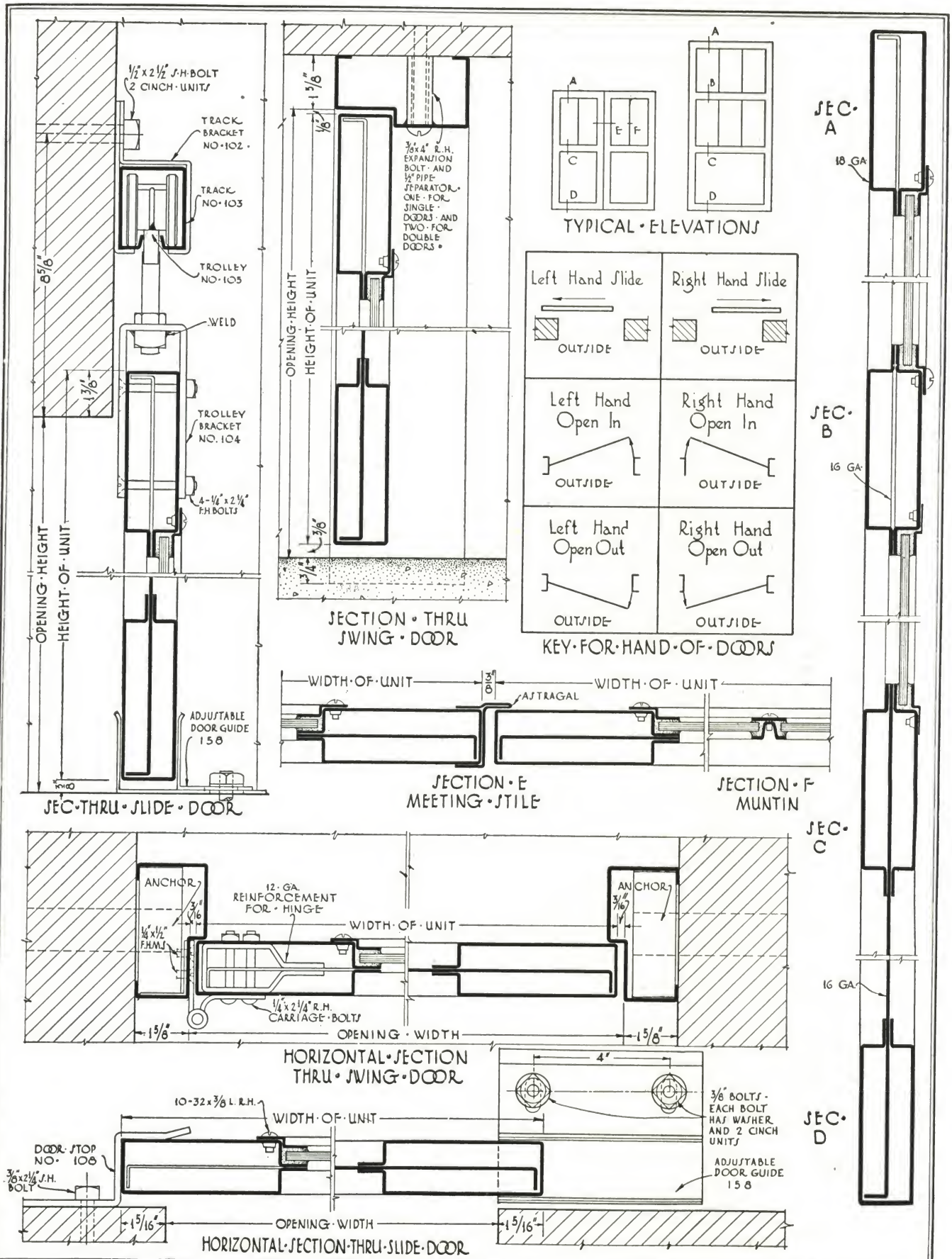






KEEPER FOR CONCRETE FLOOR

Continued on next page



SCALE FOR DETAILS 3" = 1'-0"	DETAILS FOR LUPTON COMMERCIAL DOORS	PLATE NUMBER S - 1 JUNE - 1930

Continued on next page

CORRUGATED WIRE GLASS BY LUPTON

For Sidewalls, Roofs and Skylights

Corrugated Wire Glass is a translucent material which, if used as a covering for skylights, roofs and sidewalls, has definite advantages.

It transmits a finely diffused light with minimum glare and shadow.

It is easily erected and completely weatherproof.

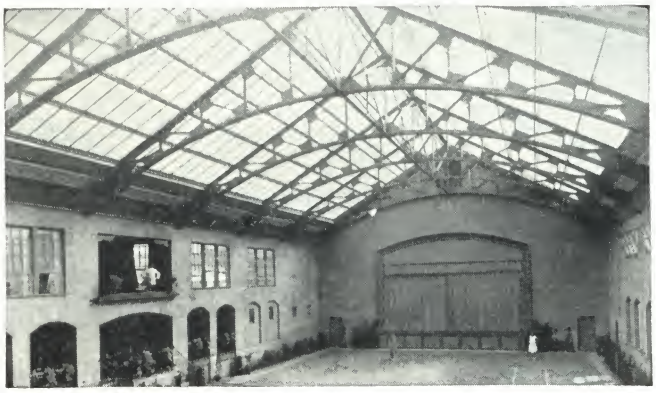
Because of its corrugations it develops greater strength under uniform loading and greater resistance to vibration and temperature changes than any other type of sheet glass of equal thickness.

No skylight bars are used. The glass carries the load directly to purlins and curbs.

Maintenance cost is low because there are no bars to rust or corrode, breakage is practically eliminated and the corrugations permit rain to clean the glass.

It meets every requirement of the National Board of Fire Underwriters for fire retardment.

Corrugated Wire Glass is often used as a covering for the entire roof area of a building. It is readily applied to single or double pitch roofs, connected directly to any type roof covering. It can be used for sawtooth roofs, back slopes of Lupton V-type roof, sidewalls, marquises and canopies.



Indoor Tennis Court of Mrs. H. E. Talbot, Dayton, Ohio
PEABODY, WILSON & BROWN, Architects

Installation Details—Details covering the more common types of installation appear on following pages. A folder containing additional roof details, details for Canopy and Marquise, Sidewall Construction and application of Roof Ventilators will be sent on request.

Note: Details are typical and are meant to indicate method of attaching glass to roof or framework. Sizes of curbs shown are minimum for satisfactory glass bearing. Supporting structure must be designed with adequate strength in each specific case.

Draining Condensation—Two methods of draining condensation are shown on page 118. The usual condensation gutters can be used; or drainage tubes can be provided, placed at the bottom of each corrugation under the felt separating the two sheets of glass and under the special sealing strip at the lower curb. Tubes conduct condensation to outside of roof.

Actinic Glass—Actinic glass excludes much of the sun's radiant heat, thus reducing the summer temperature under the glass. Its use is sometimes advisable where glass is to cover large areas.

SPECIFICATION FOR INSTALLATION OF CORRUGATED WIRE GLASS

Work by Others

1. All supporting frames, curbs, purlins, ridge-beams, tie-rods and bracing for proper construction shall be provided under another contract.

2. All roofing, curb and roof flashings, gutters and counter-flashings shall be provided under another contract.

Work Required

3. The work to be done under this contract includes the furnishing of all labor, materials, equipment and services necessary for, and reasonably incidental to, the erection of (White or Actinic—specify which) Corrugated Wire Glass (in Skylights or Side-Wall Panels), as manufactured by the Pennsylvania Wire Glass Company with

Standard fittings of (specify which)
- 18 oz. cold rolled copper
- 24 gage galvanized steel (copper bearing) (painted with aluminum)
- 13 gage zinc
- No. 3S8 aluminum (.032 in. thick)
- 24 gage "Lead Sealed" steel
- 6 lb. Hoyt Hard Lead

as shown on the drawings and herein specified.

Shop Drawings

4. This Contractor shall furnish the (Architects, Engineers, Purchasers) for their approval before any of the work is executed, complete shop drawings conforming to the recommendation of the Manufacturer.

Construction and Erection

5. This Contractor shall erect the Corrugated Wire Glass exactly as prescribed in the approved drawings and recommendations of the Pennsylvania Wire Glass Company.

Note: While the specification clause above will cover the erection of Corrugated Wire Glass, under the heading of "Notes" below, there are several clauses which may be included where deemed necessary.

Notes

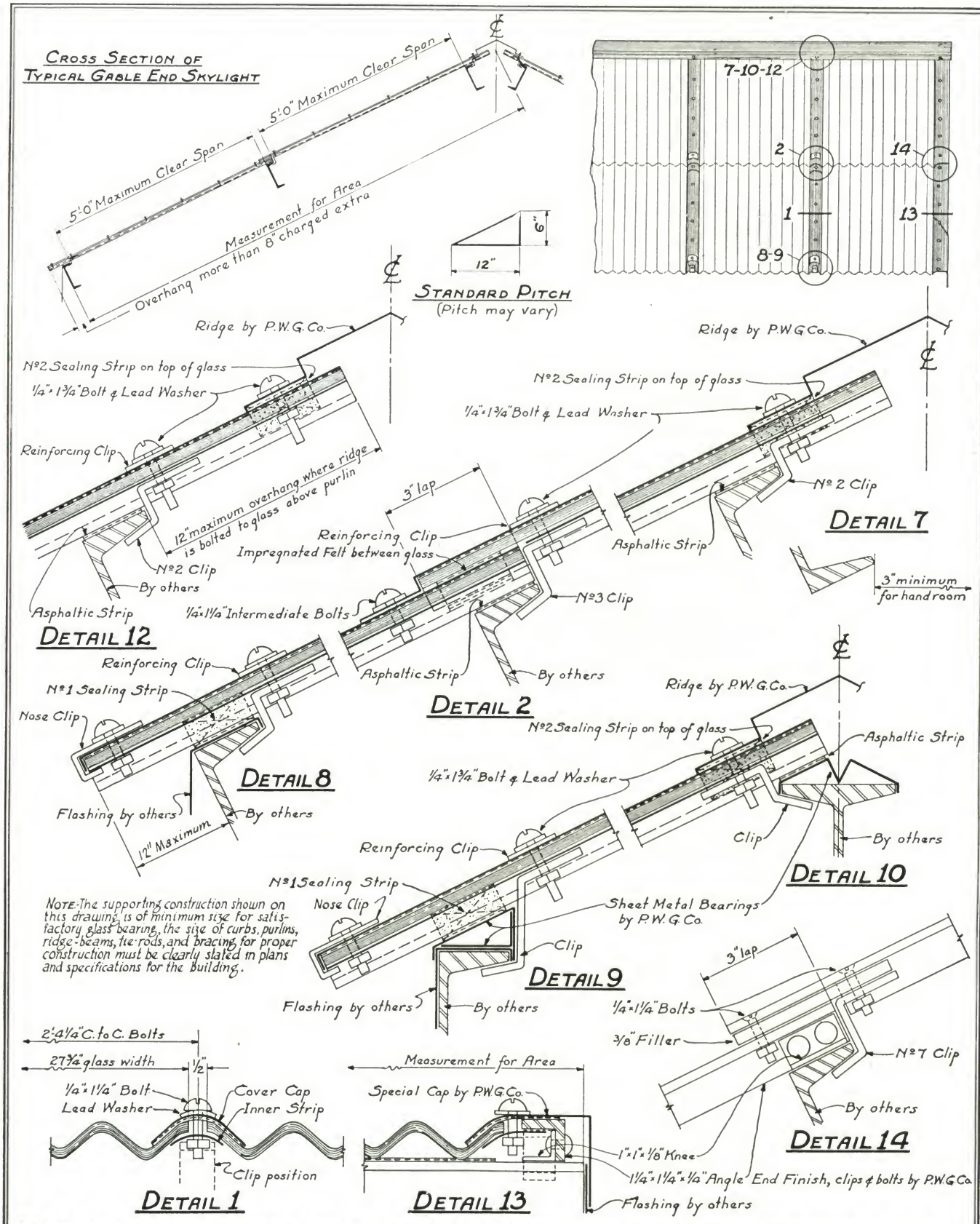
6. No sheet of Corrugated Wire Glass shall exceed 27¾ in. in width, and no single sheet shall span more than 60 in. clear opening (up the slope) without an intermediate support. Where glass is set at an angle of 60 degrees, or more, from the horizontal, the maximum clear span may extend to 96 in. (up the slope). Corrugated Wire Glass covering openings greater than those mentioned must have an intermediate support or arrangements must be made to use two or more lights of glass.

7. The sheets of glass shall be laid edge to edge (not lapping) with ½ in. spaces between the sheets and the open joints so formed shall be covered with exterior metal cover caps and metal inner strips which conform to the corrugations of the glass. The exterior cover caps shall have an asphaltic lining. The caps and inner strips, to complete the joint, shall be bolted together by bolts passing through the caps and inner strips and between the sheets of glass approximately 9 in. center to center.

8. Where structural steel supports occur, clips, engaged by bolts passing through the cover caps, shall be used to hold the glass securely in place. Wherever wood supports occur lag screws shall be used in place of clips.

9. Each light of glass shall have a firm, even bearing and wherever any sheet of glass is applied to structural work (such as curbs, purlins, etc.) or where it laps over other glass, it shall be cushioned with impregnated felt or asphalt strip. At the bottom (or eaves) of Corrugated Wire Glass construction and at the top (in conjunction with the ridge or flashings) the openings caused by the corrugations of the glass shall be filled with a sealing strip especially designed and supplied for this purpose.

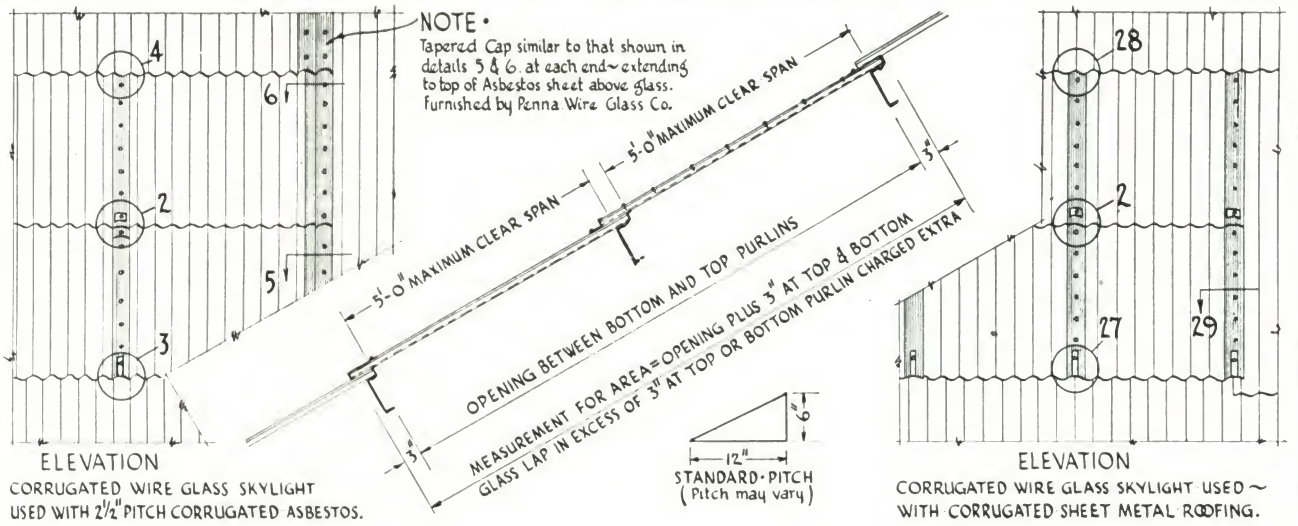
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NOTE-PA. WIRE GLASS CO. DOES NOT FURNISH PURLINS, CURB OR RIDGE SUPPORTS, CURB OR COUNTER FLASHINGS, VENTILATORS OR FRAMES

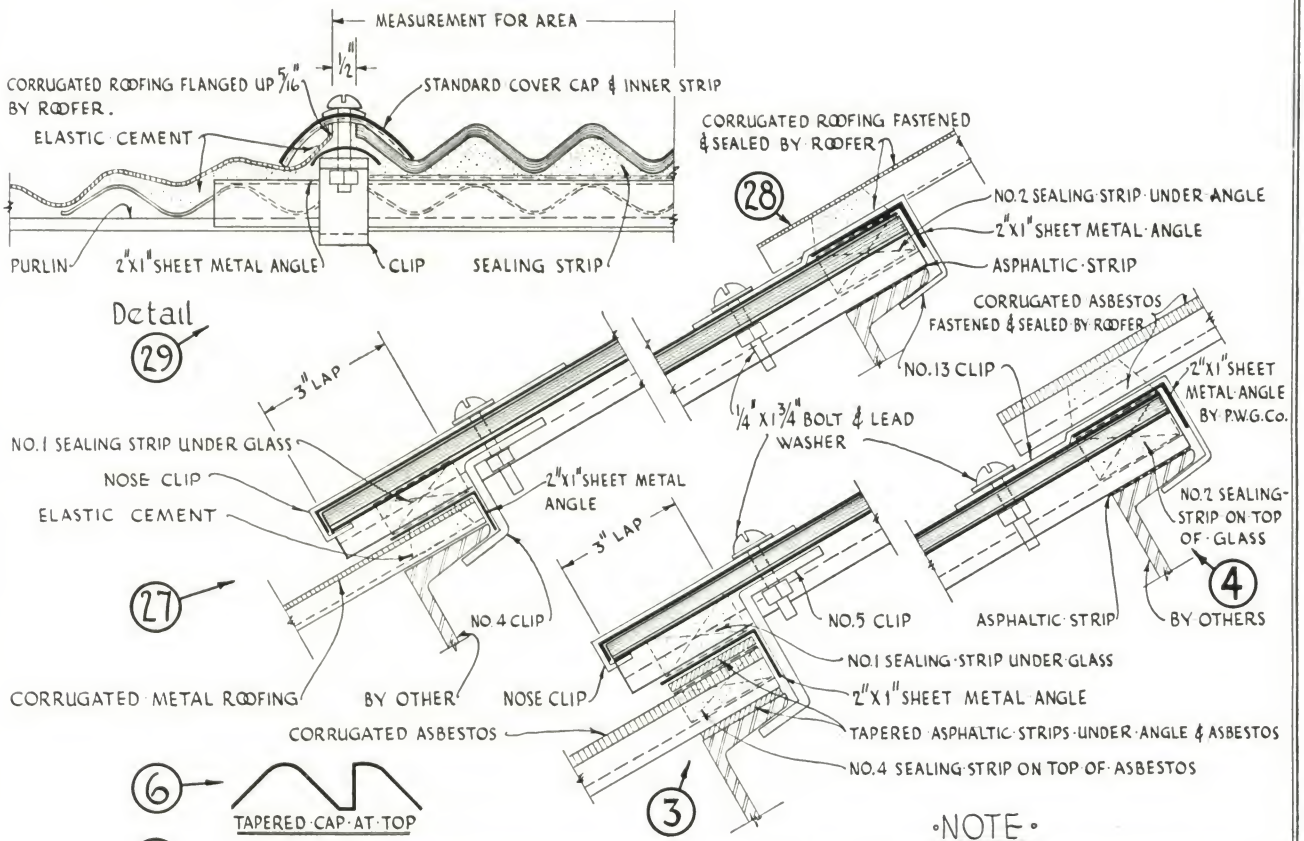
SCALE FOR DETAILS 3"=1'-0"	DETAILS OF CORRUGATED WIRE GLASS SKYLIGHTS WITH GABLE END STEEL FRAMES MANUFACTURED BY PENNSYLVANIA WIRE GLASS COMPANY PHILADELPHIA PA.	PLATE NUMBER T-101 NOVEMBER 1929

Continued on next page



ELEVATION
CORRUGATED WIRE GLASS SKYLIGHT USED WITH 2½" PITCH CORRUGATED ASBESTOS.

ELEVATION
CORRUGATED WIRE GLASS SKYLIGHT USED ~ WITH CORRUGATED SHEET METAL ROOFING.

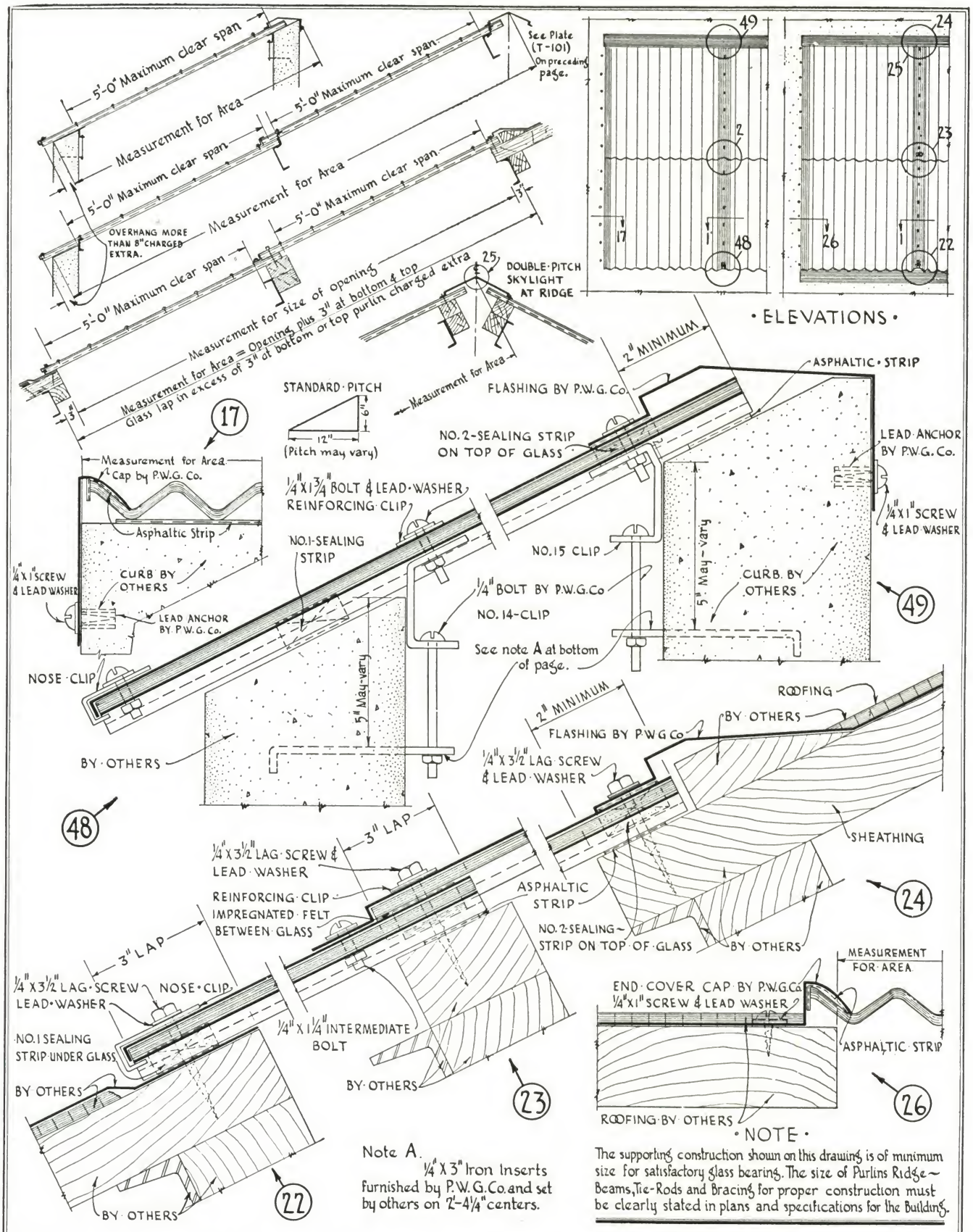


• NOTE •

The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of Curbs, Purlins, Ridge-Beams, Tie-Rods and Bracing for proper construction must be clearly stated in plans and specifications for the building. —— Pennsylvania Wire Glass Co. does not furnish Purlins, Curb or Ridge-Supports Curb or Counter Flashing, Ventilators or Frames.

SCALE FOR • DETAILS 3" = 1'~0"	DETAILS ~ C.W.G. • APPLIED • TO • CORR. - ASBESTOS ~ AND • CORR. - SHEET • METAL • ROOFING MANUFACTURE • BY • PENNSYLVANIA • WIRE • GLASS • COMPANY • PHILADELPHIA • PENNSYLVANIA	PLATE • NUMBER T • 126 AUGUST ~ 1930

Continued on next page



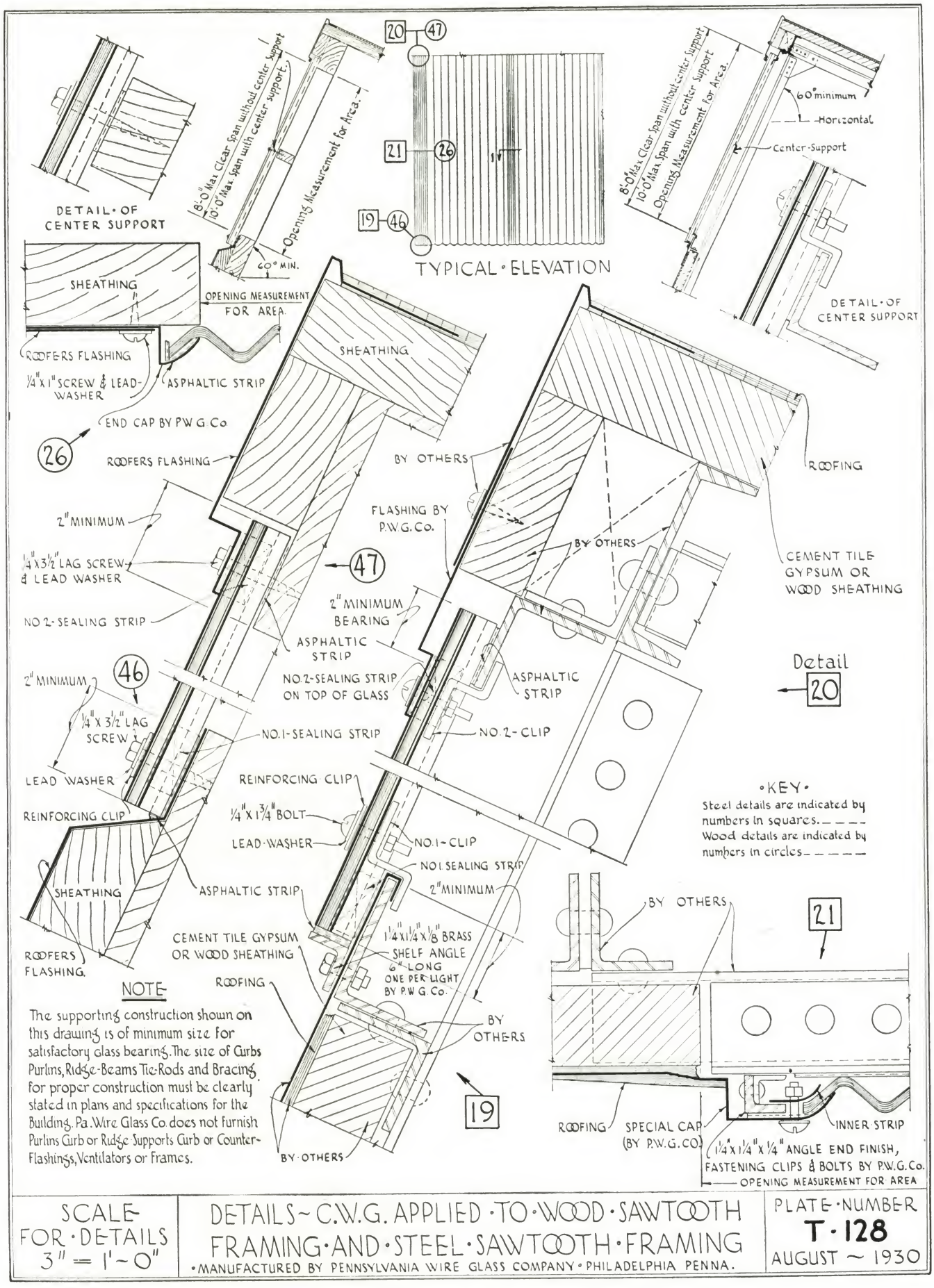
Note A.
1/4" X 3" Iron Inserts furnished by P.W.G. Co. and set by others on 2'-4 1/4" centers.

• NOTE •

The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of Purlins Ridge-Beams, Tie-Rods and Bracing for proper construction must be clearly stated in plans and specifications for the Building.

SCALE FOR DETAILS 3" = 1'-0"	DETAILS - C.W.G. APPLIED • TO • CONCRETE CURBS • AND • WOOD • SHEATHED • ROOF. MANUFACTURED BY PENNSYLVANIA WIRE GLASS COMPANY PHILADELPHIA • PENNA.	PLATE • NUMBER T • 127 AUGUST - 1930

Continued on next page



NOTE

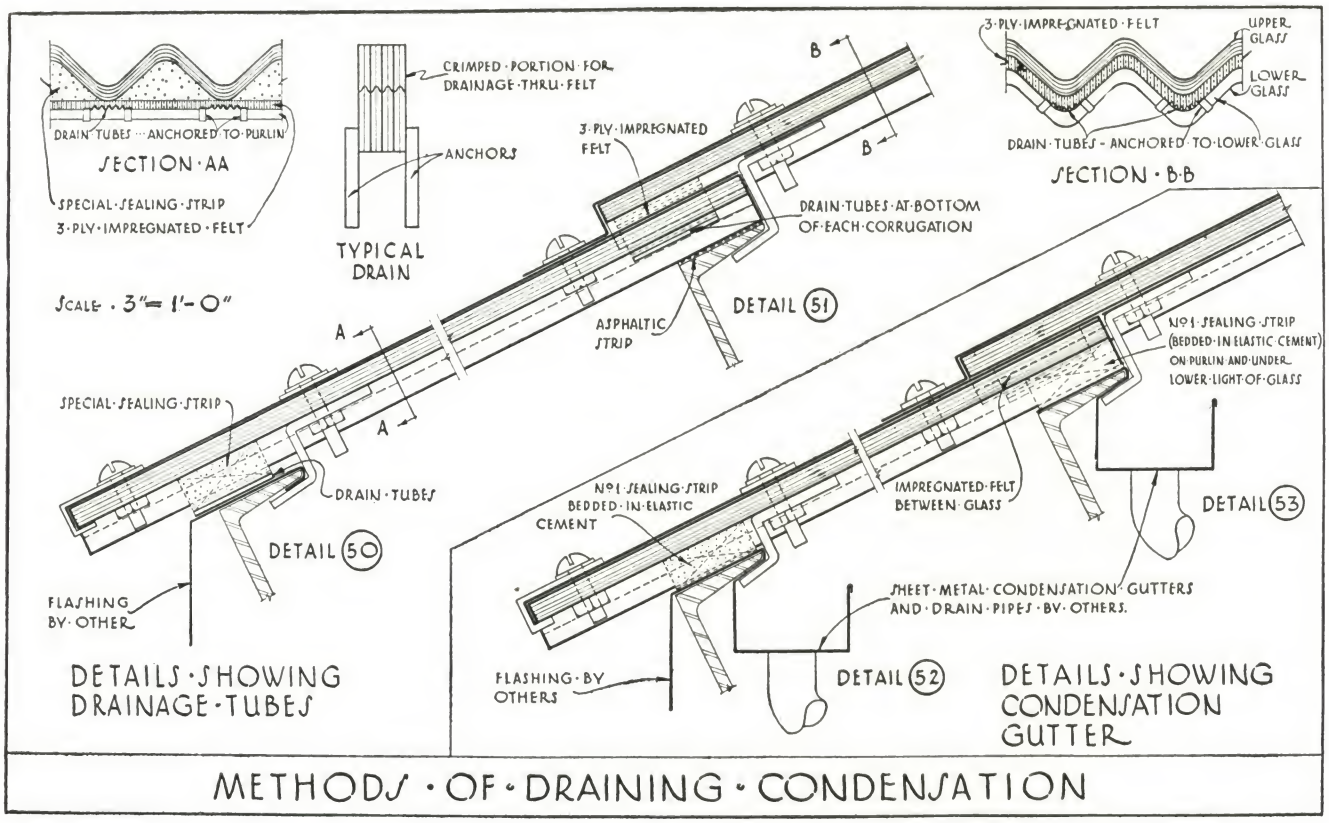
The supporting construction shown on this drawing is of minimum size for satisfactory glass bearing. The size of Curbs Purlins, Ridge-Beams Tie-Rods and Bracing for proper construction must be clearly stated in plans and specifications for the Building. Pa. Wire Glass Co. does not furnish Purlins Curb or Ridge Supports Curb or Counter-Flashings, Ventilators or Frames.

· KEY ·

Steel details are indicated by numbers in squares. – – – –
Wood details are indicated by numbers in circles – – – – –

SCALE FOR DETAILS 3" = 1'-0"	DETAILS ~ C.W.G. APPLIED · TO · WOOD · SAWTOOTH FRAMING · AND · STEEL · SAWTOOTH · FRAMING · MANUFACTURED BY PENNSYLVANIA WIRE GLASS COMPANY · PHILADELPHIA PENNA.	PLATE · NUMBER T · 128 AUGUST ~ 1930

Continued on next page



LUPTON C. W. G. SKYLIGHTS IN STANDARD SIZES

When skylights of C. W. G. are required there is an advantage in using, if possible, one of the standard sizes shown on the two following pages.

Standard size skylights require the least amount of time for delivery and erection. Shipment can be made from Dunbar, Pa., within a few days after we receive the order with complete information.

Material Supplied by Lupton

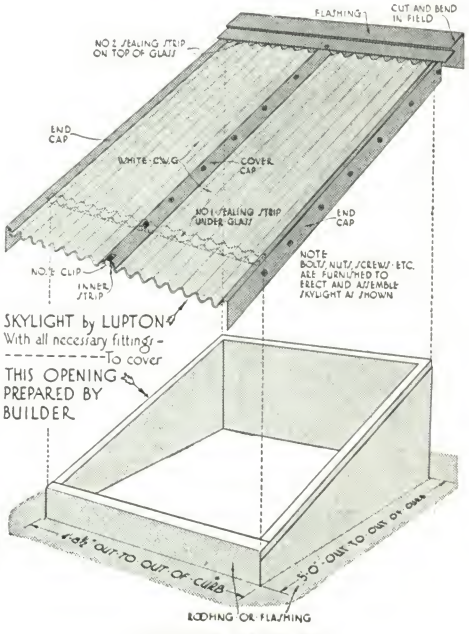
Sketch below shows the material supplied by Lupton for a Standard Skylight. It consists of glass (white or actinic as specified), flashing for upper curb, caps, bolts, clips, sealing strips and elastic cement. Setting instructions are packed in each crate. (Lupton will quote a price on erection if requested.)

Work by Builder

Wood Curbs—Skylights of the types shown on following two pages are usually applied to wood curbs and this is the type of construction shown in the details. The curbs must not be less than 2 in. thick, but the height of the curb or its length may require greater thickness or the use of tie rods or braces, to make curbs rigid and strong. A center purlin is required for Type B skylight.

The roofing material can be carried up the side and back and our top flashing and end caps will cover it. At the front or low curb, the roofing can be carried over the curb and no flashing is necessary. It is important that the construction be watertight. A cricket or gusset may be required to shed water on the upper side.

Other Types of Construction—Corrugated Wire Glass Skylights of standard size can be applied equally well to curbs of concrete, steel or any other structural material or direct to sloping roofs made of wood, corrugated steel, corrugated asbestos, steel deck or any other type of roofing. The general construction of the skylight is the same, but the method of attaching to the roof varies. A Lupton C. W. G. folder showing each construction may be obtained on request. See also pages 114 to 117.



Price List

A list of prices covering all standard sizes with white corrugated glass and Copper, Galvanized Steel or Aluminum fittings may be had on request.

Ordering

In ordering standard skylights specify quantity, catalogue number, kind of fittings, kind of glass (white or actinic) and pitch. (Although C. W. G. is weathertight on pitches as small as 1½ in. in 12 in., pitch will be assumed to be 6 in. in 12 in. unless definitely stated otherwise.)

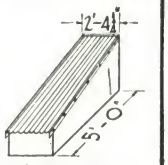
It is also important to specify the type of roof construction, whether curbs are wood, concrete or steel, etc.

Ventilators

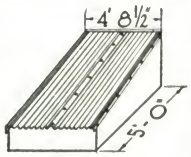
Ventilation may be provided if required, by means of windows, ventilators or fans.

Continued on next page

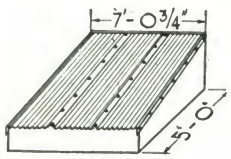
STANDARD SIZES
C.W.G. SKYLIGHTS — TYPE A — ONE LIGHT HIGH



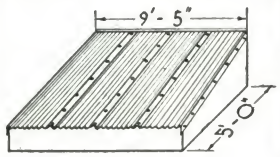
CAT. NO. A-1
AREA 13.5
SHIP. WT 95



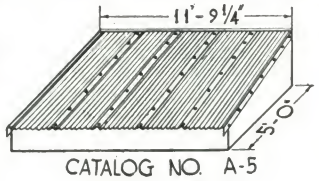
CAT. NO. A-2
AREA 27.0
SHIP. WT 189



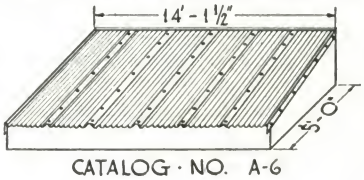
CAT. NO. A-3
AREA 40.5
SHIP. WT. 284



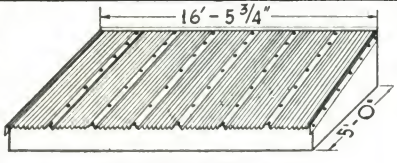
CAT. NO. A-4
AREA 54.0
SHIP. WT 378



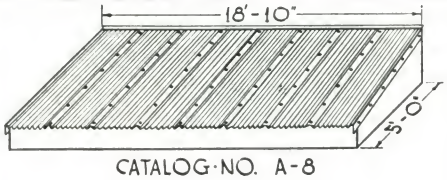
CATALOG NO. A-5
AREA 67.5
SHIP. WT. 473



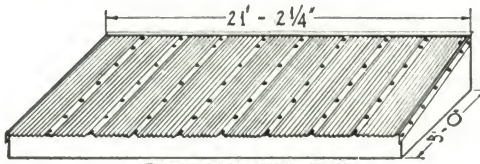
CATALOG NO. A-6
AREA 81.0
SHIP. WT. 568



CATALOG NO. A-7
AREA 94.5
SHIP. WT. 662

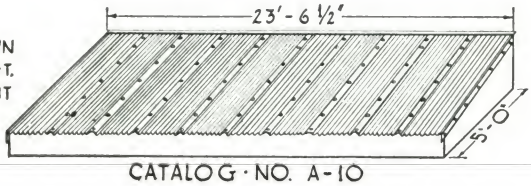


CATALOG NO. A-8
AREA 108.0
SHIP. WT. 756



CATALOG NO. A-9
AREA 121.5
SHIP. WT. 851

NOTE
AREA IS SHOWN IN SQUARE FEET. SHIPPING WEIGHT IS SHOWN IN POUNDS.



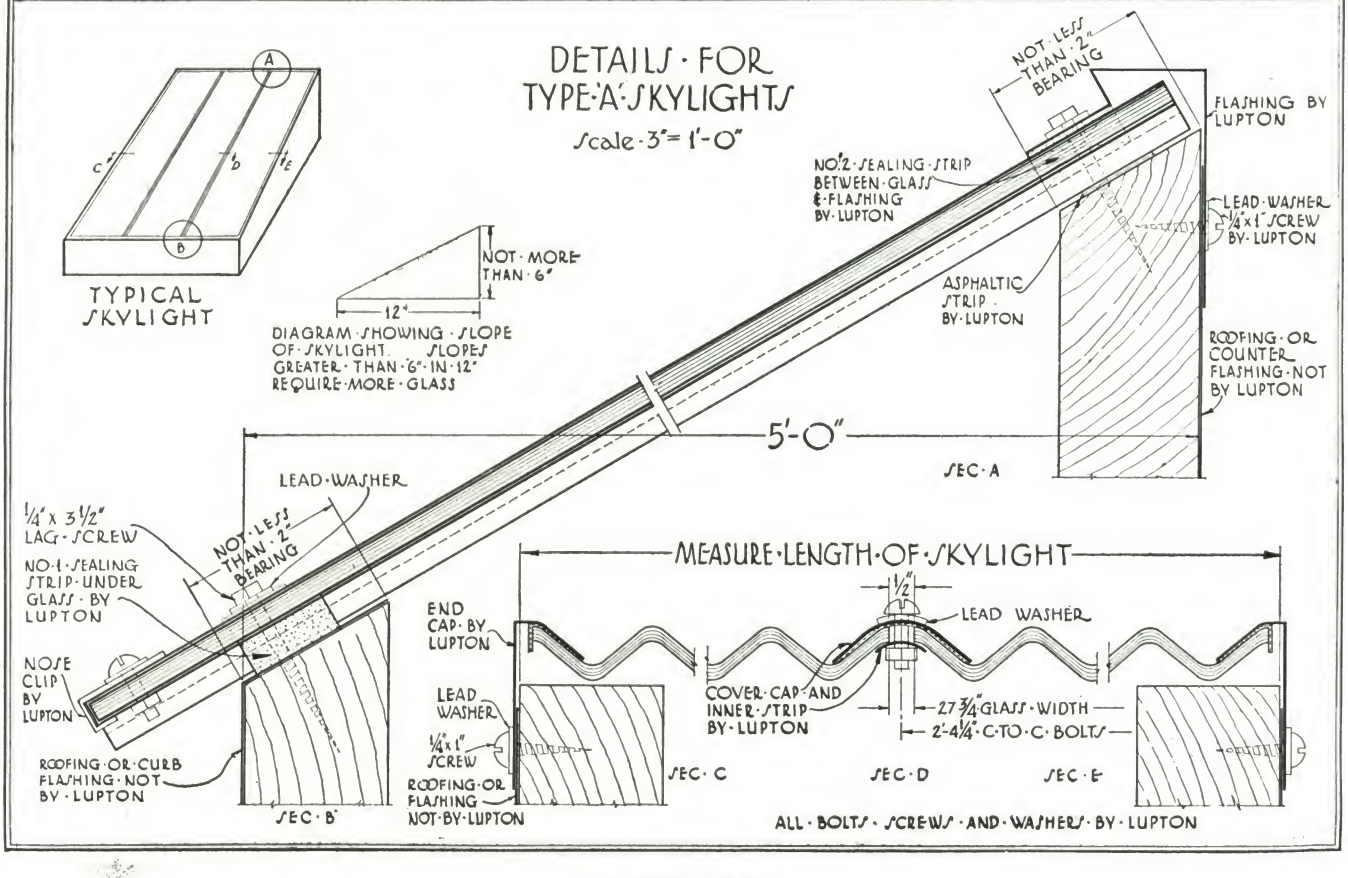
CATALOG NO. A-10
AREA 135.0
SHIP. WT. 945

DETAILS FOR TYPE 'A' SKYLIGHTS

Scale 3" = 1'-0"

TYPICAL SKYLIGHT

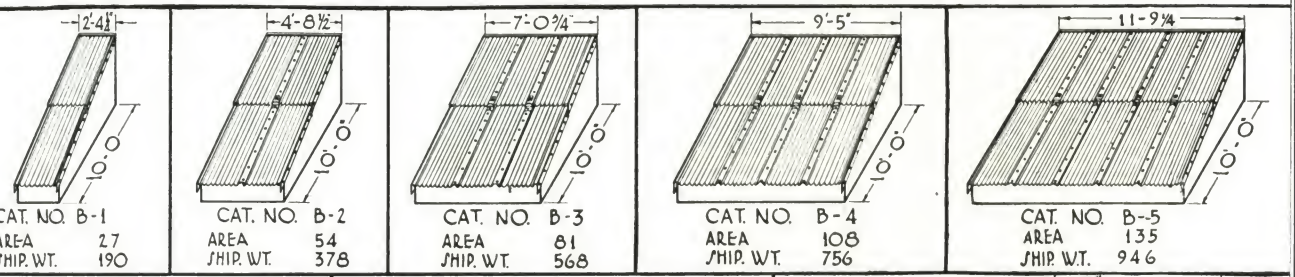
DIAGRAM SHOWING SLOPE OF SKYLIGHT. SLOPES GREATER THAN 6" IN 12" REQUIRE MORE GLASS



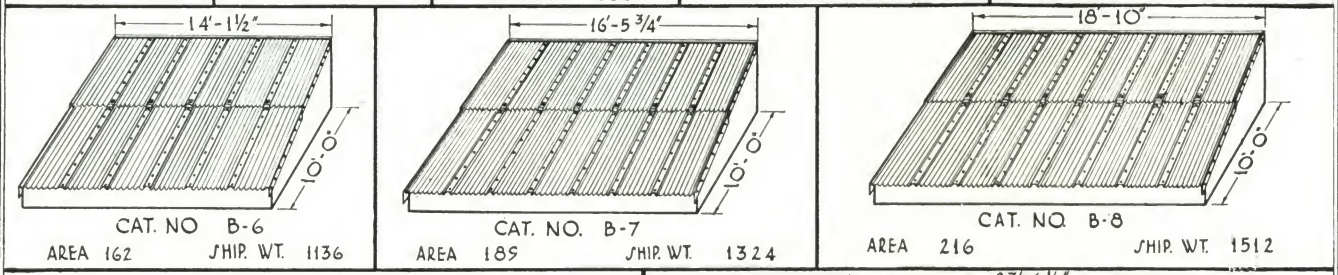
Continued on next page

STANDARD · SIZES

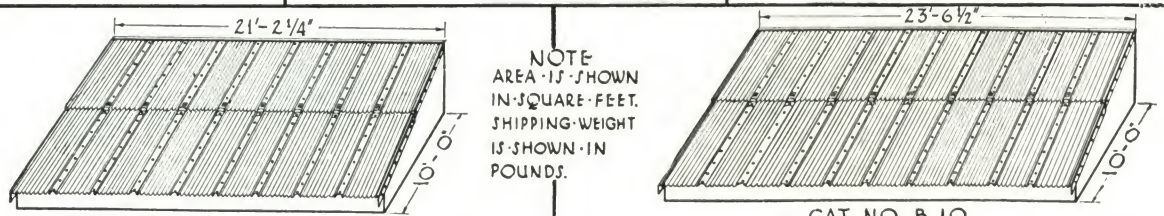
C.W.G. SKYLIGHTS — TYPE · B — TWO · LIGHTS · HIGH



CAT. NO. B-1	CAT. NO. B-2	CAT. NO. B-3	CAT. NO. B-4	CAT. NO. B-5
AREA 27	AREA 54	AREA 81	AREA 108	AREA 135
SHIP. WT. 190	SHIP. WT. 378	SHIP. WT. 568	SHIP. WT. 756	SHIP. WT. 946



CAT. NO B-6	CAT. NO. B-7	CAT. NO. B-8
AREA 162 SHIP. WT. 1136	AREA 189 SHIP. WT. 1324	AREA 216 SHIP. WT. 1512

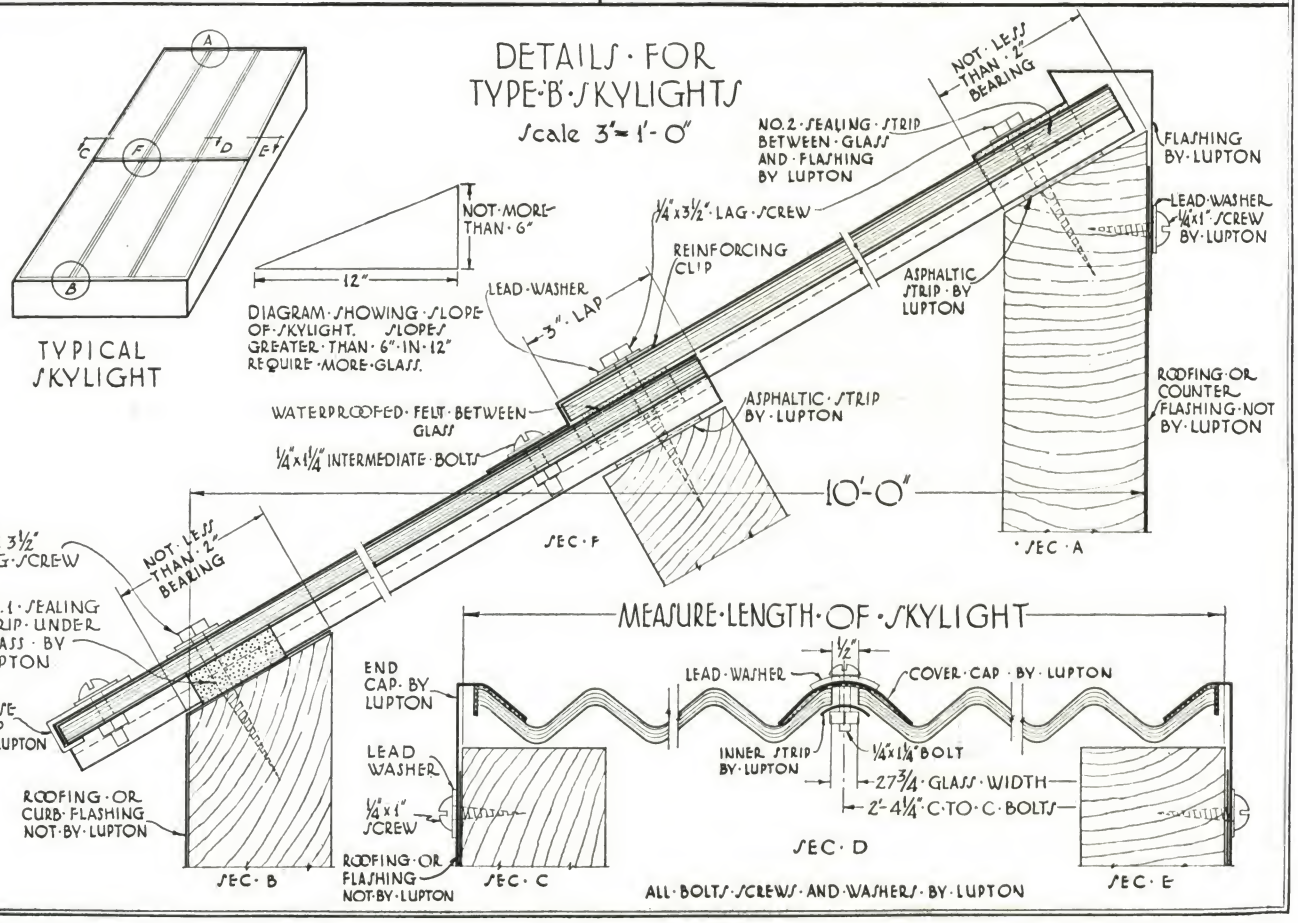


CAT NO. B-9	CAT. NO. B-10
AREA 243 SHIP. WT. 1702	AREA 270 SHIP. WT. 1890

NOTE
AREA · IS · SHOWN IN · SQUARE · FEET. SHIPPING · WEIGHT IS · SHOWN · IN POUNDS.

DETAILS · FOR TYPE · B · SKYLIGHTS

Scale 3" = 1'-0"



Continued on next page

OTHER LUPTON PRODUCTS

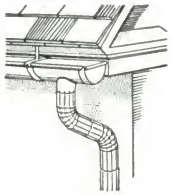
Not Described in Detail in This Catalogue

LUPTON STEEL PARTITIONS

Two types of Steel Partitions are built by Lupton. One type combining good looks, finish, durability and interchangeable unit construction is ideal for the well dressed office, while another type less expensive, but possessing equal strength and flexibility, is especially suitable for factories, etc. Finished in a variety of colors to suit individual requirements.



SHEET METAL PRODUCTS



Lupton manufactures a complete line of Rain Gutters, Spouts, Elbows and all the things necessary to erect them. A recent addition to the line is the Art-Bead Gutter. This is the half-round trough with an attractively designed edge which gives class and distinction to the edge of roof and eaves. All articles are made of the highest grade materials.

LUPTON DETENTION WINDOWS

This window offers the unique advantages of a steel window plus the detention features but without the customary jail-like bars. The concealed spring balance permits the window to be opened within certain limits by the inmates but not far enough to let them escape. All mechanism is concealed. Windows can be supplied with locks and in this way entirely controlled by the attendant.



STEEL FACTORY EQUIPMENT



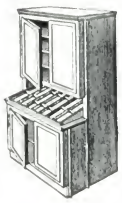
A complete line of factory equipment is manufactured by Lupton. Some of the articles in this line are Work Benches, Shop Desks, Tool Cabinets, Work Tables and Bench Legs. Neat, strong, easily kept clean. Can readily be moved from place to place to take care of changing conditions. With reasonable care they will give service for many years.

LUPTON STEEL SHELVING

Lupton Steel Shelving solves the ordinary storage problems and can be readily adapted to take care of the most unusual requirements. Made in Open and Closed types for storage purposes and in Display Type for stores. All types greatly multiply storage space, cut maintenance costs, conserve floor space, and are adaptable to different layouts.



HARDWARE STORE EQUIPMENT



The maximum in service, storage space, and display value. Display Tables, Cutlery Tables, Counters, Units combining display and storage, Screen Wire Racks, Platforms for heavy articles, Counter Merchandisers—anything needed to make a hardware store neat, inviting and brimming with sales appeal. Every piece of equipment is made according to N.R.H.A. standards, sturdily built and finished in attractive colors.

TEXTILE MILL EQUIPMENT

Realizing the need for tetxile equipment that would reduce fire hazards, damage to goods from rough edges, and cost of maintenance, Lupton has produced a complete line for the textile mills. That it is successful is proven by the long list of prominent manufacturers that have installed Lupton equipment. This equipment greatly reduces the number of seconds and cuts overhead.



STEEL PRINTING EQUIPMENT



This line includes Cut Cabinets, Job Jacket Files, Cut Storage Cabinets, Sorting Tables, Paper Racks, Retouched Drawings File and similar equipment. Made similar to our Steel Shelving. It can be taken down and re-erected without loss, is adjustable and may be added to as needed. Makes neat appearance, does not splinter and is fire-resisting.

The articles listed above and described in detail in the foregoing pages are in no sense a limit to Lupton's ability to serve in making other products of metal. For example, all the Stainless Steel Store Fronts and Windows on the lower floors and in the tower of the Chrysler Building were made by Lupton. Lupton facilities are always available for making products to meet special requirements.

LUPTON

STEEL PRODUCTS

1931

Sales Representative

DAVID LUPTON'S SONS COMPANY

Allegheny Ave. & Tulip St.
PHILADELPHIA

THE MICHAELS ART BRONZE CO., INC.

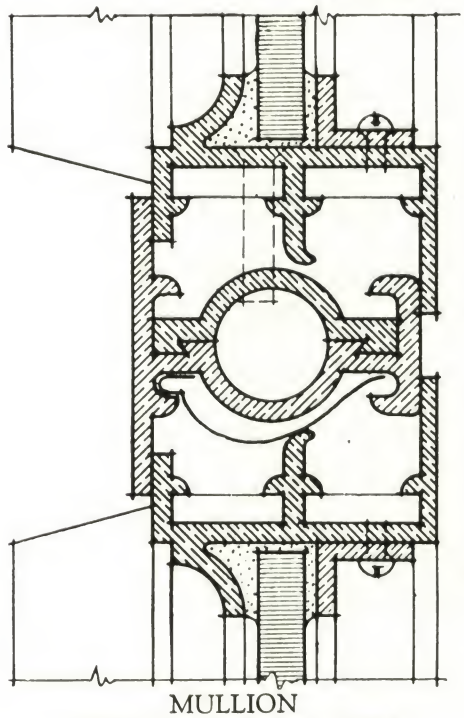
Manufacturers of Bronze Casement Windows

235-241 Court Avenue
COVINGTON, KY.

FACTORY: 230-240 Scott Boulevard, COVINGTON, KY.
(Three minutes from the heart of Cincinnati, Ohio)
REPRESENTATIVES IN PRINCIPAL CITIES

Fixed Transom side light sash similar

Sash side hung to swing out



MULLION
Side hung to swing in. Fixed sash one side

Products

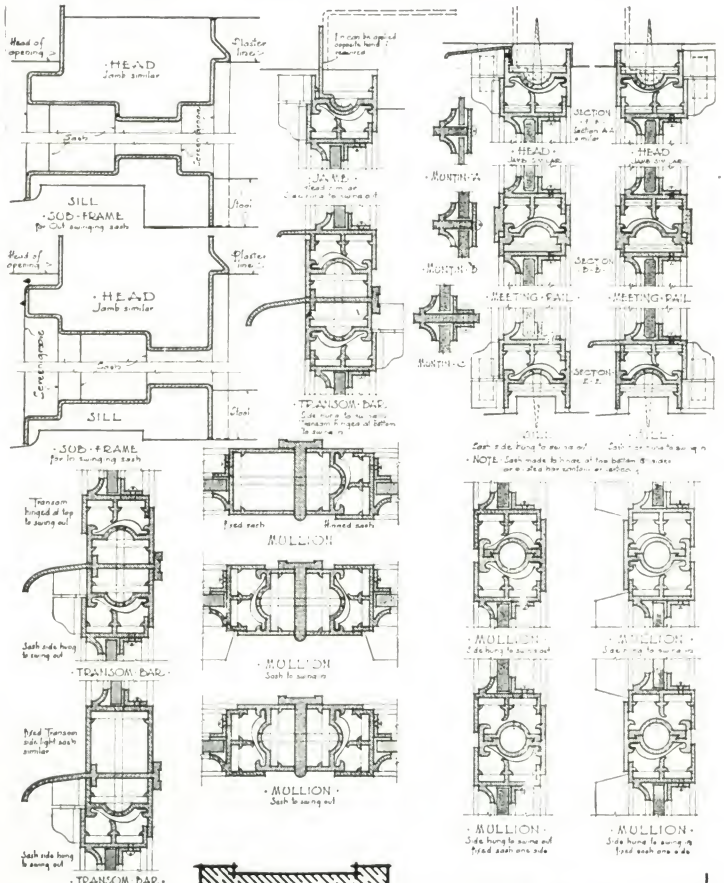
BRONZE CASEMENT WINDOWS with phosphor bronze weatherstrip. Sole manufacturer of this weatherstrip.

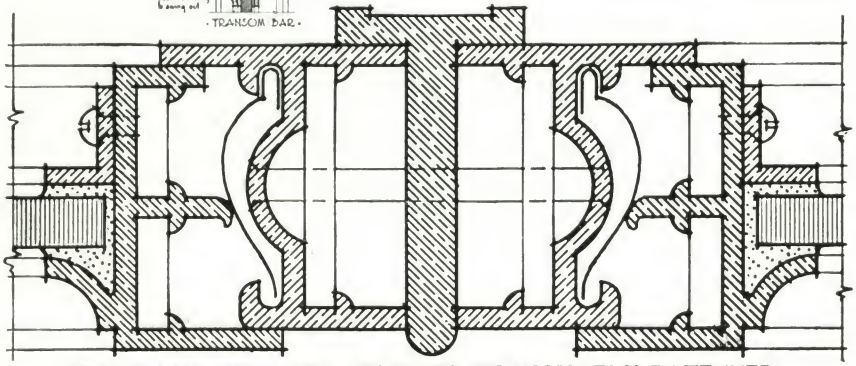
For additional Michaels Products, see Manufacturers' Index.

Service

Complete catalogues and additional details of Michaels Casement Windows sent on request.

Our Designing and Engineering staffs are at the disposal of architects and will be glad to co-operate in the solution of any problem involving the use of windows of this type.





SCALE AND FULL SIZE SECTIONS OF MICHAELS' PATENTED EXTRUDED BRONZE CASEMENT WINDOWS WITH PHOSPHOR BRONZE WEATHERSTRIP

Full size details and prices upon request.

ESTABLISHED 1879

MESKER BROS. IRON CO.

Manufacturers of Windows, Doors and Ornamental Iron

ST. LOUIS. MO.

For Mesker Stairs, see Manufacturers' Index

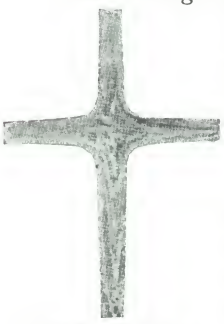
Experience and Facilities

MESKER BROS. IRON CO. has been in business continuously for over fifty years in the manufacture of high-grade metal products, and has specialized in metal window sash for the past thirty years. The factory covers over two and one-half acres of floor area, and is equipped with the most modern machinery, enabling it to take care of the largest orders with ease.

Designing Service

This catalogue has been prepared to show all necessary details for standard industrial windows as designated by the U. S. Department of Commerce, and as such cannot cover the multitude of special treatments possible.

We maintain an engineering service, however, and are at all times desirous of co-operating in the solution of special window problems. Our Engineering Department is always ready to perform such duties.



Transverse Etch Wrought Iron Normal Size

WROUGHT IRON SASH Mesker

Wrought Iron

It has been our pleasure to originate and develop solid section metal window sash made from genuine wrought iron. This material, due to its inherent ability to resist progressive corrosion, coupled with its new improved heavy duty construction, has found an immediate acceptance wherever quality products and low maintenance costs are wanted.

This metal is made to A.S.T.M. Specification A-84-30 Grade C, and where required, should be specified as such to eliminate the possibility of less corrosive resistant substitutes.

All our wrought iron bars have clearly rolled on their surface the distinguishing mark H.W.I. and can thus be readily identified.

For further information refer to our literature on wrought iron. It tells how to specify to insure getting the genuine.



Transverse Etch Steel Normal Size



Benjamin Franklin's lightning rod, after serving 158 years on St. Paul's Cathedral, London, shows no appreciable signs of serious corrosion. The surface is pitted, but the inner parts are as good as the day it was fabricated. The etched section (transverse) shows the same structure that has always characterized good wrought iron, the cinder layers which are such an efficient stop to progressive corrosion. (Compare this with the etch; the similarity is striking.)

Continued on next page

HORIZONTALLY PIVOTED WINDOWS

Heavy Duty

Pivot

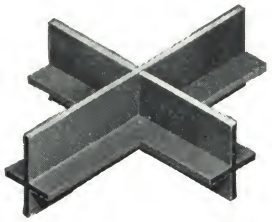
The cup pivot is characteristic of the care which has been given the design of this heavy duty sash. Its salient points are the unusual perfect weathering it affords, so hard of accomplishment in the pivoted window, the unusual bearing surface, signifying long life and ease of operation, and the neat, clean appearance it offers on both sides. The smaller inside disc is made of bronze, while the larger outside ring is of malleable iron, both almost totally impervious to corrosion, and a combination precluding any possibility of rusting tight.

Muntin Joint

All joints are both mechanically locked by means of temporary wedges and then securely arc-welded. This forms an intersection both stout and rigid and gives the sash such strength as is impossible of attainment with a mechanical joint only. This feature means better fitting ventilators because the sash will retain the original factory fit and except under the most abusive conditions will not require any field fitting as is so often necessary.

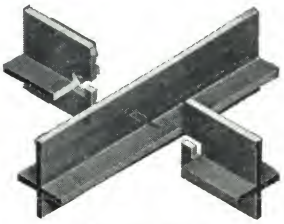


Spring Latch

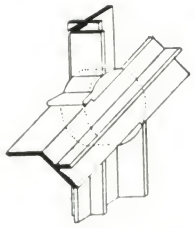




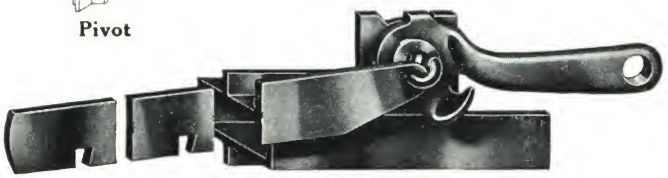
Chain Catch



Muntin Joint



Pivot



Camlock and Push Bar

Specifications

General

All window openings unless otherwise specified shall be solid section Cruciform Sash (heavy duty) as made by Mesker Bros. Iron Co., St. Louis, Mo., or equal approved by the architect.

Weathering

Continuous two-point contact around the ventilators shall be provided by means of specially hot rolled angles of at least 1/8-in. thickness.

Material

The material used shall be [low carbon hot rolled billet steel] [genuine wrought iron] in sections not less than 1/8 in. thick throughout the entire sash and not less than 1½ in. in depth. Ventilator bars shall be 1⅝-in. anchorage in the masonry and still give ⅜-in. clearance. Glass bearing rabbets shall be at least 7/16 in.

Hardware

All ventilators within easy reach of the floor shall be equipped with both camlock and push bar. All other vents shall be operated by spring latch and chain in approved manner.

Pivots

All ventilators shall be pivoted 4 in. above center on Mesker malleable iron and bronze cup pivot, affording extra large bearing surface and being perfectly weathertight.

Construction

All sash shall have nominal glass lights of either 12x18 or 14x20 in. All joints and intersections shall be solidly welded to insure rigidity. For openings requiring more than one unit, solid rolled section mullions shall be used in accordance with the manufacturer's standard practice. All mullions must be anchored at head and sill. Provide necessary clips, bolts and nuts for attaching sash to steel work where required.

Painting

All sash shall have one dip coat of rust-resisting mineral paint, gray in color, before shipment.

Glazing

All sash shall be glazed on the inside with special steel sash putty. Provide sufficient spring glazing clips (four per light). Glass shall be well bed-puttied to prevent leakage.

Erection

Each unit must be set plumb and true in prepared opening and securely cemented or grouted in by masonry contractor. Care must be taken to see that the sash are not sprung by forcing them into improperly made openings. All ventilators should be tested to assure easy operation, and have hardware attached before glazing.

Notes

(1) Sash may be furnished from genuine wrought iron in identical construction (see our literature on wrought iron).
(2) Outside or double glazing may be had.
(3) Ventilators may be bottom or top pivoted, instead of center pivoted.
(4) All sash may bear the Underwriters' label. The local fire prevention bureau will be glad to review plans and suggest where labeled sash will be required.
(5) Sash may be hot dipped galvanized after fabrication.
(6) Other combinations of hardware may be had if so specified.
(7) Window cleaning bolts may be attached as shown.
(8) Erection and glazing may be done by sash contractor.

Continued on next page

COMMERCIAL PROJECTED WINDOWS

Heavy Duty

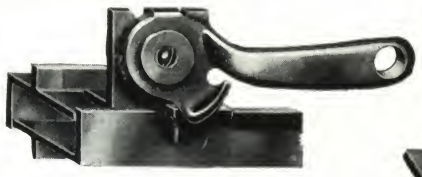
Pivots

The ventilators are supported on special hot rolled angle side arms, a feature not found in any other sash, and one which gives unusual solidness to its operation and obviates any possibility of bent side arms.

Solid bronze adjustable friction slides complete the mechanism. They slide on the sash members themselves and have no channels to become gummed up with dirt. A ball bearing furnishes the necessary friction to hold the ventilator open at any desirable angle without the use of a stay bar.

Weathering

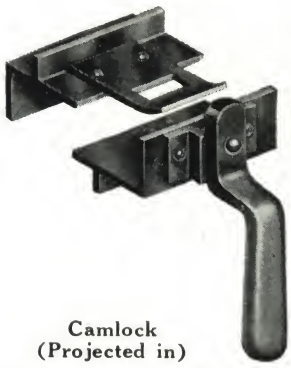
As in Mesker's Pivoted Window, the weathering on the projected type is double contact, and made up of all solid rolled sections. There are no light gauge sections, and since both contacts are continuous around the ventilator, and in the same plane, there are no breaks to cause only single contact at certain points as is found frequently in other makes.



Standard Camlock



Panel Hook



Camlock
(Projected in)



Projected Construction

Specifications

General

All window openings unless otherwise specified shall be solid section Cruciform Sash (heavy duty) as made by Mesker Bros. Iron Co., St. Louis, Mo., or equal approved by the architect.

Weathering

Continuous two-point contact around the ventilators shall be provided by means of specially hot rolled angles of at least ⅛-in. thickness.

Material

The material used shall be [low carbon hot rolled billet steel] [genuine wrought iron] in sections not less than ⅛ in. thick throughout the entire sash and not less than 1½ in. in depth. Ventilator bars shall be 1⅝-in. anchorage in the masonry and still give ⅜-in. clearance. Glass bearing rabbets shall be at least $\frac{7}{16}$ in

Hardware

All ventilators within easy reach of the floor shall be equipped with malleable iron camlock for both projecting in and out types. All projecting ventilators out of reach shall be operated with window pole.

Pivots

Ventilators shall be balanced on special angle side arms and equipped with bronze ball bearing friction slides adjustable to meet necessary conditions for holding the ventilator open at any desired angle.

Construction

All sash shall have nominal glass lights of either 12x18 or 14x20 in. All joints shall be solidly welded to insure rigidity. For openings requiring more than one unit solid rolled section mullions shall be used in accordance with the manufacturer's standard practice. All mullions must be anchored at head and sill. Provide necessary clips, bolts and nut for attaching sash to steel work where required.

Painting

All sash shall have one dip coat of rust-resisting mineral paint, gray in color, before shipment.

Glazing

All sash shall be glazed on the inside with special steel sash putty. Provide sufficient spring glazing clips (four per light). Glass shall be well bed-puttied to prevent leakage.

Erection

Each unit must be set plumb and true in prepared openings and securely cemented or grouted in by masonry contractor. Care must be taken to see that the sash are not sprung by forcing them into improperly made openings. All ventilators should be tested to assure easy operation and have hardware attached before glazing.

Notes

(1) Sash may be furnished for genuine wrought iron in identical construction (see our literature on wrought iron).

(2) Outside or double glazing may be had.

(3) Projecting out ventilators only may be labeled. The local fire prevention bureau will be glad to review plans and suggest where labeled sash will be required.

(4) Sash may be hot dipped galvanized after fabrication.

(5) Other combinations of hardware may be had if so specified.

(6) Window cleaning bolts may be attached as shown.

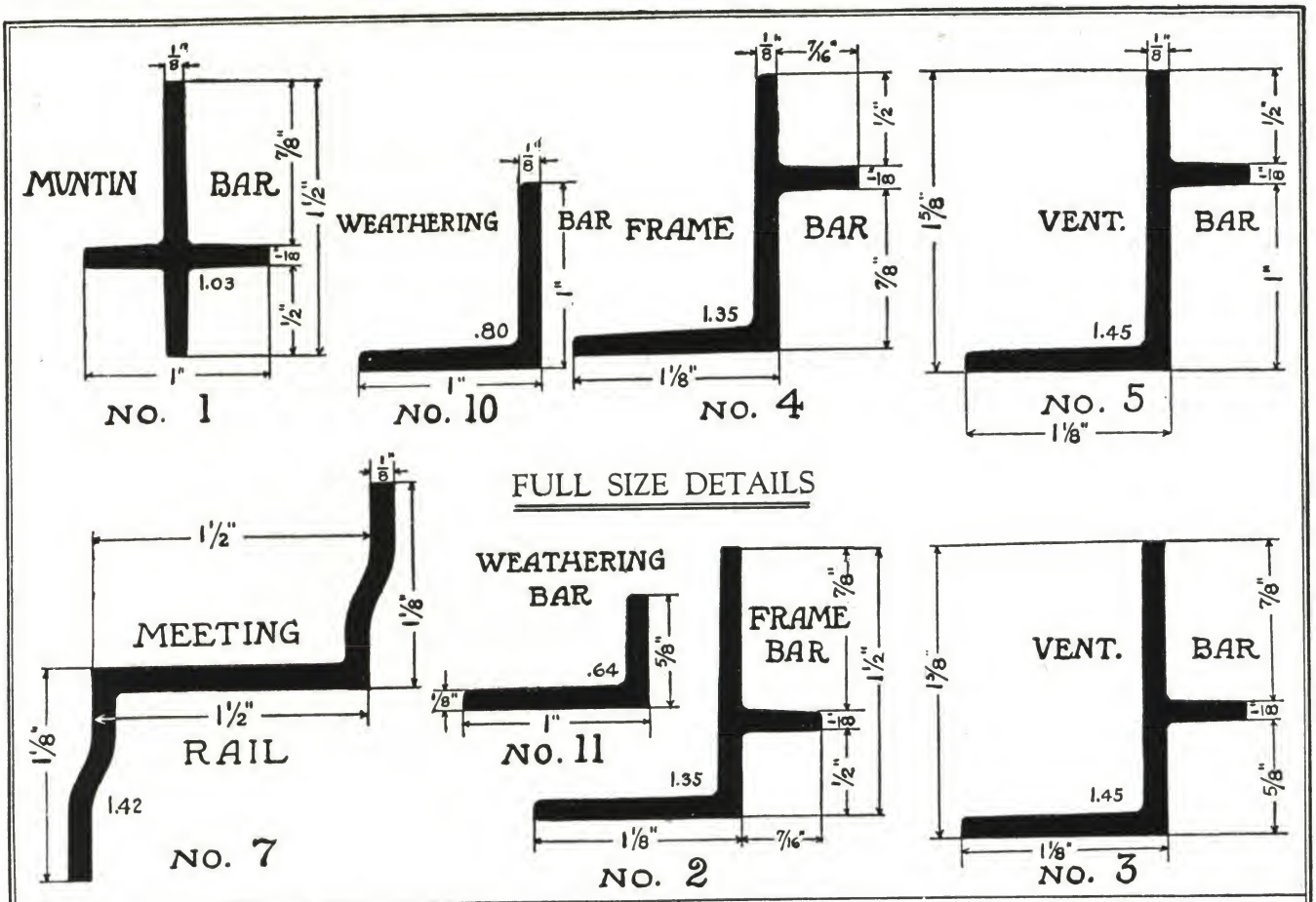
(7) Bronze hardware may be substituted for malleable iron.

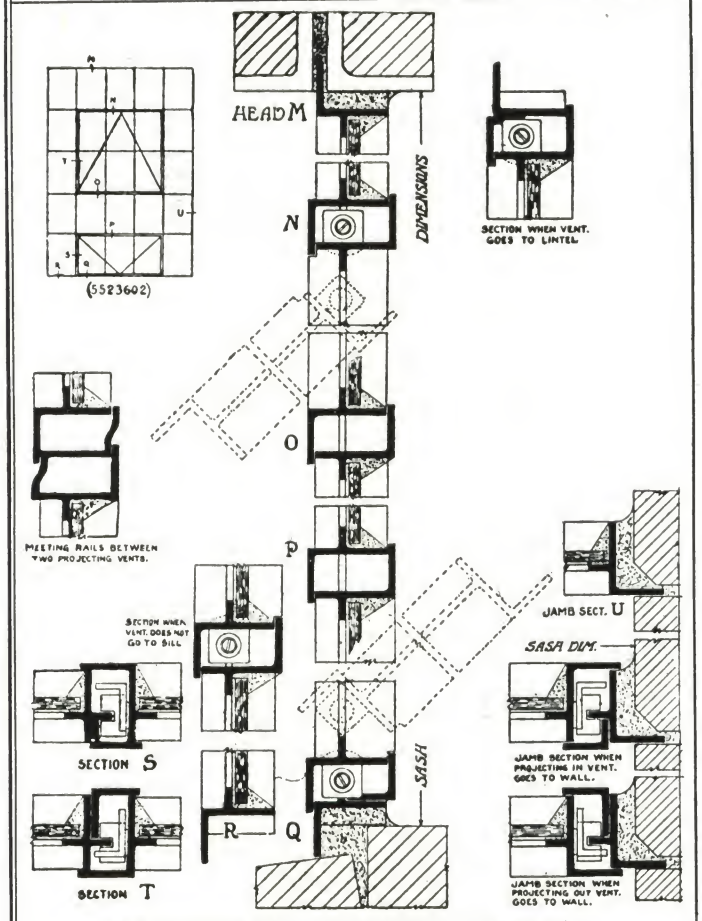
(8) Chain operation may be substituted for pole according to hardware application details.

(9) Shade brackets may be furnished where required.

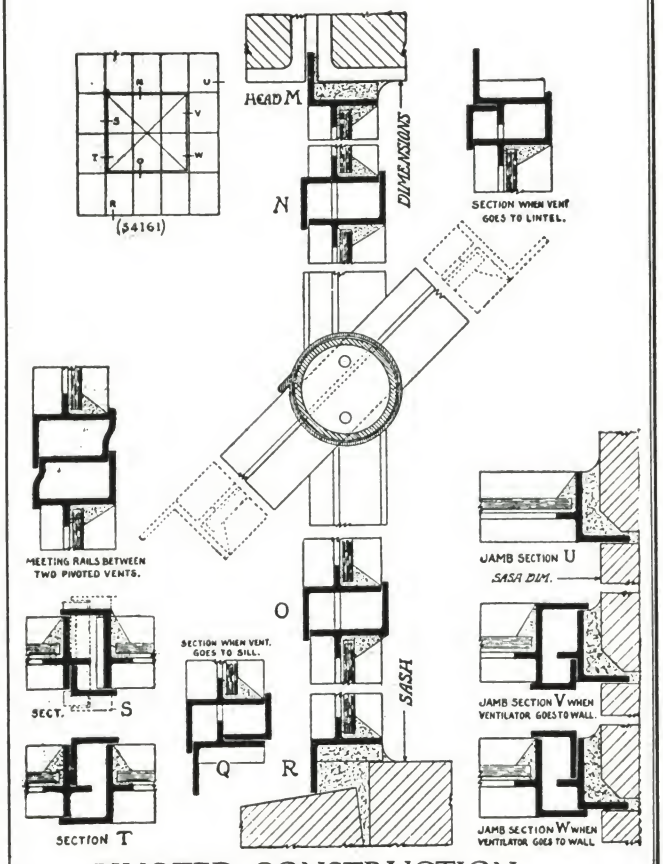
(10) Erection and glazing may be done by sash contractor.

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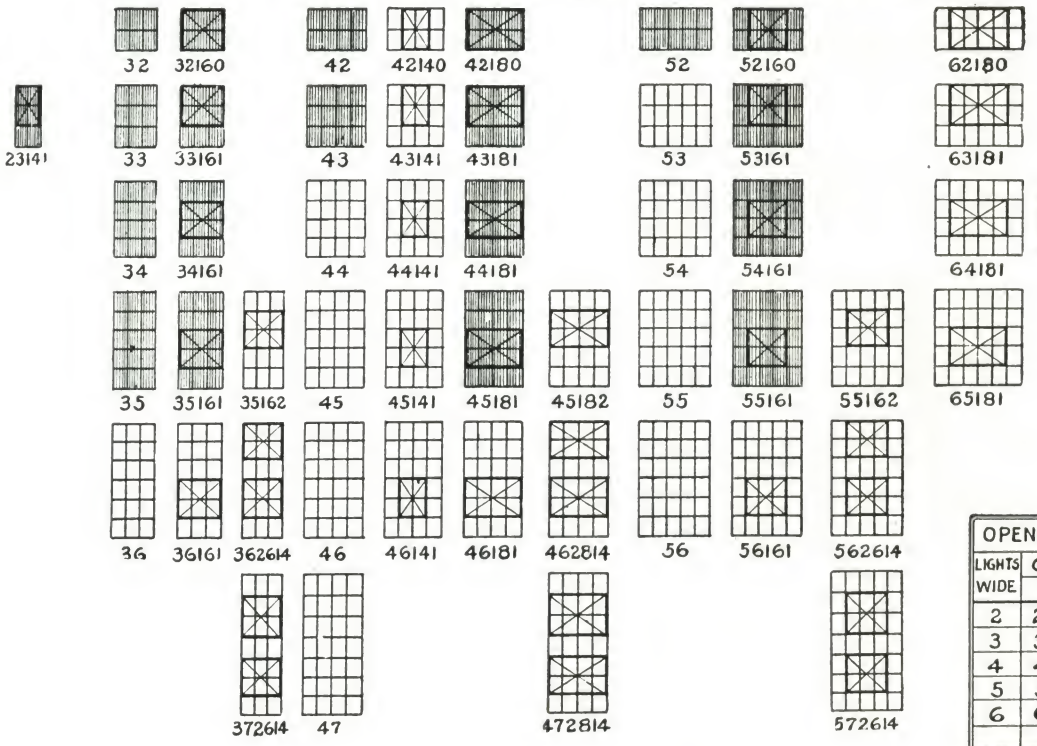
PROJECTED CONSTRUCTION



PIVOTED CONSTRUCTION

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STANDARD SIZES
PIVOTED
STOCK AND STANDARD TYPES

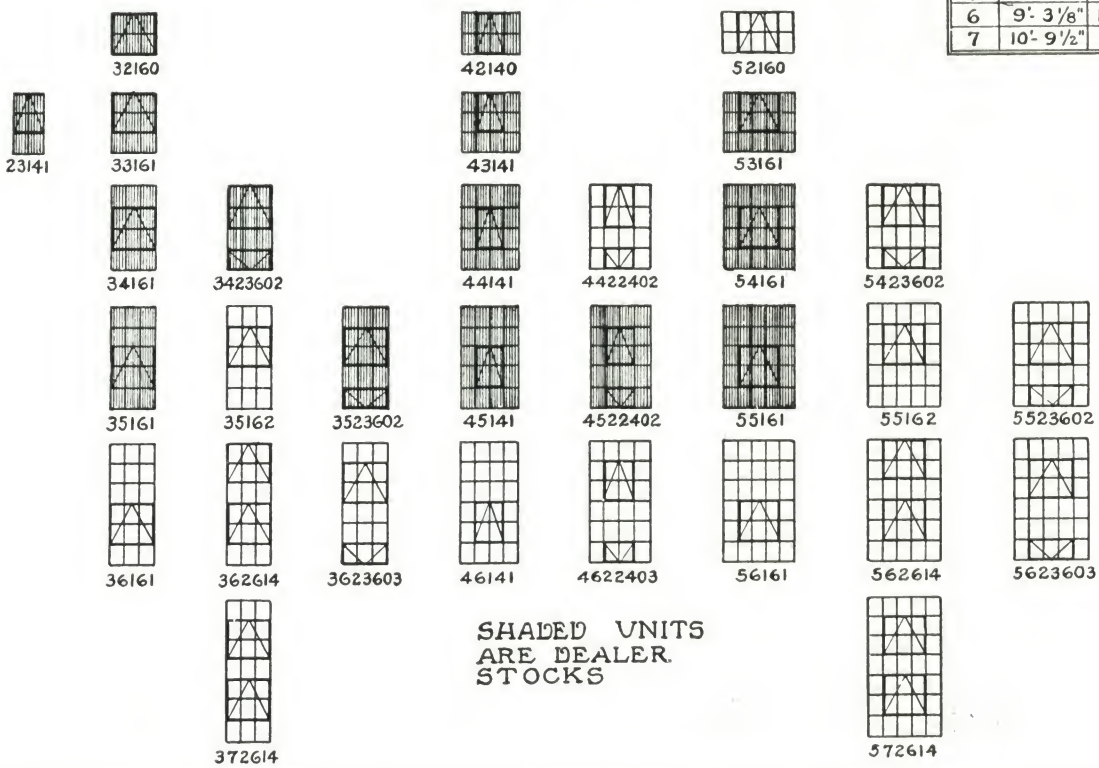


SHADED UNITS ARE DEALER STOCKS

OPENING DIMENSIONS		
LIGHTS WIDE	GLASS WIDTHS	
	12"	14"
2	2'-1 5/8"	2'-5 5/8"
3	3'-2"	3'-8"
4	4'-2 3/8"	4'-10 3/8"
5	5'-2 3/4"	6'-0 3/4"
6	6'-3 1/8"	7'-3 1/8"

LIGHTS HIGH	GLASS HEIGHT	
	18"	20"
1	1'-7 1/4"	1'-9 1/4"
2	3'-1 5/8"	3'-5 5/8"
3	4'-8"	5'-2"
4	6'-2 3/8"	6'-10 3/8"
5	7'-8 3/4"	8'-6 3/4"
6	9'-3 1/8"	10'-3 1/8"
7	10'-9 1/2"	11'-11 1/2"

PROJECTED
STOCK AND STANDARD TYPES

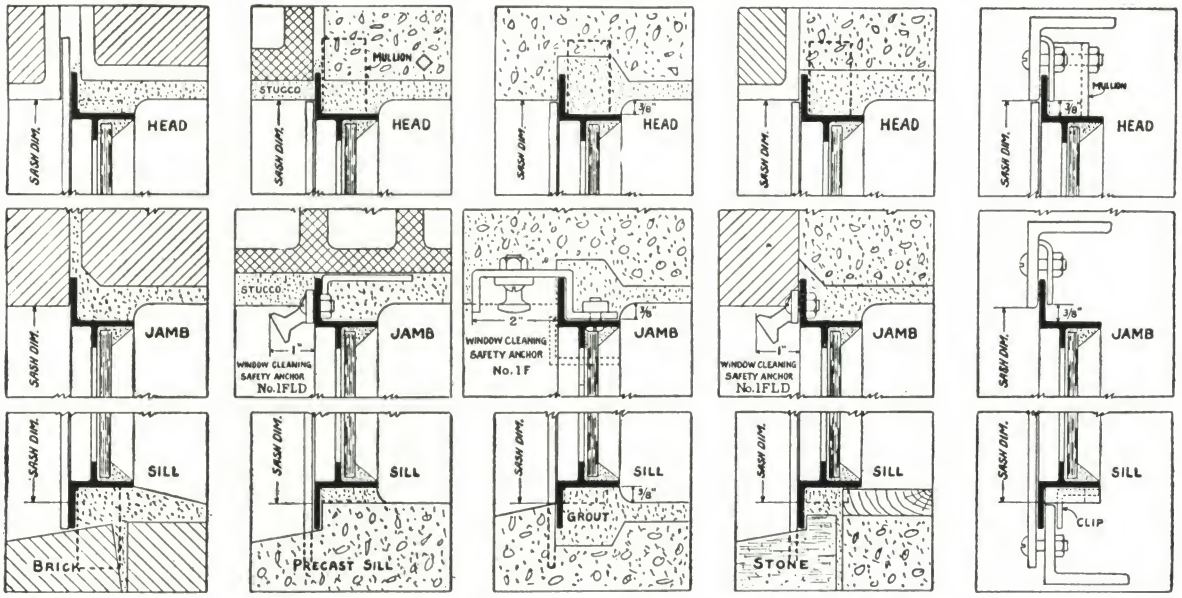


SHADED UNITS ARE DEALER STOCKS

Continued on next page

INSTALLATION DETAILS

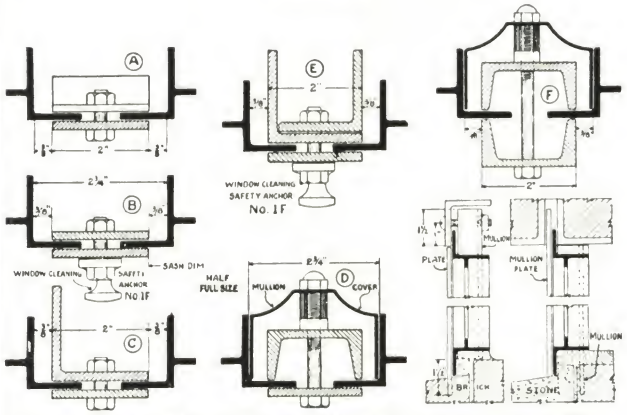
INSIDE GLAZING



BRICK CONSTRUCTION | TILE CONSTRUCTION | CONCRETE CONSTRUCTION | BRICK VENEER CONSTRUCTION | STEEL CONSTRUCTION

Scale 3" = 1'

Mullions



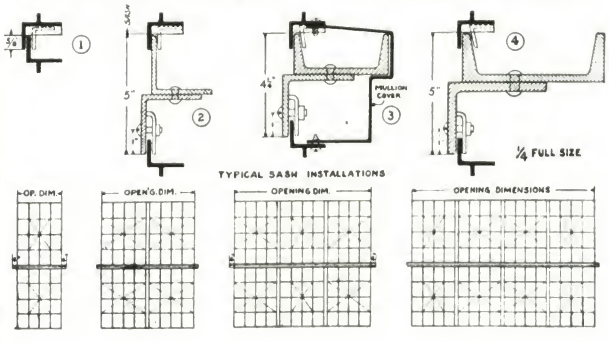
STANDARD VERTICAL MULLIONS ARE CONSTRUCTED FOR ANCHORAGE AT BOTH HEAD AND SILL. THE INNER MEMBER IS ATTACHED TO THE LINTEL BY BOLTING AND THE OTHER ONE TO THE SILL. IN CASE OF A DOUBLE ANGLE LINTEL THE MULLION MAY BE TURNED UPSIDE DOWN SO THE OUTSIDE PLATE WILL SLIP BETWEEN THE LINTEL ANGLES, AND THE INNER ONE WILL THEN BE ANCHORED TO THE SILL. MULLIONS D AND F ONLY ARE FURNISHED WITH COVERS WHEN SPECIFIED.

STANDARD VERTICAL MULLIONS

LIGHTS HIGH	NO.	REQUIRED PLATES	REQUIRED ANGLES	CHANNELS
1&2	A	1 - 2" × 5/16	CLIP	NONE
3&4	B	2 - 2" × 5/16	NONE	NONE
5&6	C	1 - 2" × 3/16	1 - 2"×2"×5/16	NONE
	D	1 - 2" × 3/16	NONE	1 - 2"
7&8	E	1 - 2" × 3/16	1 - 2"×2"×3/16	NONE
	F	NONE	NONE	2 - 2"

STANDARD HORIZONTAL MULLIONS

LIGHTS WIDE 12"×18"	NO.	REQUIRED ANGLES	REQUIRED CHANNELS	HEIGHT	LIGHTS WIDE 14"×20"
3 to 5	1	Nos. 2 & 3 SASH BARS	NONE	5/8"	3 to 5
6 to 9	2	2-2½"×2½"×¼"	NONE	5"	6 to 8
10 to 13	3	1-3½"×2½"×¼"	1-4"	4'4"	9 to 11
14 to 18	4	1-4"×3"×5/16"	1-6"	5"	12 to 16



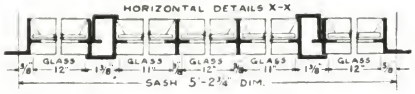
STANDARD HEIGHTS

HEIGHTS OF OPENINGS

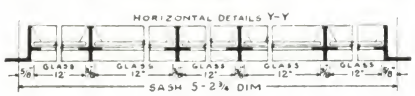
LTS. HIGH	12"×18" GLASS	LTS. HIGH	14"×20" GLASS
1	1' 7¼"	1	1' 9¼"
2	3' 1⅝"	2	3' 5⅜"
3	4' 8"	3	5' 2"
4	6' 2⅜"	4	6' 10⅜"
5	7' 8¾"	5	8' 6¾"
6	9' 3⅛"	6	10' 3⅛"
7	10' 9½"	7	11' 11½"

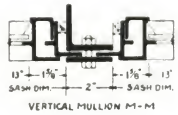
GLASS SIZES

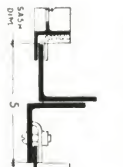
HORIZONTAL DETAILS X-X



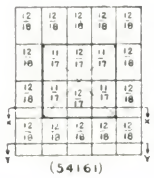
HORIZONTAL DETAILS Y-Y













SYMMETRICAL STANDARD WIDTHS

OPENING DIMENSIONS 12"×18" GLASS	LTS. WIDE IN OP'NG	LIGHTS WIDE IN EACH UNIT	OPENING DIMENSIONS 14"×20" GLASS
2'-1⅝"	2	2	2-5⅜
3-2	3	3	3-8
4-2⅜	4	4	4-10⅜
4-5¼	4	2 2	5-1¼
5-2¾	5	5	6-0¾
6-3⅛	6	6	7-3⅛
6-6	6	3 3	7-6
7-6⅜	7	4 3	8-8⅜
8-6¾	8	4 4	9-10¾
9-10	9	3 3 3	11-4
10-7½	10	5 5	12-3½
10-10⅜	10	3 4 3	12-6⅜
11-10¾	11	3 5 3	13-8¾
11-10¾	11	4 3 4	13-8¾
12-8¼	12	6 6	14-8¼
12-11⅛	12	4 4 4	14-11⅛
13-2	12	3 3 3 3	15-2
13-11½	13	4 5 4	16-1½
13-11½	13	5 3 5	16-1½
14-11⅞	14	4 6 4	17-3⅞
14-11⅞	14	5 4 5	17-3⅞
15-2¾	14	3 4 4 3	17-6¾
16-0¼	15	5 5 5	18-6¼
16-0¼	15	6 3 6	18-6¼
16-6	15	3 3 3 3 3	19-0
17-0⅝	16	5 6 5	19-8⅝
17-0⅜	16	6 4 6	19-8⅜
17-3½	16	4 4 4 4	19-11½
17-3½	16	3 5 5 3	19-11½
17-6⅜	16	3 3 4 3 3	20-2⅜
18-1	17	6 5 6	20-11
18-6¾	17	3 4 3 4 3	21-4¾
19-1⅜	18	6 6 6	22-1⅜
19-4⅛	18	3 6 6 3	22-4¼
19-4¼	18	4 5 5 4	22-4¼
19-7⅛	18	3 4 4 4 3	22-7⅛
20-7½	19	3 5 3 5 3	23-9½
21-5	20	5 5 5 5	24-9
21-5	20	4 6 6 4	24-9
21-7⅞	20	4 4 4 4 4	24-11⅞
21-10¾	20	3 3 4 4 3 3	25-2¾

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CONTINUOUS WINDOWS

Expansion Joints

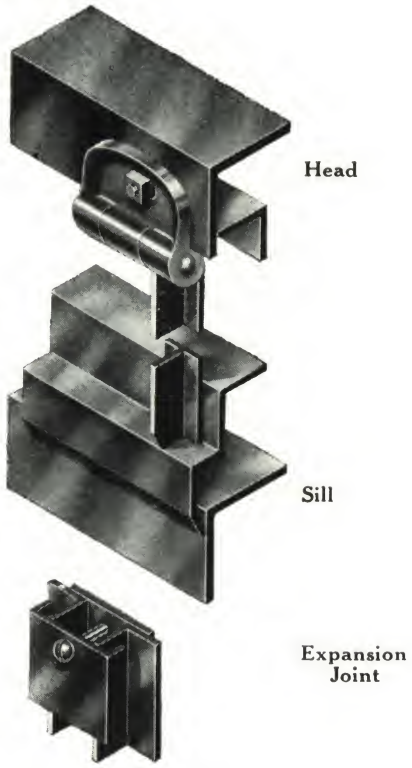
Standard lengths are joined in a continuous run by means of specially designed expansion joints which permit irregularities in the building to be taken up and prevents glass breakage, due to weaving and expansion, frequently found in sash where the parts are spliced together.

Welding

All joints are solidly welded, insuring a stiff and strong construction not capable of being easily racked out of shape as is the case with riveted construction.

Hinges

Extra heavy malleable iron hinges with bronze pins are spaced approximately 4 ft. on center. The hinges are attached on the outside of the girt angle to eliminate the necessity of notching the top rail and the inevitable leakage around such notches frequently found on other makes. The hinges are normally heavier than the girt angle and hence would not be subject to defects by corrosion.



Specifications

General

All continuous sash shall be Mesker's as made by Mesker Bros. Iron Co., St. Louis, Mo., or equal approved by the architect.

Material

All members shall be [one-piece sections from low carbon, hot rolled billet steel] [genuine wrought iron] not less than $\frac{3}{16}$ in. thick. All weathering and expansion joint members shall be formed from 11-gauge material. A sufficient quantity of glazing angle clips with all nuts and bolts shall be provided.

Construction

Sash shall be made in standard units and fastened together with expansion joints. All intersections shall be solidly welded. Heavy malleable iron hinges shall be solidly riveted to sash and provided with adjustable bolt holes for fastening to steel work. Stationary end panels shall be furnished at the ends of all runs.

Painting

All sash shall have one dip coat of rust-resisting mineral paint, gray in color, before shipment.

Glazing

All sash shall be glazed on the outside with ¼-in. glass bedded in special non-hardening putty struck off flush with face of glass and held in place with special angle clips.

Erection

All sash shall be hung carefully, having all steel work trued up by steel contractor where necessary. Where stationary end lights are omitted the general contractor shall erect special weathering members furnished by the sash contractors. Girt punching details shall be furnished steel contractor by sash contractor to insure correct steel design.

Shop Drawings

The manufacturer shall furnish detail drawings for approval before fabrication is begun.

Notes

All continuous sash may be furnished in genuine wrought iron in slightly different construction due to the difficulty in securing certain sections.

(2) Storm panels may be furnished where required.

(3) Continuous sash cannot be labeled.

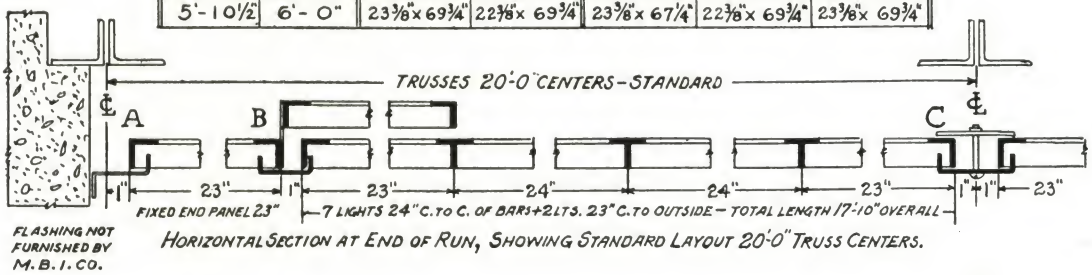
(4) Erection and glazing may be done by sash contractor.

(5) All flashing and structural work come under other headings.

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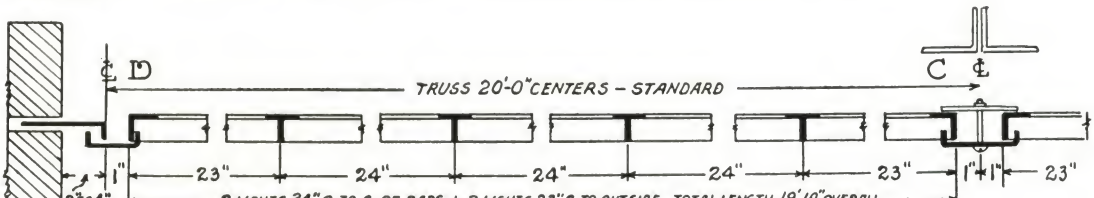
STANDARD SIZES

Table of Standard Openings and Sash.		Table of Glass Sizes				
		Hinged Sash		Fixed Sash		
Openg. Hg't.	Sash Hg't.	Standard Lts.	End Lights	Storm Lts.	End Lights	Center Lts.
2'-10½"	3'-0"	23⅜"x33¾"	22⅜"x33¾"	23⅜"x31¼"	22⅜"x33¾"	23⅜"x33¾"
3'-10½"	4'-0"	23⅜"x45¾"	22⅜"x45¾"	23⅜"x43¼"	22⅜"x45¾"	23⅜"x45¾"
4'-10½"	5'-0"	23⅜"x57¾"	22⅜"x57¾"	23⅜"x55¼"	22⅜"x57¾"	23⅜"x57¾"
5'-10½"	6'-0"	23⅜"x69¾"	22⅜"x69¾"	23⅜"x67¼"	22⅜"x69¾"	23⅜"x69¾"



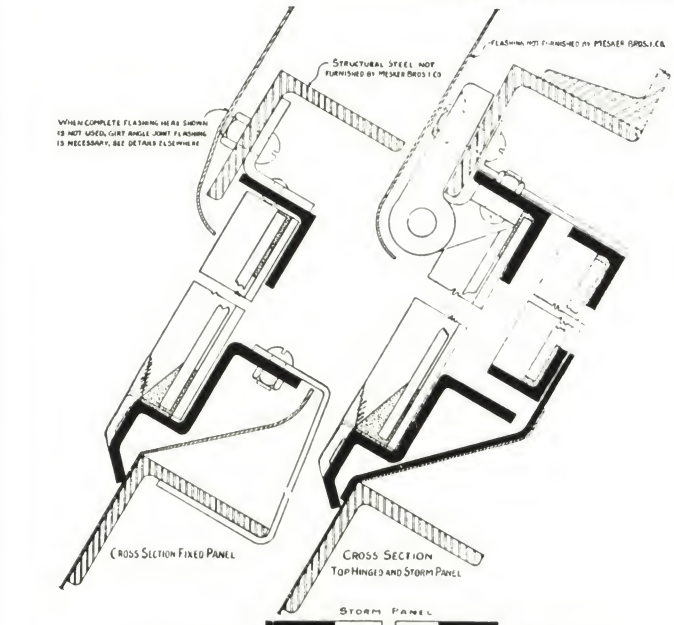
FLASHING NOT FURNISHED BY M. B. I. CO.

HORIZONTAL SECTION AT END OF RUN, SHOWING STANDARD LAYOUT 20'-0" TRUSS CENTERS.

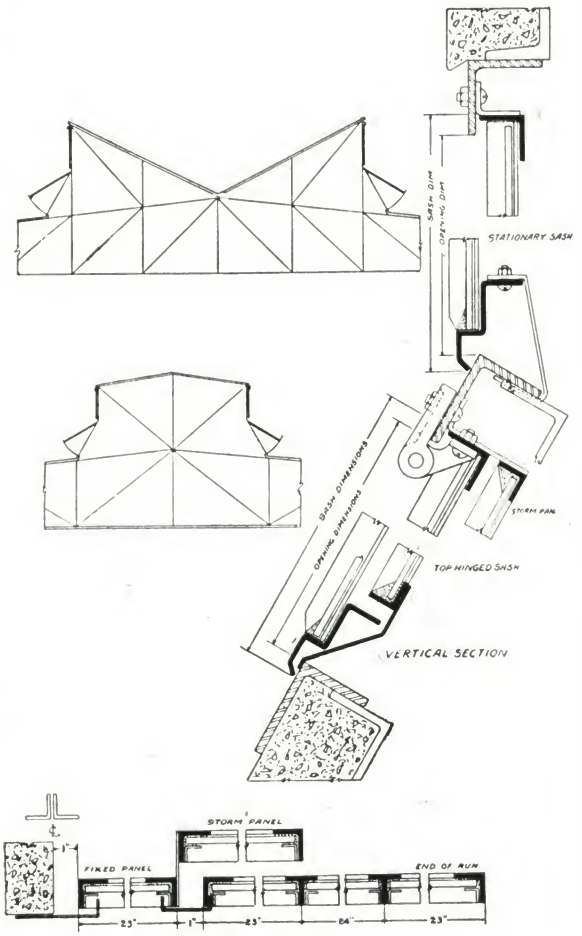


HORIZONTAL SECTION AT END OF RUN CONTINUOUS SASH WHERE FIXED END PANELS ARE OMITTED.

CONSTRUCTION DETAILS



Scale 3" = 1'



Scale 1½" = 1'

Continued on next page

MECHANICAL OPERATORS—SPECIFICATIONS

General — **Torsion Operators**

All pivoted window openings where specifically shown on drawings as mechanically operated shall be controlled by Mesker's Torsion Operators as made by MESKER BROS. IRON CO., St. Louis, Mo., or equal approved by the architect.

Powers

Powers shall be operated by galvanized endless-chain control within easy reach of the floor, and shall consist of cut cast gears and cut steel worms mounted in suitable open frames and provided with special brackets for attaching to building.

Shafting

Horizontal shafting shall be wrought pipe supported on adjustable angle iron brackets attached to the building or mullions. Pipe shall be connected in convenient lengths by rigid couplings, making a solid construction.

Lever Arms

Ventilators shall be connected to horizontal shafting by means of specially designed connecting rods and lever arms securely fastened to the sash by means of sash plates and firmly locked on the shaft.

General — **Rack and Pinion Operators**

All pivoted or continuous window openings where specifically shown on drawings as mechanically operated shall be controlled by Mesker's Rack and Pinion Operators as made by MESKER BROS. IRON CO., St. Louis, Mo., or equal approved by the architect.

Powers

Powers shall be operated by galvanized endless chain control within easy reach of the floor, and shall consist of cut cast gears and cut steel worms mounted in suitable open frames and provided with special brackets for attaching to building.

Shafting

Horizontal shafting shall be 1-in. wrought pipe supported on adjustable angle iron brackets attached to the building or mullions. Pipe shall be connected in convenient lengths by rigid couplings making a solid construction.

Lever Arms

Ventilators shall be connected to horizontal shafting by means of specially designed racks of cold rolled steel with machine cut teeth securely fastened to the sash by means of sash plates and firmly locked on the shaft by means of special machine cut pinions.

General — **Screw Type Operators**

All pivoted window openings where specifically shown on drawings as mechanically operated shall be controlled by Mesker's Screw Type Operators as made by MESKER BROS. IRON CO., St. Louis, Mo., or equal approved by the architect.

Powers

Powers shall be operated by vertical hand wheel within easy reach of the floor, and shall consist of phosphor bronze cast bevel gears mounted in suitable frames and provided with special brackets for attaching to building and cut steel screw. Cold rolled vertical shafting shall transmit the power from the screw to the horizontal shafts.

Shafting

Horizontal shafting shall be 1-in. wrought pipe supported on adjustable angle iron brackets attached to the building or mullions. Pipe shall be connected in convenient lengths by rigid couplings, making a solid construction. It shall be operated from the vertical shaft by means of specially designed lever arms and connecting rods.

Lever Arms

Ventilators shall be connected to horizontal shafting by means of specially designed connecting rods and lever arms securely fastened to the sash by means of sash plates and firmly locked on the shaft.

General — **Tension Operators**

All continuous window openings where specifically shown on drawings as mechanically operated shall be controlled by Mesker's Tension Operators as made by MESKER BROS. IRON CO., St. Louis, Mo., or equal approved by the architect.

Powers

Powers shall be operated by galvanized endless chain control within easy reach of the floor, and shall consist of cut cast gears and cut steel worms mounted in suitable fully enclosed dustproof frames and provided with special brackets for attaching to building. All parts to be running in oil.

Shafting

Power shall be transmitted through standard tension pipe line mounted on substantial roller brackets and connected to power through machine cut steel rack and pinion.

Lever Arms

Ventilators shall be connected to horizontal shafting by means of specially designed toggle arms securely hinged to the sash and firmly locked on the shaft. All bearings shall be bronze bushed.

Painting — **Included for All Types**

All exposed surfaces shall have a shop coat of rust-resisting mineral paint and a field coat after erection by the painting contractor.

Erection

All operators shall be erected by this contractor and left in perfect working order. All ventilators shall be thoroughly tried before attaching arms and shall not be glazed until completely assembled.

Shop Drawings

The manufacturer shall furnish detail drawings for approval before fabrication is begun.

Notes

(1) All operator parts not castings or machine parts can be furnished from genuine wrought iron.

(2) All parts may be hot dipped galvanized with the exception of the powers, which will then be painted aluminum.

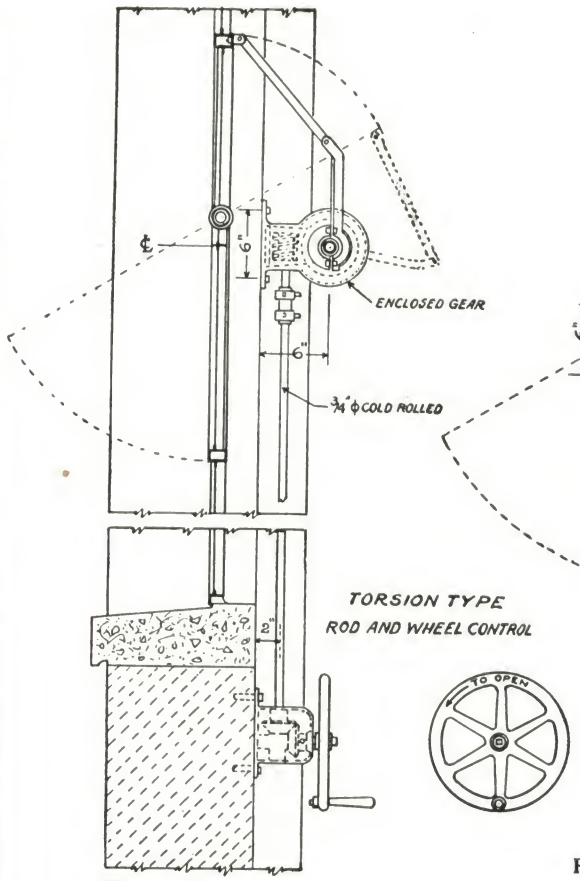
(3) Shaft control by means of cold rolled shafting with either a vertical or horizontal hand wheel may be substituted for chain operation.

(4) Enclosed powers working in oil may be substituted for open powers.

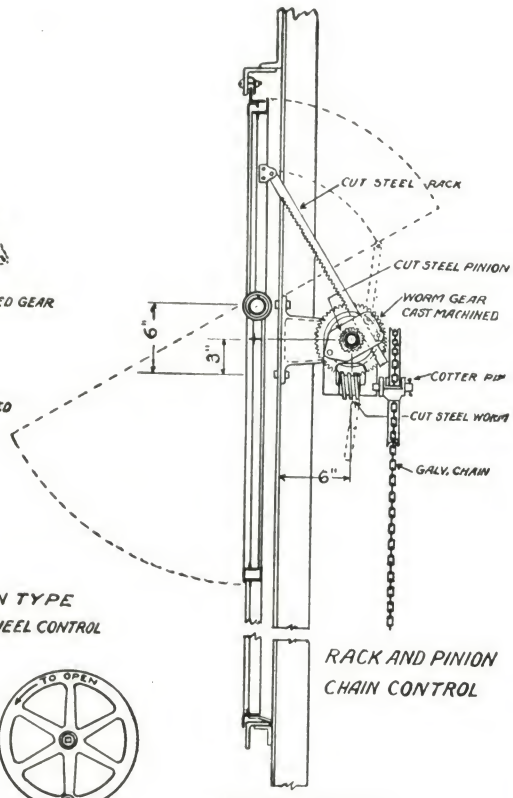
(5) All punching of structural steel and necessary supports shall be done by the steel contractor.

(6) Power control may be substituted for hand control (see specifications for motor driven units).

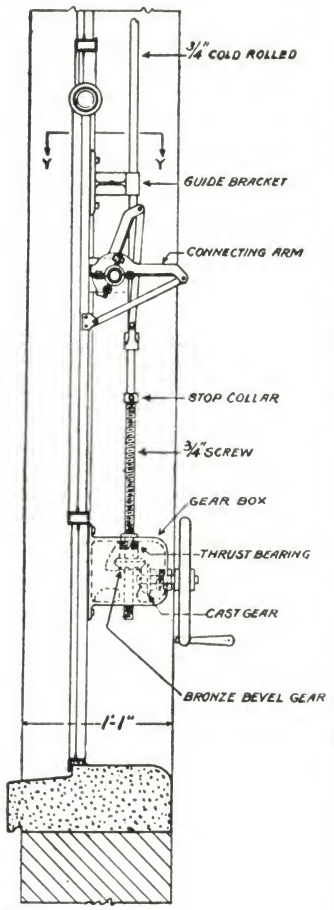
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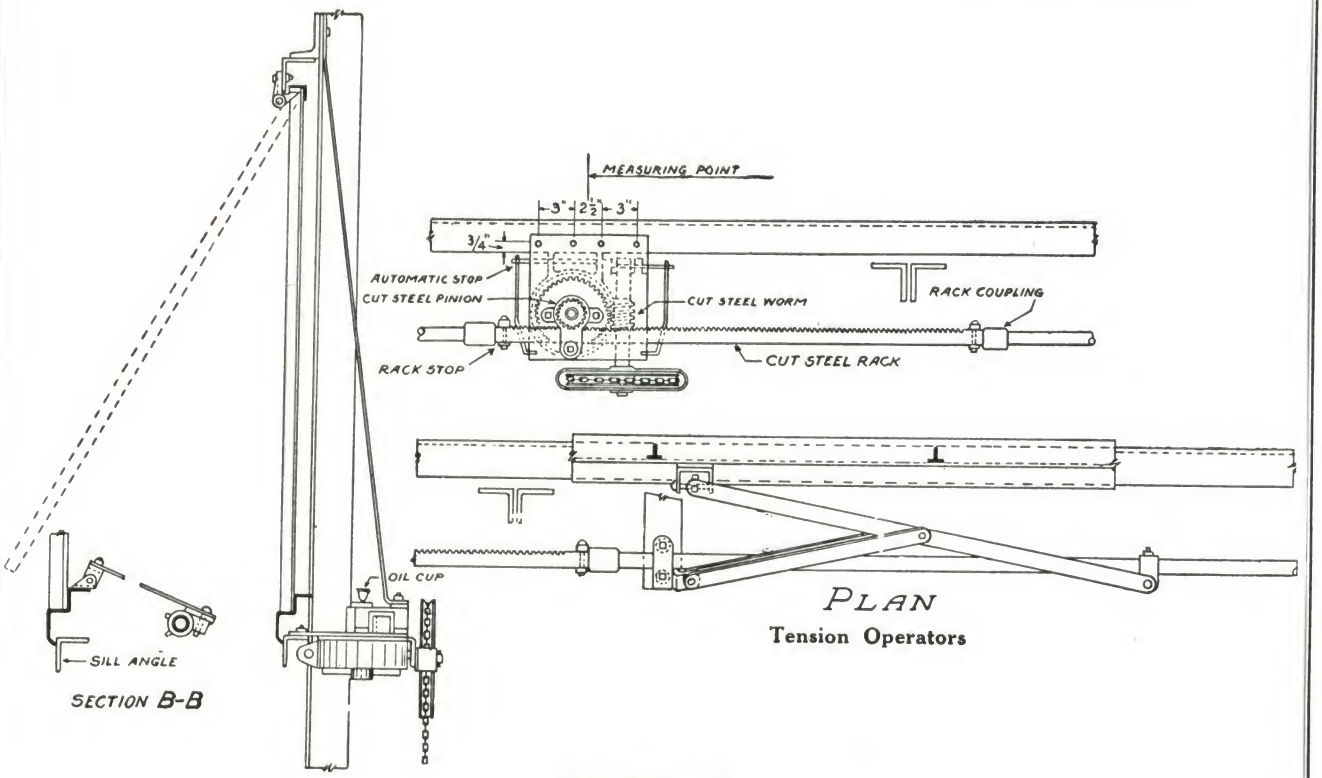
Torsion Operators



VERTICAL SECTION
CENTER PIVOTED
Rack and Pinion Operators



VERTICAL SECTION
TOP PIVOTED VENTS.
Screw Type Operators



Tension Operators

Scale ¾" = 1'

ESTABLISHED 1912

CABLE ADDRESS "MIFER"

MICHEL & PFEFFER IRON WORKS

Manufacturers of Ariston Copper Steel, Bronze and Aluminum Windows and Doors, also Ornamental Iron, Bronze and Aluminum

MAIN OFFICE AND PLANT
Harrison and Tenth Streets
SAN FRANCISCO, CALIF.

DISTRICT SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

Consult telephone directory for local sales representatives' office address or wire home office
Warehouse Stocks Located at Central Distributing Points
Member Solid Section Steel Window Industry

ARISTON
WINDOWS OF COPPER STEEL

Manufacturing Departments

STEEL WINDOWS AND DOORS

STANDARDIZED MEDIUM, STANDARDIZED HEAVY AND CUSTOM BUILT EXTRA HEAVY SECTION WINDOWS

ARCHITECTURAL PRODUCTS

Casements Open Outward
Casements Open Inward
Casements Screened
Casements Clear Opening
Detention Windows
Burglar-proof Windows
Galvanized Windows
Horizontally Projected Windows
Composite and Monumental Windows
Vertically Projected Windows
Office Windows
School Type Windows, Single or Group Operated
French Doors
Screen Doors
Shower Doors
Mechanical Operators, Manual and Motor Operated

COMMERCIAL PRODUCTS

Horizontally Pivoted and Projected Windows
Underwriters' Labeled Windows
Burglar-proof and Detention Windows
Galvanized Windows
Store Front Windows
Continuous Windows and Operators
Mechanical Operators, Manual and Motor Operated
Doors—Airplane Hangar
Industrial Doors and Partitions

MISCELLANEOUS STEEL WORK

STANDARD STEEL SERVICE STATIONS

Canopies
Cleaning and Grease Racks
Comfort Stations
Single Buildings and Super-station Units
All types carried in stock.

PLATE WORK

Buckets, Boiler Breechings
Bunker Gates, Mortar Boxes
Concrete Hoppers and Skips
Beams, Columns, Girders
Sidewalk Doors—Conveyor Frames

WIRE WORK

Window Guards
Elevator Shaft Guards
Elevator Enclosures
Machinery Safety Guards
Partitions, Screens for Offices

COASTEEL STANDARD BUILDINGS for Commercial and Industrial Uses carried in stock

ORNAMENTAL IRON, BRONZE AND ALUMINUM

ORNAMENTAL IRON

Wrought Iron Front Entrances
Steel Stairs, all Types
Spiral Stairs, Stair Railings
Bond Iron, Joist Anchors
Ornamental Cast Iron
Elevator Cars and Enclosures
Wrought Iron Folding Gates
Grilles, Gates and Fences
Hosepipe Casings, Joist Hangers
Manhole Covers

ORNAMENTAL BRONZE AND ALUMINUM

Bank Screens
Doors, Entrances, and Gates and Windows
Chromium Plated Shower Doors
Cast Bronze Tablets
Mausoleum Fixtures

Catalogues and Detail Drawings will be sent on request

General

The ARISTON Engineering Department and Department of Engineering Research is maintained to assist in solving problems in daylighting and ventilation. It is composed of a staff of specially trained engineers and designers, experienced in steel window work, who are prepared at all times to work with architects and engineers in submitting tentative designs showing the practical application of our products.

The various types of steel windows shown in this catalogue are designed in accordance with nationally adopted standards, and construction details have been prepared to meet all practical conditions in the field. Modern plant equipment and manufacturing methods produce windows of the highest grade, at the lowest possible price, and specifications are based on our extended experience in this line.

The many special designs obtainable in steel windows obviously cannot be shown in one catalogue, but we are equipped to manufacture practically any type of steel window, door or operator. The most practical and economical window designs can be obtained by consulting our branch offices or agents at the time the building is being designed.

SPECIALS

Standard types and sizes shown supply most opening requirements; however, when specials are required they can be furnished to suit the architect's particular needs. Specialization on irregular and special units, enable us to furnish these custom made windows at a cost but slightly greater than on our standards.

FACILITIES

ARISTON carries large stocks of standard windows and parts, in warehouses through the country ready for immediate shipment. Specials are furnished directly from the plant. Due to our excellent shop organization and efficiency, rapid shipment is possible on specials.

ERECTION SERVICE

ARISTON offers a complete erection service and maintains a field crew of specially trained mechanics to erect ARISTON products. In addition ARISTON maintains a service organization for the purpose of advising and instructing the builder, and, where necessary, inspecting and servicing the windows at time of installation. This latter service is entirely free and entails no obligation.

GUARANTEE

When ARISTON products are installed by our mechanics we assume complete responsibility for the delivery, handling and erection of same and guarantee satisfaction from the time the material is shipped until the installation is completed.

Continued on next page

ARISTON STANDARDIZED WINDOWS

Manufactured from Hot Rolled Copper Bearing Solid Steel Sections

ARISTON Standardized Windows are a new development in steel casements, designed to meet the requirements of the average home, combining low cost, beauty, service and permanence and are furnished in standard and special units, designed to open outward or open inward.

OPEN OUTWARD UNITS

(1) Standard Windows—Are furnished with extended friction type cleaning hinges and old coinage finish, solid bronze cam action latch and strike plate.

(2) Standard Screen Type Windows—Are furnished with extended non-friction type cleaning hinges and special ornamental locking latch and through screen sill adjuster to accommodate standard ARISTON bronze screens, and so designed that the swing leaves may be opened, closed and locked without touching the screen.

OPEN INWARD UNITS

Standard windows are furnished with close fitting hinges, concealed friction stay arms and solid bronze cam action latch and hook type strike plates. Special bronze screens, fitted to outside face of window, are standard on open inward casements and will be furnished when specified.

LONG LEG ANCHOR FRAME SECTION

In masonry construction additional anchorage should be provided. ARISTON windows are furnished when specified with special long leg anchorage frame section, providing 1⅛-in. continuous head, jamb and sill anchorage. This long leg section, an integral part of the frame, provides additional weathering, strength and durability. This section is a distinct ARISTON development and will be supplied when specified at a small additional cost.

SPECIFICATIONS FOR ARISTON STANDARDIZED WINDOWS

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Specifications are based on standard (non-screen type) windows. When specifying standard screen window combinations, hardware specifications on page 7 should be substituted.

Note: Standard and stock non-screen types shown on Plate No. II; standard and stock screen types shown on Plate No. IV; stock basement windows, types, sizes, specifications and details shown on Plate No. VII; (standard hardware details shown on pages 18 and 19).

General

All windows shown on the drawings, unless otherwise, shall be ARISTON Standardized Windows, as manufactured by MICHEL & PFEFFER IRON WORKS, San Francisco, Calif. No substitute will be permitted without the written permission of the architect.

Shop Drawings—Submit in triplicate, for the architect's approval, complete shop drawings.

Scope of Work—This contractor shall include in his work the furnishing and installing of all steel windows complete, including the attaching of hardware, and supplying glazing clips, as called for on drawings and covered in this specification.

Work Not Included—Glass, glazing, caulking and painting after erection.

Material

Michel & Pfeffer specification Copper-Alloy, new billet, hot rolled steel containing not less than .25% or more than .35% copper, shall be used in the manufacture of all members.

All bars shall be roll straightened to a tolerance of $\frac{1}{64}$ in. to each 16 ft. before fabrication, and shall be free from hammer marks, roll flaws and other imperfections.

Construction

All windows shall be constructed of special rolled sections, with frame and ventilator frame members not less than 1 in. deep. Frame and ventilator members shall be special ¾ x ¾ x 1 in. Z-bar.

All corners of frames and ventilators shall be mitered and electrically welded and ground to insure a smooth finish surface. The process used in cutting and welding shall provide exact size and squareness of corners.

Provide continuous two-point contact weathering between swing leaves and frame.

Muntin bars to be ⅝ x ¾ in. T-bar. Muntin bars shall be continuous from head to sill and from jamb to jamb. All muntin bar cross joints shall be mitre cut and electrically welded on the outside face so as to increase the rigidity and strength at intersections. Joints at frames, stiles and rails shall be mortise and tenon, air hammer riveted.

Note: Vertical or horizontal muntins, or both, may be omitted to permit glazing with single lights of plate glass or with leaded glass. (We do not supply glass.)

Vertical mullions shall be specially designed 1 in. hot rolled unequal leg "H" sections. Provide bolts for attachment to window frame.

Horizontal mullions (transom bars) shall be 1⅞ x 2⅜-in. T-section, specially rolled to form a weather drip.

Note: Where either vertical or horizontal mullions are required, care must be taken to insure mullions being well buttered with mastic in order to secure weatherproof joints.

Head Drip—Provide 16-gauge steel drip wherever swing leaves extend to head of frame.

Note: Head drips are shipped unattached and should be fitted to frame before windows are installed. (See installation detail Plate No. III.)

Long Leg Frame Member—Ariston engineers have developed a special long leg frame section for use in masonry construction.

Note: We recommend the use of either long leg frame section or head and jamb fins for all masonry construction. When desired, long leg frame sections or continuous fins, should be specified. Where used, windows must be built into masonry work and not installed in prepared openings. If long leg frame section or continuous fins are not included, jamb and sill anchor slips should be specified.

Sill and Jamb Anchor Clips—Furnish 14-gauge steel sill and jamb anchor clips with bolts to attach to frame as required.

Hardware

Side Hinges—(1) All open-out, side hung swing leaves shall be hung on heavy high elastic limit solid rolled steel extension (cleaning type) hinges, equipped with adjustable bronze friction washers to hold the window rigidly open in the desired position.

Hinges shall be electrically welded to the frame member and securely riveted to the swing leaf frame member. All hinge pins shall be cadmium plated.

Note: This friction hinge holds the swing leaves in the desired position without the use of stay bars or other mechanical adjusters. Provision is made for variable friction adjustment.

Note: If ARISTON Screen Window Combination is desired, substitute the hinge specification shown on Page 7, for the foregoing.

(2) All side hung open inward, and top hung swing leaves shall be hung on special solid rolled high elastic limit non-friction type butt hinges. Hinges shall be electrically welded and riveted to the frame and ventilator rail member.

Note: Standard Extension Hinge shown on page 19.

Locking Handles—Locking handles shall be standard solid bronze, design No. 150 (old coinage finish), designed to produce a cam action against bronze strike so as to provide a tight and even contact the full length of the ventilator. Locking handles shall be attached to handle brackets with bronze hexagon head bolts, tap screwed into steel spring friction clevis to insure even tension and to prevent rattle.

Note: Unless otherwise specified, Handle No. 150 (old coinage finish), will be furnished as standard on side hinged swing leaves. Handle No. 151 will be furnished as an alternate at slight additional cost.

Note: If ARISTON Screen Window Combination is desired, the foregoing should be omitted and the locking handle specification on page 7 substituted.

Continued on next page

SPECIFICATIONS FOR ARISTON STANDARDIZED WINDOWS (Continued)

Strike Plate—All handles on open outward swing leaves shall lock against solid bronze wedge type strike plates riveted to frame.

All handles on open inward swing leaves shall lock against rust resisting steel hook type strike plates attached to frame.

Note: If ARISTON *Screen Window Combination is desired, the foregoing should be omitted and the strike plate specification on page 7 substituted.*

Locking Handle Brackets—All side hinged (open outward or open inward) swing leaves shall be fitted with special ornamental clevis type locking handle bracket, of special ⅛-in. spring steel, both riveted and welded to ventilator rail member.

Note: If ARISTON *Screen Window Combination is desired, the foregoing should be omitted.*

Top Hung Transoms—All top hung open outward transom swing leaves shall be furnished with No. 102 stay bar of malleable iron, dull black, parkerized rust resisting finish.

Bottom Hung Transoms—All bottom hung open inward swing leaves shall be fitted with concealed friction stay arms No. 105A and No. 25B bronze pole operated snap lock.

Operators

Note: Standard side hinged open outward units are fitted with extension friction type hinges and bronze cam action locking latch. Any of the following described sill operators are standard and will be furnished when specified at slight additional cost.

(1) ARISTON Thumb Type Sliding Stay, No. 100, malleable iron black rust resisting finish. (100-A, solid bronze old coinage finish.)

(2) ARISTON Peg and Stay Adjuster No. 103, malleable iron, black rust resisting finish, including stay plate and stay bracket. (103-A, solid bronze, old coinage finish.)

(3) ARISTON Thumb and Screw Adjuster, No. 101, parkerized dull black rust resisting finish, including bronze, old coinage finish, die plate and thumbscrew. (101-A, solid bronze, old coinage finish for entire assembly.)

(4) ARISTON Concealed Type Friction Adjuster No. 105-A, carrier arm steel chromium plated rust resisting finish, friction shoe bronze and track hard drawn brass.

(5) ARISTON Geared Underscreen Operator, No. 26, malleable iron with parkerized rust resisting finish. (26-A, solid bronze old coinage finish.)

(6) ARISTON Surface Type Operator No. 7, malleable iron, parkerized rust resisting finish.

(7) ARISTON Flush Type Underscreen Operator No. 24, furnished in oxidized bronze.

Note: Operator provisions: This clause should be added to specifications in event any of the above sill operators are wanted, "Provide countersunk holes standardized as to size and location in the lower rail of the swing leaf and sill frame member for attachment of the operator."

Note: Shade and drapery brackets are not attached to steel window frames, and, therefore are not provided by the window manufacturer. When specified, windows are punched to receive standard shade and drapery brackets, which can be purchased from local shade manufacturers.

Note: All hardware, except hinges and concealed friction adjusters, shall be shipped unattached to be installed by the contractor in the field and shall be carefully packed to prevent damage.

Note: Swing leaves during shipment are held closed by means of a special clip.

Note: The following special finishes for hardware will be furnished at slight additional cost, polished brass, nickel plate, chromium plate, dull black iron, parkerized, silver plate, gold plate and verde antique. Special design hardware of cast bronze or hand forged iron also obtainable.

Screening

Note: Any standard method of screening may be specified. ARISTON *Standard Window Combination Screen unit details and specifications are covered on page 7. Other types of screens are described on Plate 5.*
Note: Screens for ARISTON *Standard Screen Window Combination Unit should be specified here.*

Mastic

The window manufacturer shall furnish 1 lb. of mastic cement to each 10 lin. ft. of outside frame.

Note: This quantity of mastic cement is sufficient to form a weather joint at the head, jambs and sill and at mullions.

Erection

Note: In masonry construction wherever casements are built into the masonry (not in prepared openings) include in the masonry specifications a clause that the mason shall use every precaution against springing or racking the casements out of line. Where built in prepared openings, provision should be made for proper rebates and reglets.

All casement windows snall oe set plumb and true, and shall be properly aligned and securely anchored before glazing.

All mullions and transom bars (and continuous head and jamb anchors, if specified) shall be bolted securely to the frames.

Steel watershed shall be placed over all ventilating units extending to the head.

All frames shall be set in mastic neatly applied in a narrow beading where the frame contacts steel mullions, transom bars or building construction. (Use 1 lb. of mastic cement to each 10 lin. ft.)

All hardware shall be applied in accordance with the manufacturer's direction.

No grouting or caulking of windows is included in this contractor's work.

Painting at the Factory

All sections shall be thoroughly cleaned of rust and scale before painting. All windows shall be given one dip coat of English oxide of iron and oil paint (gray in color) before shipment from the factory.

Note: The following alternate for standard shop paint is recommended and will be furnished at a small additional cost.

All sections shall be thoroughly cleaned of rust and scale before painting. Windows shall be given one spray coat of red rust resisting paint and one spray coat of gray primer, each baked on separately.

Galvanizing

Note: Galvanizing is recommended as an alternate for either standard or baked factory paint where added protection against the elements is necessary.

All windows, mullions, etc., shall be hot dipped galvanized after fabrication. (Mullion bolts and transom bolts shall be sherardized.)

Inspection

All windows shall be given rigid inspection as to quality, size and finish before shipment.

Glass and Glazing

Note: The following work is not included in the window manufacturer's specifications but should be included in the specifications of the specific trades covered: "Glass shall be (double strength), (¼-in. plate), (clear wire), (leaded glass)," etc. Describe the kind and quality of glass wanted.

Note: Single strength glass is not recommended. Putty shall be steel window putty especially prepared for steel windows containing not less than 50% of pure linseed oil with sufficient litharge mixed in by the glazier to insure rapid setting.

Note: Wood sash putty should never be used for steel windows.

All casement windows, unless otherwise specified, shall be glazed from the outside.

Glass shall be set in a bed of putty secured by ARISTON Copper Plate Spring Steel Glazing Clips (two clips to each light) to be furnished by the window manufacturer.

Bed and face putty shall be applied in a smooth, neat and workmanlike manner.

Note: Putty should be allowed to set three weeks in order to permit thorough hardening before painting.

Continued on next page



SECTION 24
long leg Frame for masonry construction. special construction specify when desired



SECTION 22
Horizontal Mullion



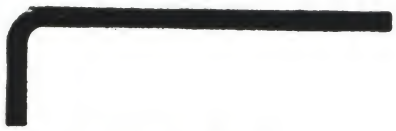
SECTION 23
Transom & Watershed



SECTION 20
Standard Frame



SECTION 21
Typical Muntin



SECTION 25
Continuous Fin

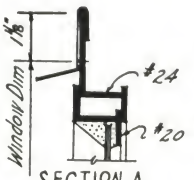


SECTION 19
Meeting Rail

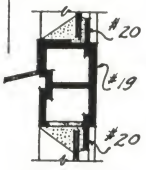
FULL SIZE OF TYPICAL WINDOW SECTIONS



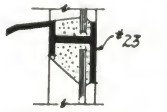
SECTION A



SECTION A
alternate with special long leg anchorage frame



SECTION B



SECTION M
vent "Z" omitted

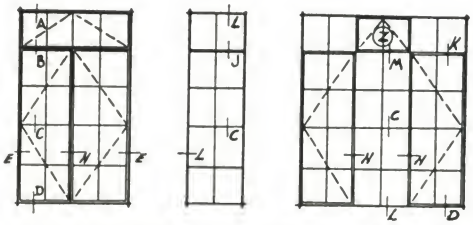


SECTION C



standard construction

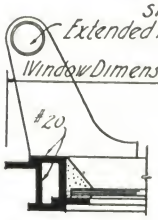
SECTION D



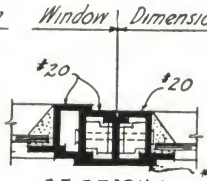
DIAGRAMATIC ELEVATIONS NO SCALE

3 INCH SCALE DETAIL ASSEMBLY

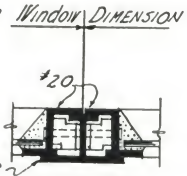
Standard window dimensions are over all Allow 1/8" between units where horizontal mullion section "I" is used. No allowance needed where vertical mullion section "F" or "G" is used. Refer to plate for details of assembly for open in casements: Installation details on plate Number 3. Maximum size of side hinged ventilators 2'-0" x 5'-6". Maximum size of top & bottom hung ventilators 3'-6" x 2'-0"



SECTION E
JAMB



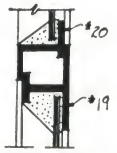
SECTION F
MULLION



SECTION G
MULLION



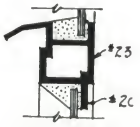
SECTION H
MEETING RAIL



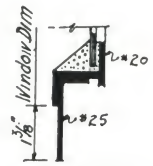
SECTION M



SECTION L



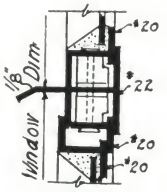
SECTION K



SECTION L
continuous fin alternate construction



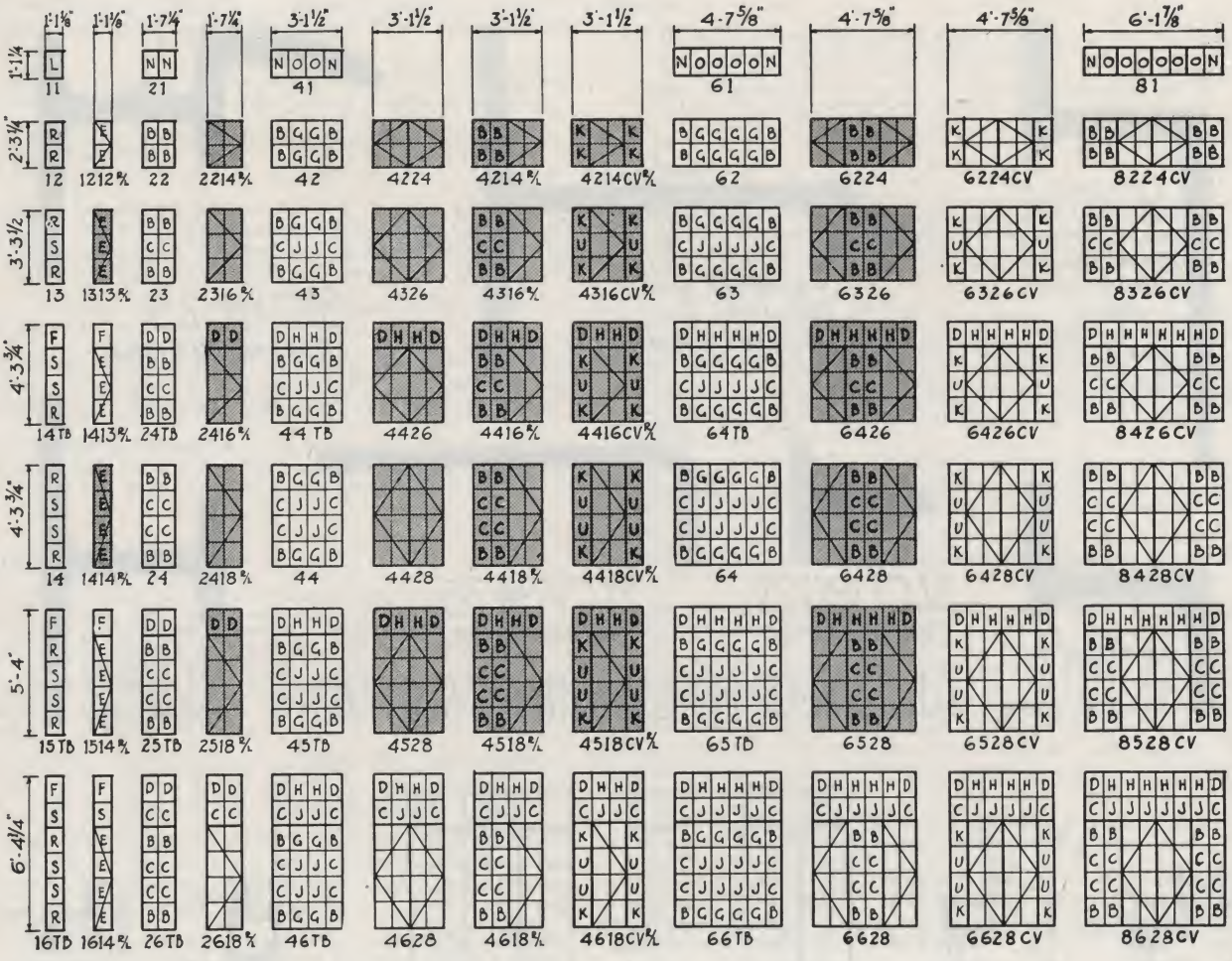
SECTION J

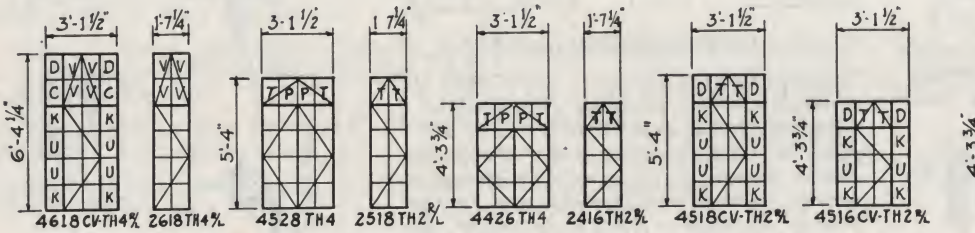


SECTION I

ARISTON WINDOWS OF COPPER STEEL	DETAILS OF STANDARD SECTIONS ARISTON STANDARDIZED CASEMENTS	SCALE AS SHOWN PLATE I

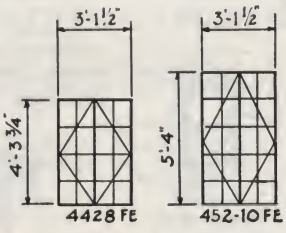
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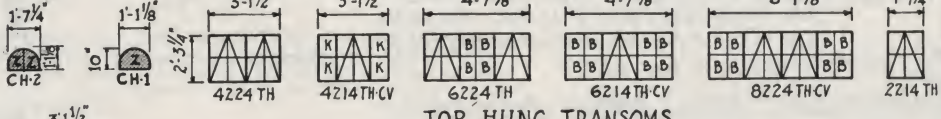
BUILT IN TRANSOM TYPE • "NITE VENTILATORS" TO BE TOP HINGED OPEN OUT

"Nite ventilators" may be added to any of the above units with fixed transoms

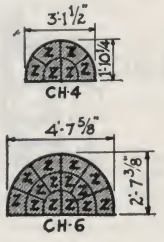


FIRE ESCAPE TYPES

clear opening



TOP HUNG TRANSOMS



GENERAL NOTES ~ CV-Center Ventilator. Units marked ⅝ furnished with either right or left hand ventilators. Handing of casements determined by location of hinges on the ventilators when viewed from the outside. Vertical or horizontal muntins or both may be omitted if desired. Any window on this plate will be furnished as a screen unit by prefixing SCW (indicating screen unit) to any of the types shown When specified any of the windows shown can be furnished to open inward outside glazed. Types shown shaded are carried in stock, other types are standard. All dimensions are overall. All units viewed from outside. Unless otherwise specified open outward units will be furnished.

GLASS SIZES			
A	8 × 12	L	11⅜ × 11½
B	8⅝ × 12⅜	N	8⅝ × 11½
C	8⅝ × 12	O	8⅛ × 11½
D	8⅝ × 11¾	P	8 13/16 × 10¼
E	10⅜ × 12	R	11⅜ × 12⅜
F	11⅜ × 11¾	S	11⅜ × 12
G	8 13/16 × 12⅜	T	8 × 10¼
H	8 13/16 × 11¾	U	8¼ × 12
J	8 13/16 × 12	V	8 × 11¼
K	8¼ × 12⅝	Z	TEMPLATE

NOTE ~ *Lights in ventilators (not lettered) are "A" size 8"×12" glass*

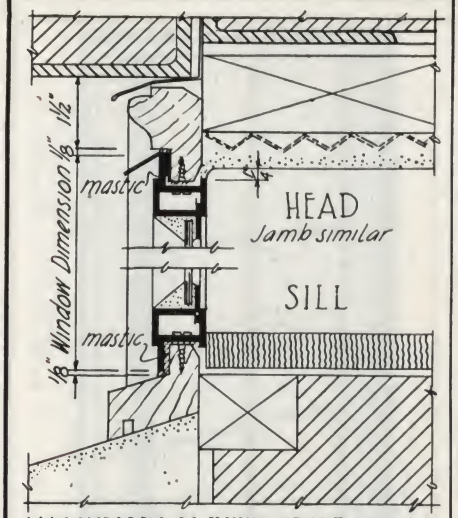
ARISTON WINDOWS OF COPPER STEEL

STANDARD TYPE AND SIZES
OPEN-IN OR OPEN-OUT
ARISTON STANDARDIZED WINDOWS

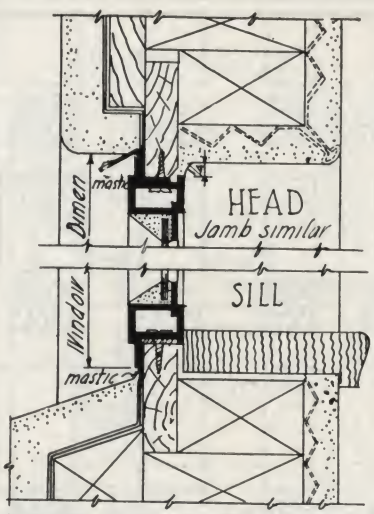
NO SCALE

PLATE II

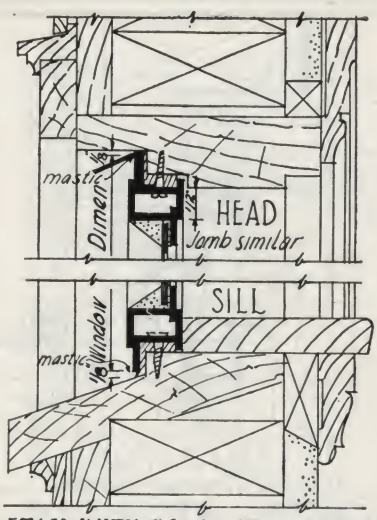
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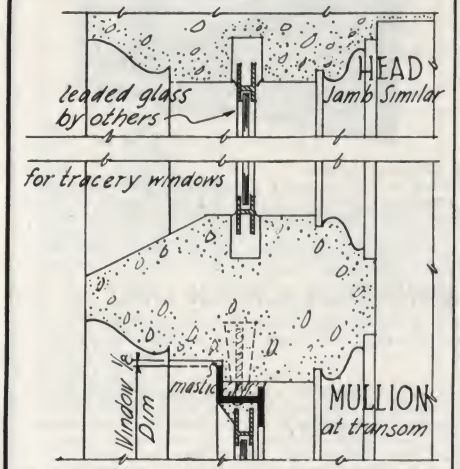
MASONRY WALL WITH STAFF MOULD



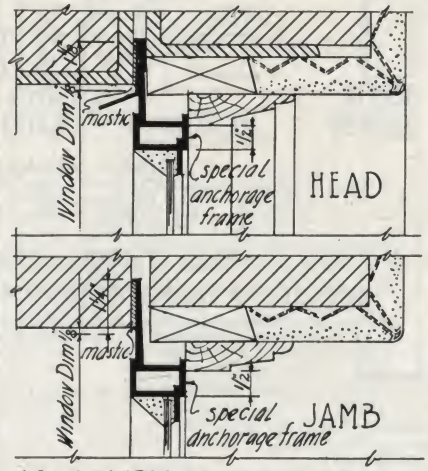
WOOD WALL & STUCCO FACE



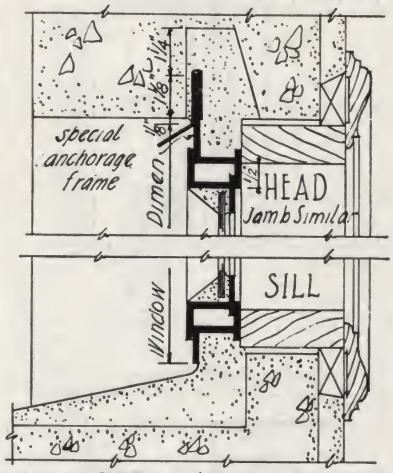
DETAIL WITH WOOD TRIM & SIDING



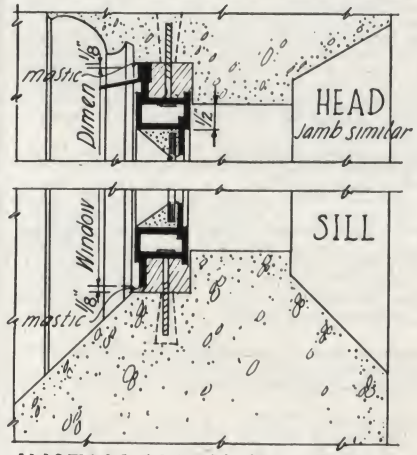
LEADED GLASS AND STONE



MASONRY CONSTRUCTION

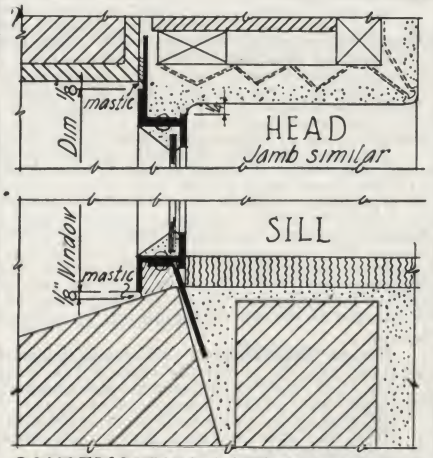


CONCRETE WITH WOOD TRIM

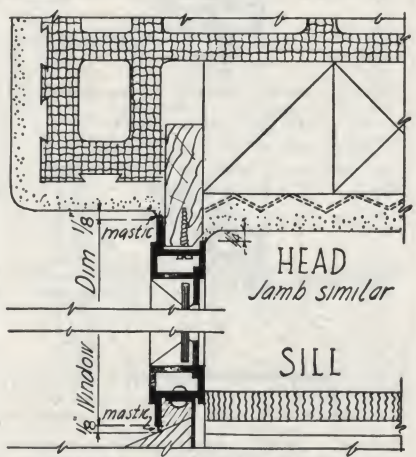


INSTALLATION IN STONE

NOTE~ On all details a clearance of 2 1/8" must be allowed for hardware



CONSTRUCTION WITH CONTINUOUS HEAD & JAMB FINS IN BRICK



CONSTRUCTION IN TILE SHOWING RABBETS

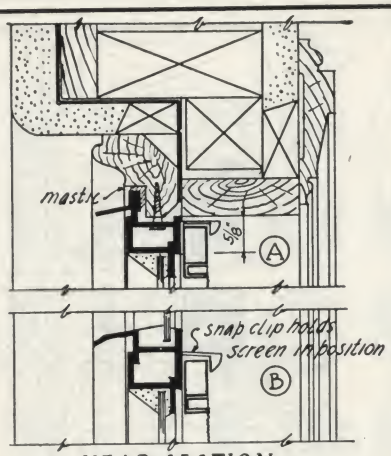
ARISTON WINDOWS OF COPPER STEEL

INSTALLATION DETAILS
ARISTON STANDARDIZED AND MEDIUM SECTION ARCHITECTURAL WINDOWS

SCALE: 3 in. = 1 ft.

PLATE III

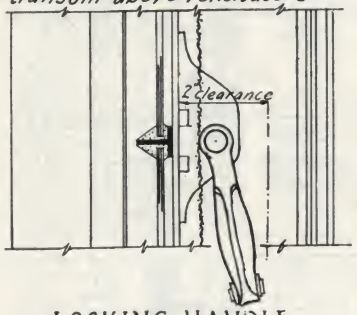
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HEAD SECTION

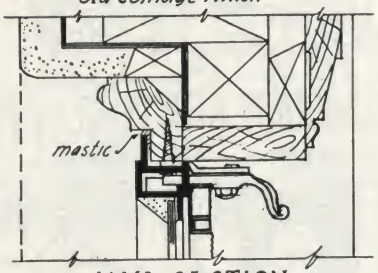
Section A-Construction with ventilators extending to head of windows

Section B-Construction with transom above ventilators



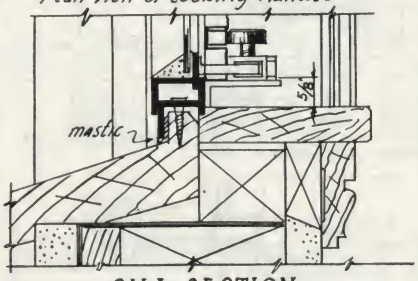
LOCKING HANDLE

solid bronze old coinage finish



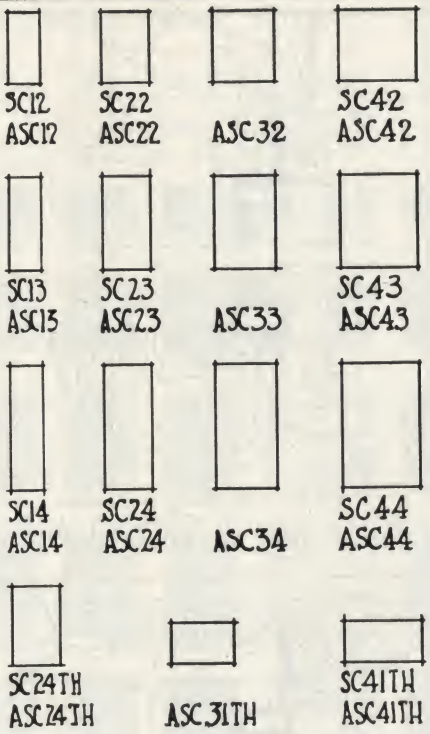
JAMB SECTION

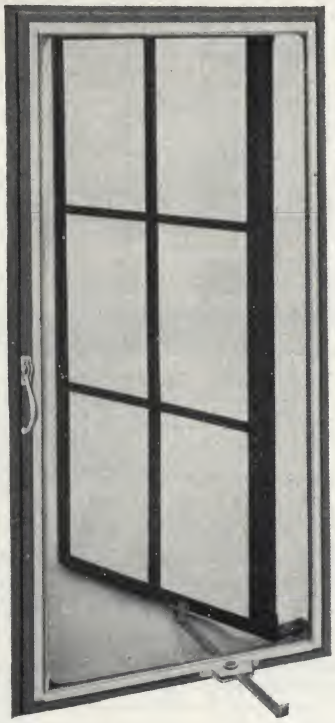
Plan view of locking handle



SILL SECTION

NOTE-*Standardized windows are shown in detail. Same details apply to Medium Section Windows*





Ariston Standard Screen Units

Screen Units are applicable to either standardized or architectural medium section windows. Prefix "SC" indicates screens for standardized windows. Prefix "ASC" indicates screens for architectural medium section windows. Three-light wide screens are furnished for medium section windows only.

Refer to Plate No. II for standard types and sizes of ARISTON standardized windows. Refer to Plate No. VIII for standard types and sizes of architectural medium section windows

SPECIFICATIONS FOR COMBINATION SCREEN UNIT

Note: The following captions should be inserted or substituted under the proper headings in the general specifications for steel windows in either standardized or medium Architectural Sections, whichever type is preferred.

General

Where indicated on the plans or called for on the window schedule, windows shall be ARISTON screen type casements, designed to open outward and to be glazed with putty on the outside. These windows shall be equipped with ARISTON screen units as specified under screens, and with special operating hardware as called for under hardware in screen casement specifications.

Material and Construction

Note: The same material and construction specifications apply here as provided for in the general specifications.

Hardware

All open outward, side hung screened unit swing leaves shall be hung on high elastic limit steel extension cleaning type hinges, equipped with solid bronze non-removable pins. Hinges shall be electrically welded to frame member and securely riveted to the swing leaves.

Locking Handles—Locking handles shall be solid bronze design No. 157 (old coinage finish), especially designed to provide a cam action to engage with a hook type keeper on swing leaf rail member and so constructed as to tightly close and lock the swing leaf in one operation.

Strike Plate—All ventilator rail members shall be fitted with a rust resisting high elastic limit steel cam action strike plate. Strike plate shall be riveted to the swing leaf rail member, designed so as to be concealed when swing leaf is closed.

Locking Handle Bracket—Furnish a specially constructed black rust resisting finish ornamental locking handle bracket of 1/8-in. high elastic limit steel, for each side hinged ventilator. Bracket is to be riveted and welded to the window frame member.

Operator—All side hung swing leaves shall be provided with special ARISTON thumb screw type through screen operator. Operator shall be so designed as to provide free movement through the screen, opening in such a manner that at no point of the opening operation will it be possible for the operator to bind or form a dead center. Operator shall consist of a special die cast arm passing through a fulcrum guide equipped with a bronze friction plate. Operator mechanism shall be attached to a spring steel sill bracket by means of a solid bronze pinion. Bracket to be fastened to the frame member by means of machine screws. Operator arm shall be attached to the sill rail swing leaf by a specially designed steel bracket.

Screen

Screen Construction—All screen frames throughout shall be of tubular construction with stiles and rails, to be not less than .032-in. thick and shall be of:

(1) Cold rolled copper content steel electro galvanized in the flat. All stiles and rails to be electrically spot welded through spline groove.

(2) Best grade commercial bronze. Stiles and rails to be soldered.

Stiles and rails of frames shall be assembled on reinforcing corners, which shall extend into the moulding at least 2 in.

Screen Cloth—(1) Standard woven antique finish bronze wire, 16-mesh to the inch, specially reinforced at the edges.

(2) Standard woven silver finish wire, 16-mesh to the inch, especially reinforced at the edges.

Screen cloth shall be held taut in a groove in screen frame with a cam shaped non-resilient metal spline which can be readily removed and replaced for the renewing of the cloth without distorting the spline or damaging the frame and without removing screws or rivets.

Screen Frame Finish—Screen frame shall be painted one coat of gray primer which shall be applied both inside and out. Before any finish is applied, screens shall be thoroughly cleaned free from all dirt or grease.

Installation—Screens shall be installed in strict accordance with the manufacturer's specifications.

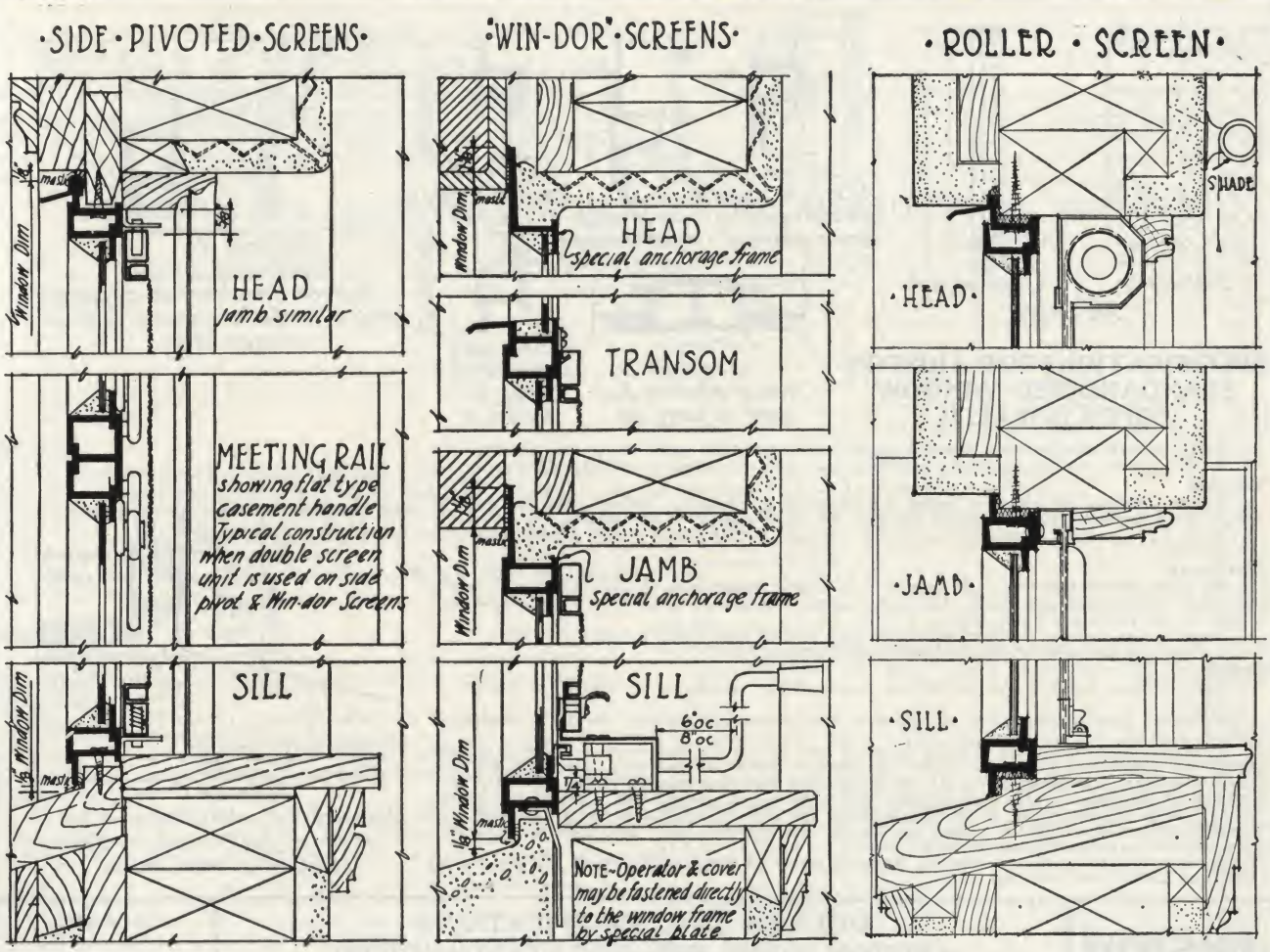
ARISTON WINDOWS OF COPPER STEEL

TYPES, SPECIFICATIONS AND DETAILS OF CONSTRUCTION ARISTON COMBINATION SCREEN UNIT

SCALE: 3 in. = 1 ft.

PLATE IV

Continued on next page



GENERAL

The above alternate screen units are offered as optional equipment and will be furnished when specified on any of the standard Open Outward Types of ARISTON Windows, shown on Plates Nos. II and VIII.

SPECIFICATIONS FOR ARISTON SIDE PIVOTED SCREENS

All exterior window openings, unless otherwise specified or designated, shall be screened on the inside with ARISTON side pivoted screens.

Material

Screen cloth shall be specially reinforced at the edges, and shall be of:

(1) Standard woven antique finish bronze wire, No. 16 mesh.
(2) Standard woven silver finish wire, No. 16 mesh.

Screen cloth shall be held taut in frame and constructed to permit easy replacement.

Screen Construction

All screen frames throughout shall be of tubular construction and shall be of:

(1) Cold rolled steel electro galvanized in the flat.
(2) Best grade commercial bronze.

Hardware

Screens shall be pivot hinged at side with trigger operated spring pivot hinge at bottom.

Note: Trigger operated pivot hinge permits instantaneous removal and replacement of screen.

Provide mortise type trigger operated spring latches on all screen leaves.

Provide suitable keepers for pivots and spring latch.

Finish

Screen frames shall be given one coat of gray primer.

Installation

Screens shall be installed in strict accordance with the manufacturer's specifications.

SPECIFICATIONS FOR "WINDOR" SCREEN UNIT

Note: The same general material, construction and hardware specifications apply, with the following additions and substitutions and should be inserted in the General Window Specifications under the heading Screens.

(A) A special flat locking handle is required in conjunction with Windor units. This hardware should be specified as a substitute for the standard bronze cam latch.

(B) Windor Screen Units are furnished with an iron locking handle as standard; bronze handle and window operator may be had at a slight extra cost if desired.

Screen Construction and Hardware

All casement swing leaves shall be fitted with No. 26 reversible crank operated worm and gear type operator provided with a removable handle and a solid bronze worm and bronze bushed gear accurately machined and housed in a deep drawn steel case. All steel parts shall be parkerized to prevent rust. Operating crank shall be dull brass tumbled finish. Ventilator shall be equipped with special flat locking handle finished in black iron.

Metal Sill—A reversible No. 16 gauge parkerized copper steel deep drawn metal sill of standard size with an upstanding lip for screen contact shall be provided.

Note: Screen construction, screen cloth, screen frame finish, and installation—as above.

SPECIFICATIONS FOR ARISTON ROLLER SCREENS

All exterior window openings, unless otherwise specified or designated, shall be screened on the inside with ARISTON Roller Screens.

Material

All exposed working parts shall be of rust resisting steel. Wire cloth shall be specially reinforced at the edges, designed with special vertical strands to resist rolling action and shall be of:

(1) Standard woven antique finish bronze wire, No. 16 mesh.
(2) Standard woven silver finish wire, No. 16 mesh.

Housings for screens shall be dirt and insect proof. Channels shall be one-piece formed sections. Screen roller shall be non-rustable steel tube, mounted on a stationary steel shaft with solid tapered bearings. Tension springs shall be No. 16 gauge piano wire. Screens shall be provided with special trip locking latch. Channels and housing shall be given one coat of standard gray primer.

Installation

Screens shall be attached to windows in the field in strict accordance with the manufacturer's specifications.

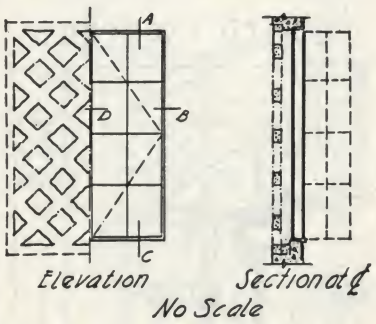
ARISTON WINDOWS OF COPPER STEEL

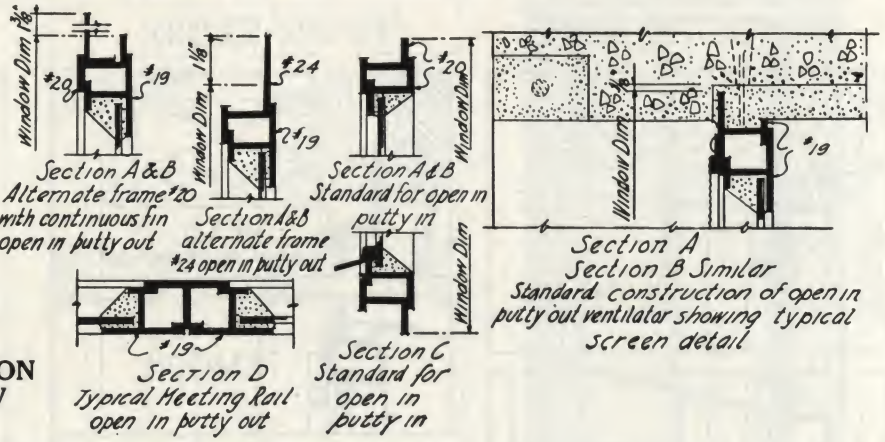
ALTERNATE SCREENING DETAILS
ARISTON STANDARDIZED AND MEDIUM SECTION ARCHITECTURAL WINDOWS

SCALE: 3 in. = 1 ft.

PLATE V

Continued on next page





SPECIFICATIONS FOR ARISTON STANDARDIZED WINDOW (OPEN INWARD)

Note: The following captions should be inserted or substituted under the proper headings in the general window specifications, when open inward casements are specified.

General

Where indicated on plans or called for on window schedule, windows shall be ARISTON Standardized Open-in Type Casements, designed for putty glazing on the outside.

Note: Open inward casements will also be furnished with inside putty glazing when specified.

Hardware

All open inward side hung and bottom hung swing leaves shall be hung on special, heavy solid high elastic limit non-friction butt type hinges. Hinges shall be electrically welded and riveted to the frame and swing leaf.

Swing leaves shall be equipped with concealed friction stay arms, ARISTON No. 105.

Locking handles shall be ARISTON solid bronze design No. 150.

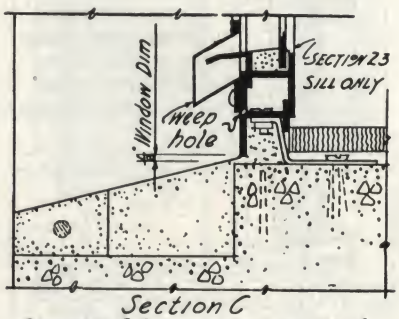
Screens

Note: When specified screens will be furnished for attachment to outside of frame member.

Following specifications should be added to the General Specifications under the heading of screens.

All open inward casements shall be equipped with special bronze screens designed to lie flat against the window on the outside. Wire cloth shall be antique finish bronze 16-mesh to the inch, drawn taut over a special frame of No. 20 gauge steel, electro galvanized in the flat. The construction of the screen frame shall be such that there will be no exposed edges of the screen. At the bottom of each screen a specially designed box shall be integral to the frame and shall extend not more than 1¼ in. beyond the face of the window frame, and shall be fitted with weep holes to carry off accumulation of water.

Screens shall be attached to window frame by means of ⅛-in. self-threading machine screws located at centers not more than 12 in.



ARISTON WINDOWS OF COPPER STEEL

DETAILS AND SPECIFICATIONS ARISTON "OPEN INWARD" STANDARDIZED WINDOWS

SCALE: 3 in. = 1 ft.

PLATE VI

SPECIFICATIONS FOR ARISTON BASEMENT WINDOWS

General

Basement windows shall be ARISTON Standardized Basement Windows as manufactured by MICHEL & PFEFFER IRON WORKS, of San Francisco.

Material

Michel & Pfeffer special copper alloy new billet hot rolled steel shall be used in the manufacture of all members.

Construction

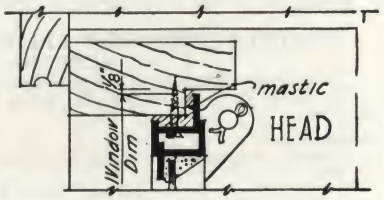
All corners of frames and ventilators shall be mitered, electrically welded and ground. All windows to be constructed of special ¾ x ¾ x 1-in. Z-bar. All sections to be at least ⅛-in. thick. Sash and frame shall be constructed to give ¼-in. double contact weathering at head-jamb and sill when closed. Special steel watershed section shall be provided at the sill.

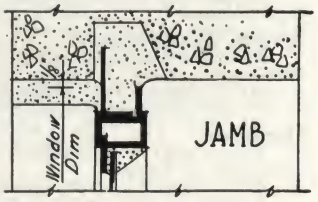
Hardware

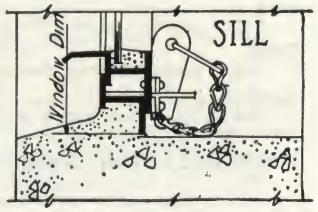
All sash shall be top hinged to swing in, hung on steel removable pin hinges welded to frame and ventilator head member. Locks shall be self-centering and shall consist of slotted angle riveted to sill and a wedge pin attached by ring and heavy chain to bottom rail of ventilator to act as support for sash when opened.

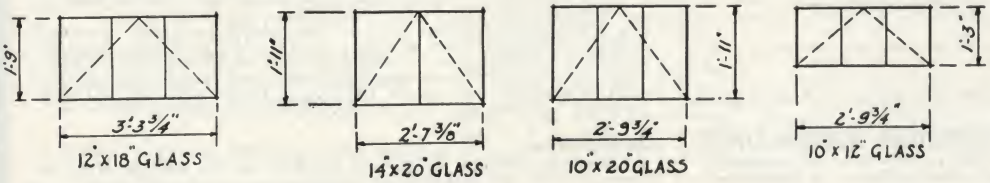
Painting

All basement windows to be given one dip coat of gray English oxide of iron and oil paint by the manufacturer before shipment.









ARISTON WINDOWS OF COPPER STEEL

TYPES, SIZES, SPECIFICATIONS AND DETAILS OF CONSTRUCTION ARISTON BASEMENT WINDOWS

SCALE: 3 in. = 1 ft.

PLATE VII

Continued on next page

ARISTON MEDIUM SECTION ARCHITECTURAL WINDOWS

ARISTON Medium Section Architectural Windows are manufactured from hot rolled copper bearing solid steel sections 1⅛ in. deep.

These windows are furnished in standard or special units to meet the architect's particular requirements. They are designed to open outward or inward and are obtainable with either standard solid rolled heavy steel extension type hinges, bronze butt hinges or patented horizontally or vertically projected sliding friction hinges.

Architectural Medium Section Windows are obtainable with either special ARISTON screen type hardware, designed to accommodate standard ARISTON bronze screens, or our standard old coinage finish bronze hardware.

Standard English and Spanish type casements and door units with swing leaves opening either outward or inward, and horizontally projected office windows and combination projected casements opening either outward or inward, are carried in stock or can be assembled from stock parts.

SPECIFICATIONS FOR ARISTON MEDIUM SECTION ARCHITECTURAL WINDOWS

Notes are explanatory or advisory only and need not be included in specifications

Note: Specifications are based on architectural non-screen type windows. When specifying Architectural Screen Window Combination Unit, hardware specifications shown on page No. 7, should be substituted.

Note: Standard types of windows and doors are illustrated on Plate No. VIII. ARISTON Combination Projected Office Windows, types and sizes are illustrated on plates Nos. X and XII. Combination office windows, unless otherwise specified, have transom and side projected ventilators open outward. Sill ventilators project in at top. Standard hardware details are illustrated on pages 18 and 19.

General

All windows shown on the drawings, unless otherwise noted, shall be ARISTON Architectural Medium Section Windows, as manufactured by MICHEL & PFEFFER IRON WORKS, San Francisco, Calif. No substitution will be permitted without the written permission of the architect.

Shop Drawings—Scope of Work—Work Not Included—Material—See Specifications, page 2.

Construction

All windows to be constructed of special heavy rolled sections with frame and ventilator frame members not less than 1⅛ in. deep.

Note: The following specifications should be used for standard architectural casement windows.

Frame members shall be 1⅛x1⅛ in. equal leg Z-bar.

Ventilator frame members shall be special ⅞x¾x1⅛ in. unequal leg Z-bar.

The combined weights of the ventilator rail and window frame members shall be not less than 2.90 lb. per lin. ft.

Note: The following specification should be used for Standard Medium Section Office Type Windows. (This specification should also be used on Architectural Type Casement Construction on which additional rigidity and anchorage are desired.)

Frame members shall be special long leg anchorage sections, not less than 1⅞x1⅛ in. unequal leg Z-bar. Ventilator frame member shall be special 1⅛x1⅛ in. equal leg Z-bar.

The combined weights of the ventilator rail and window frame members shall be not less than 3.60 lb. per lin. ft.

All corners of frames and ventilators shall be mitre cut and electrically welded and ground to insure a smooth finished surface. Process used in cutting and welding shall provide exact size and squareness of corners.

Provide continuous ¼-in. two-point contact weathering between swing leaves and frame member.

Muntin bars shall be ¾x⅞ in. T-bar.

Note: Special ⅝x¾-in. T-bar or ⅞x1⅛-in. T-bar furnished at additional cost. Specify when desired.

All muntin bar cross joints shall be electrically welded on the outside face. Joints at frame, stiles and rails shall be mortise and tenon air hammer riveted and arc welded. All exposed face at welds shall be finish surface ground to insure smoothness.

Note: Vertical or horizontal muntins may be omitted to permit glazing with single lights or with plate or leaded glass.

Vertical mullions shall be specially designed of 1⅛-in. hot rolled unequal leg H-sections. Provide bolts for attachment to window frame. Horizontal mullions (transom bars) shall be 1⅞x2⅜-in. T-sections, specially rolled to form weather drip.

Note: Where either vertical or horizontal mullions are required, care must be taken to insure mullions being buttered with mastic.

Head Drip—Provide 16-gauge steel drip wherever swing leaves extend to the head of frame.

Note: Head drips are shipped unattached and should be fitted to frame before windows are installed. See installation details, Plate III.

Head and Jamb Fins—

***Note:** We recommend the use of head and jamb fins on all masonry construction in connection with open-in casements. Where used, casements must be built into masonry work, not installed in prepared openings. If not included in specification, jamb and sill anchor clips should be specified.*

Sill and Jamb Anchor Clips—Furnish 14-gauge sill and jamb anchor clips with bolts to attach to frame as required.

Hardware

Hinges—

Note: If ARISTON screen window combination is desired substitute the hinge and hardware specifications shown on page No. 7 for the following:

Standard Hinges—All open outward, side hung, swing leaves shall be hung on special heavy high elastic limit steel extension (cleaning) friction type hinges, equipped with adjustable, bronze friction washers to hold the window rigidly open in any desired position. Hinges shall be electrically welded to the frame member and securely riveted to the ventilator frame. All hinge pins shall be cadmium plated.

All side hung open inward and top hung swing leaves shall be hung on special solid rolled high elastic limit non-friction type butt hinges. Hinges shall be electrically welded and riveted to the frame and ventilator rail member.

Alternate (1)—(Bronze Butt Hinges)

Note: When desired substitute this specification for standard hinges.

All side hinge ventilators shall be hung on 4-in. extruded bronze butt hinges.

Hinges shall be fitted with hardened steel pins and shall be fastened to the ventilator and frame member with steel machine screws (4 to each hinge leaf).

Alternate (2)—(Horizontally or Vertically Projected Sliding Friction Hinges, Open Outward—Open Inward)

Note: When desired substitute this specification for standard hinges.

All ventilators, unless otherwise noted, shall be of balanced reversible type. Each ventilator shall be balanced by two supporting arms of solid spring steel. Ventilators shall be equipped with two adjustable bronze friction shoes—vertically projected ventilators shall operate in a brass track, horizontally projected ventilators shall operate in a copper steel track. No ventilators will be accepted without a friction adjustment. Carrying arms and all other movable parts shall be either bronze or cadmium plated to prevent corrosion.

Operators—All ventilators, unless otherwise specified, not equipped with ARISTON Patented Sliding Type Friction Hinge, shall be fitted with concealed adjustable friction stay operator as standard equipment.

Note: When desired, any of the operators shown on page 19 may be substituted for the standard concealed friction type operators specified above. When specified, windows will be punched to receive standard shade and drapery brackets.

Note: Hardware and fittings are fully described on pages 18 and 19.

Note: The following fittings are recommended as a standard and should be included in the specifications as required.

Note: Single throw latches are used on all side hinged ventilators 5 ft. 6 in. and under. Double throw latches on ventilators 5 ft. 7 in. to 6 ft. 11 in. and triple throw latches on all ventilators 7 ft. to 8 ft. 6 in. Connecting rods are ¼x½ in. wrought iron painted same color as window.

(1) All side hinged and vertically projected open outward windows shall be fitted with bronze latches and wedge type strike plates.

(2) All side hinged and vertically projected open inward windows shall be fitted with bronze latches and rust resisting steel hook type strike plates.

(3) All top hinged open out windows shall be fitted with bronze peg and stay bar adjusters and locking pegs.

Note: Concealed friction type operators not furnished on top hinged windows.

(4) All bottom hinged open inward windows shall be fitted with bronze pole type snap locks, keepers and concealed friction operators.

(5) All horizontally projected out at bottom windows shall be fitted with bronze cam action latches, wedge type strike plate and ring pulls.

(6) All horizontally projected in at top windows shall be fitted with bronze cam action latches and rust resisting steel hook type strike plates.

Screening

Note: Any standard method of screening may be specified. ARISTON Architectural Combination Screen Window Units, details and specifications are covered on page 7.

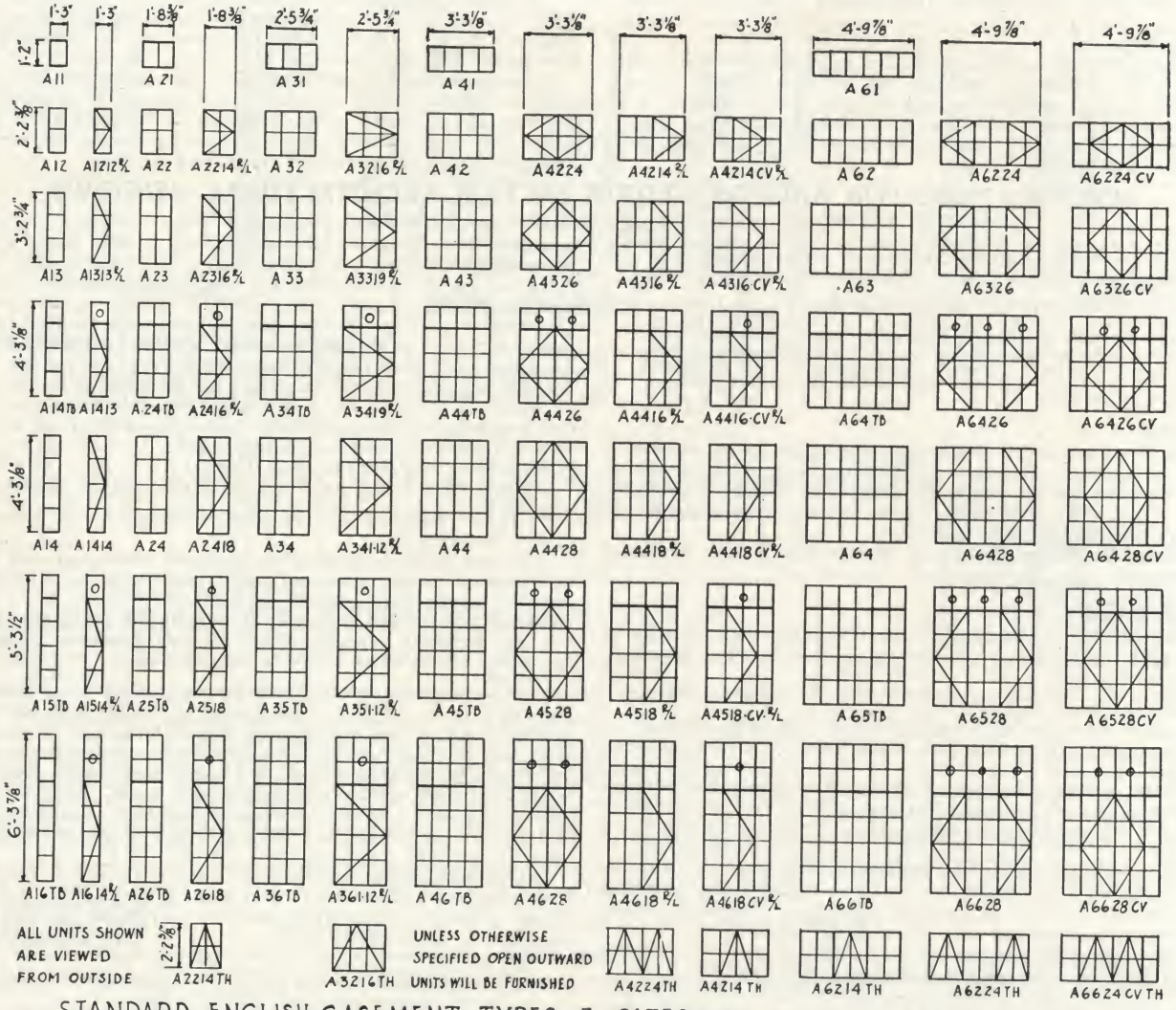
Other types of screens are described on Plate V.

Note: Screens for ARISTON Architectural Combination Screen Window Unit should be specified here.

Notes

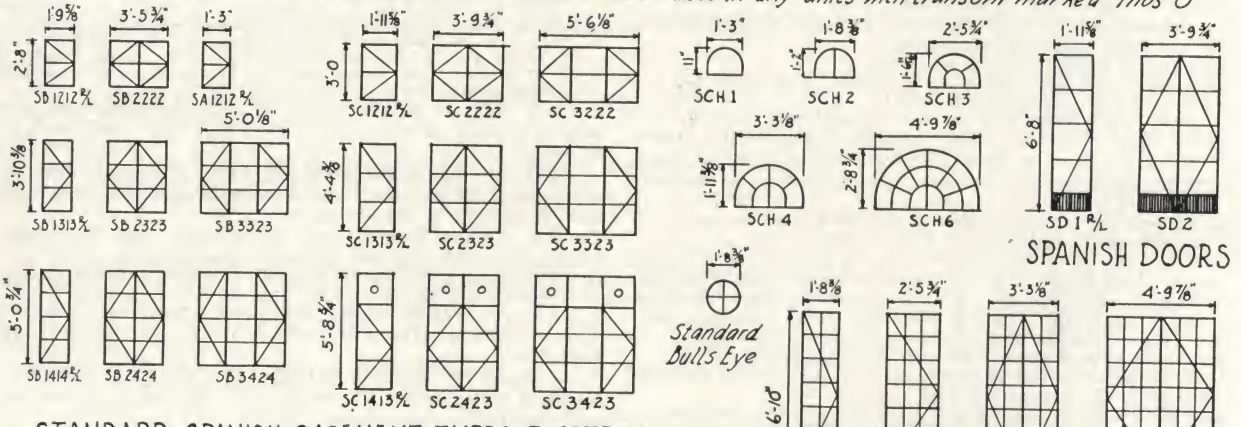
Mastic—Erection—Painting at the Factory—Galvanizing—Inspection—Glass and Glazing—See Specifications, page 3.

Continued on next page



STANDARD ENGLISH CASEMENT TYPES & SIZES

~ Any of the above obtainable in Clear Opening or Fire Escape Types. ~ Transom or Nite Ventilators obtainable in any units with transom marked Thus O



SPANISH DOORS

STANDARD SPANISH CASEMENT TYPES & SIZES

GENERAL NOTES ~ CV-Center Ventilator. Units marked R/L furnished with either right or left hand ventilators - Handing of casements determined by location of hinges on the ventilators when viewed from the outside. - Vertical or horizontal muntins or both may be omitted if desired. - Any window on this plate will be furnished as a screen unit by prefixing SCW (indicating screen unit) to any of the types shown.

ENGLISH DOORS

See Specifications & Details on page 10, 12 for Steel Doors, Screen Doors pages 16, 17

ARISTON WINDOWS OF COPPER STEEL

STANDARD TYPES AND SIZES
ARISTON MEDIUM SECTION WINDOWS

FULL SIZE
PLATE VIII

Continued on next page

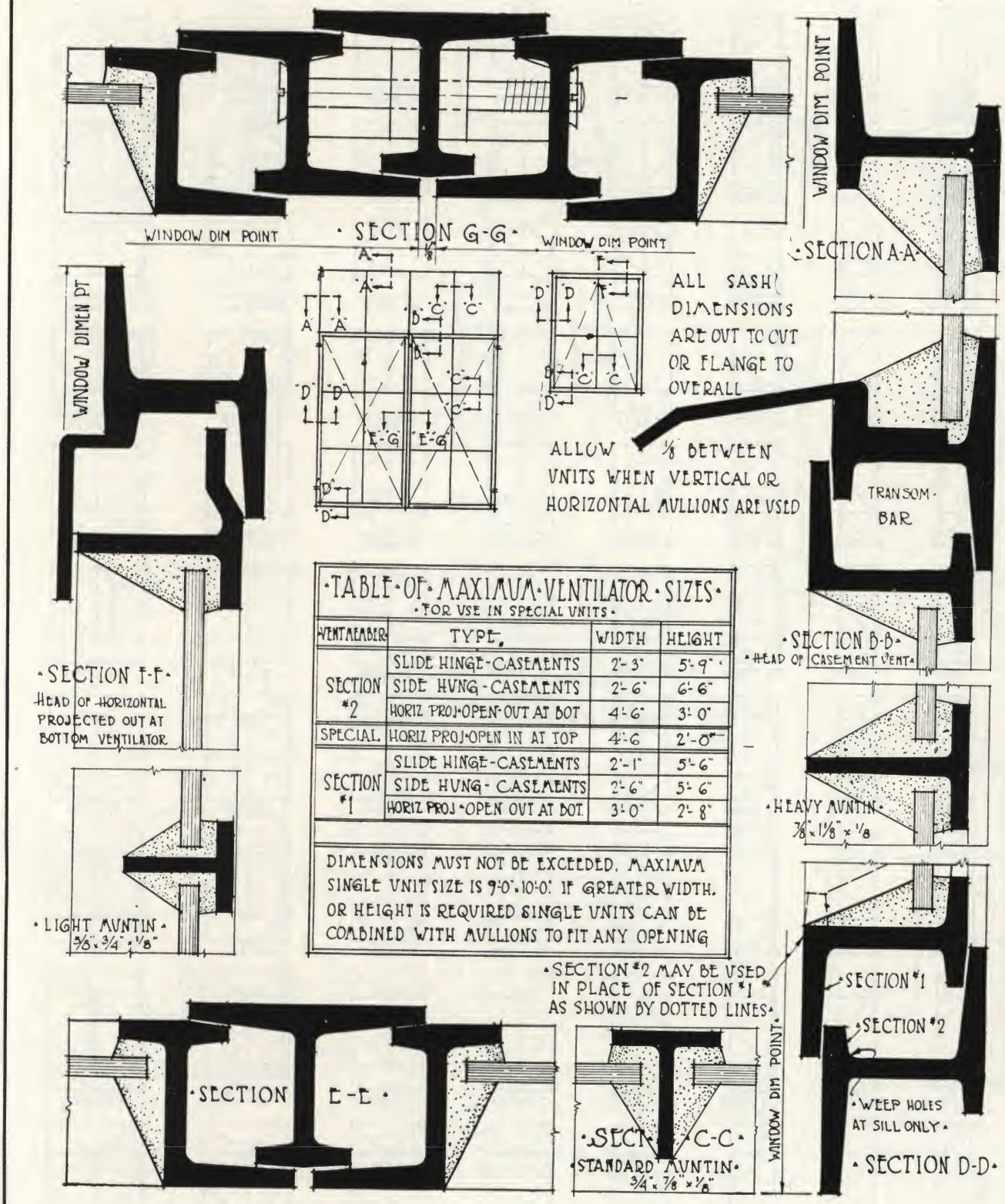


TABLE OF MAXIMUM VENTILATOR SIZES
FOR USE IN SPECIAL UNITS

VENT MEMBER	TYPE	WIDTH	HEIGHT
SECTION #2	SLIDE HINGE-CASEMENTS	2'-3"	5'-9"
	SIDE HUNG-CASEMENTS	2'-6"	6'-6"
	HORIZ PROJ-OPEN-OUT AT BOT	4'-6"	3'-0"
SPECIAL	HORIZ PROJ-OPEN IN AT TOP	4'-6	2'-0"
SECTION #1	SLIDE HINGE-CASEMENTS	2'-1"	5'-6"
	SIDE HUNG-CASEMENTS	2'-6"	5'-6"
	HORIZ PROJ-OPEN OUT AT BOT.	3'-0"	2'-8"

DIMENSIONS MUST NOT BE EXCEEDED. MAXIMUM SINGLE UNIT SIZE IS 9'-0" x 10'-0". IF GREATER WIDTH OR HEIGHT IS REQUIRED SINGLE UNITS CAN BE COMBINED WITH MULLIONS TO FIT ANY OPENING

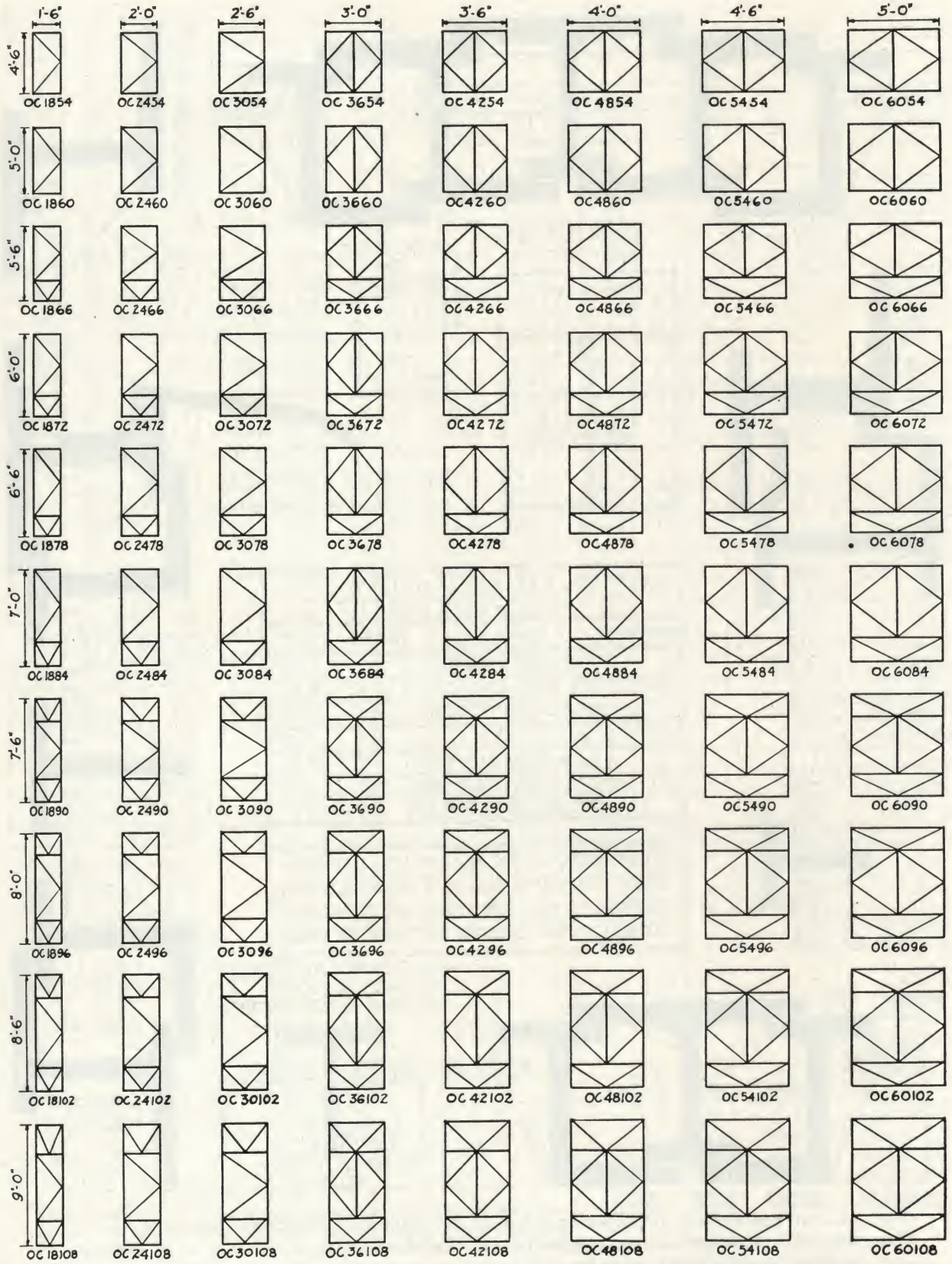
For general description and specifications of Architectural Windows, see page 10.
For standard types and sizes, see pages 11, 13 and 15.
For installation details, see page 6.
For hardware description, see pages 18 and 19.

ARISTON WINDOWS OF COPPER STEEL

MEDIUM SECTION—FULL SIZE DETAILS
ARISTON ARCHITECTURAL WINDOWS

FULL SIZE
PLATE IX

Continued on next page



Transom and Side Projected Ventilators Open Outward, Sill Ventilators Open in at Top

Specifications and general description on page 10

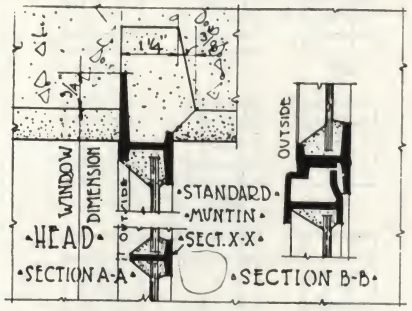
ARISTON WINDOWS OF COPPER STEEL

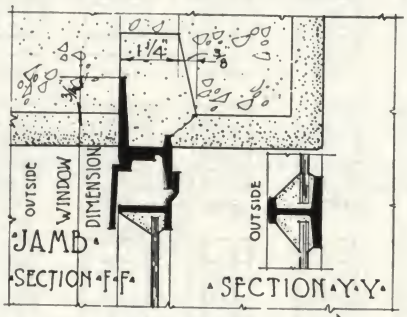
STANDARD TYPES AND SIZES
Medium, Standardized Heavy and Extra Heavy Section
COMBINATION PROJECTED OFFICE WINDOWS

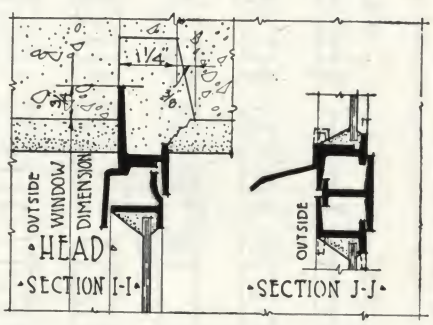
NO SCALE

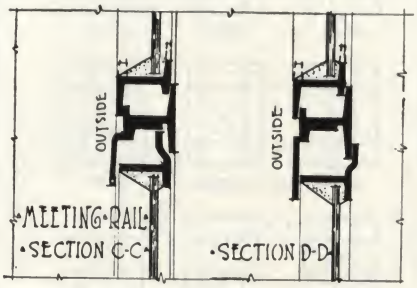
PLATE X

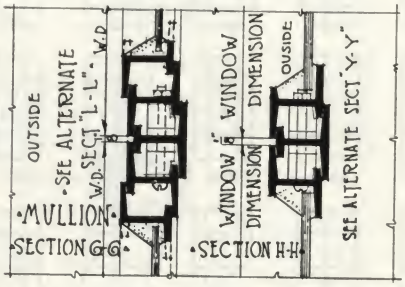
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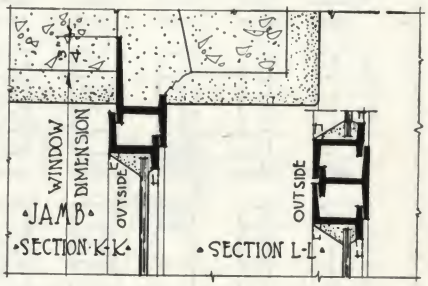


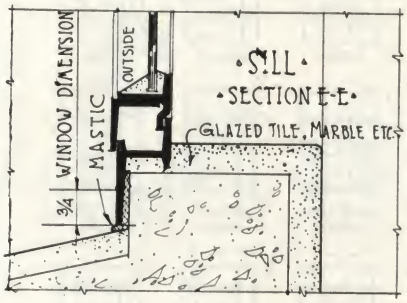












DETAILS SCALE 3"=1'0"

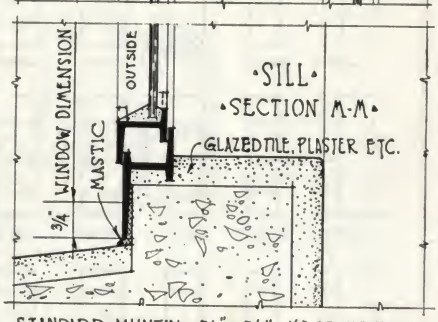

SECTION 1

SECTION #2 MAY BE SUBSTITUTED FOR SECTION #1 AS SHOWN BY DOTTED LINES ON DETAILS.

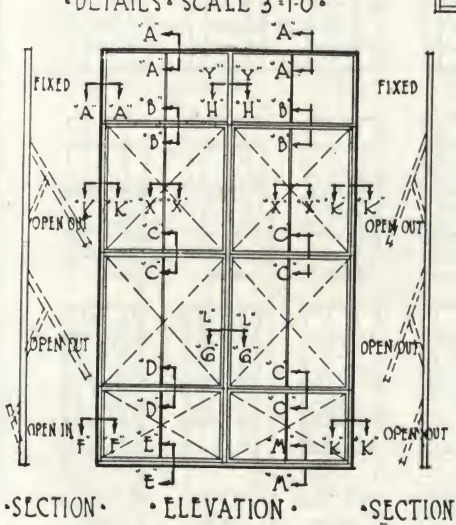

SECTION 2

TABLE OF MAXIMUM SIZES

VENT	TYPE VENTILATOR	WIDTH	HEIGHT
SECT. 2	SLIDE HINGE CASEMENTS	2'-3"	5'-9"
	SIDE HUNG CASEMENTS	2'-6"	6'-6"
	HORIZ PROJ. OPEN OUT AT BOT.	4'-6"	3'-0"
SPECIAL	HORIZ PROJ. OPEN IN AT TOP	4'-6"	2'-0"
SECT. 1	SLIDE HINGE CASEMENTS	2'-1"	5'-6"
	SIDE HUNG CASEMENTS	2'-6"	5'-6"
	HORIZ PROJ. OPEN OUT AT BOT.	3'-0"	2'-8"



STANDARD MUNTIN 3/4" x 7/8" x 1/8" OR HEAVY MUNTIN 7/8" x 1 1/8" x 1/8" OPTIONAL



PROJECTED TYPE

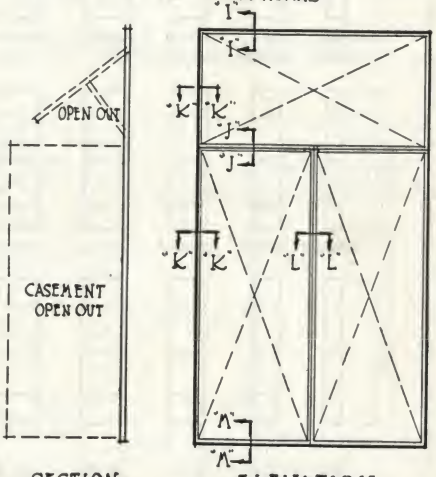
VENTILATORS MAY OPEN EITHER IN OR OUT

NOTE DIMENSIONS ON TABLE ABOVE MUST NOT BE EXCEEDED. MAXIMUM SINGLE WINDOW UNIT SIZE IS 9'0"x10'0". IF GREATER WIDTH OR HEIGHT IS REQUIRED - SINGLE UNITS CAN BE COMBINED WITH MULLIONS TO FIT ANY OPENING. STD FRAME MEMBER SECT 2 MAY BE SUBSTITUTED FOR LONG LEG FRAME MEMBER IN WOOD INSTALLATION. RECOMMENDED STANDARD UNITS SHOWN ON PAGE 13. SPECIAL TYPES AND SIZES OBTAINABLE AT NO ADDITIONAL COST.

SPECIFICATION. SAME AS MEDIUM SECTION ARCHITECTURAL WINDOWS. REFER TO PAGE 10.

STEEL GLAZING ANGLES OR BEADS FURNISHED AS AN EXTRA. 7/8" x 1 1/8" x 1/8" MUNTIN RECCOMENDED IN CONJUNCTION WITH GLAZING ANGLES OR BEADS.

VENTILATORS MAY OPEN IN OR OUT AND MAY BE INSTALLED WHERE FIXED UNITS ARE SHOWN.



CASEMENT WINDOW

TRANSOM PROJECTED OUT AT BOTTOM

For general description of Medium Section Combination Projected Office Windows, see page 10.
For types and sizes, see pages 13 and 15.
For other installation details and full size sections, see pages 6 and 12.
For glazing information, see page 10.
For specifications, see page 10.

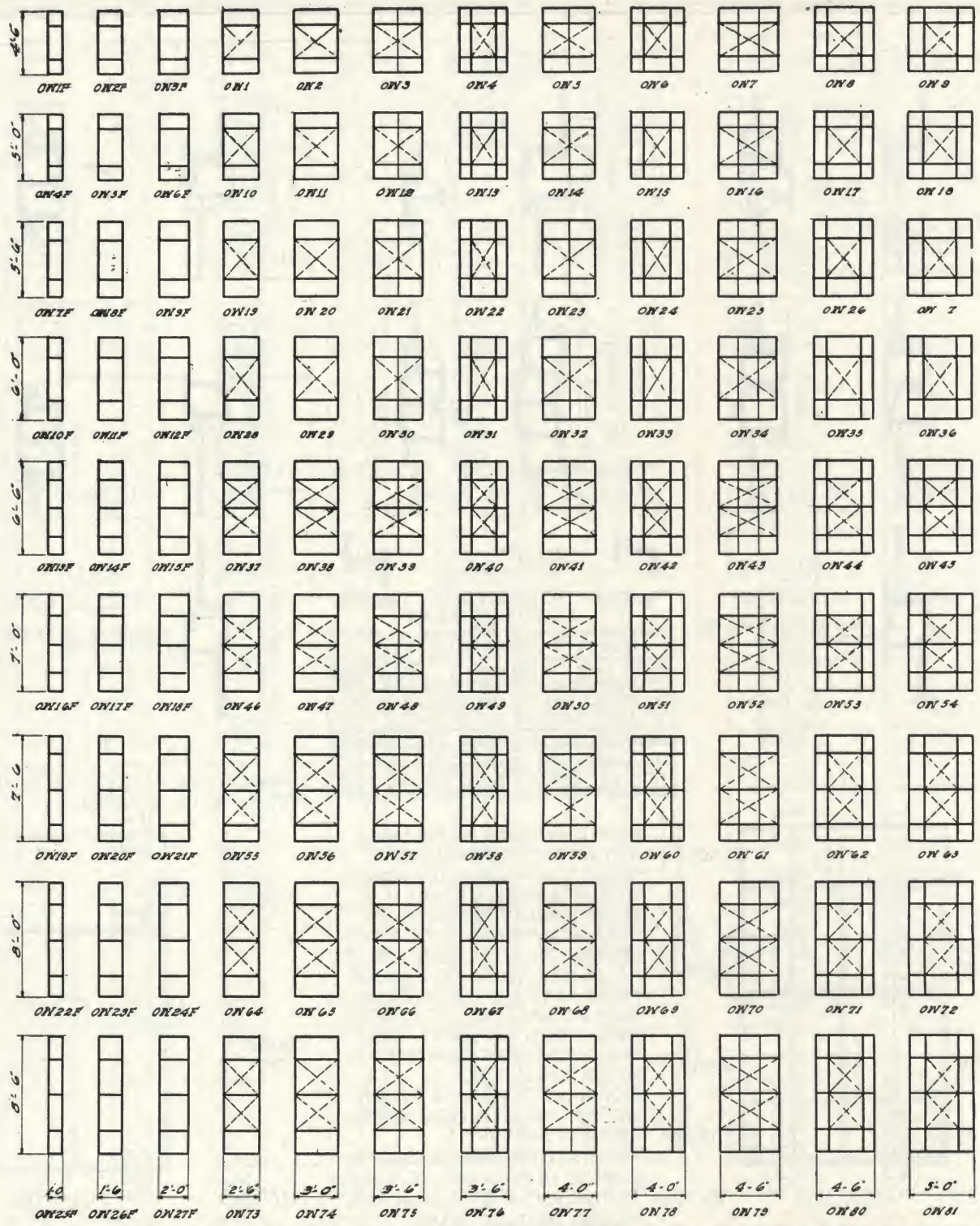
ARISTON WINDOWS OF COPPER STEEL

ELEVATIONS AND DETAILS OF CONSTRUCTION
MEDIUM SECTION
COMBINATION PROJECTED OFFICE WINDOWS

SCALE: 3 in. = 1 ft.

PLATE XI

Continued on next page



Recommended Standards for Medium, Intermediate and Heavy Section Office Windows. Additional Ventilators may be added to any fixed unit. For special sizes, or sizes larger than shown, refer to Maximum Ventilator Size Tables, Medium Section, page 12, Standardized Heavy and Extra Heavy Sections, page 20. Muntins may be added to permit any cut-up. Standard units have projected out at bottom ventilators. Projected in at top ventilators will be furnished when specified.

For general description of Office Windows, see page 10 (Medium), page 20 (Heavy and Extra Heavy).

For installation details and F.S. sections, see pages 6, 12 and 14 (Medium), pages 21 and 22 (Heavy and Extra Heavy).

For specifications, see page 10 (Medium), page 20 (Heavy and Extra Heavy).

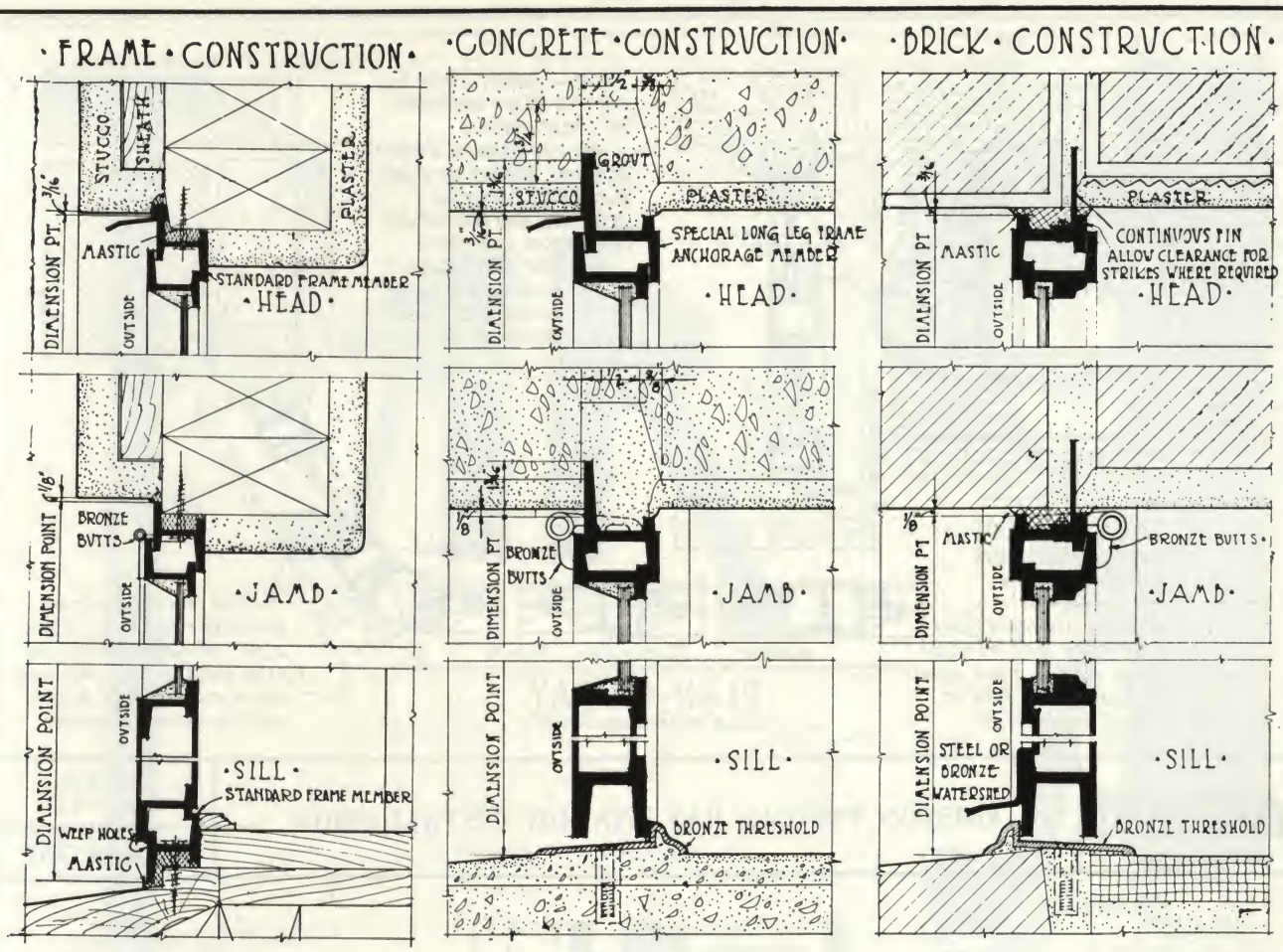
ARISTON WINDOWS OF COPPER STEEL

STANDARD TYPES AND SIZES
Medium, Standardized Heavy and Extra Heavy Section
HORIZONTALLY PROJECTED OFFICE WINDOWS

NO SCALE

PLATE XII

Continued on next page



·DETAIL·1·
·OPEN OUT PUTTY GLAZED OUTSIDE·

Standard Construction—Medium Section

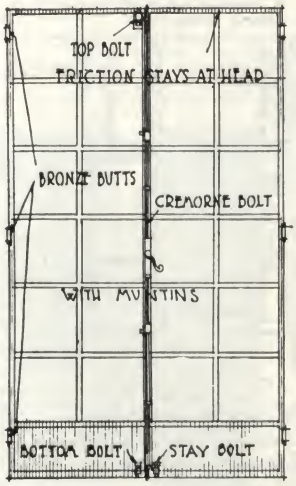
·DETAIL·2·
·OPEN OUT PUTTY GLAZED OUTSIDE·
·SCALE·3"=1'-0"·

Special Long Leg Anchorage Construction—Heavy Section

·DETAIL·3·
·OPEN IN BEAD GLAZED INSIDE·

Standard Open In Construction—Heavy Section

ARISTON CASEMENT DOORS



·ELEVATION·OF·
·BOLTED·DOOR·

ARISTON Casement Doors are furnished in standard or special sizes obtainable in either medium or heavy sections. Doors are designed to open outward and inward, and may be obtained with either bronze or steel thresholds.

Standard medium section types are shown on Plate No. 6.

Maximum sizes for single swing leaves for medium section casement doors is 2 ft. 6 in. x 7 ft.

Maximum size for single swing leaves for standardized and extra heavy section doors is 2 ft. 9 in. x 8 ft. 6 in.

Specifications

All provisions for medium and heavy section windows in the General Specifications will likewise apply here.

General

All exterior doors, unless otherwise designated or specified, shall be ARISTON Medium, Standardized Heavy or Extra Heavy Section Architectural Casement Doors, as manufactured by MICHEL & PFEFFER IRON WORKS, San Francisco, Calif.

Note: Specify type sections desired.

Doors shall be of standard construction to open outward or inward with provision for:

(1) Outside putty glazing.

(2) Inside or outside glazing with continuous glazing beads or angles.

Note: Specify type of glazing wanted.

Doors shall be provided with standard steel frame thresholds and shall be fitted with double 14 gauge kick plates 9 in. high.

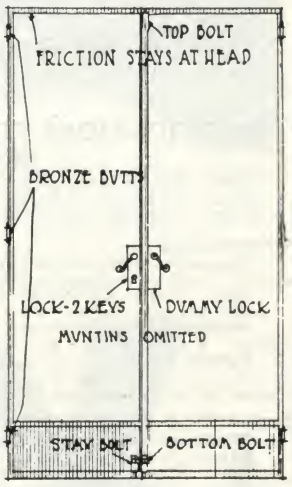
Note: Standard bronze thresholds, in lieu of steel sill member will be furnished at small added cost—specify when desired.

Hardware

Hinges—All casement doors shall be hung on 4 in. extruded bronze butt type hinges.

Hinges shall be fitted with hard steel pins.

Locking Hardware—Doors shall be equipped with keyed lock, bronze handles both sides, and top and bottom bolts on inactive leaf.



·ELEVATION·OF·DOOR·
·WITH·LOCK·

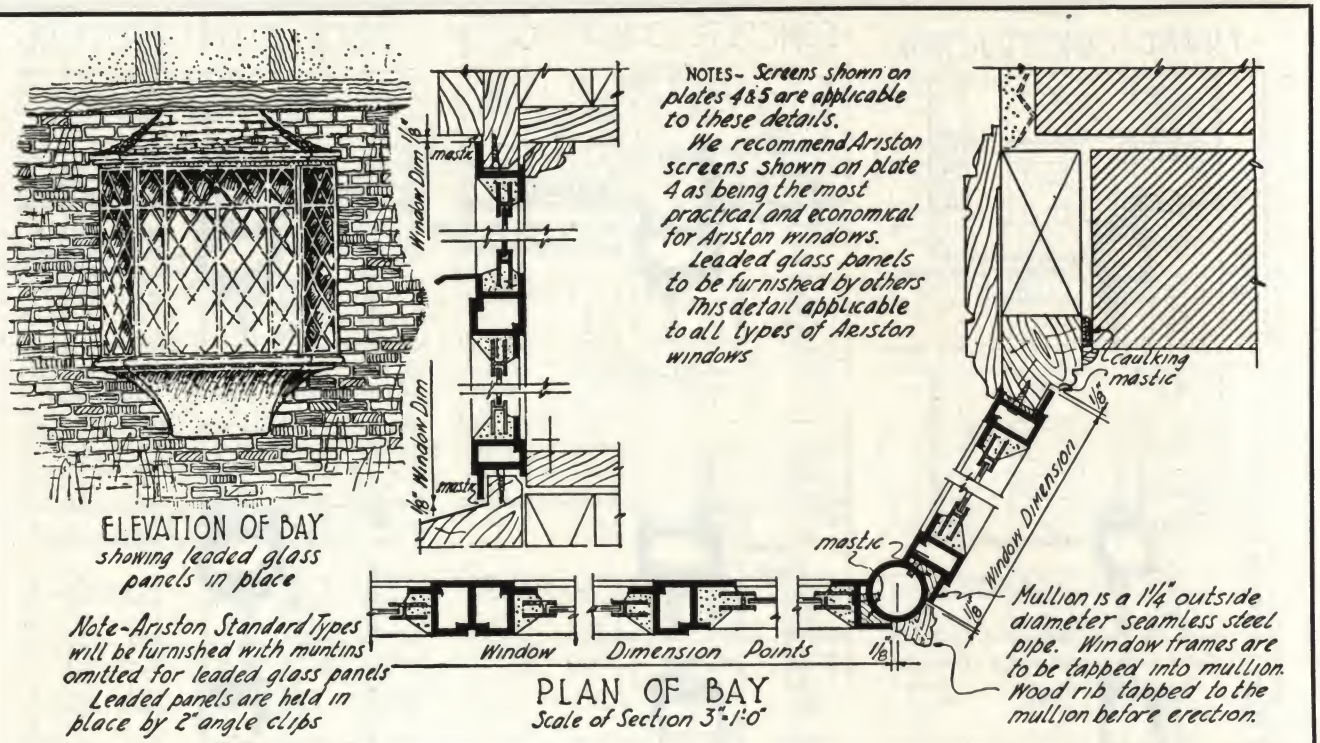
ARISTON WINDOWS OF COPPER STEEL

·ELEVATIONS, DETAILS OF CONSTRUCTION AND SPECIFICATIONS ARISTON ARCHITECTURAL CASEMENT DOORS

SCALE: 3 in. = 1 ft.

PLATE XIII

Continued on next page

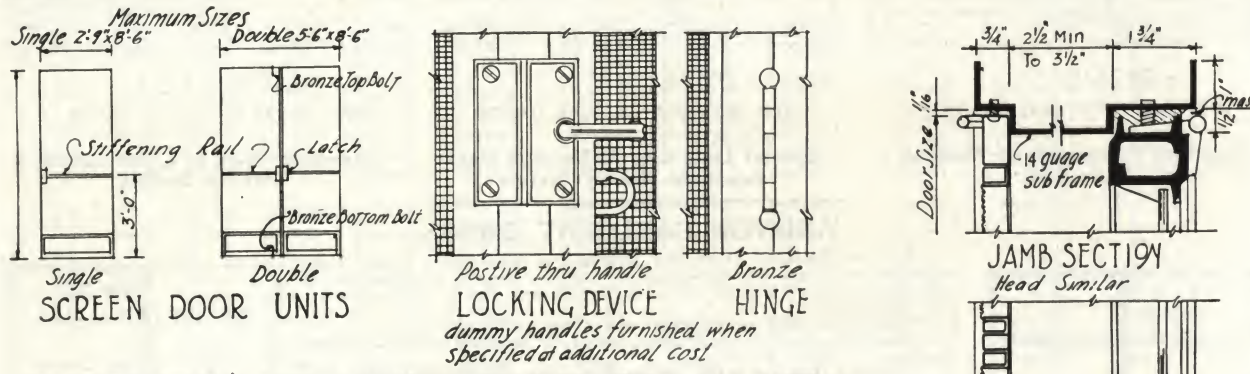


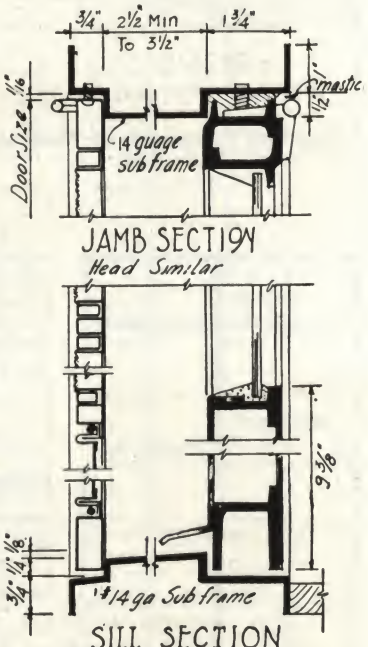
ARISTON WINDOWS OF COPPER STEEL

ARISTON TYPICAL BAY WINDOW INSTALLATION

SCALE: 3 in. = 1 ft.

PLATE XIV





SPECIFICATIONS FOR ARISTON COMBINATION ALL-METAL SCREEN AND DOOR UNIT

Note: The following paragraphs should be added to and included in the General Specifications for (medium or heavy type doors).
Note: Casement door details and specifications on page 16.

Construction

Door units shall be constructed as detailed, with No. 14 gauge subframe completely around opening specially designed with double ½-in. rebates for door and screen.

Note: Specify whether doors are to open in or out. Open in doors are screened on the outside and open out doors are screened on the inside.

Subframes—All subframes shall be 5 or 6-in. No. 14 gauge copper bearing steel with double rebates. Subframes shall be arc welded at the corners and ground smooth on all exposed surfaces.

Screen Doors—All screen door frames throughout shall be of tubular construction with stiles and rails of copper content steel, electrogalvanized. All stiles and rails to be electrically spot welded through spline groove. All doors shall have 9⅜-in. high single kick plate.

Screen Door Hardware

Hinges—Doors shall be hung on three solid bronze loose pin butt hinges.

Latch—Active leaf shall have mortise type latch complete with escutcheon plate and lever handles.

Note: Screen door can be locked on inside only.

Inactive leaf of double doors shall be provided with one-half oval solid old coinage finish surface type top and bottom bolts.

Astragals shall be provided on all double doors.

All doors shall have at least one stiffening rail at locking handle height.

Notes

Screen Cloth—See page 7.

Frame Finish—See page 8.

ARISTON WINDOWS OF COPPER STEEL

DETAILS AND SPECIFICATIONS MEDIUM AND HEAVY SECTIONS ARISTON SCREEN DOOR COMBINATION

SCALE: 3 in. = 1 ft.

PLATE XV

Continued on next page

HARDWARE AND FITTINGS FOR ARISTON WINDOWS

For Standardized, Medium and Heavy Section Windows.

General

All standard hardware on ARISTON Windows is of solid bronze specially treated and toned to an old coinage finish. Other materials and finishes may be obtained if specified. The most generally used standard hardware and fittings are described and illustrated on this page.



No. 161. Standard Cremone Bolt

Cremone Bolts for Double Side Hinged Casements and Doors.

No. 161-A, through handle cremone bolt. Fitted with dead lock (operated from either side of unit and provided with interior lock)



Bronze Butt Hinge

No. 253. Heavy Section Type
No. 254. Medium Section Type

Butts are 4 in. solid extruded bronze with hard steel pins, fitted to frame and ventilator with steel screws. Concealed or exposed friction stay adjusters are required with butt hinged ventilators.



No. 150. Single Throw Cam Latch



No. 151. Single Throw Cam Latch

Special designed hardware of cast bronze or hand forged iron furnished at additional cost. Special finishes may be secured in any of the following—polished, hammered, sanded, scaly, in either brass, nickel plate, chromium plate, old iron, parkerized, gold plate, silver plate or verde antique.

No.	No.	Opens	Throw
For Side Hinged and Vertically Projected Ventilators			
150	151	Out	Single
150-A	151-A	Out	Double
150-B	151-B	Out	Triple
152	159	In	Single
152-A	159-A	In	Double
152-B	159-B	In	Triple
Horizontally Projected Ventilators			
160	163	Out	
160-A	163-A	In	
154	153	Out	
154-A	153-A	In	





No. 150-A. Standard Double Throw Cam Latch



Horizontally Projected Sliding Friction Hinge (Patented)

No. 255—For horizontally projected vents out at bottom or in at top. Medium section windows only. Ventilator is balanced on spring steel supporting arms, cadmium plated, connection between arms and frame and ventilators are made with malleable brackets, double riveted. Ventilators equipped with adjustable brass-friction shoes, sliding vertically in a copper steel channel. Movable parts are either bronze or cadmium plated. Maximum size open out ventilators 4 ft. 6 in. x 3 ft.—open in top 4 ft. 6 in. x 2 ft.

No. 255-A — For standardized heavy section type window only.

BUTT HINGE TABLE

Height	Hinges
5 ft. 6 in. and under.....	2
5 ft. 7 in. to 7 ft. 0 in.....	3
7 ft. 1 in. to 8 ft. 6 in.....	4

Note: Maximum size side hinged ventilators—standardized section, 1 ft. 10 in. x 5 ft. 3 in.; medium section, 2 ft. 6 in. x 6 ft. 6 in; standardized heavy and extra heavy section, 2 ft. 9 in. x 8 ft. 6 in.

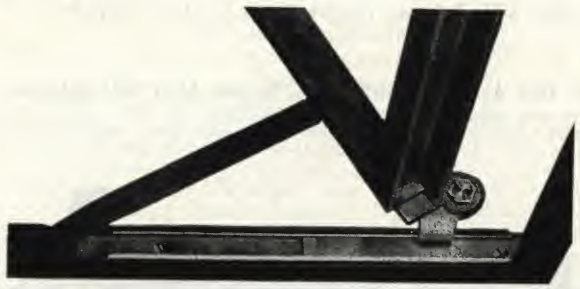


No. 251. Adjustable Friction Type Hinge

Standard for side hinged ventilators. 2 ft. 3 in. x 5 ft. 9 in. and under, unless otherwise specified on standardized medium section windows

No. 251-A. Extension Hinge Non-friction Type

For Screen Unit Combinations



Vertically Projected Sliding Friction Hinge (Patented)

No. 252—For medium section windows only.

Optional equipment (when specified) at no additional cost. All movable parts are cadmium plated high elastic limit steel or bronze. Adjustable friction element in hinge; no stay bars required. Maximum ventilator size 2 ft. 3 in. x 5 ft. 6 in.

No. 252-A—For standardized heavy section type windows only.

Continued on next page

HARDWARE AND FITTINGS FOR ARISTON WINDOWS (Continued)

The hardware and fittings used on all ARISTON Windows are made from the finest materials and combine great strength with simplicity of design. Workmanship is in keeping.

The following standard fittings are entirely suitable for the majority of cases. When special interiors require special fittings, our designers and shops are at the architect's disposal in carrying out his ideas.

Material—Government specification bronze or malleable iron is used for all ARISTON fittings. All brackets are arc welded to frames and ground smooth. Special fittings are cast bronze or hand forged iron.

Finish—Unless otherwise specified herein all fittings are of bronze finished in an old coinage color.

Fittings are interchangeable and are shipped loose. They should not be attached until after windows are installed.

When attaching fittings all screws should be properly seated and all ends cut and riveted smooth so as not to interfere with proper contact. All working parts should be oiled occasionally.

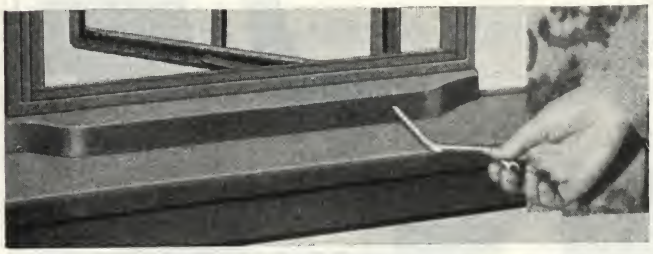


Standard Concealed Friction Adjuster

No. 105. For standardized heavy and extra heavy section windows only.

For side hinged ventilators. Installed at head of ventilator. An adjustable spring bronze sliding shoe operates in a hard drawn brass track. Friction is regulated by turning set screw. No additional sill adjuster is required. (*Note:* Peg and stay, thumb type double or single bar bronze sill adjusters or friction or gear type under screen operators will be furnished in lieu of above adjuster at a slight additional cost.)

No. 105-A. For medium and standardized section windows only.



No. 80 Ariston "Windor" Screen and Operator Unit

Specifications, Plate V



No. 100 Ariston Sliding Stay Sill Operator

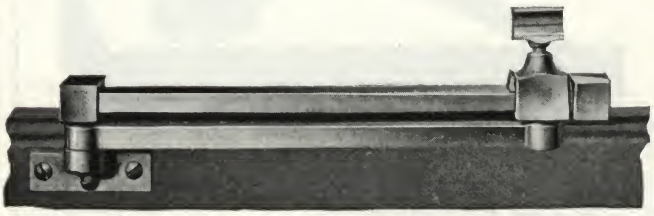


No. 101 Ariston Thumb Type Friction Adjuster

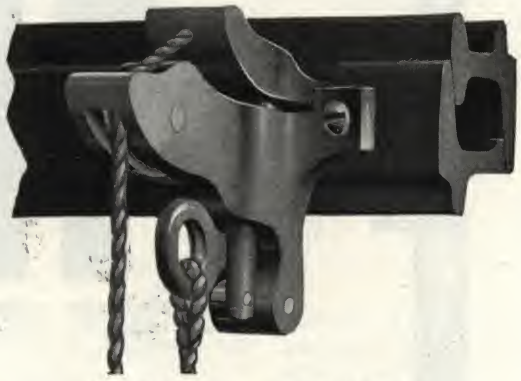
Alternate for Style 100

No. 104 Ariston Combination Screen Unit Sill Adjuster

Operates below screen without necessitating moving screen. Automatically closes and locks ventilator. Recommended for units where screen is used. See ARISTON Screen Combinations, Plate IV.

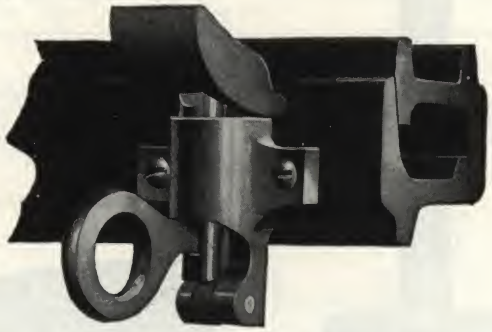


No. 107 Ariston Heavy Double Bar Sliding Type Friction Adjuster



No. 259 Cord Operated Snaplock

For open in horizontally projected or bottom hinged ventilators



No. 258 Pole Operated Snap Lock

For pole operated open in at top ventilators

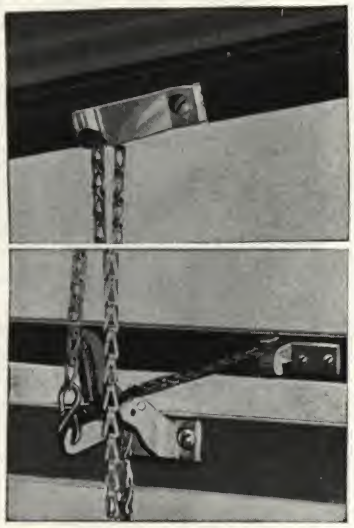
No. 258A. For pole operated open out at bottom ventilators.



No. 171 No. 172 Standard Top and Bottom Bolts

No. 171. For heavy type windows.

No. 172. For standardized and medium type windows.



No. 262 Chain Type Automatic Locking Latch

Recommended for projected out at bottom vents out of reach from floor.

May be operated through a box type screen.

Continued on next page

ARISTON STANDARDIZED HEAVY AND CUSTOM BUILT EXTRA HEAVY SECTION WINDOWS

ARISTON Heavy and Extra Heavy Section Architectural Windows are of highest quality and have been designed for use in buildings of better grade.

Manufactured in either copper alloy steel, bronze or aluminum.

Standardized heavy sections are 1½ in. deep and extra heavy sections are 1⅛ in. deep.

They are constructed of universal sections designed to open outward or to open inward on butt hinges, patented horizontally or vertically projected sliding friction hinges or bronze pivot type hinges. They may be glazed either on the outside or on the inside with putty, glazing angles, rolled steel or hardwood beads. The specially designed sections used permit uniform external and internal appearance and the same rebates and glass line and the same glass plane on both ventilator and fixed units.

These units are custom built to fit the theme of the building, with no limitation of size or type in which they may be built. The sections used provide great sturdiness to care for unusually large openings and offer the heavy sight lines demanded for massive structures. Should architect prefer the use of standard units, any of the sizes and types shown on pages 11, 13 and 15 will be furnished in heavy or extra heavy section construction.

Note: The following table is presented as a guide to maximum practical size:

MAXIMUM SIZE OF VENTILATORS

HEAVY AND EXTRA HEAVY SECTIONS

	Width	Height
Side Hung Casements and Single Leaf Doors		
Opening outward	2 ft. 9 in.	8 ft. 6 in.
Opening inward	2 ft. 9 in.	8 ft. 6 in.
Vertically Pivoted Windows	4 ft. 6 in.	8 ft. 6 in.
Double Side Hinged Casements and Doors		
Opening outward	5 ft. 6 in.	8 ft. 6 in.
Opening inward	5 ft. 6 in.	8 ft. 6 in.
Top Hinged Windows, opening outward	5 ft. 6 in.	4 ft. 0 in.
Horizontally Projected Windows		
Out at bottom, down at top	5 ft. 6 in.	4 ft. 0 in.
In at top, up from bottom	5 ft. 6 in.	4 ft. 0 in.
Bottom Hinged Windows, opening inward	5 ft. 6 in.	4 ft. 0 in.
Horizontally Pivoted Windows	5 ft. 6 in.	4 ft. 0 in.
Vertically Projected, opening outward and opening inward	2 ft. 6 in.	5 ft. 6 in.

(Furnished in standardized heavy sections only.)

SPECIFICATIONS FOR ARISTON STANDARDIZED HEAVY AND EXTRA HEAVY SECTION WINDOWS

Notes are explanatory or advisory only and need not be included in the specification.

General

All windows shown on drawings, unless otherwise noted, shall be ARISTON Architectural (1) Standardized Heavy Section, (2) Custom Built Extra Heavy Section Windows (specify section desired) as manufactured by MICHEL & PFEFFER IRON WORKS, San Francisco, Calif. No substitution will be permitted without the written permission of the architect.

Shop Drawings—See specifications, page 2.
Scope of Work—See specifications, page 2.
Work Not Included—See specifications, page 2.
Material—See specifications, page 2.

Construction

All windows shall be constructed of special heavy rolled sections with frame and ventilator frame members not less than (1½ in. deep on heavy sections), (1⅛ in. deep on extra heavy sections).

The combined weight of ventilator rail and window rail and window frame members shall be not less than 3.96 lb. per lineal ft. (heavy section) and 5.10 lb. per lineal ft. (extra heavy section).

All corners of frames and ventilators shall be mitered and electrically welded. All stiles, rail members and muntin joint intersections to be arc welded. Exposed face at welds to be ground to insure a smooth finished surface. Sash to have ⅜-in. double contact weathering on all sides without the use of screwed-on or pressed-on fillets or strips. All handle brackets to be welded to ventilator rail members. Sections shall be designed so that glass will be in same plane, and sight lines and masonry lines will be uniform throughout each opening.

Hardware

All ventilators shall be fitted with either (1) 4-in. extruded bronze butt hinges, (2) bronze pivots or (3) ARISTON patented slide type hinges (recommended for use only on standardized heavy section windows).

Note: All ventilators, unless otherwise specified, not equipped with ARISTON patented sliding type friction hinge, shall be fitted with concealed adjustable friction stay operators.

All hardware and fittings, unless specified, to be solid bronze, old coinage finish. Design and finish to be in accordance with ARISTON standard practice.

Note: Hardware and fittings are fully described and illustrated on pages 18 and 19.

Note: The following fittings are recommended as a standard specification. Either or any of the following clauses to be included in the specification as required.

Note: Single throw latches are used on all side hinged ventilators 5 ft. 6 in. and under. Double throw latches on ventilators 5 ft. 7 in. to 6 ft. 11 in. and triple throw latches on all ventilators, 7 ft. to 8 ft. 6 in. Connecting rods are ¼ x ½ in. wrought iron painted same color as window.

(1) All side hinged, open outward and vertically pivoted windows shall be fitted with bronze latches and wedge type strike plates.

(2) All side hinged, open inward windows shall be fitted with bronze latches and bronze hook type strike plates.

(3) Vertically projected open outward windows shall be fitted with bronze latch and wedge type strike plates.

(4) All vertically projected open inward windows shall be fitted with bronze latch and hook type strike plates.

(5) All double side hinged open outward or inward windows (clear opening type) shall be fitted with bronze sash pull, cremone bolt and strikes.

(6) All double side hinged windows (with fixed connecting rail) open outward type same specification as No. 1 above, open inward same specifications as No. 2 above.

(7) All top hinged windows shall be fitted with bronze peg and staybar adjuster and locking peg.

(8) All bottom hinged windows shall be fitted with bronze pole type locks, keepers and concealed friction operator.

(9) Horizontally pivoted windows shall be fitted with cord or pole type snap locks and concealed friction operator.

(10) Horizontally projected, out at bottom windows shall all be fitted with bronze cam action latch, wedge type strike plate and ring pull.

(11) All horizontally projected, in at top windows shall be fitted with bronze cam action latch and bronze hook type strikes.

Erection

Note: In masonry construction wherever casements are built into masonry (not into prepared openings) include in the masonry specifications a clause that the mason shall use every precaution against springing or racking windows out of line. Where built into prepared openings provision should be made for proper rebates and reglets.

All windows shall be set plumb and true and shall be properly aligned and securely anchored before glazing.

All mullions and transom bars (and continuous head and jamb anchors if specified) shall be bolted securely to the frame.

Steel watersheds shall be placed over the head of all open outward ventilating units and over the sill of all open inward ventilating units. All frames shall be set in mastic neatly applied in a narrow beading, where the frame contacts steel mullions, transom bars or building construction (use 1 lb. of mastic cement to each 10 lineal ft.).

All hardware shall be applied in accordance with the manufacturer's directions.

No grouting or caulking is included in this contractor's work.

Note: This follows after erection and before screening.

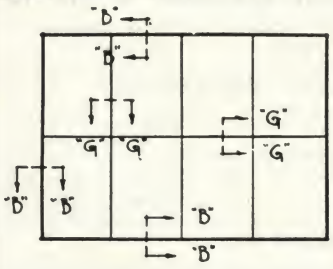
Screening—See specifications, pages 7 and 8.
Mastic—See specifications, page 3.
Painting at Factory—See specifications, page 3.
Galvanizing—See specifications, page 3.
Inspection—See specifications, page 3.

Provisions for Glazing—Glass to be furnished and set as provided under another heading. Steel window manufacturer will furnish (1) moulded solid rolled steel glazing beads (2) ½x½x⅛-in. solid rolled steel glazing angles or (3) spring steel glazing clips, for holding glass in place. *(Specify type desired.)*

Glazing beads (or angles) shall be mitered at corners, fitted to windows at factory and held in place with countersunk machine screws (brass or steel). All glazing beads (or angles) shall be installed on inside of windows. Putty glazed installations shall be glazed from the outside.

Glass and Glazing—See specifications, page 3.

Continued on next page

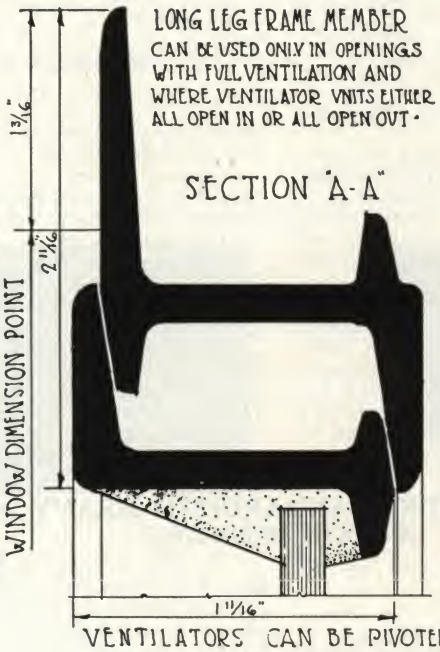


• NOTES •

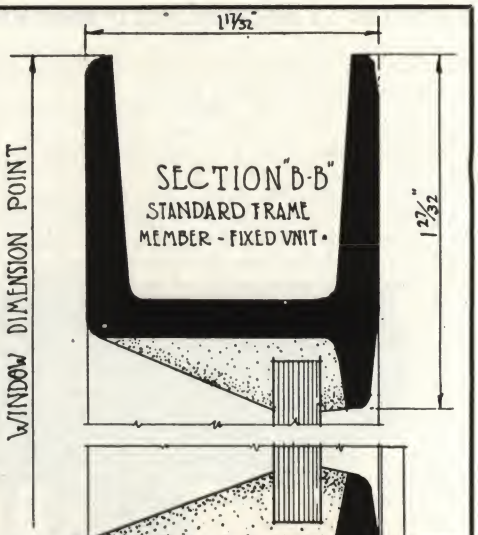
SECTIONS "F-F" & "D-D" ARE SIMILAR TO SECTION "A-A" & SHOWING ALTERNATE GLAZING AND FRAME CONDITIONS & ARE INTERCHANGEABLE • WATERSHEDS NOT SHOWN - REFER TO INSTALLATION DETAILS •

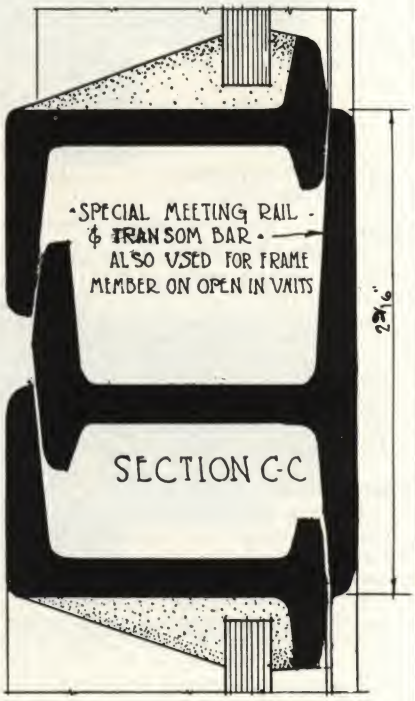
SECTION "F-F" STANDARD CONSTRUCTION FOR OPEN OUT GLAZED INSIDE OR OPEN IN GLAZED OUTSIDE WINDOWS • SECTION "D-D" STANDARD CONSTRUCTION FOR OPEN OUT GLAZED OUTSIDE OR OPEN IN GLAZED INSIDE WINDOWS •

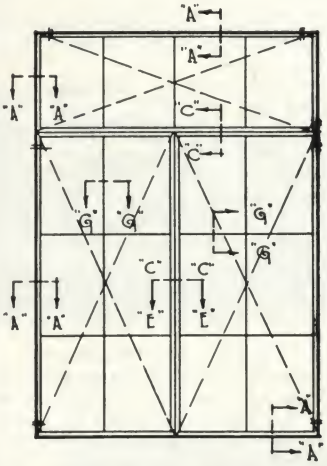
LONG LEG FRAME MEMBER
CAN BE USED ONLY IN OPENINGS WITH FULL VENTILATION AND WHERE VENTILATOR UNITS EITHER ALL OPEN IN OR ALL OPEN OUT •

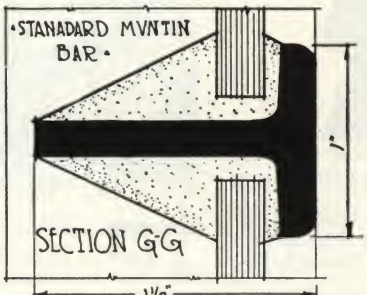


VENTILATORS CAN BE PIVOTED SIDE-HINGED-HORIZONTALLY PROJECTED-IN OR OUT – TOP OR BOTTOM HUNG •

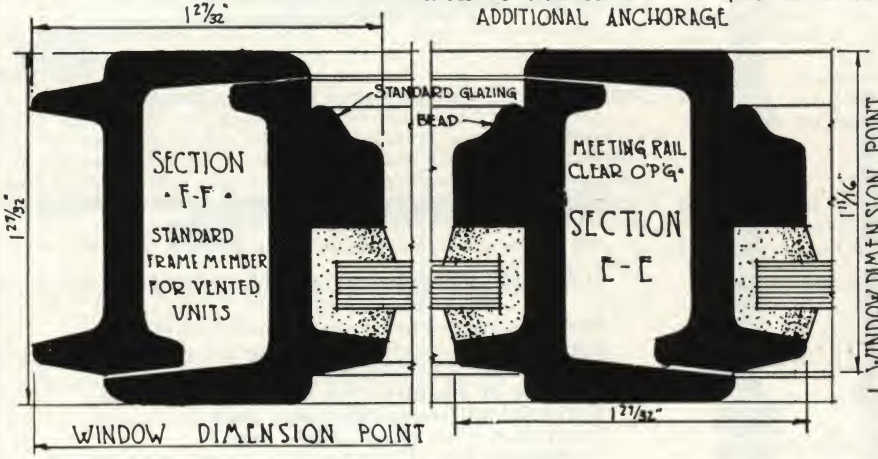


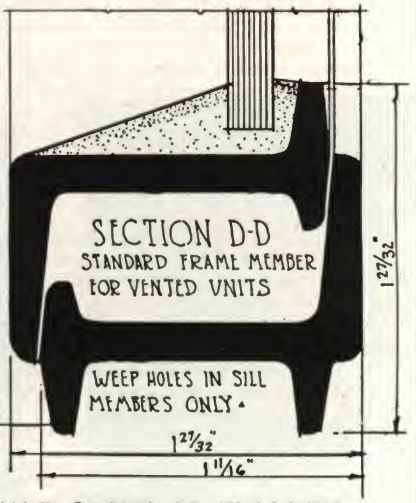






CONTINUOUS FINS OR ANCHORS MAY BE ADDED TO FRAMES "B-B" – "F-F" & "D-D" TO PROVIDE ADDITIONAL ANCHORAGE





NOTES – WINDOWS MAY OPEN IN OR OUT - AS DESIRED • OPEN-IN CASEMENTS HAVE BRONZE OR STEEL WATERSHED AT SILL • OPEN-OUT CASEMENTS HAVE STEEL WATERSHED AT HEAD • PUTTY MAY BE INSIDE OR OUTSIDE. •

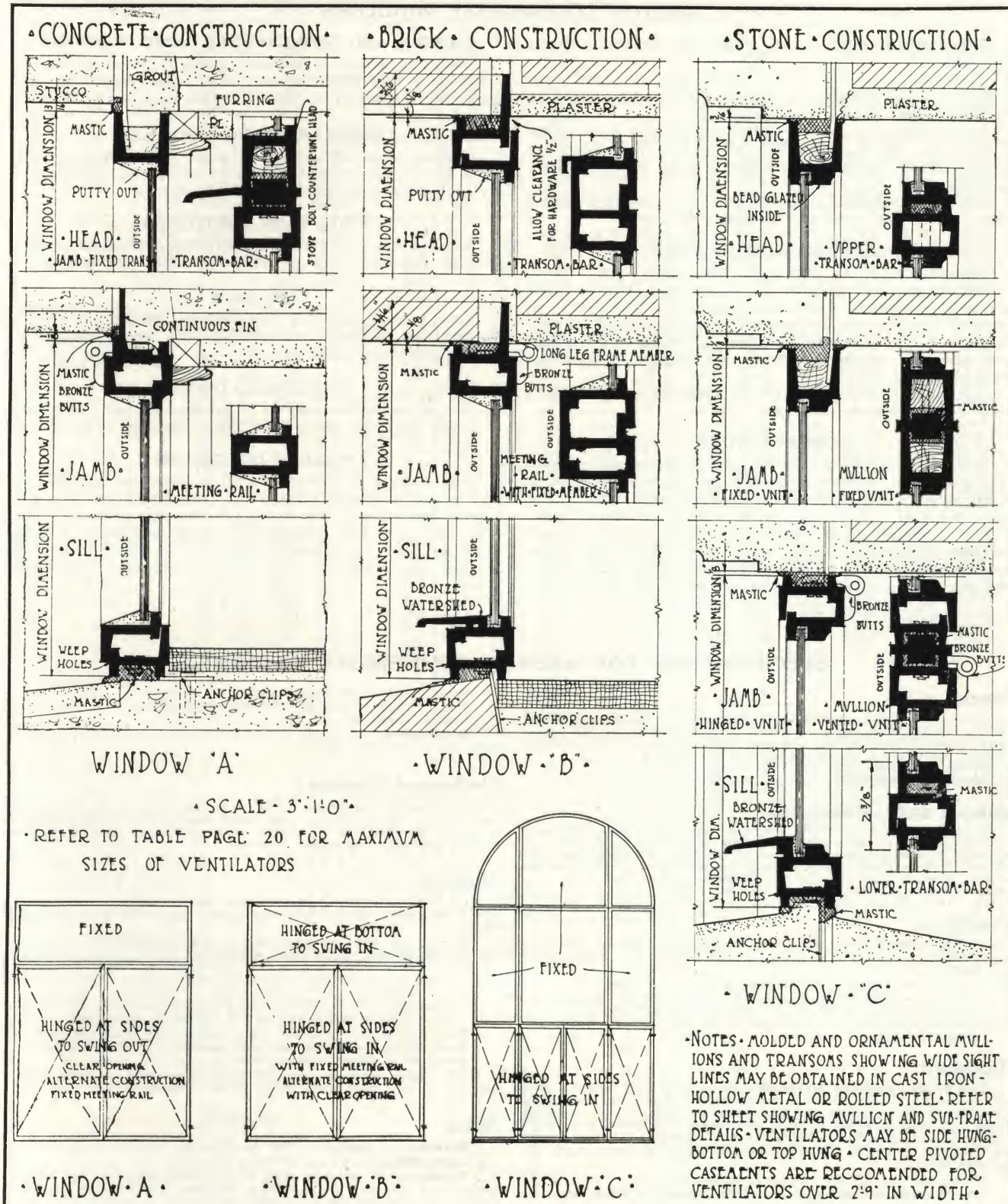
Units may be combined to fit any special conditions. Maximum single fixed unit size is 10x12 ft.
Single units may be combined with mullions to fit any opening.

ARISTON WINDOWS OF COPPER STEEL

FULL SIZE DETAILS
ARISTON EXTRA HEAVY SECTION WINDOWS

FULL SIZE
PLATE XVI

Continued on next page



NOTES: MOLDED AND ORNAMENTAL MULLIONS AND TRANSOMS SHOWING WIDE SIGHT LINES MAY BE OBTAINED IN CAST IRON-HOLLOW METAL OR ROLLED STEEL. REFER TO SHEET SHOWING MULLION AND SUB-FRAME DETAILS. VENTILATORS MAY BE SIDE HUNG-BOTTOM OR TOP HUNG. CENTER PIVOTED CASEMENTS ARE RECCOMENDED FOR VENTILATORS OVER 2'9" IN WIDTH.

Notes: All connecting bars punched with long slotted holes. Composite windows must be braced and plumb before fixing. Bracing should not be removed until whole frame is firmly cemented in position. Unless otherwise specified hollow metal frames are furnished in 14 gauge steel. Frames should be set and pointed by masonry contractor as work proceeds. Submit problems to our Engineering Department.

Operating Room Window

Notes: Units of any size, type or design may be built to suit special conditions. Large glass area permits minimum shadow. Interior sash should be set flush with interior wall to eliminate dust ledge.

Connecting bars may be used as mullion or transom bar. Size to be determined by our Engineering Department according to size of opening to be filled.

ARISTON WINDOWS OF COPPER STEEL

ELEVATIONS AND DETAILS OF CONSTRUCTION
ARISTON HEAVY SECTION WINDOWS

SCALE: 3 in. = 1 ft.

PLATE XVII

Continued on next page

ARISTON COMMERCIAL WINDOWS

Manufactured from 1⅛-in. copper bearing rust resisting steel sections.

ARISTON Commercial Windows have been designed principally for use in industrial structures. Weather resisting copper bearing steel is used throughout.

Water resistance and weather protection have been rigidly safeguarded. The flat exterior face with welded joints reduces chances of corrosion, by removing points where moisture can settle.

Standard horizontally pivoted types and sizes are carried at the factory for immediate shipment at all times.

STANDARD WINDOW UNITS

Standardization and economic considerations have led to the almost complete adoption of 12x18 and 14x20-in. glass size as the standard for commercial windows. A majority of steel window jobs can be designed with these standard units and it is to the advantage of architects to use the standard units whenever possible as they are stocked, fabricated and shipped without delay.

The table on page 24 shows the range of standard 12x18 and 14x20-in. glass size windows.

NOMENCLATURE

Numbers designating various types of commercial windows are translated as follows: first numeral, number of lights in width; second numeral, number of lights in height; third numeral, number of ventilators; fourth numeral, number of lights in each ventilator; fifth numeral, number of lights between ventilator and the sill of the window. A horizontally pivoted type 43141 indicates a unit four lights wide, three lights high with one four-light ventilator one light above the sill.

CAMBER AND SEMICIRCULAR HEAD WINDOWS

These units are not stocked; however, they will be furnished at a very slight additional cost, and require but little more time for delivering than is needed for stock windows.

BURGLAR PROOF WINDOWS

Obtainable in 7x9 and 8x8-in. glass sizes. Special burglar proof windows are manufactured for all sizes of openings and are sold at the price of a cheap iron guard.

STEEL SASH PARTITIONS

Partitions are constructed with our commercial window sections, according to the requirement of the individual job.

SPECIALS

Our standard sizes will supply most of the opening requirements; when specials are called for they can be supplied to exactly suit the architect's needs.

INDUSTRIAL DOORS

Doors are built of angles or tubular sections. They may be either sliding or swing type, hung singly or in pairs.

WINDOW DIMENSIONS

The window dimensions shown in tables on page 25, correspond to the masonry openings. The actual out to out or overall dimension is 1¼ in. larger than the window dimensions shown. This provides for ⅝-in. anchorage at head, jamb and sill. An adjustment space of ⅜ in. all around the window has already been provided within the sash dimensions.

SPECIFICATIONS FOR ARISTON COMMERCIAL WINDOWS

General

All windows shown on drawings and called for in these specifications shall be ARISTON Commercial Windows, as manufactured by MICHEL & PFEFFER IRON WORKS, of San Francisco, Calif. No substitution will be permitted without the written approval of the architect.

Scope of Work—(See specifications, page 2.)

Work Not Included—(See specifications, page 2.)

Material and Construction

Steel used shall be new billet hot rolled copper-alloy steel, containing not less than 0.25 or more than 0.35 copper in order to resist rust. All corners of frames and ventilators shall be tenon and air hammer riveted. All muntin joints shall be mitered and spot welded to provide complete rigidity. Muntin bars, except where ventilator occurs, are to be continuous from head to sill and from jamb to jamb.

Ventilators

All ventilators shall be fitted with double contact weathering on all sides and horizontally pivoted 2 in. above the center line, unless otherwise specified.

Note: Alternate types of ventilators may be (1) bottom pivoted, open-in, (2) bottom hinged, open-in, (3) horizontally pivoted 4 in. from ventilator head rail to open out, (4) horizontally projected out-at-bottom or (5) horizontally projected in-at-top. Specify type wanted.

Hardware

For Center Pivoted Windows—All center pivoted windows shall be fitted with (1) standard stay bar hardware; ventilators over 5 ft. above floor level shall be fitted with (2) snap latch at head, chain operated; (3) snap latch at ventilator sill member and endless chain over a chain roller, fastened to ventilator head rail member; (4) same operating equipment as in (3) except for the substitution of a cam handle for the snap latch.

Note: (1) and (2) are considered standard.

For Ventilators Pivoted 4 in. from Head to Open Out—All ventilators pivoted 4 in. from head to open out shall be fitted with standard cam acting stay bar hardware.

For bottom Hinged or Bottom Pivoted Ventilators—All bottom hinged (or bottom pivoted) ventilators shall be fitted with (1) pole operated snap lock, fastened to ventilator head rail member, and a sliding stay arm, operating in jamb rail member, to hold ventilator in an open position; (2) snap lock fastened to head rail of ventilator and operated by an endless chain which acts over and against a chain roller at head rail.

Note: (1) is considered standard.

For Horizontally Projected Ventilators—*(Out at Bottom)*—All horizontally projected ventilators (out at bottom) shall be fitted with (1) bronze cam latch and strike at sill, pull hook at head; (2) automatic through screen operator controlled by endless chain.

Note: (1) is considered standard.

(In at Top)—All horizontally projected ventilators (in at top) shall be fitted with (1) pole or cord operated snap lock and keeper; (2) bronze spring type cam latch and keeper, pole (or hand) operated.

Note: (1) is considered standard.
Note: Poles not furnished by window manufacturer as part of standard hardware.

Installation—All hardware shall be installed after erection of windows but prior to glazing.

Mechanical Operators

All runs of ventilators, indicated as mechanically controlled, shall be equipped with torsion or other approved operators, and of design shown on drawings. All structural work for support of steel windows shall be provided by another contractor.

Mullions

(1) ARISTON standard plate mullions shall be provided and installed for all openings with two or more window units 5 ft. 2 in. or less in height.

(2) ARISTON standard T-bar mullions shall be provided and installed for all openings with two or more window units over 5 ft. 2 in. in height.

(3) ARISTON double back to back T-bar mullions shall be provided and installed for all openings with two or more window units over 10 ft. 3⅛ in. in height.

All mullions shall be 2¾ in. wide (2-in. mullion dimension distance) with slotted holes to permit vertical and horizontal adjustment.

Note: If mullion covers are wanted, they should be specified here.
Note: When galvanizing has been specified the following clause should be included in specification.

All window units in contact with mullions shall have the contact surfaces covered with mastic to make joint watertight.

Notes

Painting at Factory—(See specifications, page 3.)

Galvanizing—(See specifications, page 3.)

Erection—All windows shall be set plumb and true, and properly aligned and anchored before glazing. Wooden wedges shall be used to hold windows in place, and in setting same must be located so as not to bulge or distort window unit. All hardware shall be installed in accordance with manufacturer's direction.

Inspection—(See specifications, page 3.)

Screens—Removable flat type screens shall be fitted to outside face of window over ventilators and shall be held in place by clips fastened to window frame by machine screws, permitting economical replacement at any time. Screens shall be (1) 16 gauge copper wire mesh cloth, securely double overlapped and crimped into a bronze frame, (2) 16 gauge galvanized wire mesh cloth securely double overlapped and crimped into a galvanized frame.

Note: The above screens are recommended in conjunction with bottom hinged ventilators.

Glass—(See specifications, page 3.)

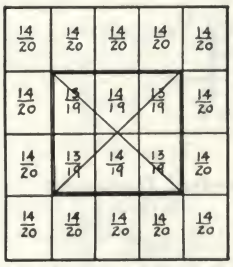
Glazing—(See page 27.)

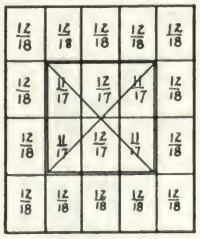
Caulking—(After erection.)

Painting—(After erection.)

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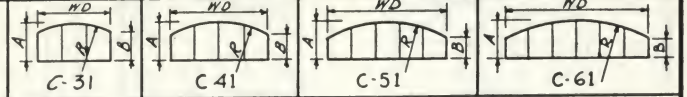
HEIGHTS	2 LITES WD	3 LITES WIDE	4 LITES WIDE	5 LITES WIDE	6 LITES WIDE
1 LITE HI — 18"GL 1'-7¼" 20"GL 1'-9¼"	21 21120	31 31130	41 41140	51 51130	61 61140 61120
2 LITES HI — 18"GL 3'-1⅝" 20"GL 3'-5⅝"	22 22140	32 32160	42 42140 42180	52 52160	62 62180 62140
3 LITES HI — 18"GL 4'-8" 20"GL 5'-2"	23 23141	33 33161 33160	43 43141 43181 43180	53 53161 53160	63 63181 63141
4 LITES HIGH — 18"GL 6'-2⅜" 20"GL 6'-10⅜"	24 24141	34 34161 34162 342602	44 44141 44181 44182 442802	54 54161 54162	64 64181 64182
5 LITES HIGH — 18"GL 7'-8¾" 20"GL 8'-6¾"	25141	35 35161 35162 35163 352603	45 45141 45181 45182 452803	55 55161 552603	65 65181 652803
6 LITES HIGH — 18"GL 9'-3⅛" 20"GL 10'-3⅜"	26141	36 36161 36162 36163 362614	46 46141 46181 462414 462814	56 56161 562614	66 66181 662814
7 LITES HIGH — 18"GL 10'-9½" 20"GL 11'-11½"	27141	37 37161 37164 372614	47 47181 47184 472414 472814	57 57161 572614	67 67181 67184
WIDTHS 12" GLASS / 14" GLASS	2'-1⅝" / 2'-5⅝"	3'-2" / 3'-8"	4'-2⅜" / 4'-10⅜"	5'-2¾" / 6'-0¾"	6'-3⅛" / 7'-3⅛"



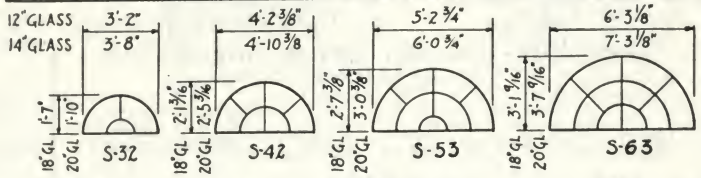


▲STANDARD▲GLASS▲SIZES▲FOR▲COMMERCIAL▲WINDOWS▲

Glass	12 x 18	14 x 20	12 x 18	14 x 20	12 x 18	14 x 20	12 x 18	14 x 20
WD	3'-2"	3'-8"	4'-2⅜"	4'-10⅜"	5'-2¾"	6'-0¾"	6'-3⅛"	7'-3⅛"
A	1'-6⅛"	1'-8⅛"	1'-6⅛"	1'-8⅛"	1'-6⅛"	1'-8⅛"	1'-6⅛"	1'-8⅛"
B	1'-1"	1'-2¼"	0'-11⅜"	1'-0⅜"	0'-9¹¹⁄₁₆"	0'-10⅜"	0'-8⅞"	0'-8⁷⁄₁₆"
R	3'-2"	3'-8"	4'-2⅜"	4'-10⅜"	5'-2¾"	6'-0¾"	6'-3⅛"	7'-3⅛"



▲STANDARD▲CAMBER▲HEAD▲UNITS▲ONE▲LIGHT▲HIGH▲



*Notes: Types shown are standard commercial pivoted and commercial projected windows. Commercial projected ventilators may open in or out as desired. Specifications on page 23. Windows marked thus * are stocked in warehouse, for immediate shipment. Windows Marked thus • are standard and will be fabricated for shipment on short notice. All others require delayed shipping schedule. Specials furnished on request at slight extra cost.*

SYMBOLS

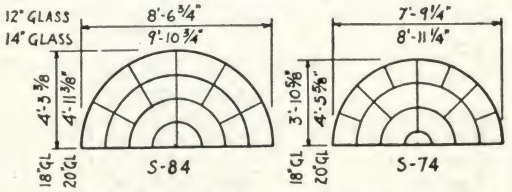
Symbols are shown below each unit and are interpreted as follows:

First number indicates the number of lights in width.
Second number, lights in height.
Third number (if given), number of ventilators.
Fourth number (if given), number of lights in each ventilator.
Fifth number (if given), the number of lights from the sill of the window to the sill of the ventilator, thus indicating ventilator location.

Thus, the symbol 53 designates the window which is five lights wide and three lights high, with no ventilator; symbol 53161 designates the window which is five lights wide and three lights high, with one ventilator containing six lights located one light above the sill of the window.



▲WINDOW FRAME▲



▲STANDARD▲SEMICIRCULAR▲UNITS▲

NOTES~ Circle heads not over six lites wide are attached to square head units as shown Section A Plate 19 .-Over six lites as shown Sections B & C Plate 19

ARISTON WINDOWS OF COPPER STEEL

STANDARD TYPES AND SIZES
ARISTON COMMERCIAL WINDOWS

NO SCALE

PLATE XVIII

Continued on next page

TABLE OF WINDOW COMBINATIONS

Commercial Pivoted and Projected Windows

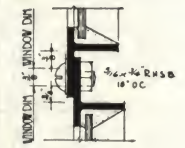
14″x20″ Glass Width of opening	12″x18″ Glass Width of opening	Number of lights wide	Number of sash units	Number of lights in each sash unit	Number of mullions
1′ 3¼″	1′ 1¼″	1	1	1	None
2′ 5⅝″	2′ 1⅝″	2	1	2	None
3′ 8″	3′ 2″	3	1	3	None
4′ 10⅜″	4′ 2⅜″	4	1	4	None
5′ 1¼″	4′ 5¼″	4	2	2, 2	1
6′ 0¾″	5′ 2¾″	5	1	5	None
7′ 3⅛″	6′ 3⅛″	6	1	6	None
7′ 6″	6′ 6″	6	2	3, 3	1
9′ 10¾″	8′ 6¾″	8	2	4, 4	1
11′ 4″	9′ 10″	9	3	3, 3, 3	2
12′ 3½′	10′ 7½″	10	2	5, 5	1
12′ 6⅜″	10′ 10⅜″	10	3	3, 4, 3	2
13′ 8¾″	11′ 10¾″	11	3	4, 3, 4	2
13′ 8¾″	11′ 10¾″	11	3	3, 5, 3	2
14′ 8¼″	12′ 8¼″	12	2	6, 6	1
14′ 11⅛″	12′ 11⅛″	12	3	4, 4, 4	2
14′ 11⅛″	12′ 11⅛″	12	3	3, 6, 3	2
15′ 2″	13′ 2″	12	4	3, 3, 3, 3	3
16′ 1½′	13′ 11½″	13	3	5, 3, 5	2
16′ 1½′	13′ 11½″	13	3	4, 5, 4	2
17′ 3⅞″	14′ 11⅞″	14	3	5, 4, 5	2
17′ 6¾″	15′ 2¾″	14	4	3, 4, 4, 3	3
18′ 6¼″	15′ 0¼″	15	3	5, 5, 5	2
18′ 6¼″	16′ 0¼″	15	3	6, 3, 6	2
19′ 0″	16′ 6″	15	5	3, 3, 3, 3, 3	4
19′ 8⅝′	17′ 0⅝″	16	3	5, 6, 5	2
19′ 8⅝′	17′ 0⅝″	16	3	6, 4, 6	2
19′ 11½′	17′ 3½″	16	4	4, 4, 4, 4	3
20′ 2⅜″	17′ 6⅜″	16	5	3, 3, 4, 3, 3	4
20′ 11″	18′ 1″	17	3	6, 5, 6	2
21′ 4¾″	18′ 6¾″	17	5	3, 4, 3, 4, 3	4
22′ 1⅜″	19′ 1⅜″	18	3	6, 6, 6	2
22′ 4¼″	19′ 4¼″	18	4	4, 5, 5, 4	3
22′ 4¼″	19′ 4¼″	18	4	3, 6, 6, 3	3
22′ 7⅛″	19′ 7⅛″	18	5	3, 4, 4, 4, 3	4
22′ 10″	19′ 10″	18	6	3,3,3,3,3,3	5
23′ 9½′	20′ 7½″	19	5	3, 3, 3, 3, 3	4
24′ 9″	21′ 5″	20	4	5, 5, 5, 5	3
24′ 9″	21′ 5″	20	4	4, 6, 6, 4	3
24′ 11⅞′	21′ 7⅞	20	5	4, 4, 4, 4, 4	4
25′ 2¾′	21′ 10¾	20	6	3,3,4,4,3,3	5
25′ 5⅝′	22′ 8¼	21	5	3, 5, 5, 5, 3	4
27′ 1¾′	23′ 5⅜	22	4	5, 6, 6, 5	3
27′ 4⅝	23′ 8⅝	22	5	4, 5, 4, 5, 4	4
27′ 7½	23′ 11½	22	6	3,4,4,4,4,3	5
28′ 7″	24′ 9″	23	5	4, 5, 5, 5, 4	4
29′ 6½′	25′ 6½	24	4	6, 6, 6, 6	3
30′ 0¼′	25′ 0¼	24	6	4,4,4,4,4,4	5

Burglarproof Windows—8x8 In. Glass

Width of opening	Number of lights wide	Number of sash units	Number of lights in each sash unit	Number of mullions
1′ 5⅝″	2	1	2	None
2′ 2″	3	1	3	None
2′ 10⅜″	4	1	4	None
3′ 6¾″	5	1	5	None
4′ 3⅛″	6	1	6	None
4′ 11½″	7	1	7	None
5′ 7⅞″	8	1	8	None
6′ 4¼″	9	1	9	None
7′ 0⅝″	10	1	10	None
7′ 3½″	10	2	5, 5	1
7′ 11⅞″	11	2	6, 5	1
8′ 8¼″	12	2	6, 6	1
9′ 4⅝″	13	2	7, 6	1
10′ 1″	14	2	7, 7	1
10′ 9⅜″	15	2	8, 7	1
11′ 5¾″	16	2	8, 8	1
12′ 2⅛″	17	2	9, 8	1
12′ 10½″	18	2	9, 9	1
13′ 6⅞″	19	2	10, 9	1
14′ 3¼″	20	2	10, 10	1
15′ 2½″	21	3	7, 7, 7	2
15′ 10⅞″	22	3	7, 8, 7	2
16′ 7¼″	23	3	8, 7, 8	2
17′ 3⅝″	24	3	8, 8, 8	2
18′ 0″	25	3	8, 9, 8	2
18′ 8⅜″	26	3	9, 8, 9	2
19′ 4¾″	27	3	9, 9, 9	2
20′ 1⅛″	28	3	9, 10, 9	2
20′ 9½″	29	3	10, 9 10	2
21′ 5⅞″	30	3	10, 10, 10	2

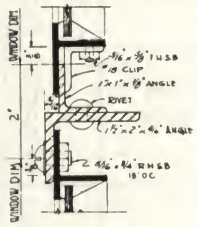
Number of lights high	Height 8″x8″ glass	Height 12″x18″ glass	Height 14″x20″ glass	Number of sash units
1	.....	1′ 7¼″	1′ 9¼″	1
2	1′ 5⅝″	3′ 1⅝″	3′ 5⅝″	1
3	2′ 2″	4′ 8″	5′ 2″	1
4	2′ 10⅜″	6′ 2⅜″	6′ 10⅜″	1
5	3′ 6¾″	7′ 8¾″	8′ 6¾″	1
6	4′ 3⅛″	9′ 3⅛″	10′ 3⅛″	1
7	4′ 11½″	10′ 9½″	11′ 11½″	1
8	5′ 7⅞″	.....	.....	1
9	6′ 4¼″	.....	.....	1
10	7′ 0⅝″	.....	.....	1

Horizontal Mullions



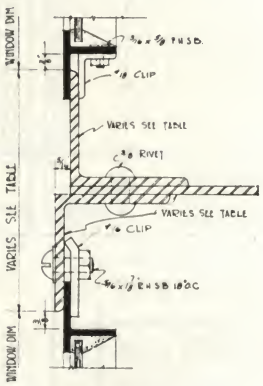
Type A

For Units Up to and Including 6 Lights in Width



Type B

Horizontal Mullion Suitable for Single Unit Openings



Type C

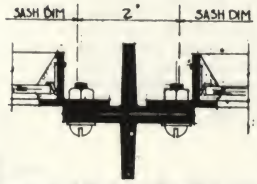
Standard Horizontal Mullion

For size of structural mullion see table

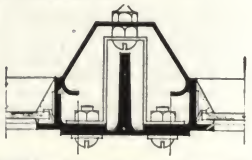
DIMENSIONS OF STRUCTURAL HORIZONTAL MULLIONS

Lights wide	Typ. no.	Req.	Size of angles	Size of plate	Weight per foot lb.	Between dimensions
12x18 In. Glass						
2 to 6	A	.....	.....	.....	.....	0⅜″
2 to 6	B	1	1″ x1″ x⅛″	None	3	2″
		1	1½″x2″ x3/16″	None		
6 to 9	C	2	2½″x2½″x3/16″	None	6.5	5″
10 to 14	C	2	2½″x2½″x3/16″	6″x¼″	11.5	5¼″
15 to 16	C	2	2½″x2½″x¼″	6″x¼″	13.5	5¼″
17 to 18	C	2	3″ x3″ x¼″	6″x¼″	15.5	6¼″
14x20 In. Glass						
2 to 6	B	1	1″ x1″ x⅛″	None	3	2″
		1	1½″x2 ″x3/16″	None		
6 to 8	C	2	2½″x2½″x3/16″	None	6.5	5″
9 to 11	C	2	2½″x2½″x3/16″	6″x¼″	11.5	5¼″
12 to 16	C	2	3″ x3″ x¼″	6″x¼″	15.5	6¼″
16 to 18	C	2	3″ x3″ x5/16″	6″x¼″	17.5	6¼″

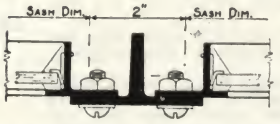
Typical Vertical Mullions



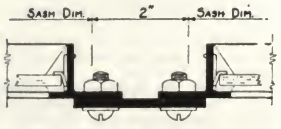
Mullion No. 1, for Openings Over 7 Lights High



Mullion No. 2 with Mullion Cover



Mullion No. 2, Tee Type



Mullion No. 3, for Openings 3 Lights High and Under

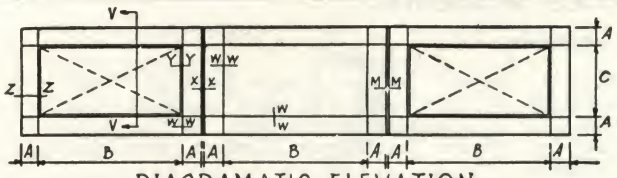
ARISTON WINDOWS OF COPPER STEEL

STANDARD WINDOW COMBINATIONS
MULLION SIZES AND DETAILS
ARISTON COMMERCIAL WINDOWS

NO SCALE

PLATE XIX

Continued on next page



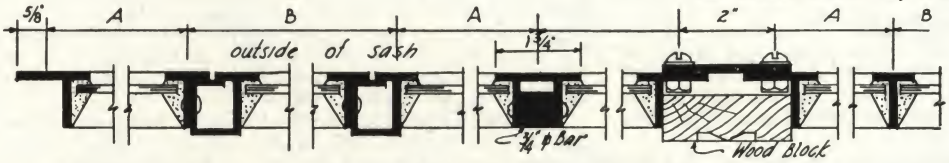
DIAGRAMATIC ELEVATION

Dimension A is variable from 6" to 12"
Dimension B is variable from 1'-0" to 4'-6"
Dimension C is variable from 1'-0 to 4'-0"

NOTE ~ ARISTON STORE FRONT WINDOWS *are manufactured from commercial sections for use above transom bars on store fronts. Center pivoted ventilators are used pivoted 2" below center. Hardware is bronze pole type snaplock. Specifications are the same as for commercial windows except for change of hardware, ventilators & mullions. Bottom hinged, top hinged or projected type ventilators also obtainable. Additional muntins may be added.*



VERTICAL SECTION V-V
Thru ventilator



SECTION Z-Z *below ℄* | SECTION Y-Y *above ℄* | SECTION X-X *Narrow Mullion* | ALTERNATE SECTION M-M MUNTIN *Standard Mullion at W-W*

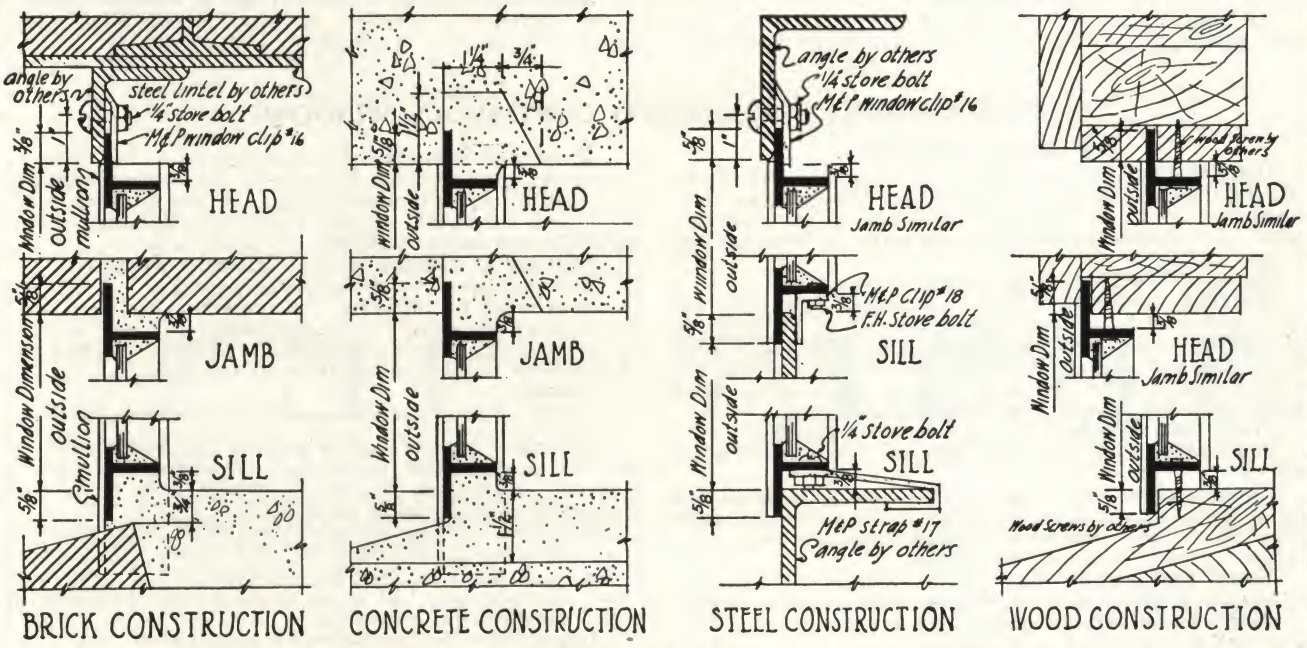
Mullion X-X or Mullion M-M furnished as optional on any store front window at no additional cost

ARISTON WINDOWS OF COPPER STEEL

ELEVATIONS AND DETAILS OF CONSTRUCTION
ARISTON STORE FRONT WINDOWS

SCALE: 3 in. = 1 ft.

PLATE XX



BRICK CONSTRUCTION | CONCRETE CONSTRUCTION | STEEL CONSTRUCTION | WOOD CONSTRUCTION

Note: Dimension points shown on pages 24 and 25 are not given over all but correspond with the size of the wall openings indicated above.

INSTALLATION DATA FOR VARIOUS TYPES OF CONSTRUCTION

MASONRY WALL

Set end units in each opening first, inserting the frame into groove in the brick or concrete. Set remaining units and mullions and bolt them loosely together. If necessary block up windows to bring members in line horizontally, using wedges at jambs to hold the window in place. When a steel lintel is used, window is bolted to the clips furnished for this purpose or directly onto the steel. Care should be taken in placing wedges *only under* vertical mullions or jambs. The masonry sills should be finished before head and jambs are grouted in.

STEEL FRAME

Bolt all units and mullions together loosely fastening them with clips to frame angles. Line up the members properly and tighten all bolts and clips, leaving the window ready for other contractors.

WOOD FRAME

Procedure is same as with masonry wall, except that windows are fastened to wood frames with screws instead of being grouted in.

HARDWARE

Operating hardware should be attached after windows have been trued and securely fastened in place. Wires on ventilators are to be removed at the same time. (Hardware is not installed by window manufacturer.)

GLAZING

Glazing clips must be used to hold glass in place. Four clips are furnished with each light. Glazing is done from the inside and steel sash putty must be used.

ARISTON WINDOWS OF COPPER STEEL

INSTALLATION DETAILS
ARISTON CONMERCIAL WINDOWS

SCALE: 3 in. = 1 ft.

PLATE XXI

Continued on next page

ARISTON CONTINUOUS WINDOWS

Important Features

ARISTON Continuous Windows have been designed to provide a maximum amount of lighting and natural ventilation in roofs and side walls of industrial buildings where mass control of ventilation is necessary. Units are joined end to end by means of fixed intermediate panels to form a continuous window for openings up to 1000 ft. in length. Such runs are operated with ARISTON operators. ARISTON Continuous Top Hung Windows when open form a continuous awning of glass and steel that effectively prevents the entrance of rain or sleet, thereby permitting efficient ventilation in stormy weather. Storm Panels are attached to the stationary end panels to keep the moisture out at these points.

CONSTRUCTION

Unusually heavy members are used in the fabrication of ARISTON Continuous Windows. All joints are accurately fitted and rigidly tenon and air hammer riveted. Muntin bars are arc welded to top and bottom rail members thereby providing additional stiffness.

These features combined permit the fabrication of Continuous Windows as high as 7 ft.

STRUCTURAL STEEL WORK

The structural steel work required for the installation of ARISTON Continuous Windows and operators described in the specifications and shown in the details is not furnished by ARISTON. We however furnish necessary drawings for attaching hinges and showing punching for hinges in girt angles. Punching is done by steel contractor.

FLASHINGS

All joints at sill and intermediate panels, all combination storm panels and short end panels on stationary units require flashing. ARISTON does not furnish flashings. They should be furnished by sheet metal contractor and their installation insisted on as we cannot be responsible for the weather proofness of ARISTON Continuous Windows when flashings are omitted.

MECHANICAL OPERATING DEVICES

ARISTON offers four types of mechanical operating devices, designed for either hand or electric control.

Worm and Gear Operators—Designed for horizontally pivoted ventilators, may be used on top and bottom pivoted units.

Rack and Pinion Type Operators—Recommended as a substitute for worm and gear operators. Also suitable for projected ventilators and small runs of continuous windows.

Rack and pinion operators are recommended as standard for use on ordinary commercial structures where medium runs up to 100 ft. are used.

Screw Type Operators—Designed for power houses and for use on exceptionally high openings, entirely filled with windows and structural mullions. Recommended for use on horizontally center and top pivoted ventilators and individual bays either within or beyond reach of the floor. Operators are fitted close to the inside face of window, out of the way of movable cranes and other obstructions. Power and electrical mechanism if desired may be concealed in the wall.

Tension Type Operators—Recommended for use on long runs of horizontally center or top pivoted windows and for top (or bottom) hinged continuous windows.

We invite Architects to submit their operating problems to our Engineering Department.

Note: Architect should always specify whether manual or power operation is desired. If power operation is wanted, specify size of motor required.

SPECIFICATIONS FOR ARISTON CONTINUOUS WINDOWS

TOP HUNG WINDOWS

General—All windows shown on drawings and herein specified, shall be ARISTON Continuous Type Windows, as manufactured by MICHEL & PFEFFER IRON WORKS, of San Francisco, Calif. No substitution permitted without the written approval of the architect.

Scope of Work—(See specifications, page 2.)

Material—Michel & Pfeffer specification new billet hot rolled steel shall be used in the manufacture of all members. All head and jamb members shall be 1½x$\frac{3}{16}$-in. angles. Sill members shall be of specially designed section not less than 1$\frac{1}{8}$ in. deep, providing a long downstanding leg, insuring great rigidity and close contact with building construction.

Work Not Included—(See specifications, page 2.)

Muntins—Muntin shall be 1½x$\frac{3}{16}$ in. T-bars, set 2 ft. on centers.

Construction—All joints shall be accurately fitted and rigidly tenon and air hammer riveted to form standard panel units. Muntin bars shall be arc welded to top and bottom rail members, to provide additional stiffness.

Fixed End Panels—Ends of all swing units, adjoining building construction, shall be provided with stationary panels.

Fixed Intermediate Panels—Between ends of swing units there shall be provided 2 ft. fixed panels.

Storm Panels—Where indicated, provide 2-ft. storm panel, attached to intermediate and stationary end panels with steel plates, and to sill by clips. Panels shall be constructed so that they will underlap swing window unit, and shall be provided at sill with continuous drip, set over sill flashing.

When continuous windows are used in sidewall construction, Storm Panels shall be omitted and special channel type weathering substituted.

Hardware—All continuous windows shall be top hung on specially designed heavy iron butts, fitted with ⅜ in. brass pins. Hinges shall be spaced 4 ft. apart on centers. Butts shall be arc welded to head angle. Necessary bolts for attachment in the field shall be furnished.

Condensation Gutters—Where condensation gutters are shown on drawings, they shall be furnished and installed by another contractor.

Structural Supports—All structural work for support of continuous windows shall be provided by another contractor, who shall furnish a continuous angle not less than 3x3 in. with leg turned downward, against which the sill member of the window can weather to a depth of at least ¾ in.

Painting at Factory—(See specifications, page 3.)

Galvanizing—(See specifications, page 3.)

Provisions for Glazing—All continuous windows are to be glazed on the outside. All glass shall be secured by means of special glazing angle clips, fastened to jamb rails and muntin bars with bolts, furnished under this contract.

Glass—

Glazing—*Note: The following should be included in Specification for Glazing Work.*

Glazing—All glass shall be bed and face puttied with special steel window putty, containing not less than 50% pure linseed oil. A sufficient quantity of litharge to be mixed in by the glazier to insure rapid set up.

Erection—All continuous windows shall be set plumb and true, and aligned. Distortion of units, which might occur in shipment or handling, must be corrected in field before erection. After hanging, all swing units shall be accurately adjusted and fitted before glazing.

Inspection—(See specifications, page 3.)

BOTTOM HUNG WINDOWS

Specifications for bottom hung windows are similar to those on continuous top hung windows, with the following exceptions:

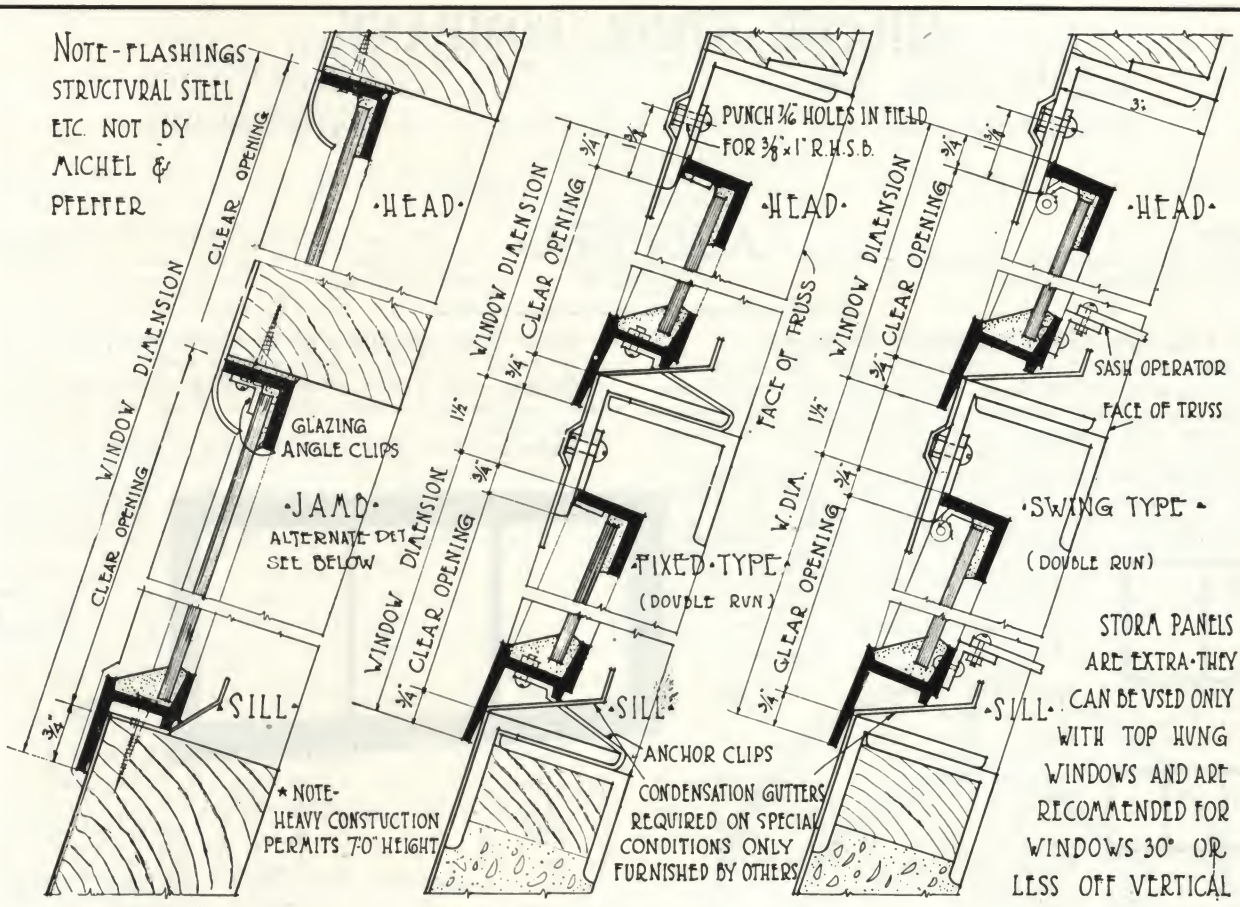
(1) Special T-bar is used for the head construction.

(2) A special angle section designed to take butt hinges is substituted for the specially rolled Z-bar sill member.

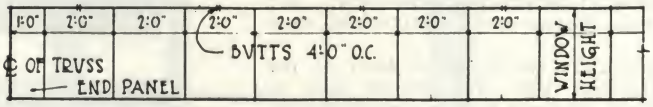
FIXED WINDOWS

Specifications for continuous fixed windows are the same as for continuous top hung windows, except that all window units are stationary. Special steel clips bolted to the window head and structural girts are substituted for butt hinges. Steel sill clips are furnished by MICHEL & PFEFFER IRON WORKS, and are bolted to the sill of the window and bent around steel sill girt to rigidly anchor window in position at the bottom.

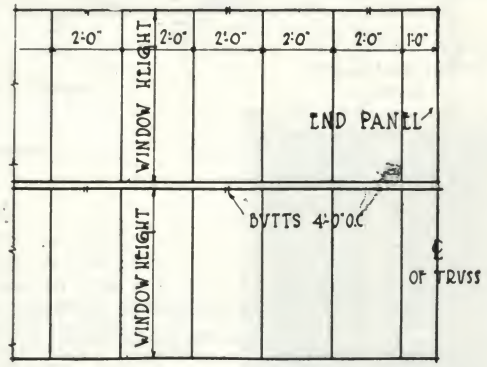
Continued on next page



·WINDOW·HEIGHT·	·CLEAR·OPENING·	·GLASS·HEIGHT·	·GLASS·WIDTH·
3'-0"	2'-10½"	2'-9½"	2 3½"
4'-0"	3'-10½"	3'-9½"	2 3½"
5'-0	4'-10½"	4'-9½"	2 3½"
6'-0"	5'-10½"	5'-9½"	2 3½"
★ 7'-0"	6'-10½"	6'-9½"	2 3½"



·ELEVATION·SINGLE·RUN·



·ELEVATION·DOUBLE·RUN·

·NOTES- CONTINUOUS SASH SHOULD BE CONTROLLED BY MECHANICAL OPERATORS·SASH MAY BE OPERATED IN SINGLE RUNS OR GROUPS·
·STANDARD UNITS ARE DESIGNED FOR TRUSS SPACINGS OF 20'-0" ON CENTERS BUT MAY BE OBTAINED TO FIT OPENINGS OF ANY SIZE OR RUN·

Note: Trusses on Girt Diagram are shown in a conventional manner in order to show relationship to girts.

ARISTON WINDOWS OF COPPER STEEL

INSTALLATION DETAILS
ARISTON CONTINUOUS WINDOWS

SCALE: 3 in. = 1 ft.

PLATE XXII

MILCOR STEEL COMPANY

MILWAUKEE, WIS. CANTON, OHIO
CHICAGO, ILL. KANSAS CITY, MO. LA CROSSE, WIS.
SALES OFFICES
BOSTON, MASS. DETROIT, MICH. ATLANTA, GA. LITTLE ROCK, ARK. MINNEAPOLIS, MINN.

Products

MILCOR ONE-PIECE STEEL BASEMENT WINDOWS.
MILCOR FIREPROOF WINDOWS.

MILCOR
TRADE-MARK
(Registered)

For our pages on Metal Tile Roofing and Metal Lath, Corner Beads, etc., see Manufacturers' Index.

Milcor One-piece Steel Basement Windows

Frame—Stamped from a solid sheet and formed without a joint. A solid integral flange projects from jambs, sill and head into masonry for anchorage and weathering. An integral fin on inside of jambs guides mason when setting the window and insures against fouling the sash.

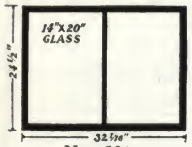
Sill—Special design provides protection against driving rain. Sill section slopes sharply downward and outward. Sloping and rounded corners prevent driven rain entering. At jambs, inside edge of frame is slightly turned in over sash providing further protection.

Sash—Formed in one piece, including hinge sections. Only glazing bars spot-welded in place. Glazing done from inside. Putty bed rests on channel formed when stamping sash. All Milcor steel sash are interchangeable in like frame sizes.

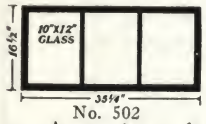
Lock—Type regularly used for double hung sash. Lever end is drilled for chain to hold window open.

Hinges—Cotter pins used for hinge coupling. Insures against unhinging as with open type hinges and makes sash easy to remove.

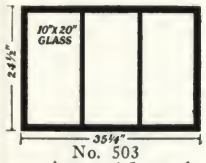
Bulletin—Write for bulletin giving complete description.



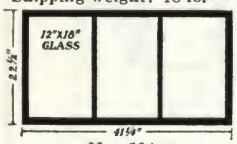
No. 501
Area: 2.5 sq. ft.
Shipping weight: 17 lb.



No. 502
Area: 4 sq. ft.
Shipping weight: 15 lb.

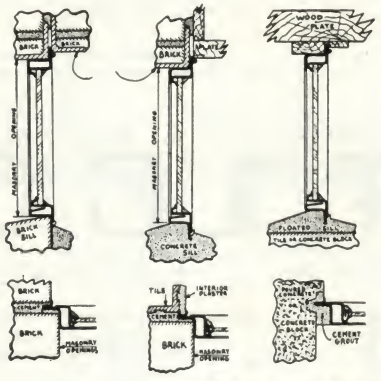


No. 503
Area: 4.5 sq. ft.
Shipping weight: 18 lb.



No. 504
Area: 4.5 sq. ft.
Shipping weight: 19 lb.

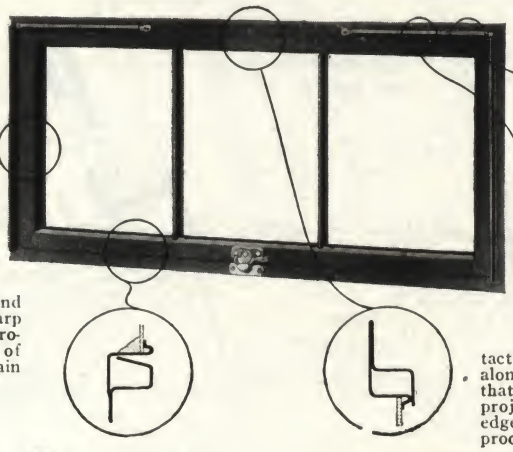
Frame and Glass Sizes



Installation Details

Note two-point contact of sash with one-piece frame at jamb insuring good weathering. Also channel where putty bed for glazing rests

Right: Frame and sash detail. Note sharp drop of sill and protecting overhang of sash. Driving rain cannot enter

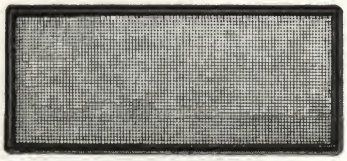


Hinge details are integral with frame and sash and are linked together with large cotter pins

Left: Two-point contact of sash with frame along headpiece. Note that the outside flange projects down beyond top edge of sash for weatherproofing



Right:
Milcor Steel Basement Window
Outside. Note wide anchorage flange



Right:
Steel Frame Screen for Milcor Basement Window
Screen frame screws tightly to window frame on outside, and is quickly secured in place or removed



S14 Double Hung or S16 Counterbalanced Window

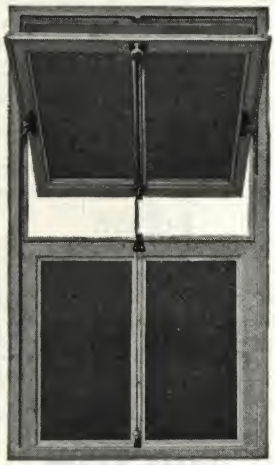
Milcor Fireproof Windows

Made of specially inspected No. 24 gauge galvanized sheet steel, and are hollow air channel construction throughout. We can also furnish windows in heavier weight galvanized sheet steel or pure copper.

Milcor Metal Windows carry the fireproof label of the Fire Underwriters' Laboratories, Inc. All pivoted sash on Milcor Fireproof Windows are equipped with two positive locking gravity locks, one at the top and one at the bottom of each sash. Each lock is attached to a chain which is designed to hold the sash open at any angle. Each length of chain has a link of fusible metal which melts at 165° F. If the window is open when a fire starts, the heat will melt this link; the chain will break and the window will close automatically.

Milcor Fireproof Windows are made with either square or segment (arched top) heads.

Write for complete information.



S4 Window
Lower sash stationary. Upper sash swings on off-center pivot

ESTABLISHED 1884

THE PHILADELPHIA SUPPLIES CO., INC.

SUCCESSORS TO P. DEISSLER & BRO.

All-metal Window Frames and Pivoted Window Ventilators

1741 North Sixth Street
PHILADELPHIA, PA.

Products

Sole manufacturers of the P. Deissler & Bro. patented PIVOTED VENTILATORS.

METAL FRAMES for church windows and the leaded glass trade.

BASEMENT WINDOW VENTILATORS for masonry or wood construction.

Also Skylights, Domes, and all other kinds of wrought iron work used in the leaded glass trade.

Improved Type All-metal Built-in Window Frames

Frames are made of steel or wrought iron as desired. They are built in as the building is in course of construction and make a rigid and everlasting weatherproof job. They are made in all styles—square, round or gothic top, and in any size or weight material desired. Used for leaded, plate, wire, ribbed or prism glass. Finish is either painted or galvanized.

Frames are made for storm glass outside and leaded glass inside or for single glazing.

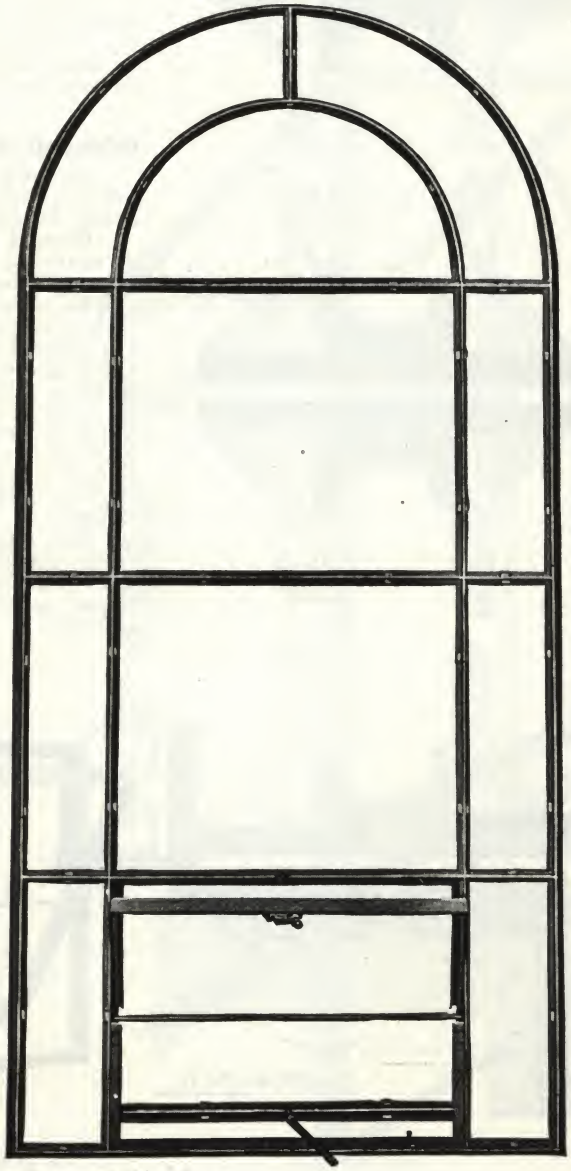
Ventilators can be put in the top, center or bottom of frames, and the inside swinging frames can be removed for glazing.

"Deissler" Improved Pivoted Ventilators

These ventilators have been specified for over 40 years as the standard church window ventilator. They are made of steel or wrought iron angles for single or double glazing and can be used for leaded, plate, wire, ribbed or prism glass. The inside frame of ventilators can be taken out and bars put in to suit the design. Finish is either painted or galvanized.

Where ventilators are in reach they are provided with spring lock at the top and lug at the bottom with strap for adjusting extent of opening. Ventilators out of reach should be specified with bottom heavy, self-closing; these are for the intermediate and bottom sections of windows. They are equipped with lock, pulley, bracket and chain fastener attached to the ventilator and are operated from the side with a chain. This eliminates the objection of cords or chains obstructing the design or view of the window.





Two Designs of Frames That Are Reasonable in Price

We also make special designed metal frames—any style, size or weight material desired

Continued on next page

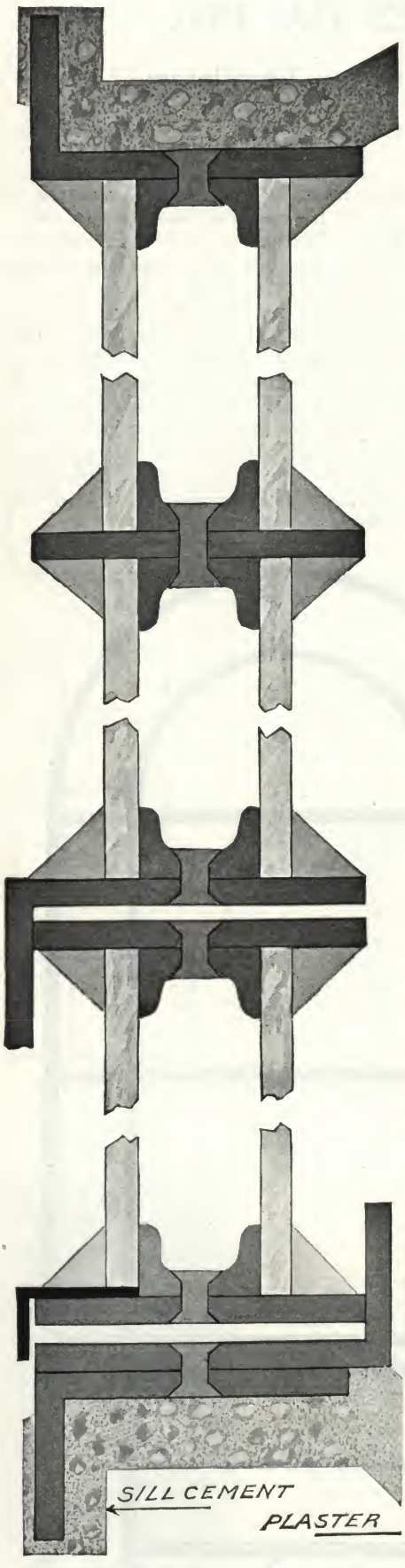


Fig. 1—Sectional View
(Full size)

Fig. 1. Sectional View (Full Size)

Illustrates a section of a metal frame for outside storm sash and inside leaded glass glazing. The double, double bottom ventilator shown is pivoted in the center to swing in at the top. Specify Catalogue No. 10 for double bottom ventilators where operation of sash is by spring lock at top and adjusting lug at the bottom; for the bottom heavy self-closing type adjusted by chain at the side specify Catalogue No. 38.

Fig. 2. Sectional View (Full Size)

Illustrates a section of a Te-iron metal frame for single glazing. Type illustrated is for building into masonry openings but it can be made with angle iron all around and screwed into rough wood openings. Can also be used where wooden frames have a rabbet in which case the angle iron on the outside is not required as the frames have turned ends on the mullion bars which can be screwed direct to the wood.

The ventilator is also for single glazing and pivoted in the center to swing in at the top.

Specify Catalogue No. 1 ventilator for the bottom; No. 2 for the middle, and No. 3 for the top. Hardware can be furnished the same as described for the Nos. 10 and 38 Double, Double Bottom Ventilators described above.

Information Required for Estimates

All-metal Window Frames — Send blue prints and specifications with list of bidders. Any charge for these will be gladly remitted.

Pivoted Window Ventilators—The quality of ventilators and style wanted; and if for leaded glass, give bar sizes.

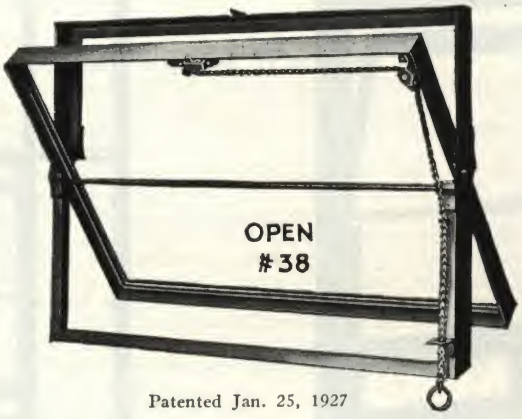
The sizes should be taken from the outside of angle iron, giving the width first, then the height. For rabbeted work, sizes should be taken full size.

In grooved mullions or jambs, the sizes should be taken daylight size.

State if ventilators are to be placed in top, middle or bottom of window, and if they fit in wood all around; and, also, if they are to be painted or galvanized.

For domes, skylights or iron work, send sketches.

Sizes, shapes and quantities vary so considerably, that it is impossible for us to issue a reliable price list. We will be glad to prepare a special estimate on receipt of specifications and quantities.



Patented Jan. 25, 1927

No. 38 Bottom Heavy Self-closing Ventilator

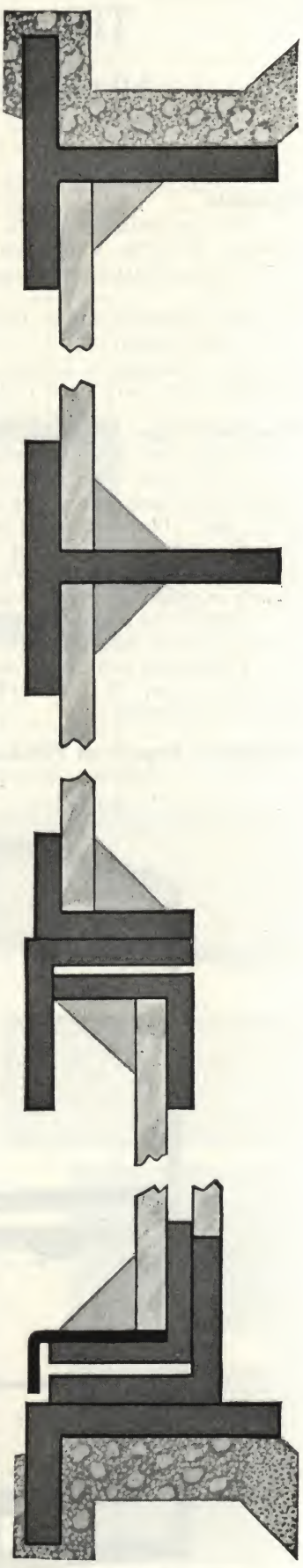


Fig. 2—Sectional View
(Full size)

Details of P. Deissler & Bro. Pivoted Ventilators and Metal Frames

Continued on next page

The Improved Projection Type, Built-in Window Frames and Ventilators for Public Buildings and Churches

No. 60 Frame for Double Glazing—The No. 60 frame is our improved built-in steel frame with the projection type ventilators. Most adaptable for double glazing—for leaded glass inside with storm glass on the outside. Projection ventilators can be made to project outward or open inside.

The frame and ventilators are absolutely weatherproof. They can be arranged to hold glass with glazing clips, spring clips, or glazing beads. Be sure to specify which you wish, as the glazing beads come slightly higher in price.

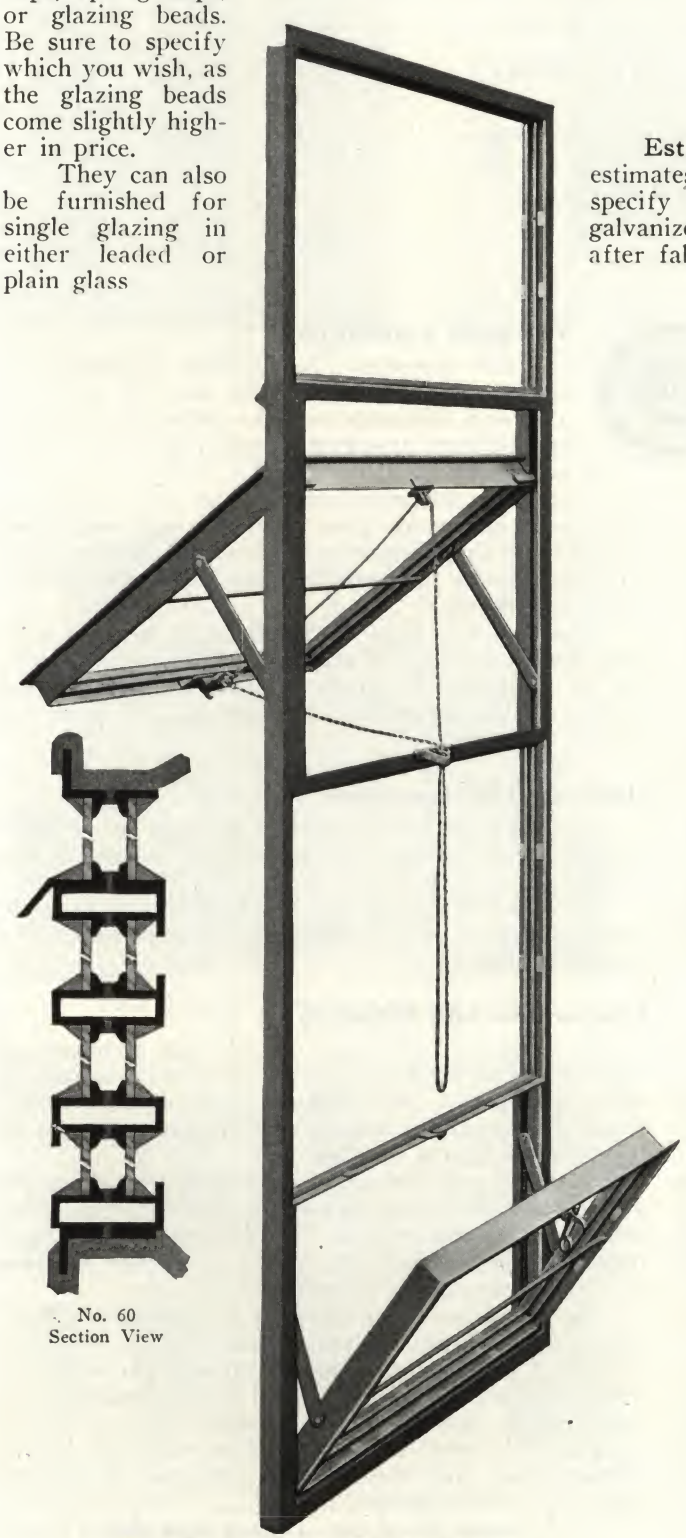
They can also be furnished for single glazing in either leaded or plain glass

No. 61 Frame for Single Glazing—The No. 61 frame is our improved built-in steel frame with projection type ventilators. Most adaptable for single glazing.

The frame and ventilators are absolutely weatherproof.

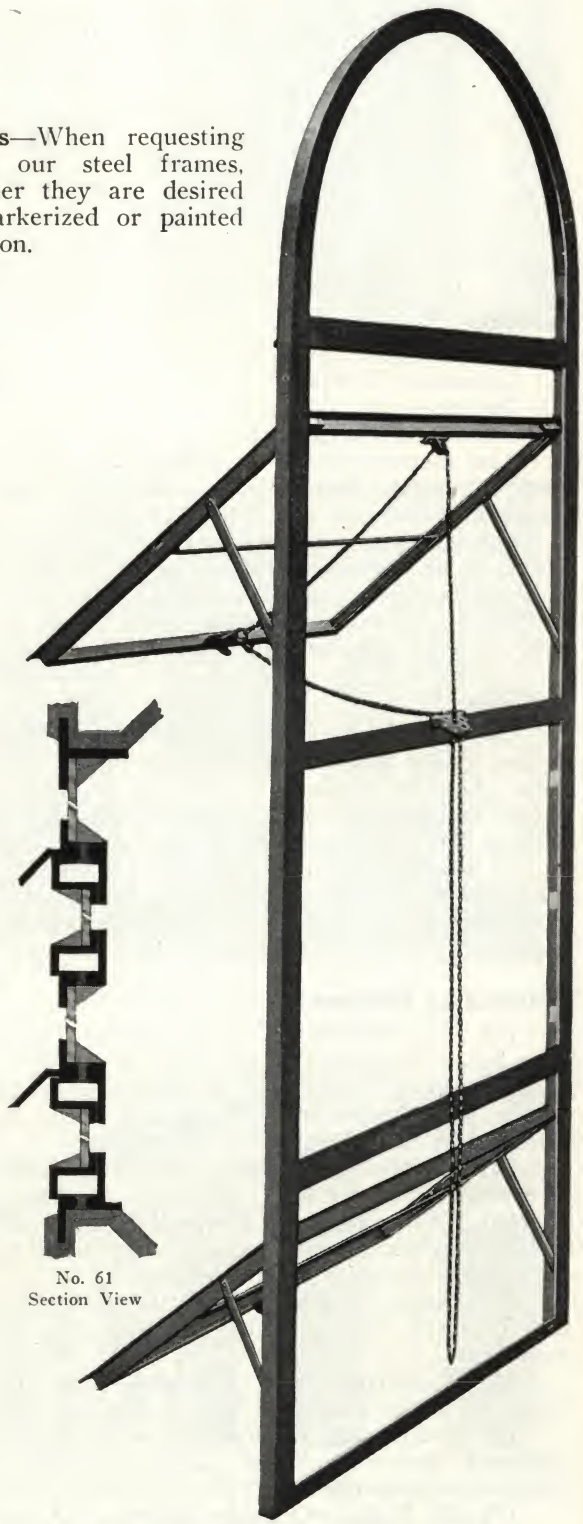
Frame can be furnished in either round top gothic head or square.

Estimates—When requesting estimates on our steel frames, specify whether they are desired galvanized, parkerized or painted after fabrication.



No. 60
Section View

No. 60 Improved Built-in Steel Frame



No. 61
Section View

No. 61 Improved Built-in Steel Frame

THE NEWMAN MANUFACTURING CO.

FOUNDED 1882

Bronze, Aluminum and Nickel Windows
(Double-hung, Casement, Pivoted, Fixed)

MAIN OFFICE AND PLANT
CINCINNATI, OHIO

BRANCHES: CHICAGO AND NEW YORK

SALES OFFICES IN 84 CITIES

Products

PIVOTED-SASH WINDOWS.
CASEMENT WINDOWS.
DOUBLE-HUNG WINDOWS.
STATIONARY WINDOWS.

Also manufacturers of Bronze and Aluminum Transoms, Side Grilles, Overhead Fan-lights, complete Storefronts and similar products.

For our pages on Ornamental Brass and Bronze Work, Solid, Kalamein, Hollow and Extruded Doors, Storefronts, Grilles, see Manufacturers' Index.

For Iron Work and Lighting Fixtures, see our Midwest Metal Art Division in Manufacturers' Index.

Facilities

Our facilities for hand-crafting all types of genuine bronze, nickel and aluminum windows are second to none. Newman windows are built up of hollow or extruded members, or these two in combination, with or without cast ornamentations, as may be most expedient.

In our gigantic new plant are 226,000 sq. ft. of space devoted to the fabricating of high grade bronze and aluminum work. We employ 450 skilled craftsmen.

Outstanding Features

(1) Adaptability—Newman Double Hung Windows are so designed that they may be readily adapted to any building of any type of architecture, regardless of size, and whether new or being renovated. In other words, there is a design for every building.

(2) Positive Permanence—Built of "the metals of everlasting beauty."

(3) No Maintenance Cost—Require no attention, and are foolproof and practically impossible to wear out, thus eliminating up-keep expense.

(4) Inside Setting—Ingenious construction permits of inside setting, which eliminates the need for scaffolding.

(5) Watertight and Airtight—Best from the viewpoint of the owner, because they reduce fuel costs.

(6) Facility of Adjustment—Parting strips are removable over entire length, facilitating adjustment of sashes or sash weights.

(7) No Visible Outside Screws—All glazing is done from the inside.

Two-point Construction

For Newman Double-hung Windows we recommend and customarily use our new and improved two-point contact construction (patents applied for) as specified and endorsed by many prominent U. S. architects.

Using this ingenious method, we are enabled to fabricate windows of great strength and undoubted durability, so simplified as to construction that the prices are astonishingly low, quality, appearance and permanence considered.

Also we specialize in standard three-point construction windows of all standard types. In fact, there are no limits to the kinds of plain and ornamental windows of bronze, nickel and aluminum which we can manufacture.

Hardware and Accessories

Any and all standard types of cast or wrought hardware are suitable for application to all of our windows.

Newman Windows may be supplied with or without windshields, heat screens and fly screens of any preferred make.

Co-operation with Architects

It is always a pleasure to work with architects on their problems involving the use of metal windows of every description. We welcome opportunities to offer pertinent suggestions and submit detailed estimates of cost, free of charge or obligation.

In addition to the details reproduced on the pages immediately following, we have on file numerous other so-called standard designs, for all purposes, and upon request we will supply blueprints or special sketches to conform to the requirements of the job.

Special windows of all kinds are among our leading specialties, and you are cordially invited to solicit the aid of our Engineering Department whenever you detail or specify windows. Our 35 draftsmen are at your service, and they are prepared to work up the complete job from the opening sizes, with the distinct understanding that sketches and estimates of cost are positively free of charge.

Full size details of any of the designs shown herein will be sent upon request.

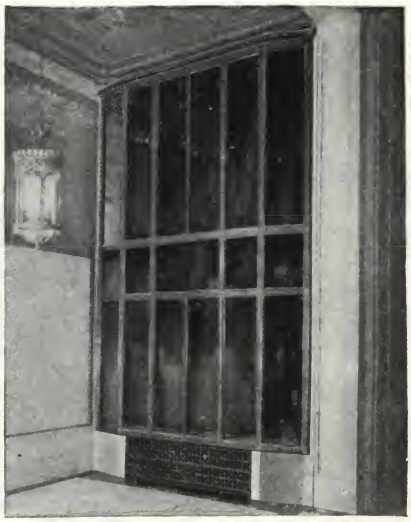
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Museum of Art, Baltimore, Md.
JOHN RUSSELL POPE, Architect



Commercial Loan & Trust Co.
San Antonio, Tex.
PHELPS & DEWEES, Architects



Book Tower Annex, Detroit, Mich.
ALBERT KAHN, Architect

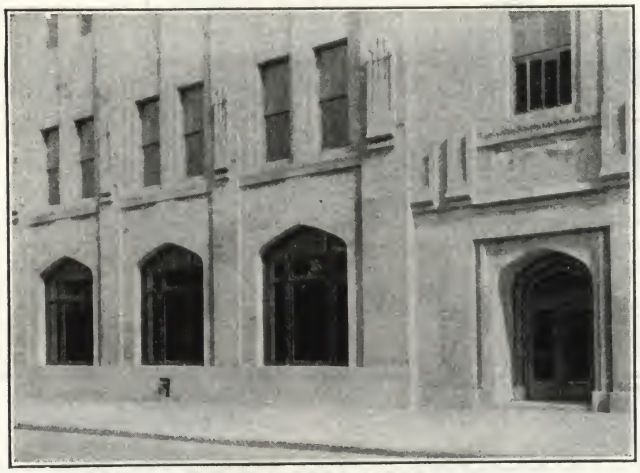
A Few of Hundreds of Installations of Newman Windows



First Camden Trust Co., Camden, N. J.
SIMON & SIMON, Architects



City National Bank, Miami, Fla.
R. DE C. WEAKLEY, Architect



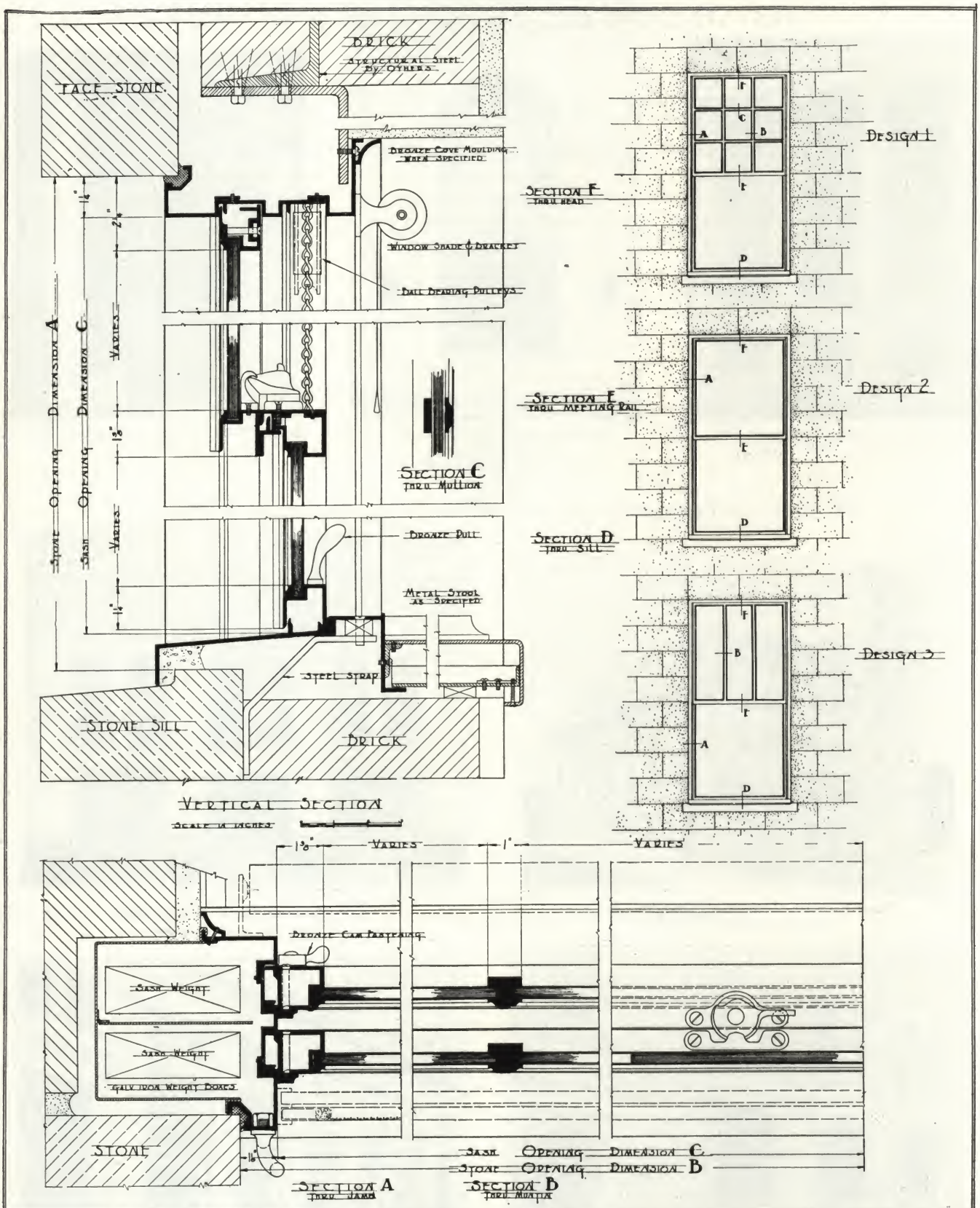
Telephone Building, Bridgeport, Conn.
R. W. FOOTE, Architect



Union Gas & Electric Building, Cincinnati, Ohio
GARBER & WOODWARD, Architects

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NEWMAN BRONZE AND ALUMINUM WINDOWS



THE NEWMAN MFG. CO.
NORWOOD P.O. STA.
CINCINNATI. O.

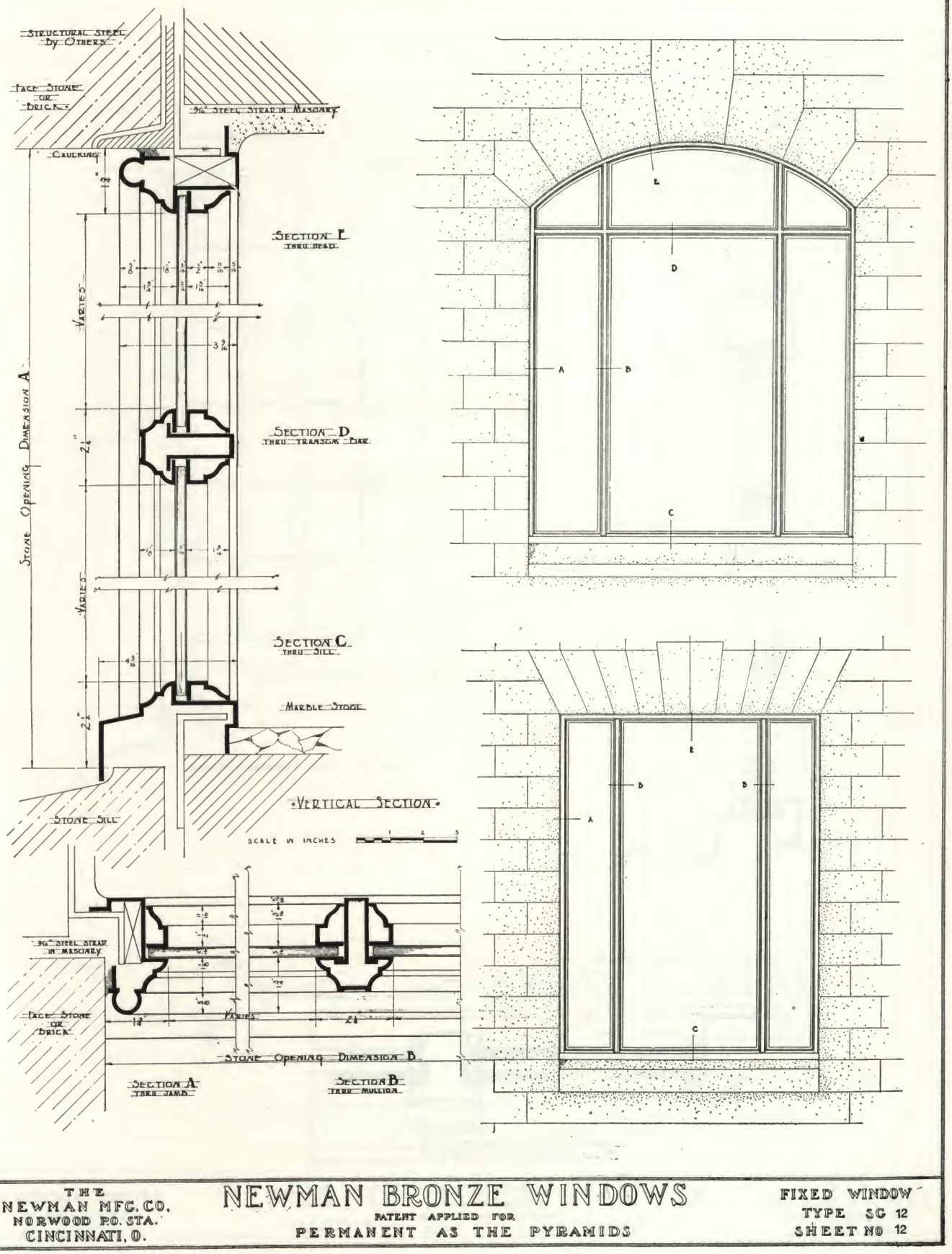
NEWMAN BRONZE WINDOWS

PATENT APPLIED FOR
PERMANENT AS THE PYRAMIDS

DOUBLE HUNG WINDOW
TYPE DH
SHEET NO 9

Continued on next page

NEWMAN BRONZE AND ALUMINUM WINDOWS



THE NEWMAN MFG. CO. NORWOOD P.O. STA. CINCINNATI, O.

NEWMAN BRONZE WINDOWS

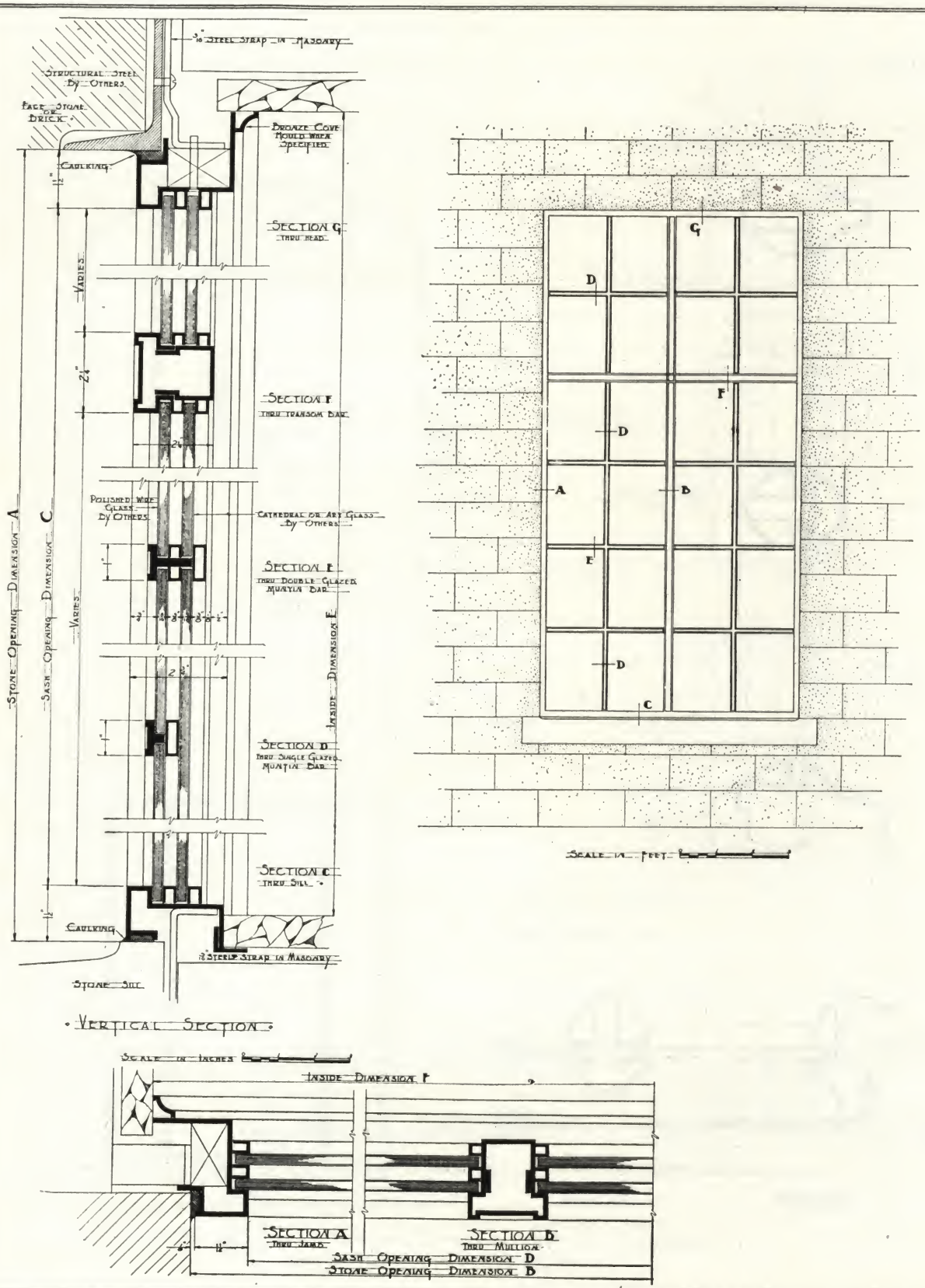
PATENT APPLIED FOR

PERMANENT AS THE PYRAMIDS

FIXED WINDOW
TYPE SG 12
SHEET NO 12

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NEWMAN BRONZE AND ALUMINUM WINDOWS



THE NEWMAN MFG. CO.
NORWOOD P.O. STA.
CINCINNATI, O.

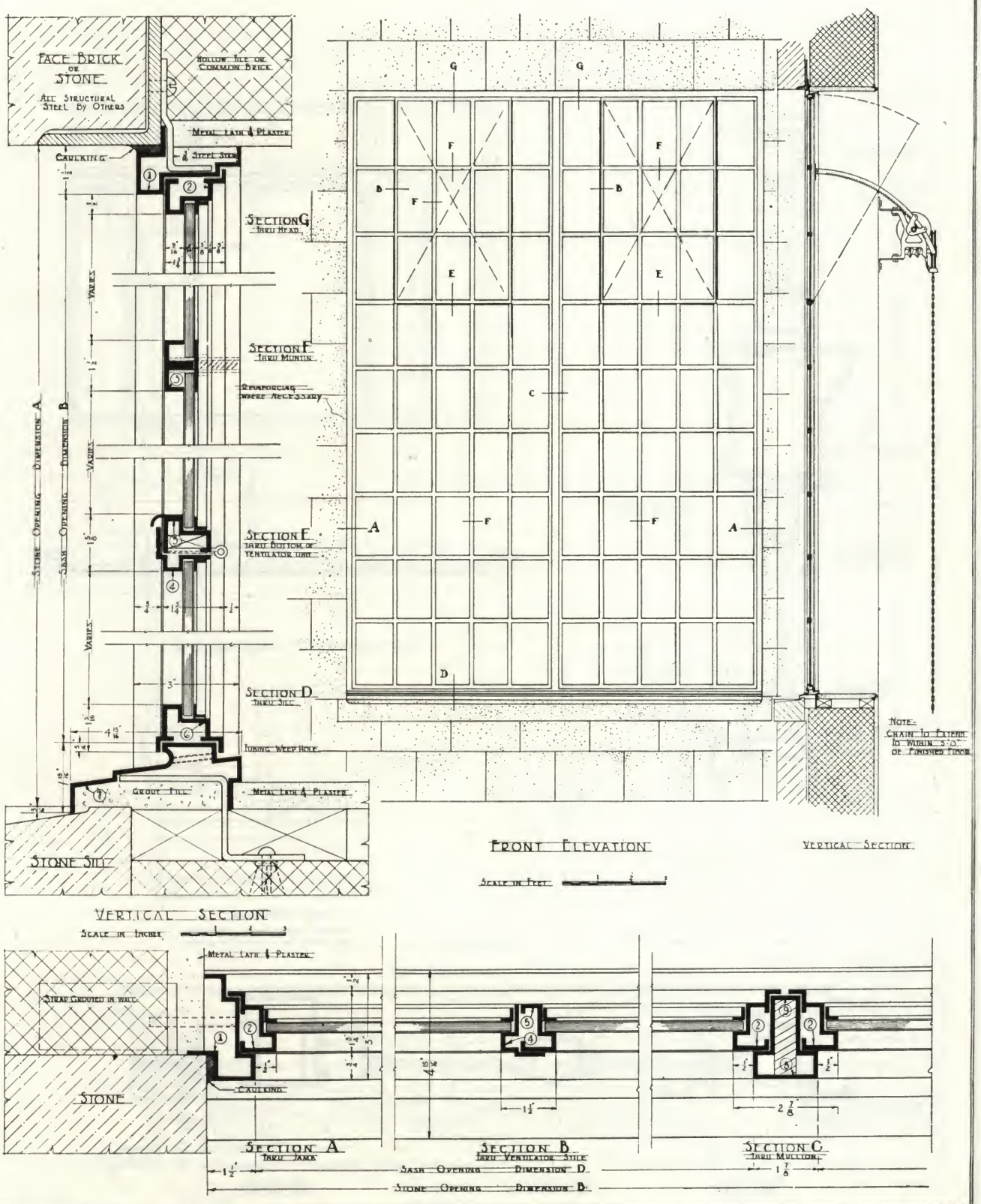
NEWMAN BRONZE WINDOWS

PATENT APPLIED FOR
PERMANENT AS THE PYRAMIDS

FIXED WINDOW
TYPE DG 13
SHEET NO 13

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NEWMAN BRONZE AND ALUMINUM WINDOWS



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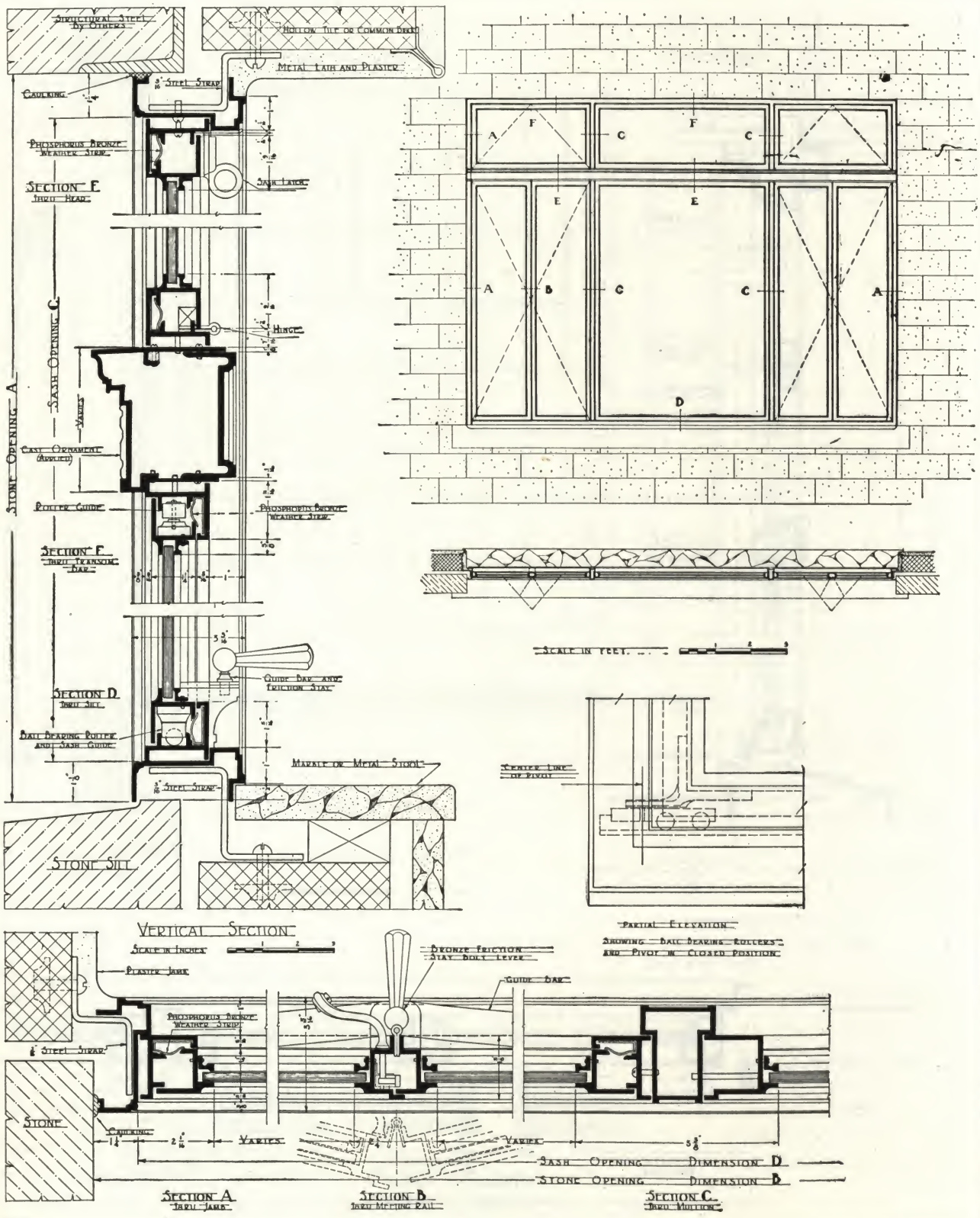
NEWMAN BRONZE CASEMENTS

PATENT APPLIED FOR
"PERMANENT AS THE PYRAMIDS"

FIXED WINDOW
TYPE VJ 11
SHEET NO 11

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NEWMAN BRONZE AND ALUMINUM WINDOWS

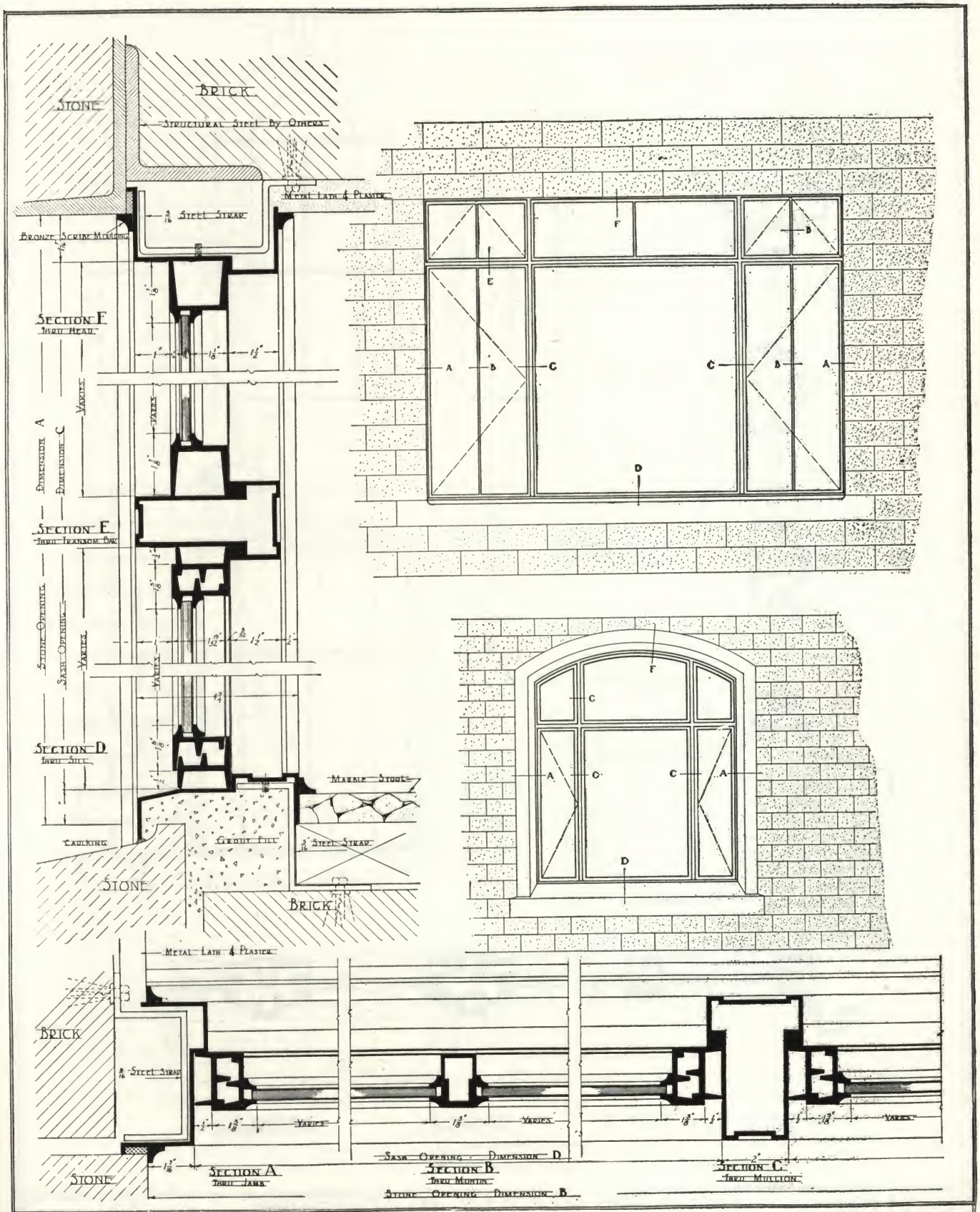


Details of NEWMAN BRONZE CASEMENTS

SHEET 8
TYPE CW8

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NEWMAN BRONZE AND ALUMINUM WINDOWS

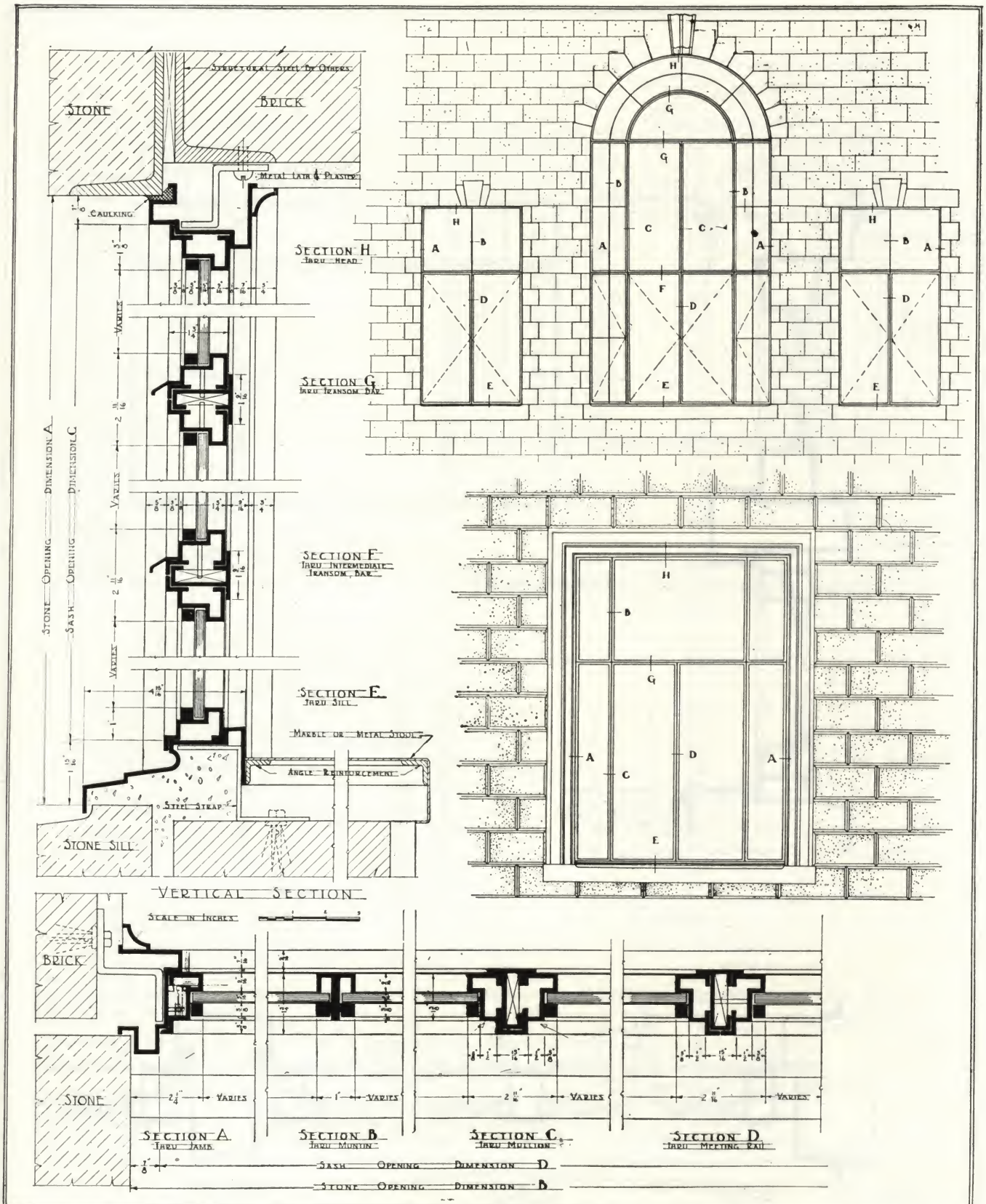


Details of NEWMAN BRONZE CASEMENTS

SHEET 6
TYPE CW6

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NEWMAN BRONZE AND ALUMINUM WINDOWS



THE NEWMAN MFG. CO.
NORWOOD P.O. STA.
CINCINNATI, O.

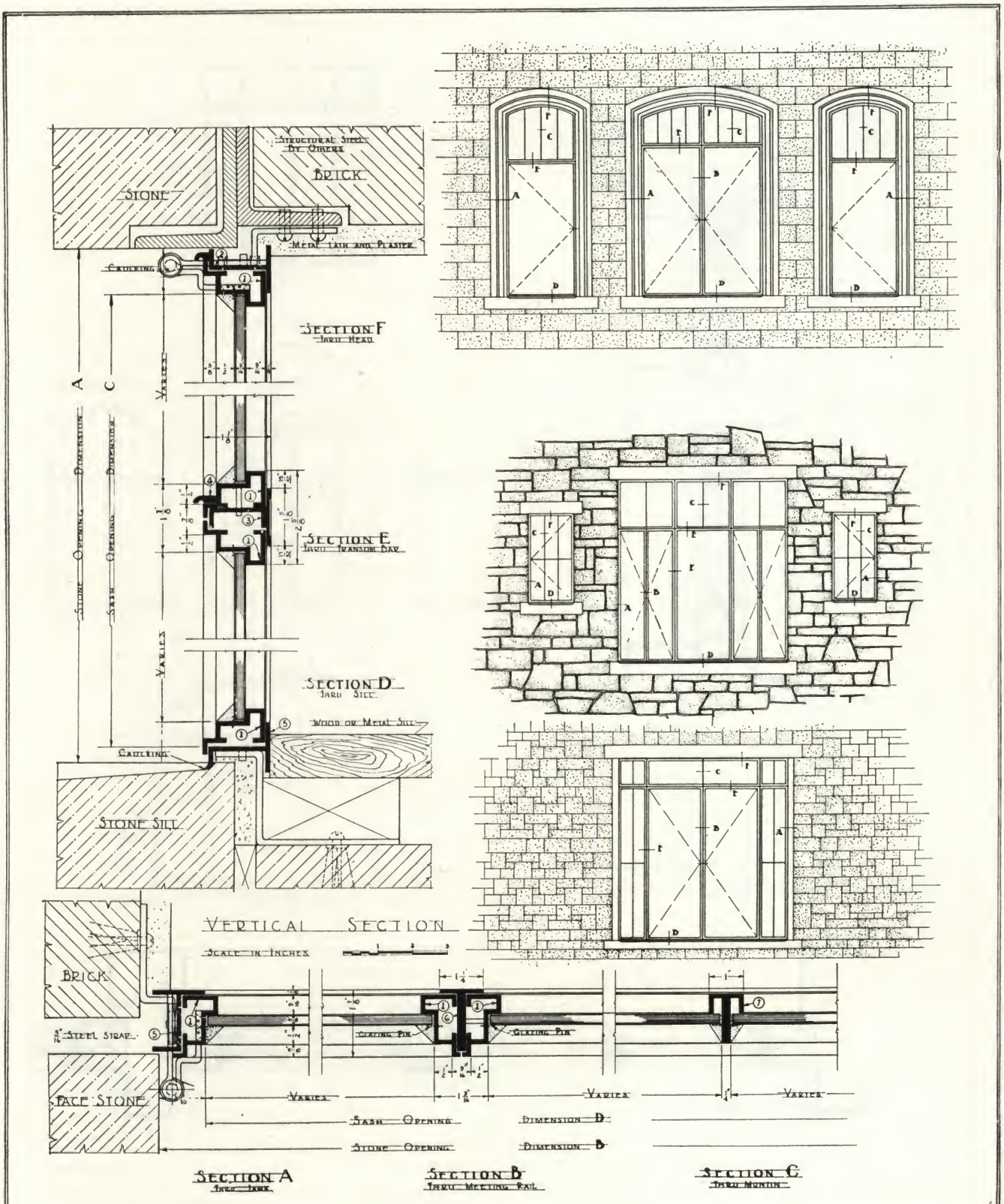
NEWMAN BRONZE CASEMENTS

PATENT APPLIED FOR
"PERMANENT AS THE PYRAMIDS"

CASEMENT WINDOW
TYPE CW 4
SHEET NO. 4

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NEWMAN BRONZE AND ALUMINUM WINDOWS



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CINCINNATI, O.

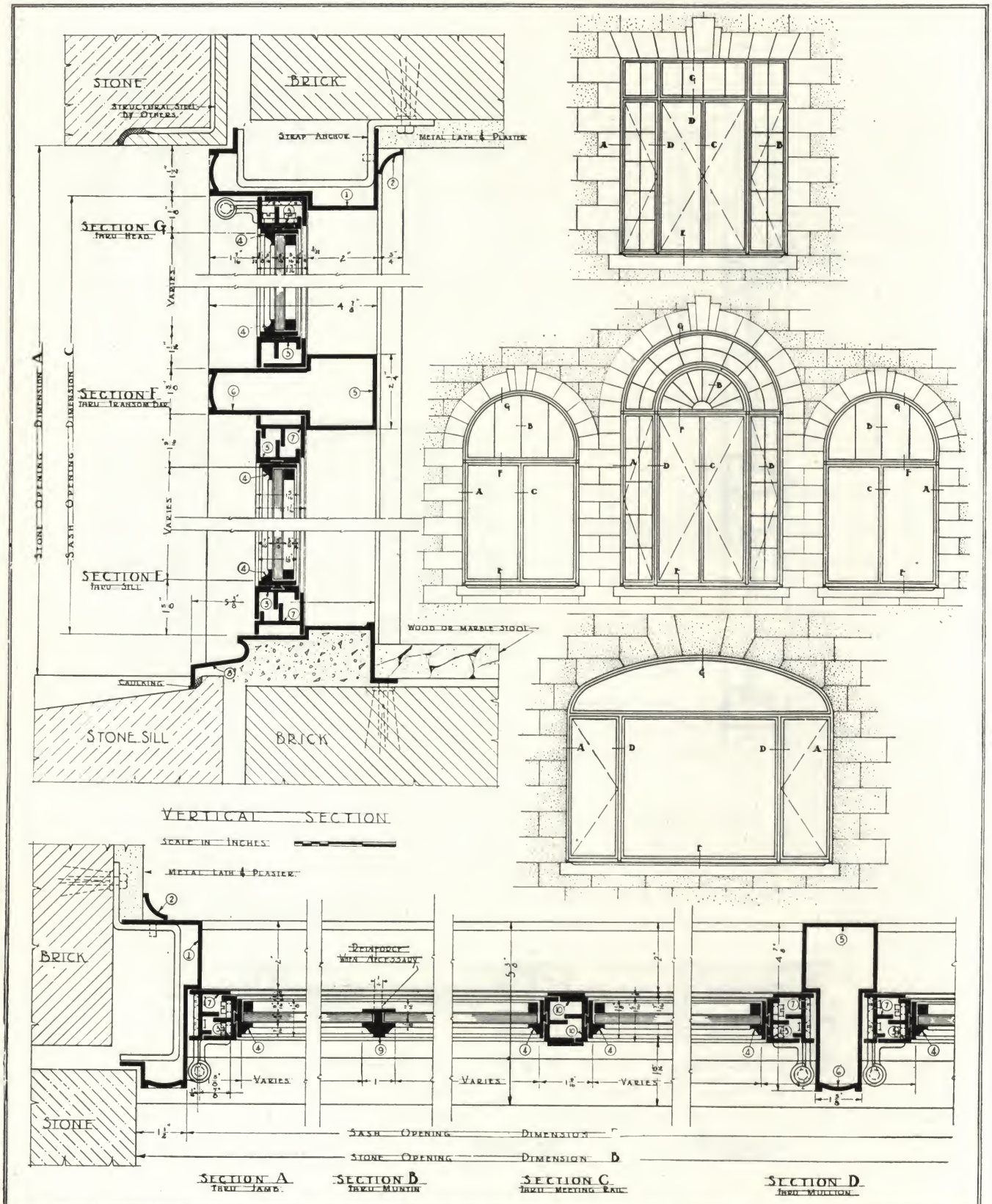
NEWMAN BRONZE CASEMENTS

PATENT APPLIED FOR
"PERMANENT AS THE PYRAMIDS"

CASEMENT WINDOW
TYPE CW 3
SHEET NO 3

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NEWMAN BRONZE AND ALUMINUM WINDOWS



THE NEWMAN MFG. CO.
NORWOOD P.O. STA.
CINCINNATI, O.

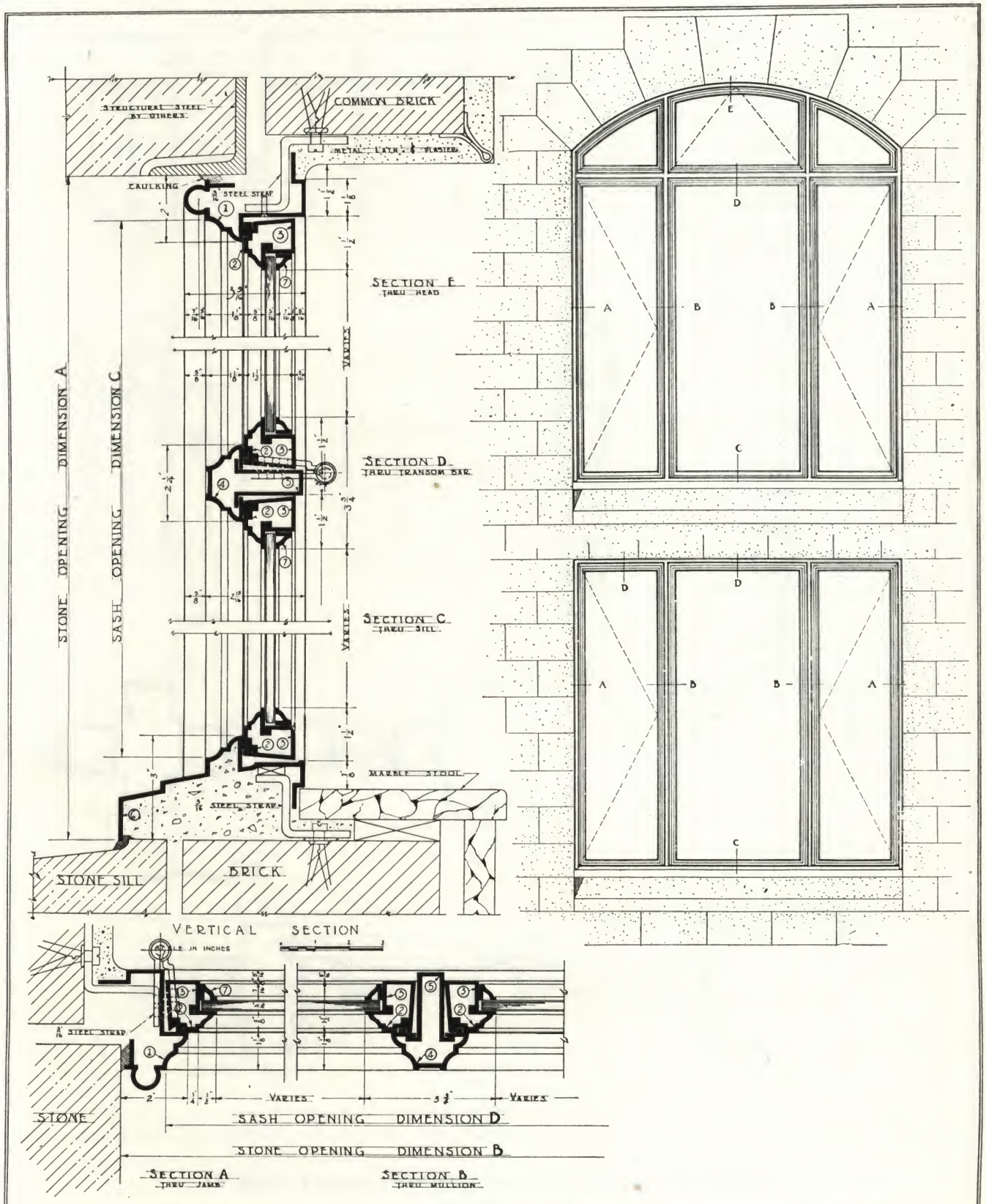
NEWMAN BRONZE CASEMENTS

PATENT APPLIED FOR
"PERMANENT AS THE PYRAMIDS"

CASEMENT WINDOW
TYPE CW 5
SHEET NO. 5

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NEWMAN BRONZE AND ALUMINUM WINDOWS

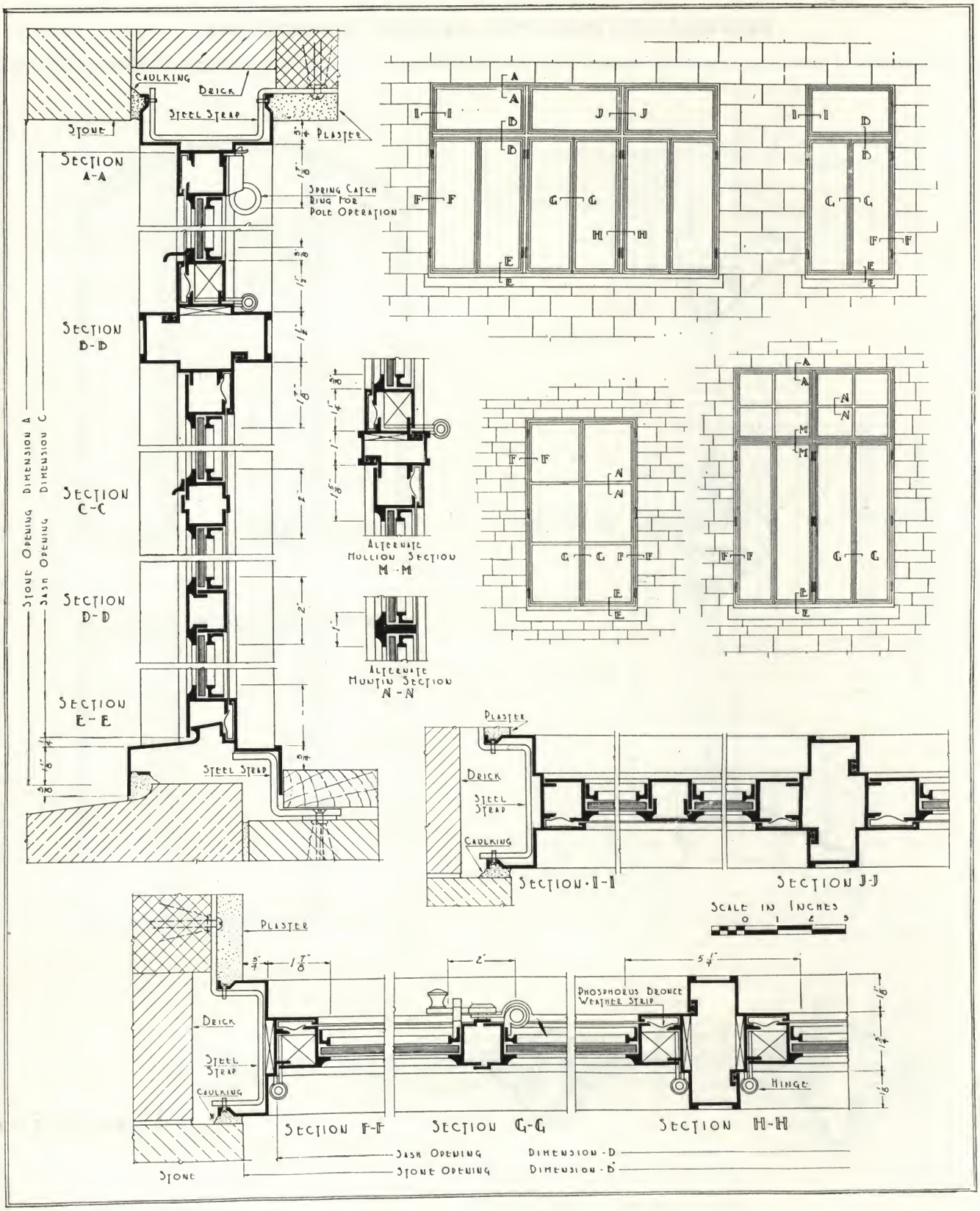


THE NEWMAN MFG. CO.
NORWOOD P.O. STA.
CINCINNATI, O.

NEWMAN BRONZE WINDOWS

PATENT APPLIED FOR
PERMANENT AS THE PYRAMIDS

CASEMENT WINDOW
TYPE CW 7
SHEET NO 7



Details of New and Improved Newman Casement Window

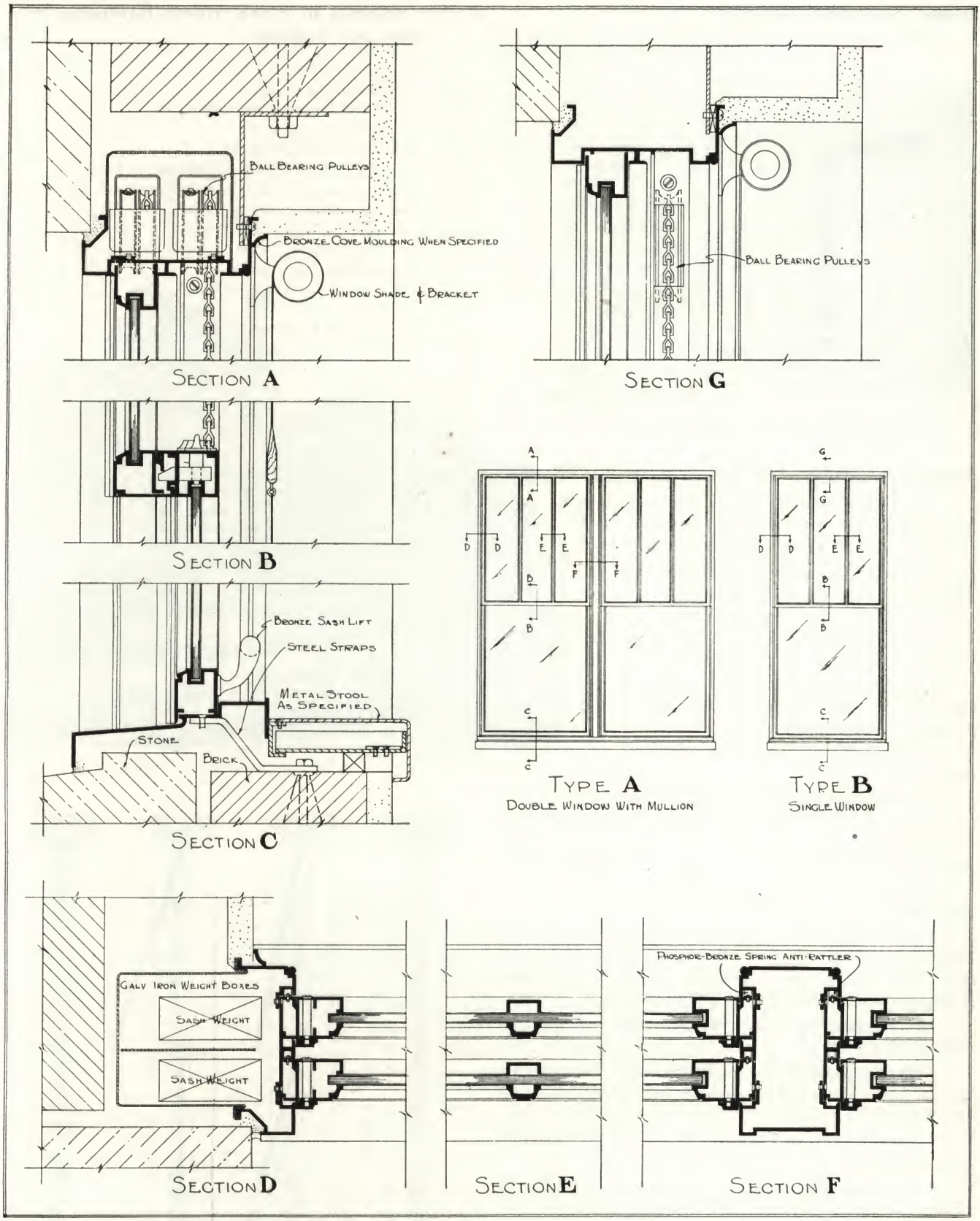
(Patents applied for)

Please write to us for full information on this improved window, made of bronze, aluminum or nickel, in all styles and sizes to order.

This is the new Newman "2-point contact" window, with phosphor bronze weatherstripping on all four sides, making this an absolutely weatherproof window.

Details to suit special conditions will be prepared and sent to you immediately upon receipt of data, without charge or obligation.

Continued on next page



Details of New and Improved Newman Double Hung Window

(Patents applied for)

The latest addition to the Newman line is this greatly improved double hung window, made of bronze, aluminum or nickel, in either single or double style, and in any needed size. This window has a new type of meeting stile that makes for a positively weatherproof contact. It has concealed cam fasteners at the meeting stiles. It also has phosphor bronze anti-rattling devices at the jambs.

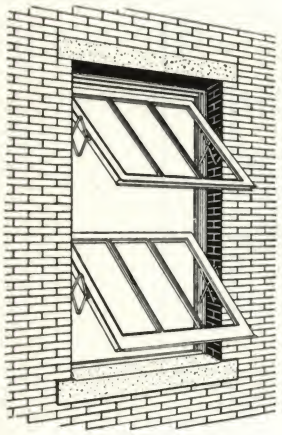
Write for additional details, suggested specifications, and estimates of cost.

Continued on next page

Wilson Reversible Windows

THE NEWMAN MANUFACTURING CO. takes great pleasure in announcing the addition to its line of the famous "Wilson Reversible Window," now offered in bronze, aluminum, nickel and steel, in all sizes to suit conditions.

Write for blue prints from detailed drawings, mentioning the metal in which you are interested. Specifications, sketches and estimates are free of obligation.



Wilson Reversible Window

Patents

Wilson Reversible Windows are fully covered by U. S. Patents 1193101 and 1565975.

Special Advantages of the Wilson Reversible Window

(1) Cheaper to Make—It eliminates weights, pulleys and chains, and takes less material in the frame, and saves the expense of the window cleaning device.

(2) Can Be Cleaned from Inside of Building—This means the saving of accidents, and, consequently, a reduction of the insurance risk.

(3) Ventilation—100% ventilation when desired, versus double hung maximum 50%.

(4) Light—Several more inches all around, because frame and mullions are narrower. Specially important in school buildings.

(5) Noiseless—Free from rattling even when open.

(6) Weathertight—Without weatherstrips it is claimed to be the tightest window on the market, and it is especially easy to weatherstrip because it does not wear out the weatherstrips by sliding across their faces.

(7) When partly open, it admits air while excluding rain.

(8) Shades—With shades that travel with the sash, tilting when the sash tilts, it makes an ideal awning. With lower sash curtained, it admits air while giving privacy, valued in hotel bedrooms.

(9) Re-glazing and Re-painting—These are done from the inside.

(10) Burglarproof—In shutting the window you use the lock as a handle and therefore cannot forget to lock it; and the lock cannot be reached from the outside.

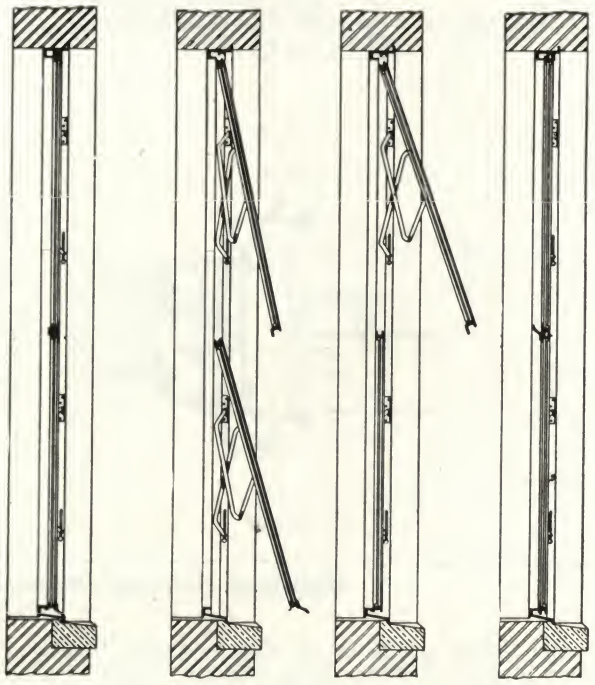
(11) Cheaper to Ship—About one-half the shipping weight.

(12) Cheaper to Erect—Frames are erected with sashes already in position. The hanging of sashes and weights are thus avoided.

(13) Completely Reversible—It is the only window on the market that is completely reversible, that is when the sash are in a reversed position the entire opening is closed; thus during the whole operation of cleaning, it almost entirely excludes wind and cold air, a very important point in cold weather.

A Few Buildings in Which Wilson Reversible Windows Are Installed

BUILDING AND LOCATION	WINDOWS
Powers Building, Decatur, Ill.	975
Bloomington High School, Bloomington, Ill.	275
Lewis Building, Champaign, Ill.	80
Robinson Building, Champaign, Ill.	122
Citizens National Bank Building, Independence, Kan.	140
Commercial National Bank Building, Independence, Kan.	90
Wilson-Hawkins Building, Akron, Ohio	24
Mt. Sinai Hospital, Philadelphia, Pa.	24
Simons Building, Spokane, Wash.	50
Y. M. C. A. Building, Lima, Ohio	250
Y. M. C. A. Central Building, Cincinnati, Ohio	1534
Y. M. C. A. Building, Fort Wayne, Ind.	244
Brown Co. Hospital, Binghamton, N. Y.	76
Simmonds Building, Kenosha, Wis.	235
Salvage Corp Station, Indianapolis, Ind.	39
Waggoner Building, Fort Worth, Tex.	814
Citizens National Bank Building, Wichita Falls, Tex.	439
School Building, Pensacola, Fla.	28
Tampa Church, Tampa, Fla.	58
Pensacola High School, Pensacola, Fla.	380
New Palestine School, New Palestine, Ind.	108
Valas & Spare Apartment, Indianapolis, Ind.	21
Morrison School, Morrison, Ill.	34
First National Bank, Springfield, Ill.	136
Factory Building, Chicago, Ill.	138
Y. M. C. A. Hotel, Chicago, Ill.	2082
Lyon & Healy Building, Chicago, Ill.	93
Dawes Hotel, Chicago, Ill.	292
Illinois Central Office Building, Chicago, Ill.	897
Tibatha Hospital, Chicago, Ill.	149
Karpen Building, Chicago, Ill.	255
Goetz Apartment, Chicago, Ill.	103
Woods Office Building, Chicago, Ill.	234
Standard Accident Building, Detroit, Mich.	794



Positions of Wilson Windows

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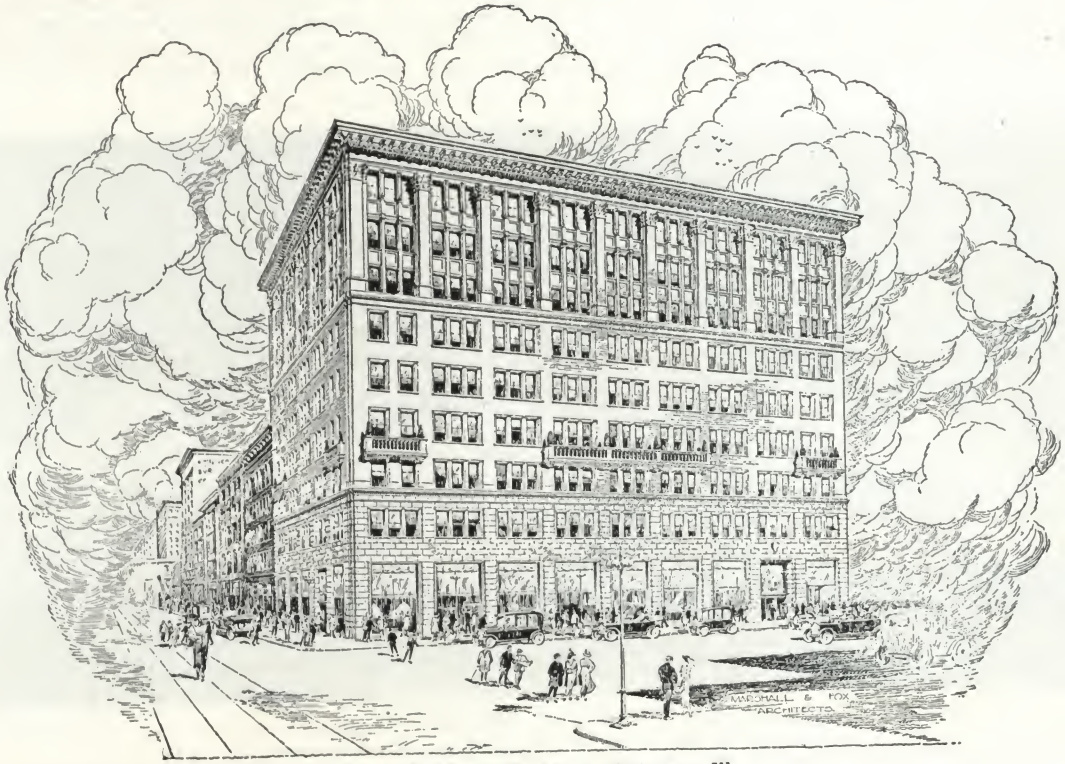
Typical Installations of Wilson Reversible Windows



Central Y. M. C. A., Cincinnati, Ohio



Illinois Central Office Building, Chicago, Ill.



Lyon & Healy Building, Chicago, Ill.

S. H. POMEROY CO., INC.

Double Hung Metal Windows in Steel and Bronze

280-296 East 134th Street, NEW YORK, N. Y.

LOCAL REPRESENTATIVES

ATLANTA, GA., George Dowman, 462 Highland Avenue N. E.
BIRMINGHAM, ALA., J. O. Burks, 1008 Martin Building
BOSTON, MASS., Skillman & Sunderland Co., 1042 Little Building
BUFFALO, N. Y., Wm. Kraetz, 505 Delaware Avenue
CHARLOTTE, N. C., W. Fred Casey & Co., 507 No. Tryon Street
CHICAGO, ILL., Kasson Steel Products Co., 360 No. Michigan Avenue
CINCINNATI, OHIO, L. D. Zellner Co., 622 Broadway
CLEVELAND, OHIO, Mills Co., 965 Wayside Road
COLUMBUS, OHIO, Alvan Tallmadge, 63 Parkwood Avenue
DALLAS, TEX., Pinkston-Mason Co., 710 Construction Building
DETROIT, MICH., J. W. Rollinson Specialties Co., 2270 Penobscot Building
MINNEAPOLIS, MINN., John F. Hurley Co., 711 National Building
NEW ORLEANS, LA., J. T. Mann & Co., Inc., 319 Dryades Street
PHILADELPHIA, PA., Thos. S. Gassner Co., 4545 Wayne Avenue
PITTSBURGH, PA., Norman C. Brown, Park Building
RICHMOND, VA., James S. Archer, 202 Davis Building
ST. LOUIS, MO., John Wasson Co., Paul Brown Building
SAN FRANCISCO, CAL., H. E. Root, 639 Howard Street
TAMPA, FLA., Stovall & Archer, 1009 Peninsular Telephone Building
WASHINGTON, D. C., A. B. Gilbert, 1427 Eye Street N. W.

IN CANADA: Cresswell-Pomeroy, Ltd., 3989 St. Ambroise Street, MONTREAL, P. Q.

A Pioneer Manufacturer of Metal Windows

The S. H. Pomeroy Co. Inc., was a pioneer manufacturer of metal windows. It has been engaged in perfecting window design and adaptability for over 30 years, during which time many prominent installations have been made. It now offers its—

"Superior Type" Heavy Metal Double Hung Window

Superior Metal—This window is made throughout of hot dipped galvanized copper-bearing steel. It is painted with a special galvanized iron primer made to our order.

Note: Committee A-5 American Society for Testing Materials:

"We have now reached a point where we may definitely conclude that copper-bearing metal shows marked superiority in rust-resisting properties as compared to non-copper-bearing metal of substantially the same general composition . . . under atmospheric exposure."

Superior Distribution of Metal—Structural and wearing portions of frame and sash of No. 14 and No. 18 gauge metal, viz.: sill, No. 14 gauge; pulley stiles, head and vertical rails of sash, No. 18 gauge; jamb boxes and cross rails of sash, No. 20 gauge.

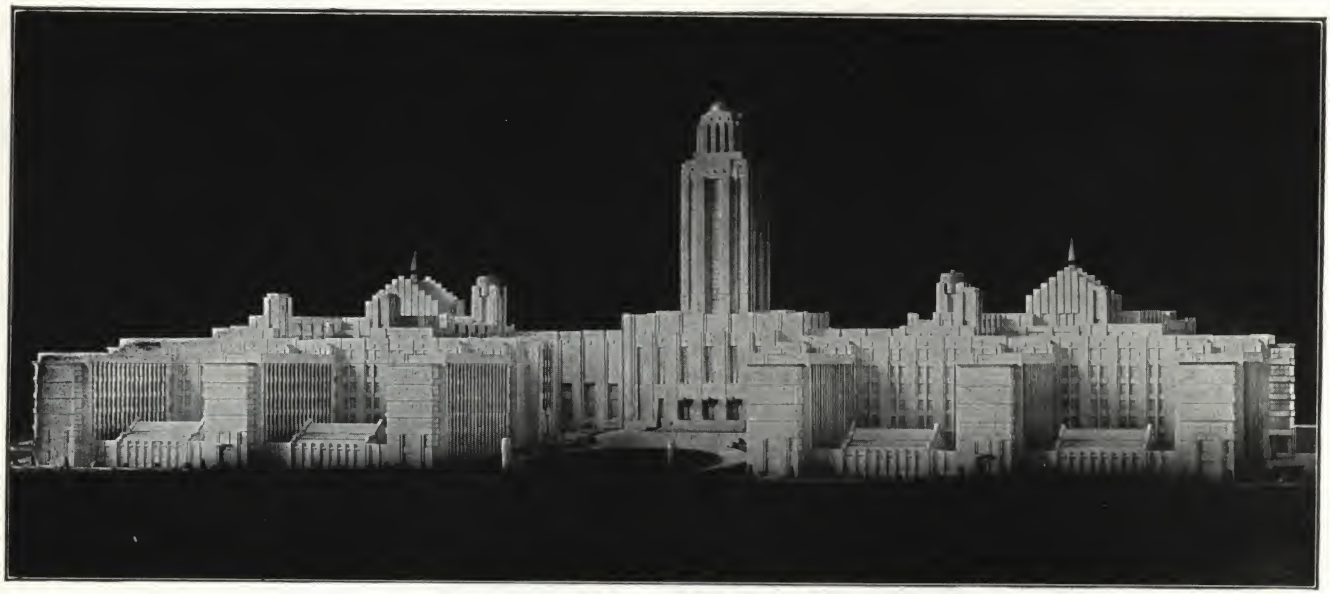
Superior Weathering—Two-point contact inside and out entire perimeter of both sash, making double weathering.

Superior Light—Due to small sash and frame members, maximum sight glass area is obtained.

Width of standard muntin 1 in., Underwriters' muntin 1¾ in.

Superior Appearance—Compare the slender lines, the simplicity and dignity of design with other metal windows. Note the absence of rivet and screw heads, bolts, etc. All exposed screw heads on interior are countersunk.

Superior Economy—In the "Superior" window we offer to the building public, wherever located, a double hung metal window of unsurpassed merit and at a price so surprisingly close to wood windows that their use must now become universal.



University of Montreal, Montreal, Canada

Ernest Cormier, Architect. Damien & Boileau, Contractors

In this building nearly 7000 double hung steel windows and casements, by Pomeroy, are to be installed. This, we believe, represents the largest metal window contract in the British Empire

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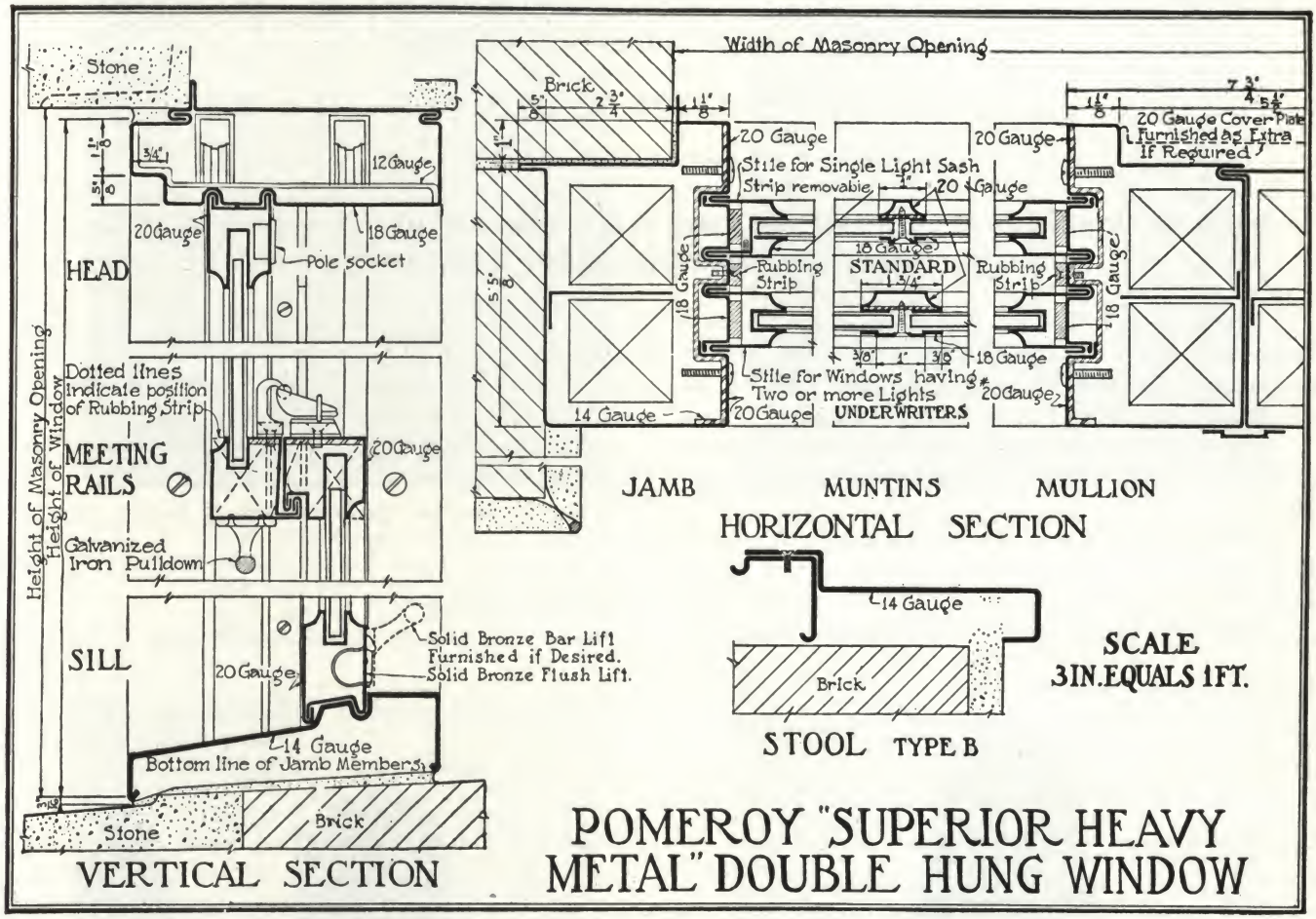
Air Infiltration

This window has been designed and constructed with the idea of insuring against excessive infiltration of air.

Subjected to test made at the University of Wisconsin by Professors Edward Anderson and G. C. Wilson, under the supervision of Professor G. L. Larson, in a manner similar to that described in the Journal of the American Society of Heating and Ventilating Engineers, June, 1924, the amount of infiltration of air through a standard double hung window proved to be less than two-thirds of a cubic foot of air per foot of sash perimeter per minute when subjected to static air pressure equivalent to air pressure exerted by a wind of twenty-five miles per hour.

This minimum amount of infiltration of air is accomplished without any added weatherstripping, device or appliance, with their additional cost.

This amount of air leakage is not discernible to a person standing on the room side of a window without the aid of a mechanical recording instrument.



Specification for "Superior" Type Heavy Metal Double Hung Window

Scope—Furnish and install, where shown on drawings, double hung windows of "Heavy Metal Superior Type," as manufactured by S. H. Pomeroy Co., Inc., of New York City.

Material—All windows to be constructed throughout of copper-bearing hot dipped galvanized steel. Sills shall be of No. 14 gauge, jambs of No. 20 gauge, pulley stiles No. 18 gauge, heads No. 18 gauge, side rails of sash and inside muntin caps No. 18 gauge, cross rails of sash No. 20 gauge.

Frame Construction—Head, sill and jambs shall be constructed of one piece of metal, exclusive of pulley stiles and closure strips. All members shall be formed straight and true, neatly mitered, lapped and properly interlocked to their respective intersecting parts. Exterior hanging stile shall be flat and 1⅛ in. in width. The interior of jamb shall be flat and 3⅞ in. wide. The depth of frame from inside to outside of hanging stile shall be 6⅝ in. Pulley stiles shall be formed with deep weathering grooves and shall be removable to permit of access to weight boxes and pulleys, and held in position by flat head countersunk screws. These screws, and two others on each jamb face, shall pass through heavy reinforcing plates spanning the inside of jamb box. With the exception of these screws no other screw heads, nuts, bolts or rivets shall appear on the inner face of the jamb or soffit of the head.

Sash Construction—Sash shall be moulded and of tubular design 1¼ in. thick. Side rails shall project not more than 1¼ in. beyond the inner face of the jamb, making the total distance from masonry jamb to sight line of glass 2½ in. Stiles and rails shall be constructed of one piece of metal moulded and neatly mitered, lapped and properly welded and interlocked. Side rails shall be of open construction with each flange being formed with a returned edge projecting into and operating in the weathering grooves of pulley stiles. Top and bottom sash rails shall be formed with flanges which shall engage in weathering grooves in the soffit of the head and those formed in the sill. Meeting rails shall not be more than 1¾ in. in depth and constructed with flanges forming interlocking contact. Glass rabbets in side and bottom rails shall be ¾ in. deep. Those occurring in top rails of upper and lower sash shall be 1⅜ in. deep. Where sash are to be glazed with one light of glass the side rails shall be constructed with removable inside glazing beads which shall be held in place with flat head countersunk machine screws.

Muntins—Exterior muntin bar shall be moulded and reinforced with No. 14 gauge steel lugs. Interior caps shall be flat and held in place by flat head countersunk machine screws passing through the reinforcing lug of the exterior member.

Hardware Equipment—Frames shall be equipped with solid steel bronze bushed pulleys, contained in Nos. 12 and 14 gauge steel housings. Sash shall be hung on substantial sherardized steel sash chain and properly counterbalanced by cast iron weights. Sash shall be equipped with one pair of solid moulded bronze lifts, one malleable iron plated sash lock and pole socket.

Painting—Frames and sash throughout shall be given one shop coat of manufacturer's special prepared metallic primer before delivery.

Note: If Underwriters' label is desired the following paragraph should be incorporated:

"Windows shall be constructed in accordance with the requirements of the National Board of Fire Underwriters and shall bear their label of approval, as well as the label of the manufacturer."

Note: If it is desired to construct this window of bronze, please write for specification.

RICHEY, BROWNE & DONALD, INC.

Manufacturers of the Browne Window

52-15 Flushing Avenue
MASPETH, CITY OF NEW YORK

AGENTS IN PRINCIPAL CITIES

BROWNE WINDOWS OF COPPER BEARING STEEL AND EXTRUDED ARCHITECTURAL BRONZE, FIREPROOF, WEATHERPROOF AND DUSTPROOF

Operation of Browne Windows—Built on principles that produce positive results in operation and in overcoming air leakage. The windows may be in groups of one or more pair of sash as desired.

Browne Fire Windows—Same in general appearance, and bearing labels of Underwriters' Laboratories, Inc.

Browne Psychiatric Type Windows—With tee-bar muntins and stops to limit opening. These eliminate need of restraint bars or guards.

Other Types of Browne Windows—These windows are made in a wide range of types and sizes appropriate for office buildings, hospitals, school and university buildings, public buildings, department stores, industrial buildings, apartments, hotels, homes, etc.

Samples—Browne Windows are on display at the following places:

Architects' Samples Corp., New York, N. Y.
Architects' Exhibit Corp., Boston, Mass.
Architects' & Builders' Exhibit, Buffalo, N. Y.
Architects' Exhibit, Inc., Cleveland, Ohio.
Architects' Exhibit, Inc., Detroit, Mich.
Metropolitan Builders' Exhibit, Seattle, Wash.



Gulf Building, Houston, Tex.
A. C. Finn, Architect
Kenneth Frenzheim & J. E. R. Carpenter, Associated Architects
American Construction Co., Builders
W. B. Booker, Building Manager



New York State Psychiatric Institute, 168th Street and Riverside Drive, New York, N. Y.
Sullivan W. Jones, State Architect
Dr. George H. Kirby, Director

Neurological Institute in background also equipped with Browne Windows
James Gamble Rogers, Architect
Chas. F. Neergaard, Consulting Architect
Esther F. Rivington, Superintendent

Continued on next page



Browne Windows Installed in Sun Room of a Metropolitan Hospital



Typical Office Building Installation of Browne Windows

General Description of Browne Windows

Sash are firmly hinged together to open (outwardly) and shut under symmetrical control of hinged arms attached to a stationary vertical bar. The arms afford absolutely rigid support. A simple catch fastens sash when window is closed.

Heavy felt weatherstripping is an integral part of the construction.

Every window is assembled at factory, tested for accuracy and shipped a complete unit including weatherstrips.

Browne windows require no special skill for setting and are readily glazed after installation.

Hardware—Furnished by us. Bronze handle shipped loose to be applied at the job by contractor.

Glass—Should be furnished and set by glazing contractor.

Painting—All steel parts receive one shop coat of paint before shipment.

All finishing coats should be applied by the painting contractor.

Browne Window Advantages

Maximum Light and Vision—Sash are continuous from sill to head with no obstruction from horizontal meeting rails.

Ventilation—Ideal changing of air without drafts. The sash control forms flue that draws out all impure air, which is automatically replaced with fresh air. A pleasant quality of ventilation is obtained by bowing sash open to maximum of seven or eight inches. This gives fresh air intake at bottom, exhaust at top, with no opening at sides.

Weather Protection—The airtight and dustproof qualities of the windows have been established under laboratory test.

Noiseproof—Thick felt contact cushions practically shut out street noises when window is closed.

Safety—All parts of the sash are accessible from the inside. The expense and danger of outside window cleaning and painting are eliminated.

Simplicity—No track mechanism for the accumulation of dirt and water. No weight boxes to invite drafts and annoyance from noise; no chains, weights or pulleys to get out of order; no rattling of parts when open or closed.

Contact—No metal to metal weathering contact. The contact in all cases is metal to felt.

Service—Continuous and lasting, with no danger of sagging, warping, racking or wearing off paint.

Operation—Smooth, easy, noiseless; with slight physical effort the sash may be opened to any desired angle. Releasing catch handle, pushing sash partly open and a slight pull at the edges of sash towards center opens window full extent. Pushing edges of sash away from center brings handle within easy reach for closing and locking. The handle is a most convenient latch attachment and is intended for this use only. Where windows can not be reached from the floor, our standard operator may be applied, locking window in any position.

Strength—All parts are sturdy and substantial; the greatest care is taken in the construction and assembling to insure rigidity and permanence.

Curtains, etc.—Curtains, shades, Venetian blinds, and inside screens may be applied as for ordinary sash.

Economy—Minimum cleaning and maintenance costs; assurance of maximum results from heating arrangements; and fuel saving due to dependably tight openings are prominent features.

Full size details, specifications and complete information furnished on request

ESTABLISHED 1880

LIONEL VALLAS

Manufacturer of Sheet Metal Products

2850 West Lake Street, CHICAGO, ILL.

See Manufacturers' Index for Lionel Full Ventilating Skylights and Syphon Type Ventilator

LIONEL HOLLOW METAL WINDOW

Materials

The sill of the Lionel Hollow Metal Window is made of No. 12 gauge galvanized iron, the head, jambs, parting stops and muntin bars are all made of No. 16 gauge galvanized iron. All weather stripping is of brass. Sash weights are single unit castings attached to steel chains.

Bronze rubbing plate on each jamb at ends of meeting rails to insure tight fit.

Windows are made of bronze or aluminum if desired.

Construction

Samples submitted upon request to show our superior construction and workmanship.

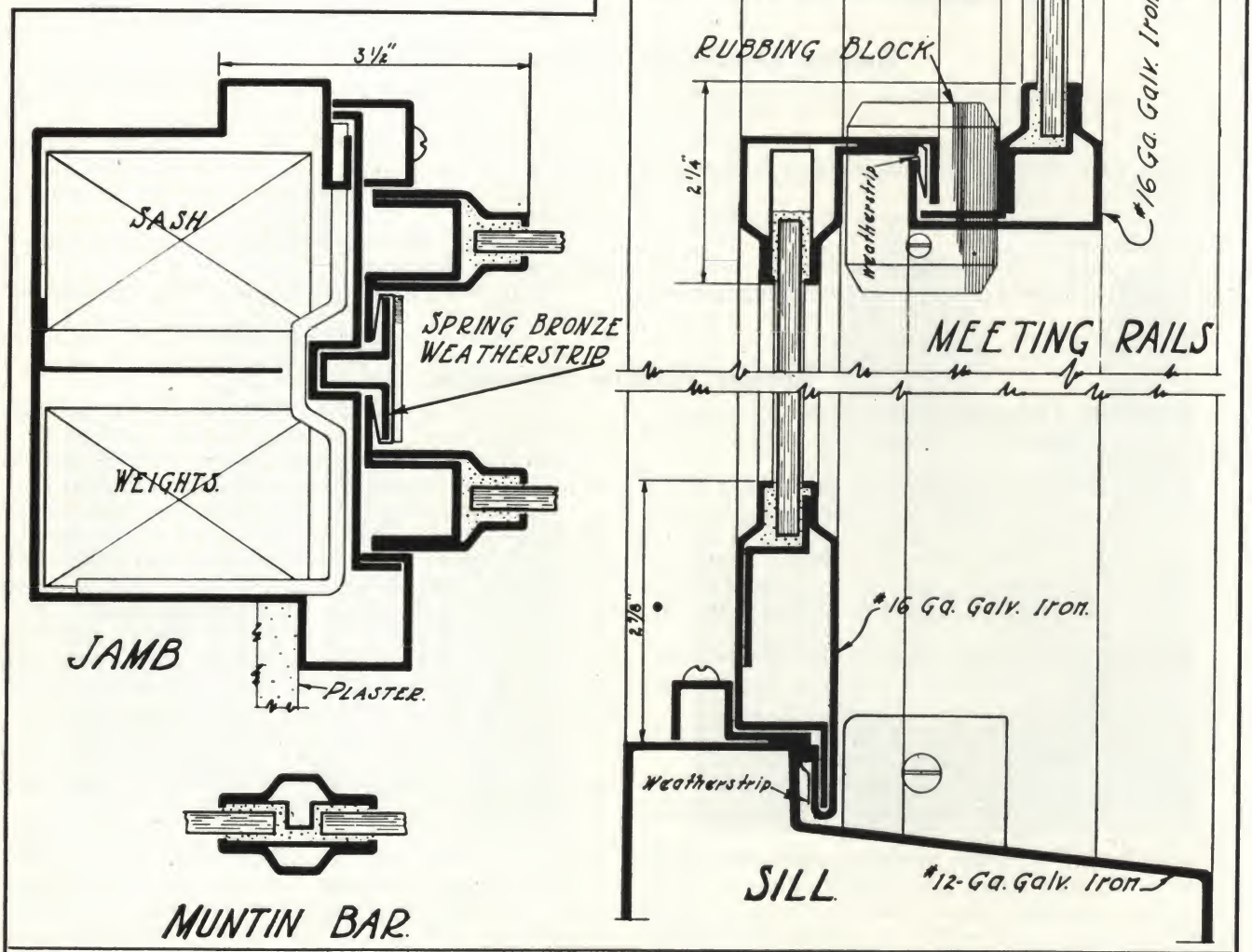
Paint

All parts receive one coat of best grade priming paint on inside and outside before delivery.

Note

We also manufacture the Lionel Hollow Metal Door.

An opportunity to estimate your work will be given prompt and careful attention.



WINDOW DETAIL—ONE-HALF FULL SIZE

SOULÉ STEEL COMPANY

STEEL WINDOW AND DOOR DIVISION

Member Solid Section Steel Window Industry

FACTORIES

LOS ANGELES, CALIF. SAN FRANCISCO, CALIF.

SALES OFFICES IN PRINCIPAL CITIES

Standardized Windows and Doors

As members of the Solid Section Steel Window Industry we have standardized our product to conform to the standardization and simplification program of the United States Department of Commerce. This is for the purpose of giving better service to the buyer of steel windows through greater ability to manufacture a better product at a minimum price. Therefore, pages of the Solid Section Steel Window Industry in this volume will give all necessary data regarding our standard and stock types of horizontally pivoted windows, commercial projected windows, architectural projected windows, and industrial doors.

Specialized Windows and Doors

In the following pages we have attempted to give sufficient exact data about our various other specialized types of windows and doors to enable the architect and builder to select the types most suitable to their purposes. In addition to the information given here we have prepared a number of special catalogues giving very complete information regarding each type of product together with photographs and drawings of typical installations. These catalogues will be furnished on request.

Our engineering sales organization is available at all times to give any additional assistance or advice required. Many years of experience in meeting the varied problems of our part of the building industry have given us invaluable knowledge which is at your command.

Protection of Products

All SOULÉ Windows and Doors are given a shop coat of high grade paint before shipment. This shop coat protects the products until they are installed in the building. After installation we recommend that at least two coats of high quality mineral paint be applied by the painting contractor.

Hardware is boxed securely and shipped with the units to which it is to be applied in the field.

Erection

We strongly recommend that we erect all important installations of our products, particularly specialized items. Our erection service is available throughout the country.

Standardized products may be installed without difficulty by any builder. We will furnish installation details free of charge with any of our products.

Glazing

Proper glazing of steel windows is a very important part of any satisfactory installation. Special steel window putty must be used to insure correct setting and strength. We recommend tinting the putty with dry colors instead of painting its surface. Spring wire glazing clips are furnished with all SOULÉ Windows unless screwed on glazing angles or beads are specified.

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PIVOTED STEEL WINDOWS

Specification

All steel windows shown on plans shall be SOULÉ Steel Windows as manufactured by SOULÉ STEEL COMPANY.

Windows shall be constructed of hot-rolled, solid, moulded steel sections specially rolled for the purpose.

All joints of frame and ventilator members shall be mortised and tenoned and air-hammer riveted.

Muntin bars shall be neatly mitered together and welded at intersections and shall be mortised and air-hammer riveted into frame members.



The Rigid Soulé Joint
Used at intersection of muntin bar

Ventilators shall be of the pivoted type hung on heavy steel butt members securely riveted to the ventilator and frame two inches above the center (unless otherwise specified) and having removable brass pins.

Ventilator shall have double contact weathering on all four sides and weathering shall overlap at pivots.

Provide special tee-bar mullions with sherardized bolts between window units where two or more occur in the same opening, except for one and two light high windows which shall have flat mullions.

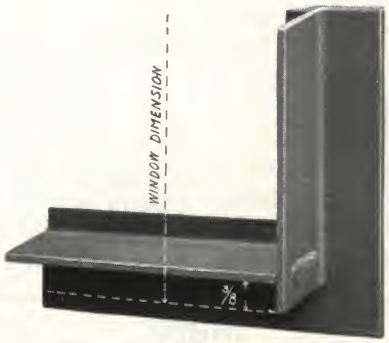
Provide standard push-bar or spring latch and chain hardware for windows as selected by the architect and provide also four copper plated steel spring glazing clips for each light of glass except where glazing angles are required.

Where required by ordinance or hereinafter specified provide standard glazing angles mitered at corners and attached with steel machine screws and nuts.

All windows shall be given one dip coat of SOULÉ Gray rust-resisting paint at factory.

Windows shall be installed by skilled erectors under the supervision of the manufacturer or his agent and shall be properly wedged, squared plumb and true, ready for grouting by masonry contractor.

Glass and glazing, grouting, and final painting of sash shall be done by others.



Corner of Window Frame
Showing window dimension point and purpose of ⅜ in. clearance within the window dimension

COMMERCIAL PROJECTED WINDOWS

Specification

All windows shown or indicated on plans as being projected type shall be SOULÉ Commercial Projected Windows as manufactured by the SOULÉ STEEL COMPANY.

Windows shall be constructed of hot-rolled, solid, moulded steel sections especially rolled for the purpose. All joints of frame and ventilator members shall be mortised and tenoned and air-hammer riveted and in addition, lower corners of ventilators shall be welded and ground smooth on the face.

Ventilators shall project out or in as indicated on plans and shall be hung on heavy steel arms attached to ventilator with bronze pivots and to frame members with adjustable bronze pivots. Sliding pivots shall be contained in a steel housing securely riveted to the ventilator and shall have a bronze shoe held in the channel formed by the frame members by means of a coil spring. Where two or more window units occur in the same opening provide special tee-bar mullions with sherardized bolts and washers between units.

Provide pressed steel mullion covers with clips and bolts for all mullions between projected window units.

Hardware for ventilators within reach from floor shall be No. 101 handle on projected out ventilators. For ventilators out of reach from floor provide No. 101 cam handle and No. 102 pole eye for pole operation (or No. 29 throwout latch and chain for chain operation) on projected out ventilators and No. 8 transom catch for pole operation (or No. 129 spring catch and chain for chain operation) on projected in ventilators. All hardware shall be of malleable iron.

Windows shall be given one dip coat of SOULÉ gray paint at factory before shipment. Openings shall be properly prepared for windows according to shop details furnished by manufacturer and windows shall be erected by manufacturer or his agent, plumb and square and securely blocked or anchored in place, after which they shall be grouted in with rich cement grout by masonry contractor. Window erector shall attach all hardware and adjust ventilators so they will operate easily and fit tightly.

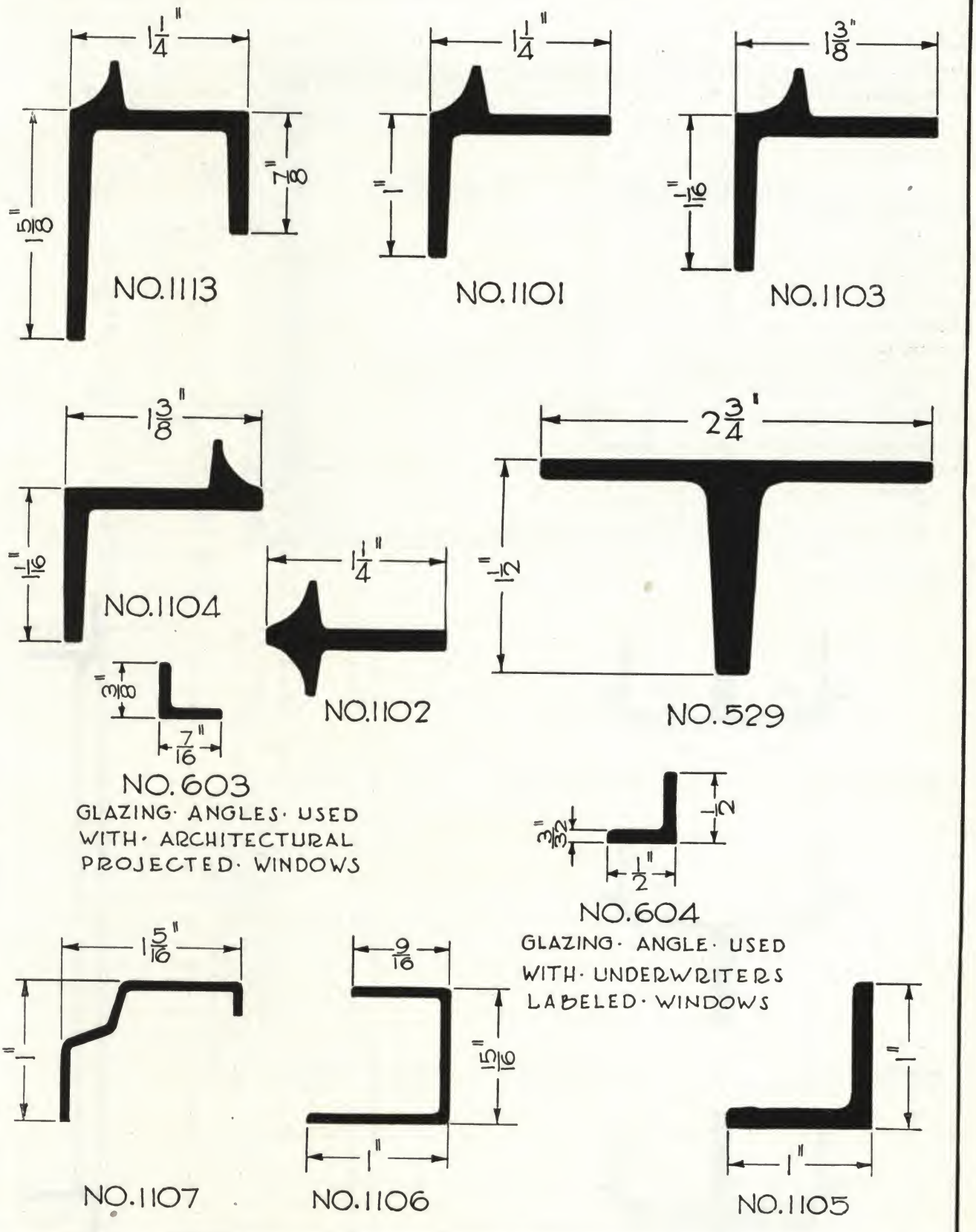
SCREENING

Commercial projected windows are particularly suitable for screening and screens as illustrated are manufactured by the SOULÉ STEEL COMPANY in accordance with the following:

Specification—Windows where indicated on plans or hereinafter specified shall be provided with SOULÉ metal frame screens with No. 14 mesh copper-bronze wire cloth. Screen frame for projected out ventilators shall be built out to enclose the operating hardware and shall have recess and slot in sill to permit the operation of the ventilator through the bottom of the screen frame. Projected in ventilators shall have the screens attached outside with special clips and machine screws.

All screens shall be so attached to windows that they may be easily removed.

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SOULÉ	INDUSTRIAL - WINDOW - SECTIONS	DRAWING NO. S-28

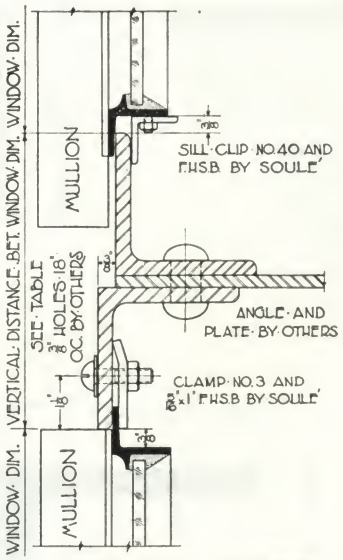
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MULLIONS

Steel mullions are furnished when windows consist of more than one unit, and are fastened together with $\frac{5}{16}$x$\frac{3}{4}$ in. round head sherardized stove bolts and washers. The stems of the mullions may be turned in or out when erected in masonry. When erected in steel or wood the stem should be turned out, otherwise a special cut off is required. Provision should be made at the sill for fastening mullions in the masonry. Mullions are made with horizontally slotted holes and windows with vertically slotted holes to allow for adjustment.

Horizontal Mullions

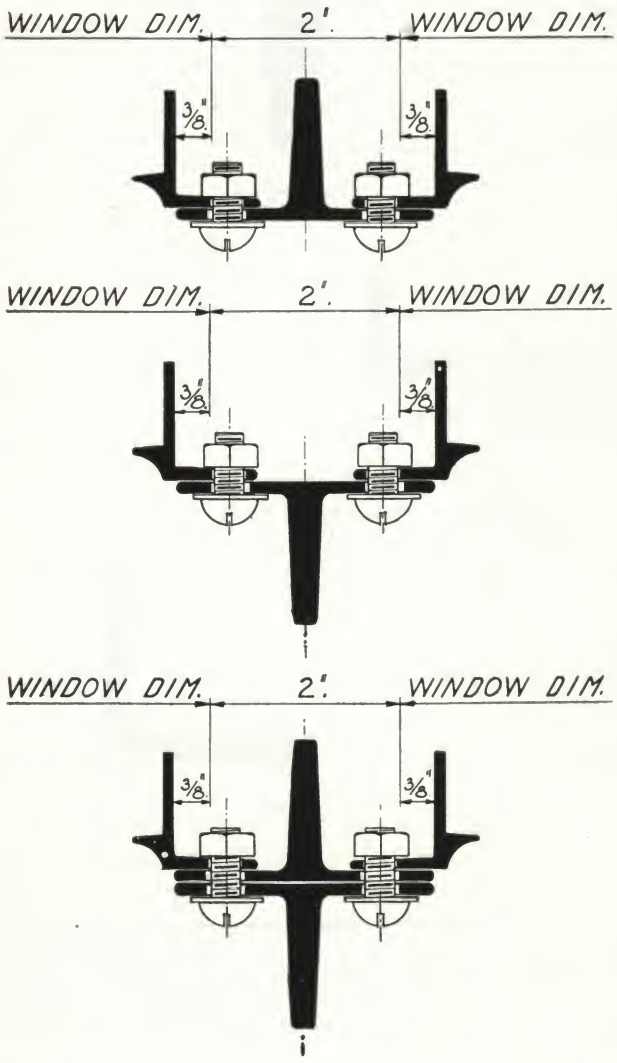
Where greater heights than seven lights are required, structural horizontal mullions should be used. They are not furnished by the window contractor, but the detail and the table will be of assistance to architects and builders in designing these members.

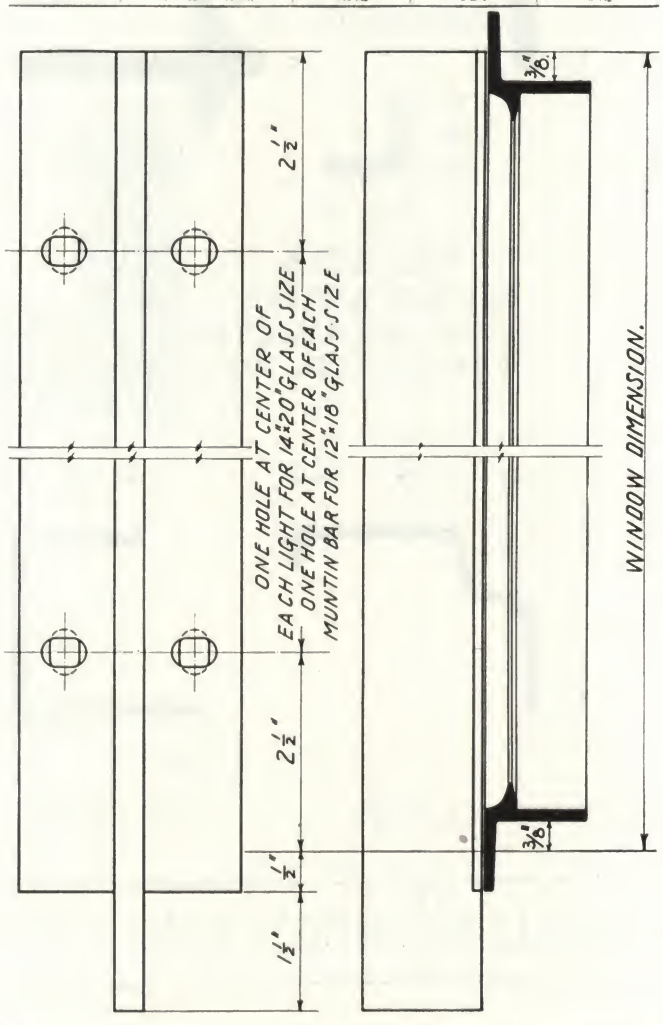


VERTICAL SECTION
SCALE-3"-1'-0"

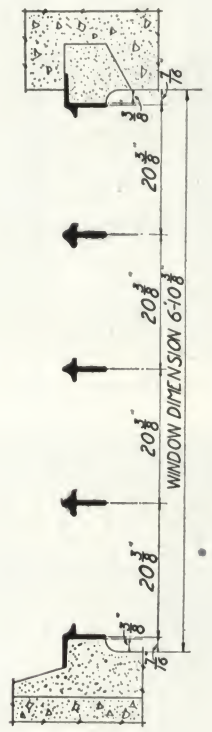
STRUCTURAL MULLION DIMENSIONS

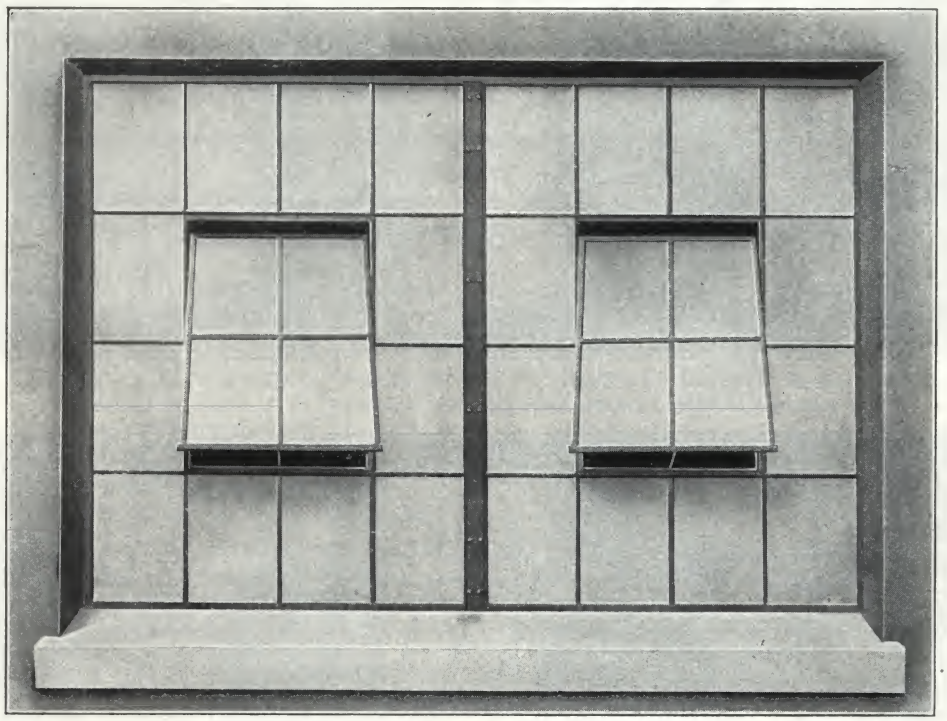
Number of lights wide	Size angles 2 per mullion, inches	Size of plate, inches	Weights, lb.	Vertical distance between window dimensions, inches
12x18-in. Glass				
6	2½x2½x5/16	None	71	5
8	2½x2½x5/16	None	101	5
9	2½x2½x5/16	None	119	5
10	2½x2½x5/16	4x5/16	131	5¼
11	2½x2½x5/16	4x5/16	152	5¼
12	2½x2½x5/16	5x5/16	183	5¼
13	2½x2½x5/16	6x5/16	205	5¼
14	2½x2½x5/16	6x¼	244	5¼
15	2½x2½x¼	6x5/16	272	5¼
16	2½x2½x¼	6x¼	300	5¼
17	3 x3 x¼	6x5/16	351	6¼
18	3 x3 x¼	6x¼	403	6¼
14x20-in. Glass				
6	2½x2½x5/16	None	85	5
8	2½x2½x5/16	None	120	5
9	2½x2½x5/16	4x5/16	140	5¼
10	2½x2½x5/16	5x5/16	175	5¼
11	2½x2½x5/16	6x5/16	201	5¼
12	2½x2½x5/16	6x¼	242	5¼
13	2½x2½x¼	6x5/16	275	5¼
14	2½x2½x¼	6x¼	308	5¼
15	3 x3 x¼	6x5/16	363	6¼
16	3 x3 x¼	6x¼	421	6¼
17	3 x3 x5/16	6x5/16	475	6¼
18	3 x3 x5/16	6x¼	524	6¼



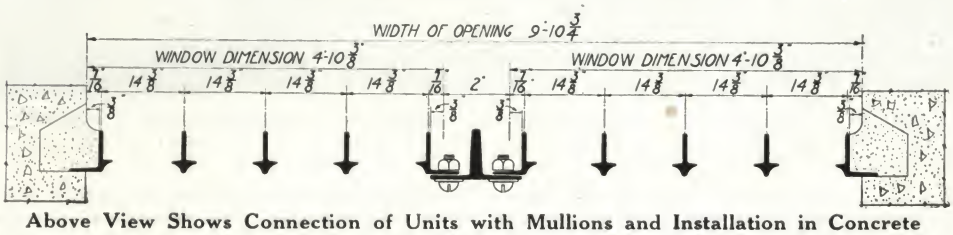


Continued on next page





Standard steel windows are built around standard glass sizes. Note method of arriving at window dimension, i. e.—glass size plus ⅜ in. times number of lights in width or height plus 1/16 in. for each edge of unit



Above View Shows Connection of Units with Mullions and Installation in Concrete

Designating Window Units

A standard numerical system of designating units is employed to eliminate confusion and to simplify the description of the unit.

The letters B and C indicate glass sizes. B is 12x18-in. glass size and C is 14x20-in. glass size.

The numbers following the letter (indicating glass size) describe the type of unit, as follows:

First numeral—number of lights wide.

Second numeral—number of lights high.

Third numeral—number of ventilators.

Fourth numeral—number of lights in each ventilator.

Fifth numeral—number of lights between sill of unit and bottom of ventilator.

Sixth numeral—number of lights between sill of unit and bottom of upper ventilator (when unit has two ventilators).

Seventh numeral—number of lights between sill of unit and bottom of top ventilator (when unit has three ventilators).

Examples—

A window unit three lights wide and four lights high, without ventilators and in 12x18-in. glass size would be designated B-34.

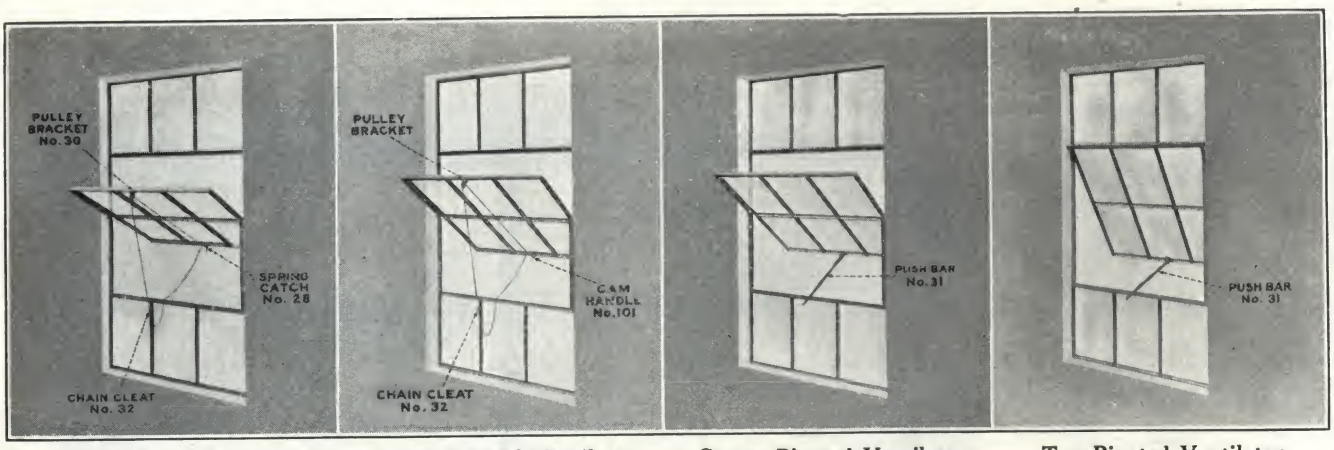
A unit four lights wide and four lights high with one ventilator of four lights located one light up from the sill and in 14x20-in. glass size would be designated C-441-4-1.

A unit five lights wide and six lights high with two ventilators of six lights each located one light up from the sill for the lower ventilator and three lights up from the sill for the upper ventilator and in 14x20-in. glass size would be designated C-562-6-1-3.

A unit three lights wide and six lights high with three ventilators of six lights each located at the sill and two and four lights up from the sill respectively and in 14x20-in. glass size would be designated C-363-6-0-2-4.

Window Dimensions

Continued on next page

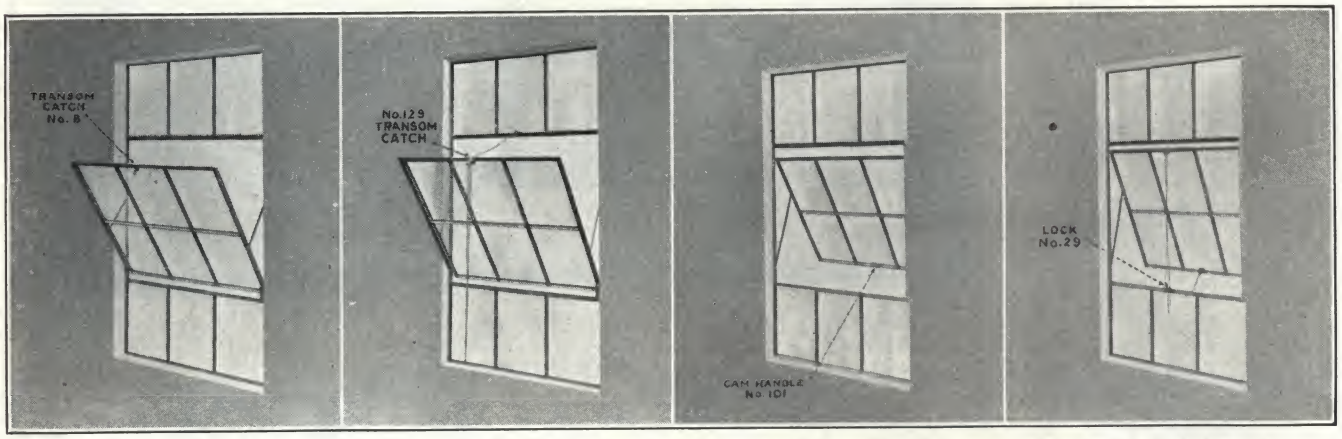


Center Pivoted Ventilator
Spring catch and chain hardware

Center Pivoted Ventilator
Cam handle and chain hardware

Center Pivoted Ventilator
Push bar hardware

Top Pivoted Ventilator
Push bar hardware



Projected In Ventilator
Transom catch hardware, window pole not included

Projected In Ventilator
Transom catch and chain hardware

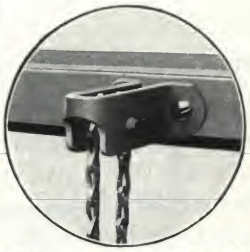
Projected Out Ventilator
Cam handle hardware

Projected Out Ventilator
Spring lock and chain hardware

Types of Ventilators and Hardware



Spring Catch No. 28



Pulley Bracket No. 30



Cam Handle
No. 101 and chain



Chain Cleat No. 32
(Also fastened to walls where windows are out of reach)



Push Bar No. 31 in Open Position



Push Bar No. 31 in Locked Position



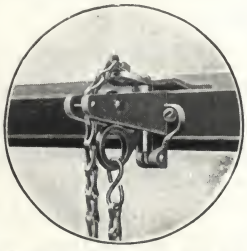
Transom Eye No. 102



Transom Catch No. 8



Spring Lock No. 29 and Chain



Transom Catch No. 129 and Chain

Hardware

Attach in Field by Window Erectors

Continued on next page

UNDERWRITERS' LABELED WINDOWS

In many instances where steel windows occur on a fire exposure, or in buildings subject to unusual fire hazard a considerable saving in fire insurance rates may be secured by the use of SOULÉ Underwriters' Labeled Windows. These windows have been tested and listed by the Underwriters' Laboratories, Inc., and bear their label.

Either Center-pivoted or Projected-out Windows may be labeled by conforming to certain Underwriters' requirements and by attaching glazing angles for holding the glass in place. These glazing angles must be ½x½ in. and must be attached to the sash members with steel bolts.

Sizes

The total area of each individual sash unit must not exceed 84 sq. ft. nor 12 ft. in either width or height. Where an opening is larger than these limits a standard 2-in. mullion bar must be used between units.

Glass Sizes

The maximum exposed area of each light of glass must not exceed 350 sq. in. and the height must not be greater than 54 in. nor the width greater than 48 in.

Mullions

Where mullions are required for connecting sash units together, they should extend into the masonry at the top and bottom at least 4 in. If steel lintels are used the mullions should be attached by clips which are furnished with the mullions.

Hardware

Center-pivoted ventilators are furnished with iron push bars or malleable iron cam handles and chain with fusible link. Projected type ventilators are furnished with malleable iron cam handles and with transom eye for pole operation where ventilators cannot be easily reached from the floor.

Erection

Windows should be installed by skilled erectors under the supervision of the manufacturer or his agent and be properly wedged, squared plumb and true, ready for grouting by masonry contractor.

STEEL DETENTION WINDOWS

SOULÉ Detention Windows are made for use where burglar-proof windows are desired without the necessity of using burglar bars. They are constructed of standard solid steel members with muntin bar divisions for 8x8 in. lights of glass. Ventilators may be two, three, or four lights wide and one light high, pivoted in the center with non-removable pivot pins. Standard mullion bars are used between units. Either push bar or chain hardware may be used as desired.

STANDARD DIMENSIONS

Number of lights	Height or width dimension	Number of lights	Height or width dimension	Number of lights	Height or width dimension	Number of lights	Height or width dimension
2	1 ft. 5⅝ in.	6	4 ft. 3⅛ in.	10	7 ft. 0⅝ in.	14	9 ft. 10⅛ in.
3	2 ft. 2 in.	7	4 ft. 11½ in.	11	7 ft. 9 in.	15	10 ft. 6½ in.
4	2 ft. 10⅜ in.	8	5 ft. 7⅞ in.	12	8 ft. 5⅜ in.		
5	3 ft. 6¾ in.	9	6 ft. 4¼ in.	13	9 ft. 1¾ in.		

ERECTING SOULE STEEL WINDOWS

Masonry Walls

Set the end units for each opening first, with the flange inserted into the groove left in the brick or concrete. The remaining units and mullions are then set and loosely bolted together. The window should then be blocked up so that the bars are in line horizontally. Wedges can be used at the jambs to tighten units and hold them plumb. If the head is of masonry, the window can be lined up with wedges; if a steel lintel is used bolt the window to the steel or use the clips furnished for the purpose. Wedges should be used only under mullions or jamb members of window and should never be placed under the center of a light.

The masonry sills should be finished before the jambs and head are grouted.

Steel Frame

When windows are fastened to steel work, clips and anchors as shown in installation details are used. Bolt window units and mullions together loosely, line up the window and then tighten mullion bolts and clip bolts.

Wood Construction

Secure window to wood frame with screws, after the units are properly lined up, as shown in details on page 8.

Attaching Hardware

After windows have been erected, plumbed, squared and securely fastened in place, cut the wires on the ventilators and attach the operating hardware. (See illustrations on page 6 for types of hardware.)

Glazing

Glazing is done from the inside and glass is held in place by spring wire clips, four being furnished for each light. It is important that glass be carefully back puttied with good steel window putty and imperative that the glazing clips be used.

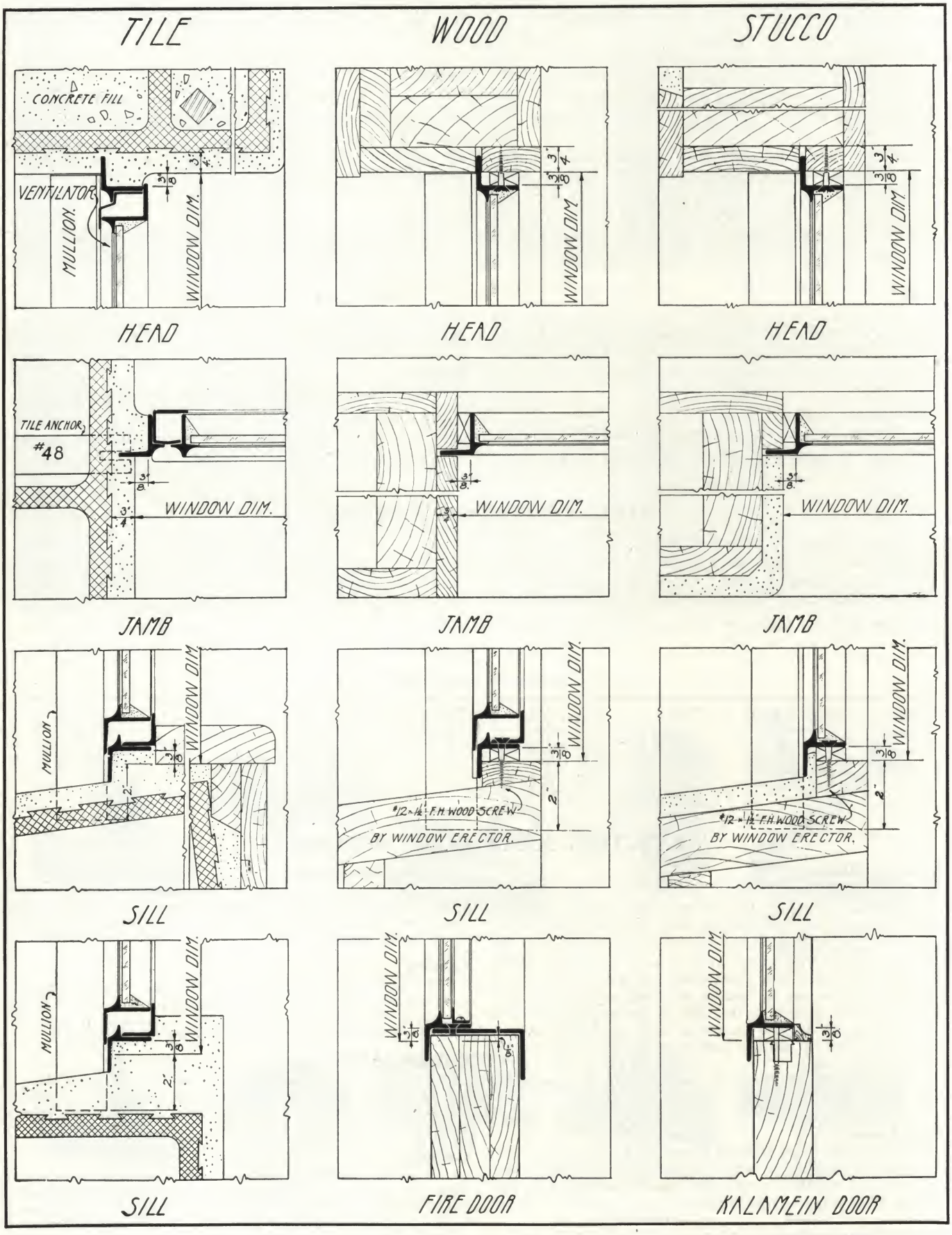
Galvanized Windows

In erecting galvanized steel windows and mullions, it is very important that the mullion compound furnished be applied between window units and mullions where they come in contact with each other.

Caution

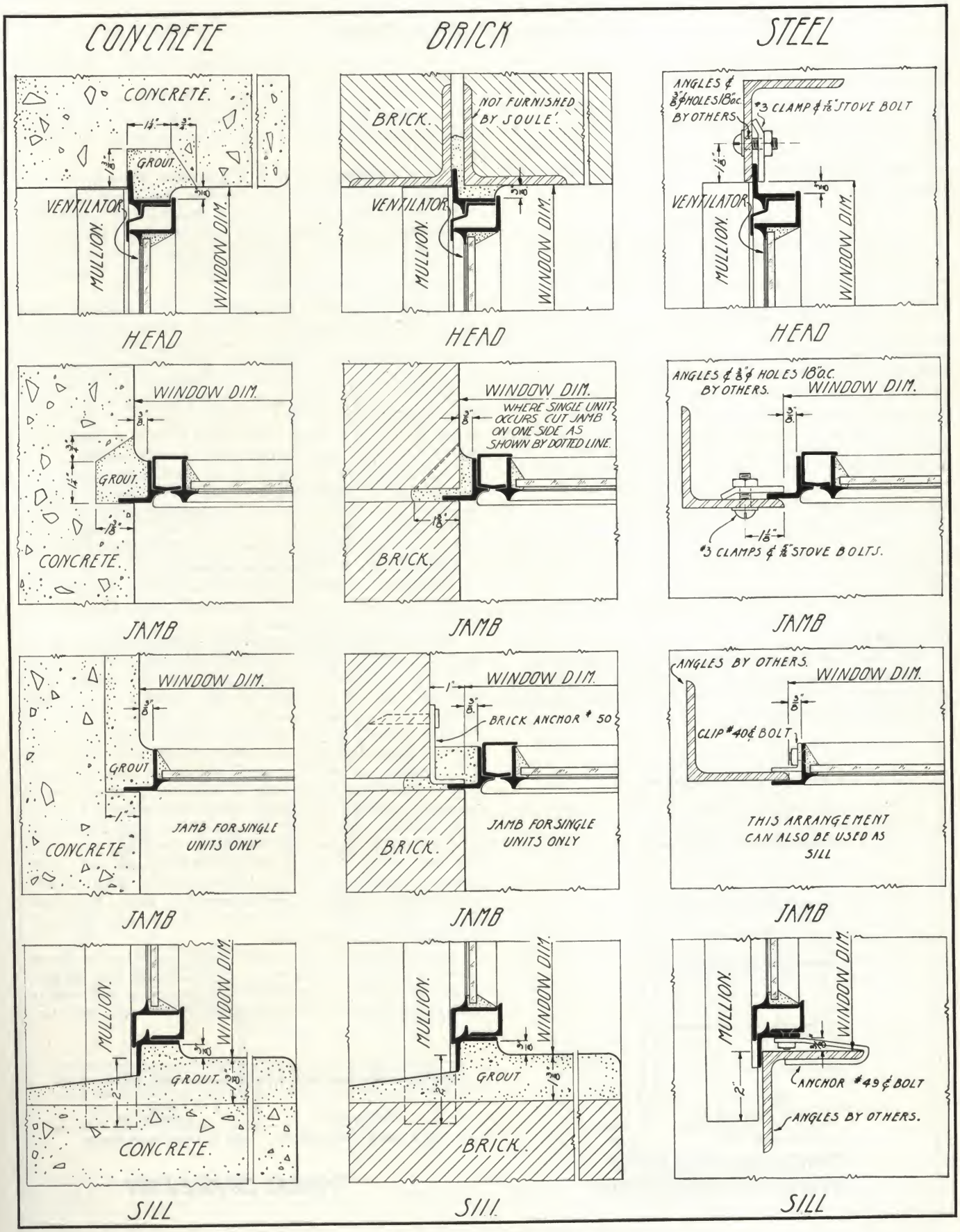
In erecting window units, be sure that they are placed right side up. For center-pivoted, top-pivoted and projected-out ventilators, the plate to which hardware is attached is at bottom of the ventilator. On bottom pivoted ventilators and projected-in ventilators, the pivots are located near the bottom of vented openings, and the holes for attaching hardware are at the top of the ventilators.

Continued on next page



Installation Details

Continued on next page



Installation Details

Continued on next page

MECHANICAL OPERATORS

SOULÉ Mechanical Operators for steel windows have been developed and perfected after many years' experience. SOULÉ Operators will be found to embody all of the best features of the various types and in addition they are made with an accuracy and finish which makes for ease of operation and positive control of window ventilation.

Specification

Torsion Type S-A with Chain Control, Plate G-5—

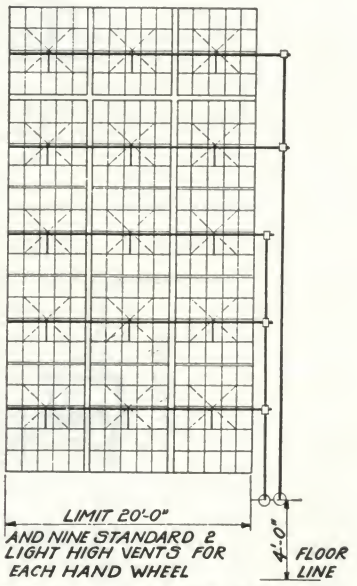
All windows shown on plans or hereinafter specified to be mechanically operated shall be controlled by means of SOULÉ Torsion Type S-A Operators.

Power unit shall consist of a cast iron segmental worm gear and worm with teeth ground to engage smoothly and mounted in an enclosed power housing securely bracketed to building construction. Segmental gear shall be securely attached to power transmission shaft by means of set screws extending into shaft. Power transmission shaft shall consist of 1 in. black, steel pipe joined into a continuous line by means of machined couplings and pins. Shaft shall be carried on heavy steel brackets with machined, cast iron bearings which shall have both horizontal and vertical adjustment. Torsion arms for operating ventilators shall be made from ⅜x¾ in. steel, drop forged to fit power shaft with drop forged clamp and two set screws. Connecting rod shall be made of same material as torsion arm and attached thereto by means of a heavy steel rivet pin.

Operation of power unit shall be secured by means of a sprocket wheel and endless chain extending to within three feet of the floor.

Torsion Type S-C with Crank Control, Plate G-6—

All windows shown on plans (or hereinafter specified) to be mechanically operated shall be controlled by means of SOULÉ Torsion Type S-C Operators.



TYPICAL MULTIPLE RUNS OPERATED IN SINGLE BAYS

(Construction of power, shafting, brackets, and torsion arms same as for Type S-A.)

Operation of power unit shall be secured by means of a ¾-in. vertical shaft rotated by means of a cast iron handwheel and enclosed mitre gear box located approximately 3 ft. 6 in. from floor.

Rack and Pinion Type S-B Operator, Plate G-7—

Power unit shall consist of a cast iron worm gear and worm with teeth ground to engage smoothly and mounted in an enclosed power housing, securely attached to building construction by means of adjustable brackets. Worm gear shall be securely attached to power transmission shaft by means of set screws extending into shaft.

Power transmission shall consist of 1-in. black steel pipe joined into a continuous line by means of machined couplings and pins. Shaft shall be carried on heavy steel brackets with machined, cast iron bearings which shall have both horizontal and vertical adjustment. Arms for operating ventilators shall consist of a rack accurately machined from 1-in. channel section. Rack shall be operated by a cast iron pinion securely attached to the power shaft. Rack shall be held in engagement with the pinion by a steel housing with two roller guides.

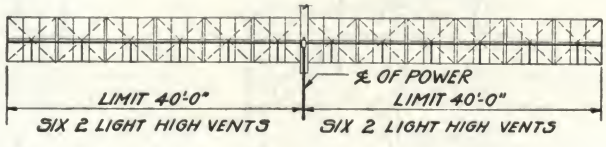
Operation of power unit shall be secured by means of a cast iron, grooved sprocket wheel and endless chain extending to within 3 ft. of the foor (or by means of a ¾-in. vertical shaft rotated by means of a cast iron hand-wheel and enclosed mitre gear box located approximately 3 ft. 6 in. from the floor).

Screw Type E-B Operator, Plate G-8—

Mechanical operators where shown shall be SOULÉ Electrically Controlled (or Hand Controlled) Screw Type E-B as manufactured by SOULÉ STEEL CO.

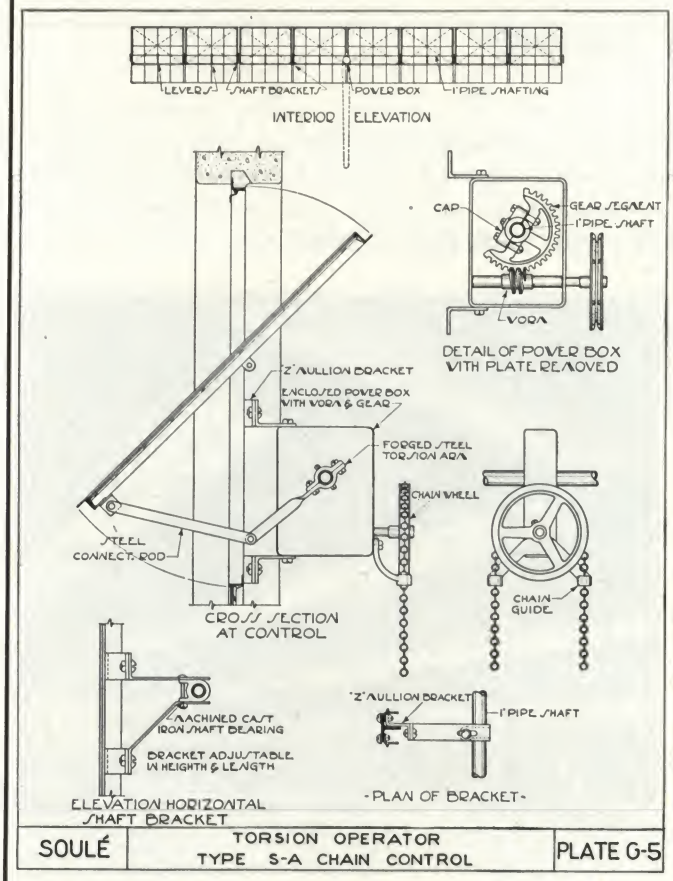
Operators shall control ventilators by bays or banks as indicated by dotted lines on elevation drawings. Power units shall consist of motor, reduction gears and limit switches complete and enclosed in a tight housing. Reduction gears shall operate in an oil tight housing and shall run in an oil bath. Flexible coupling shall be provided between motor and gears. Vertical power threaded shaft shall be solid cold rolled steel 1 in. in diameter with Tee guide bearings at each horizontal shaft. Horizontal shafts shall be connected to vertical shaft by means of heavy drop forged torsion arms securely fastened to both shafts. Vents shall be connected to horizontal shafts by drop forged torsion arms and heavy connecting rods. No cast arms will be allowed. Vertical and horizontal shafts shall operate in machined cast iron bearings having lateral adjustment sufficient to equalize any inequalities in walls. Horizontal shafts shall be made of 1-in. black steel pipe with machined couplings and pins at all joints.

Motor shall be furnished with winding to conform to power circuit of building. Push button control switch shall be furnished by operator manufacturer but all wiring and conduit shall be furnished and installed complete by electrical contractor.

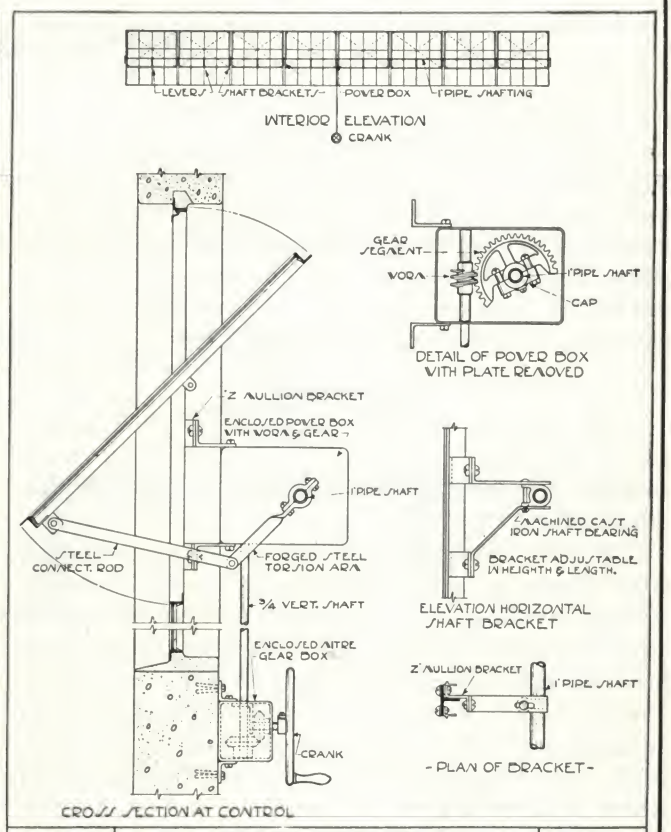


TYPICAL SINGLE RUN

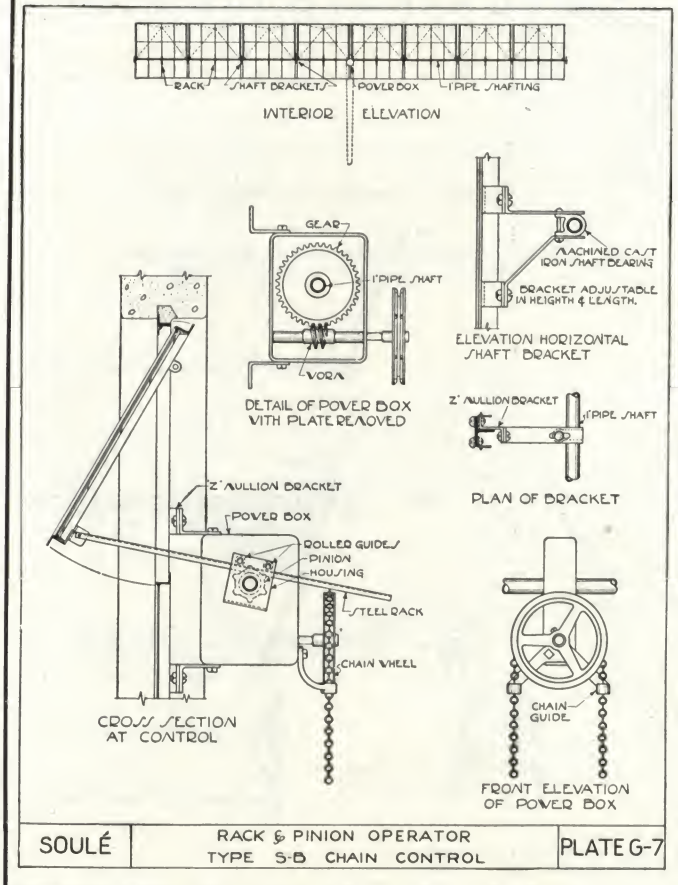
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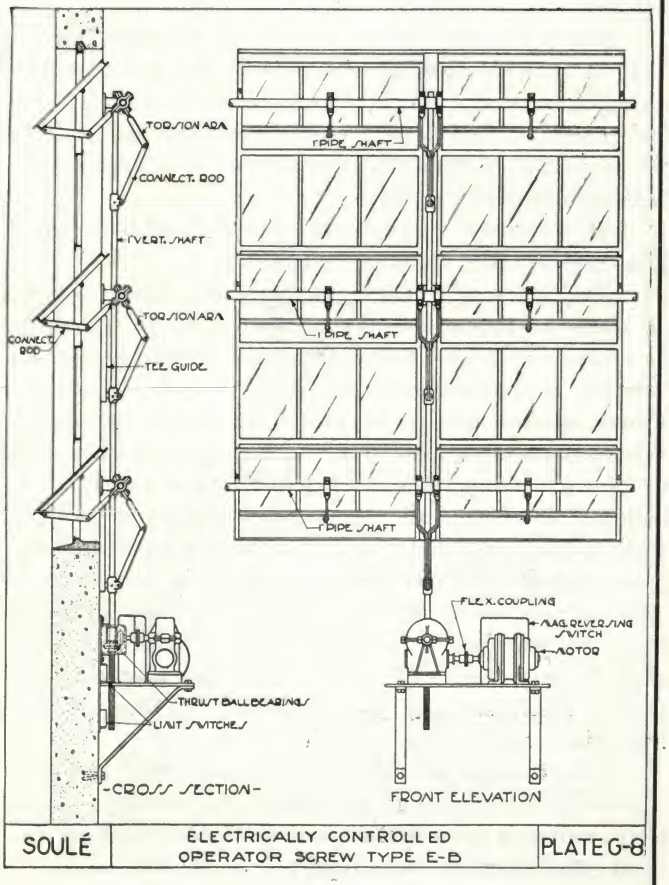
SOULÉ | TORSION OPERATOR TYPE S-A CHAIN CONTROL | PLATE G-5



SOULÉ | TORSION OPERATOR TYPE S-C CRANK CONTROL | PLATE G-6



SOULÉ | RACK & PINION OPERATOR TYPE S-B CHAIN CONTROL | PLATE G-7



SOULÉ | ELECTRICALLY CONTROLLED OPERATOR SCREW TYPE E-B | PLATE G-8

Details of Operators and Controls

Continued on next page

CONTINUOUS WINDOWS

Soulé Top-hung Continuous Windows are particularly adapted to and designed for sawtooth or monitor roof construction where it is desirable to admit the maximum amount of light by placing the windows on a slope. By the use of Soulé Continuous Operators it is possible to open an entire run of Continuous Sash at one time for efficient ventilation.

Specification

All openings shown on the drawings or indicated as "Continuous Windows" shall be Soulé Continuous Windows as manufactured by the Soulé Steel Company.

Windows shall be constructed of special hot-rolled steel shapes as per manufacturer's standard details, securely riveted or welded together. Windows shall be attached to the adjoining steel work at the top with heavy malleable iron butts not more than 4 ft. on centers. Provide a 12-in. stationary end panel at each end of each swinging section. Attach a formed piece of 12-gauge steel weathering to each end of each swinging section which shall overlap the end panels. Vertical division bars shall be spaced 2 ft. on centers. Provide four angle glazing clips for each light of glass. Paint all windows one shop coat Soulé gray paint.

Storm Panels—Storm Panels (if definitely specified) 2 ft. wide shall be provided at the end of each swinging section. Storm Panels shall be attached to end panels by means of a continuous plate and to the sill by means of clips and weather bar overlapping the flashing installed by others.

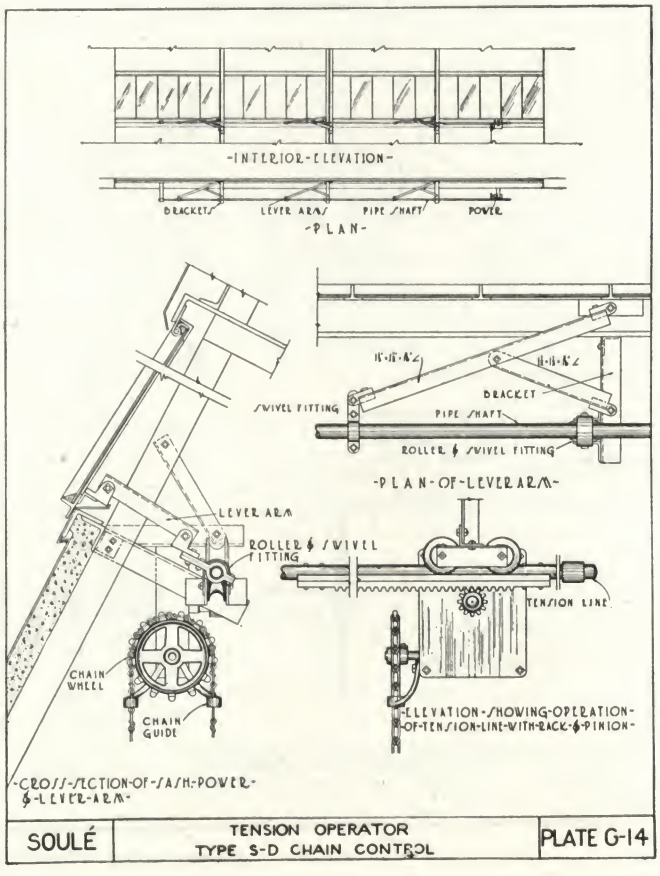
All structural supports and flashings shall be supplied and installed by other contractors.

Operators—All continuous windows where shown on plans or therein specified to open shall be operated by means of Soulé Tension Operator Type S-D, Chain Control, as manufactured by Soulé Steel Company. Power stations are to be placed as shown on plans. Where hand chains interfere with equipment they are to be carried on idlers to accessible clear position as indicated on plans. All worms, gears, pinions, and racks shall be accurately fitted and have bronze bushed bearings. Worm and gear shall be enclosed in a dustproof case and provision shall be made for proper lubrication. All tension line bearings shall be of cast iron and shall be equipped with rollers for easy operation of shaft. Worm and gear ratio shall be such that pull on hand chain shall not be excessive.

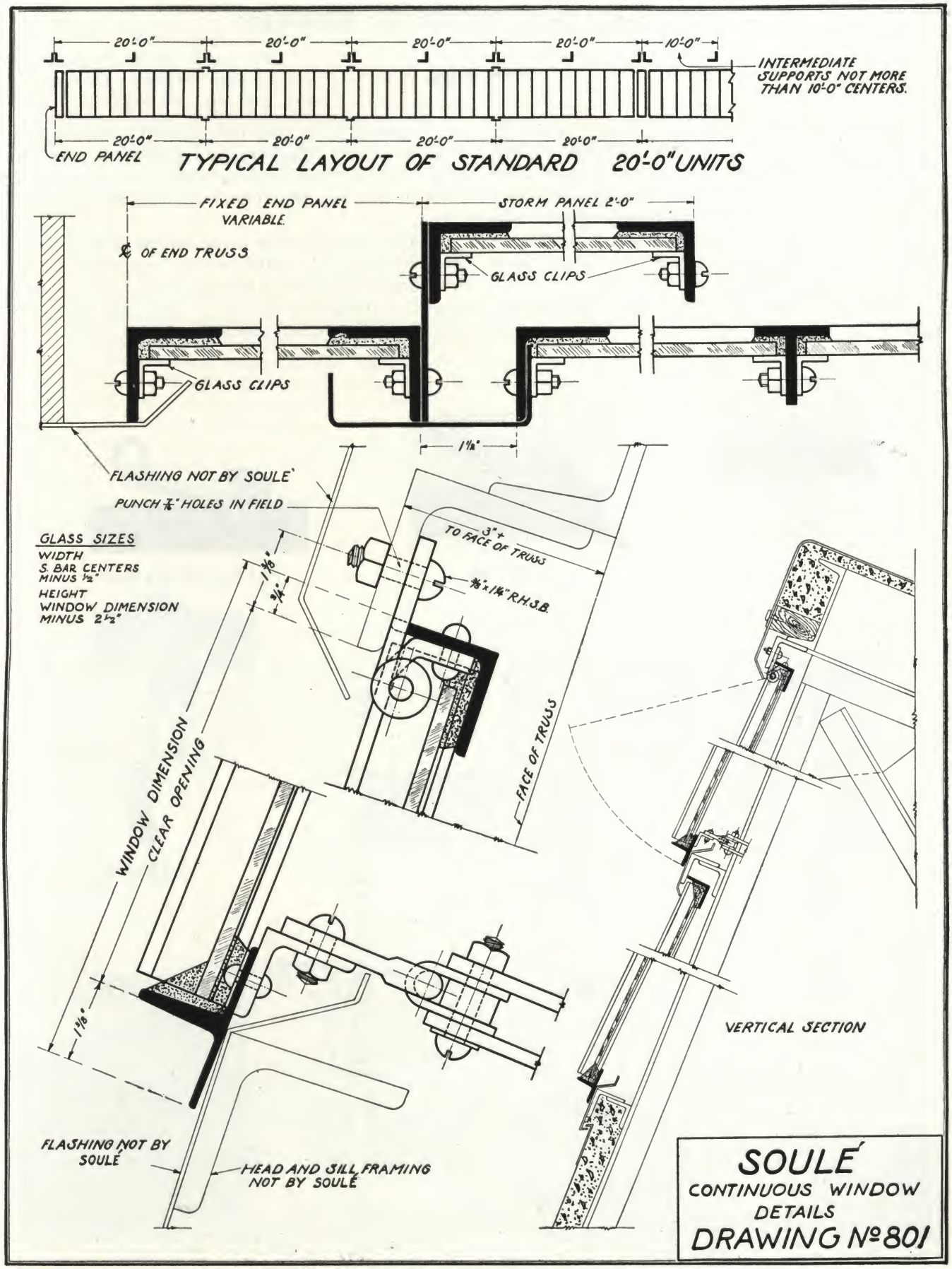
This contractor shall furnish and erect powers, tension line, tension line brackets, and lever arms complete; but structural steel contractor shall furnish structural steel members to support brackets and powers. All structural steel members shall be designed to carry operator loads transmitted to them through brackets. Operators shall open sash thirty-six inches or to a maximum of 35 degrees. Length of any one run shall not exceed 250 ft. Operators shall be finished with one shop coat of Soulé gray paint.



United States Steel Products Co., Los Angeles, Calif.
Met-Prod-Co Continuous Sash in Monitors



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ARCHITECTURAL PROJECTED WINDOWS

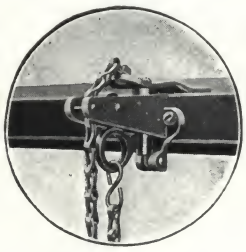
Description

SOULÉ Architectural Projected Steel Windows differ from Commercial Projected Steel Windows in their glass divisions, hardware, outside frame member, and welded construction. They offer a more pleasing design and are particularly suitable for offices and schools. The long leg frame member makes it possible to anchor the windows in the masonry and also leave ample room for plastering on both sides.

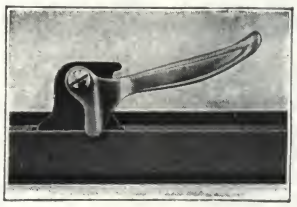
Shade bracket clips No. 110 can be supplied when specified.

Standard types and sizes of SOULÉ Architectural Projected Steel Windows are shown on pages of Solid Section Steel Window Industry in this volume. Other types or sizes can be furnished when desired.

Underwriters' Labels can be furnished on Architectural Projected Windows but are restricted to out-projecting ventilators and the exposed area of each light of glass is limited to 350 sq. in. and must be held in with glazing angles and steel bolts.



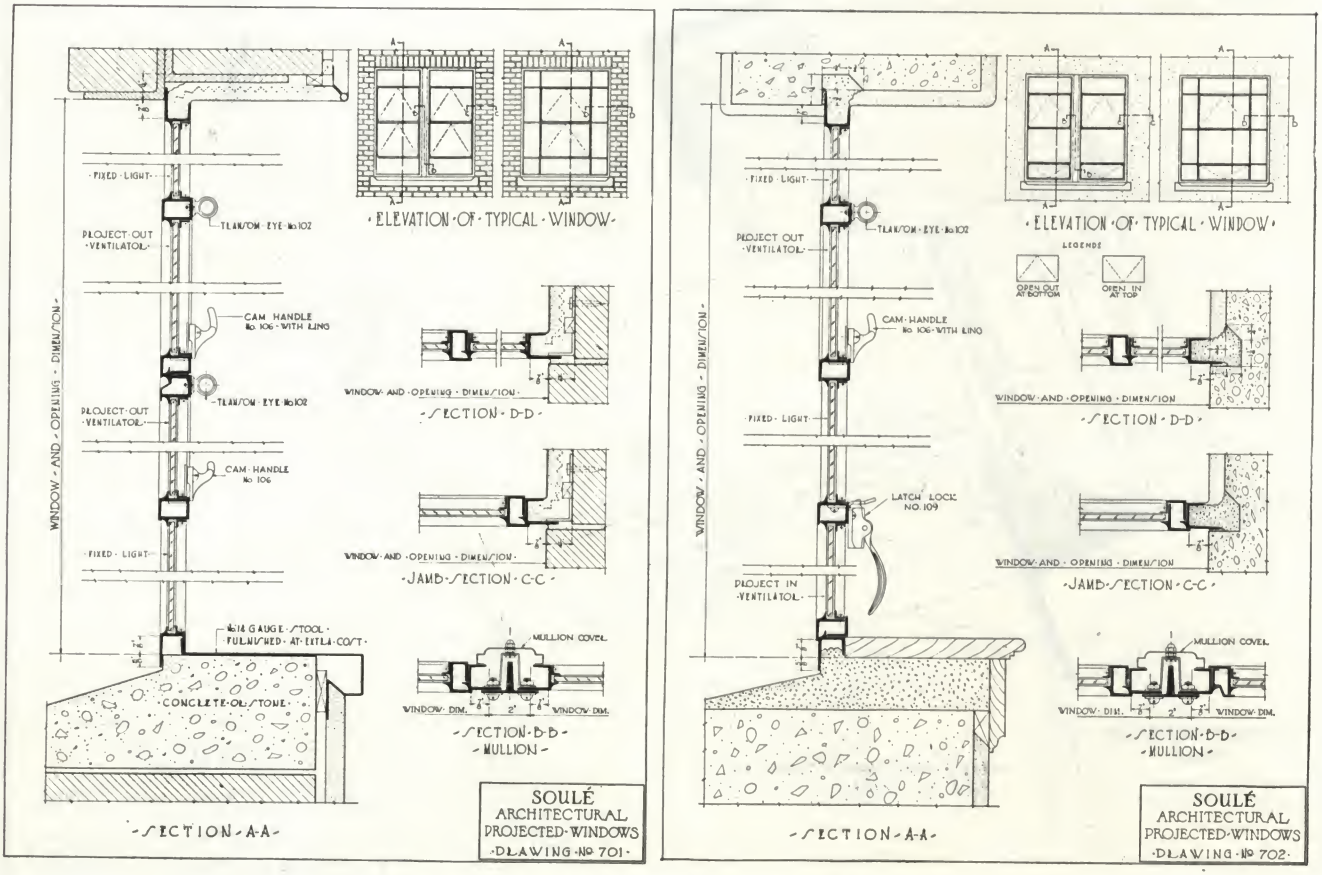
Part No. 129



Part No. 106



Part No. 106 with Ring



Details of Architectural Projected Windows

Continued on next page

SPECIFICATION FOR ARCHITECTURAL PROJECTED WINDOWS

All windows so shown on plans shall be SOULÉ Architectural Projected Steel Windows as manufactured by the SOULÉ STEEL COMPANY.

Windows shall be constructed of hot-rolled, solid, moulded steel sections especially rolled for the purpose. Outside frame member shall be an unequal leg channel section with outstanding leg 1⅝ in. long. All joints of frame and ventilator members shall be mortised and tenoned and air-hammer riveted and in addition all corners shall be electrically welded and the exposed faces ground smooth.

Ventilators shall have double contact weathering against frame members all around. They shall project out or in as indicated on plans and shall be hung on heavy steel arms attached to ventilator with bronze pivots and to frame member with adjustable bronze pivots. Sliding pivots shall consist of a bronze shoe on a hardened steel pin mounted in a steel housing securely riveted to the ventilator. Shoe shall be held in the channel formed by the frame members by means of a coil spring. Alignment stops shall be installed in the channel track to limit travel of shoe but shall be so designed as to permit reversal of ventilator for cleaning.

Where two or more window units occur in the same opening provide special Tee bar mullions with sherardized bolts and pressed steel mullion covers inside.

Hardware for ventilators within reach from floor shall be No. 106 Handle on out-projecting ventilators and No. 109 Latch Handle on in-projecting ventilators. For ventilators out of reach from floor provide No. 106 Cam Handle with Ring and No. 102 Pole Eye for pole operation (or No. 29 Throwout Latch for chain operation). For chain operation of in-projecting ventilators use No. 129 spring latch. All hardware shall be solid bronze, polished finish.

All windows shall be given one dip coat SOULÉ gray paint at factory before shipment.

Openings shall be properly prepared for windows as per shop details furnished by manufacturer and windows shall be erected by manufacturer or his agent, plumb and square and securely blocked or anchored in place, after which they shall be grouted in with rich cement grout by masonry contractor. Window erector shall attach all hardware and adjust ventilators so they will operate easily and fit tightly.

Optional Types of Glazing—

(a) Provide copper plated spring steel wire clips for inside putty glazing.

(b) Provide copper plated spring steel wire clips for outside putty glazing.

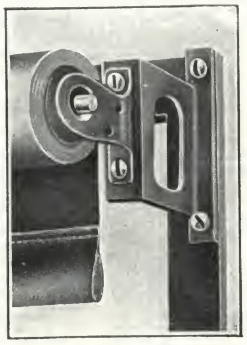
(c) Provide ⅜x$\frac{7}{16}$x$\frac{1}{16}$-in. glazing angles attached with round head brass screws and nuts.



Part No. 109



Part No. 102



Part No. 110



Daniel Webster School, Oakland, Calif.

CHAS. W. MCCALL, Architect R. W. LITTLEFIELD, Contractor

Continued on next page

TUBULAR STEEL ENTRANCE DOORS

Specification

Plate G-19

All steel doors shown on plans shall be SOULÉ Tubular Steel Doors as manufactured by the SOULÉ STEEL COMPANY.

Doors shall be constructed with stiles and rails of 1½x3-in. cold drawn tubing with all corners and intersections electrically welded and ground smooth. Steel panels shall be welded in place and caulked with mastic. Provide copper plated spring steel wire glazing clips for glass panels (or continuous steel glazing angles).

Swinging doors shall be hung in steel channel bucks as detailed and shall be equipped with three heavy steel butts to each leaf. Single swing doors shall have iron lever handles and cylinder lock (or latch). Pairs of swinging doors shall have astragal, lever handle and cylinder lock (or latch) on one leaf and surface bolts at top and bottom on other leaf.

Sliding doors shall be equipped with tubular track and roller bearing hangers of ample size for weight of door. Guide rollers and backstops shall be provided at the floor and each door shall be equipped with pull handle and hasp.

All doors, frames, and track shall be given one coat SOULÉ gray paint at factory before shipment.

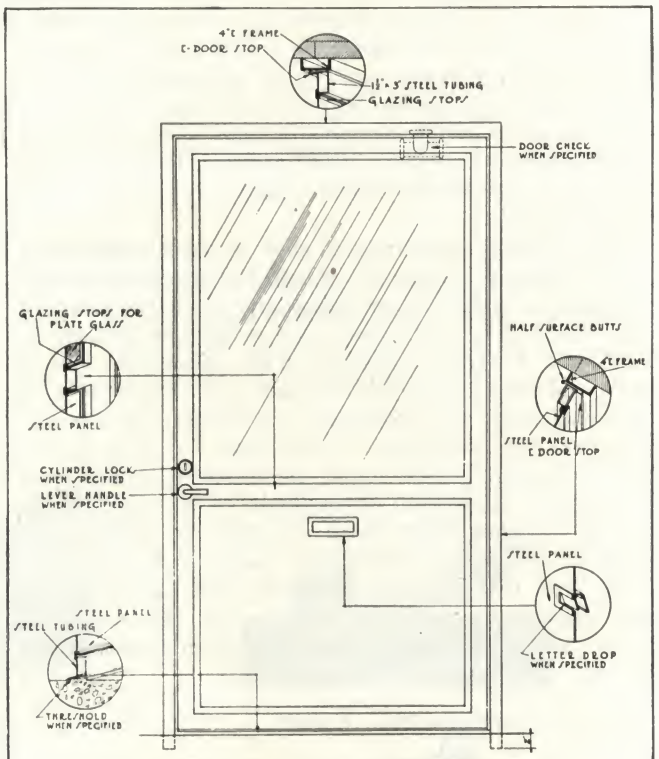
Doors shall be installed and hardware fitted by manufacturer or his agent.

Plates G-18 and G-24

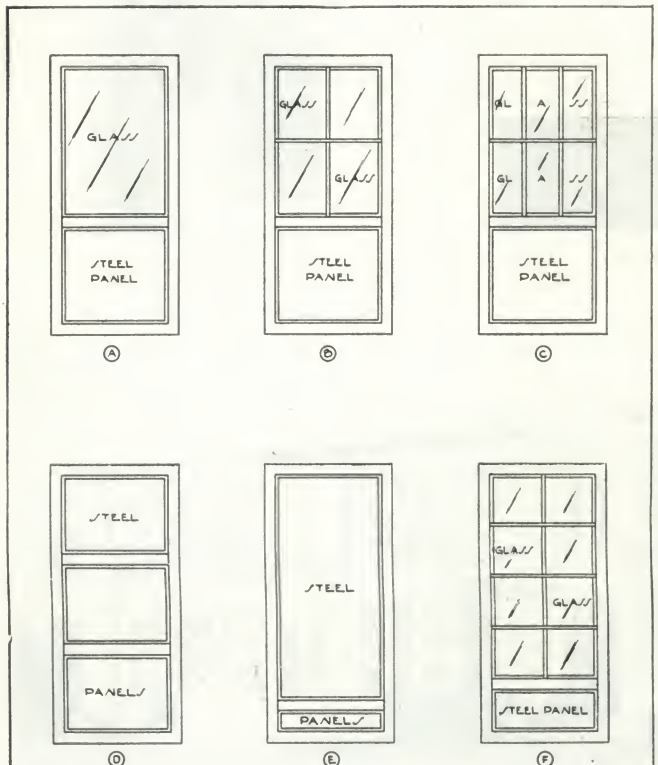
All doors where shown on plans or in door schedule shall be SOULÉ Tubular Steel Doors as manufactured by the SOULÉ STEEL COMPANY and shall be completely equipped with hardware as shown on door schedule. Entrance doors shall be complete with frame, cylinder lock, lever handles, rosettes, butts, letter drop, and door check. Pairs of doors shall be equipped with astragal and surface bolts in addition to the above hardware.

All hardware shall be fitted to doors and doors shall be fitted to frames in the shop. Stiles and rails shall be of 1½x3-in. cold drawn tubing with all joints electrically welded and ground smooth. Panels shall be welded in place and glass panels shall be set with glazing beads or glazing angles as shown in details. Steel panels shall be of 14 gauge furniture steel. Threshold shall be of specially rolled steel section with grooved top and shall be welded to side members of door frame.

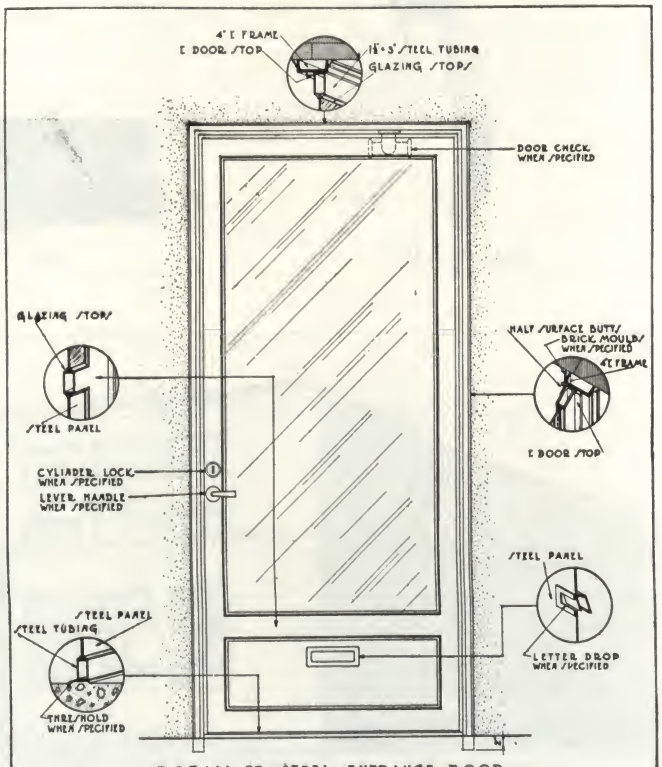
Doors shall be finished with one shop coat of SOULÉ gray paint.



SOULÉ | STANDARD STEEL DOOR | PLATE G-19



SOULÉ | STEEL ENTRANCE DOORS | PLATE G-18



SOULÉ | STEEL ENTRANCE DOOR | PLATE G-24

Continued on next page

FOLDING DOORS

Soulé Folding Doors are particularly designed for wide openings where it is desirable to fold the doors against the jamb or behind a pier where they occupy a minimum amount of space when folded. They have found special favor for large markets where the use of Soulé Folding Doors allows the maximum clear opening with the minimum amount of obstruction. They do not interfere in any way with the transom lights and both the Mesh Type and Glass Panel Type make attractive display windows when closed.

Specification

Where indicated on plans provide Soulé Mesh (steel or glass panel) Type Folding Doors, complete with all necessary operating hardware.

Framework of leaves shall be constructed of special members electrically welded together at all intersections and ground smooth on all exposed faces. Kick panels shall be of 14-gauge steel welded in. Upper panels (for Mesh Type) shall be constructed of heavy expanded metal tightly clamped in pressed steel frame which, in turn, shall be welded into framework of leaf. Upper panels (for Glass Panel Type) shall be filled with 24 oz. sheet glass (or wire glass) set in moulded rubber glazing strips and held in place with continuous glazing angles.

Each alternate leaf shall be hung at the top on a heavy cast iron hanger with roller bearing wheels rolling in heavy tubular track. Hanger shall have, in addition to supporting wheels, guide rollers traveling between upturned flanges of track. Track shall be securely anchored to building construction above opening by means of suitable anchors or brackets.

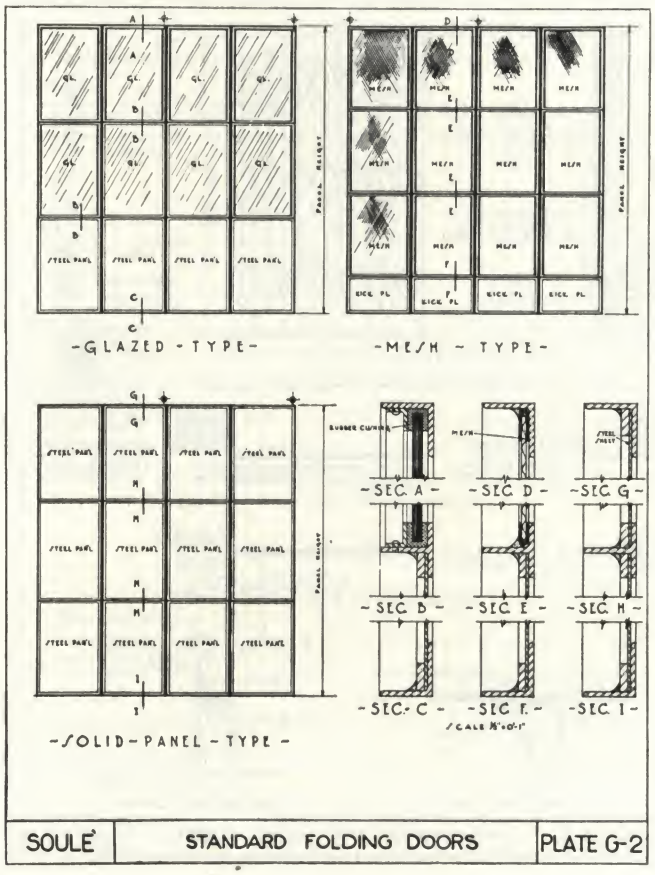
Door leaves shall be hinged together on steel butts and shall fold to the jamb as shown on plans and where so shown shall swing around behind wall at jamb. Where doors are made to swing provide heavy steel pivot-hinge bar at end of doors and patented locking device to swinging and locking portion of track at head. Floor guide shall be made to fold up and swing with door.

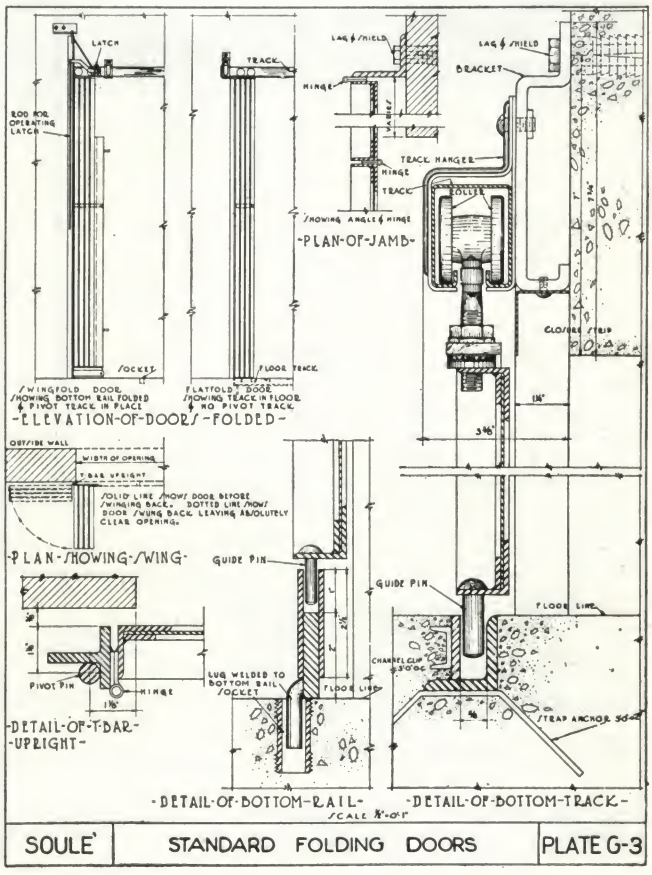
Where it is not required to swing door behind jamb the floor guide shall be set down and securely anchored in the floor with the top of the guide flush with the floor.

Paint all doors and hardware one shop coat Soulé gray paint before delivery.

Doors shall be erected by the manufacturer or his agent square and plumb in the openings and shall fit within ½ in. of the adjoining masonry at floor, jambs, and head.

Door leaves shall be made to fold together and to jamb without binding or undue effort.

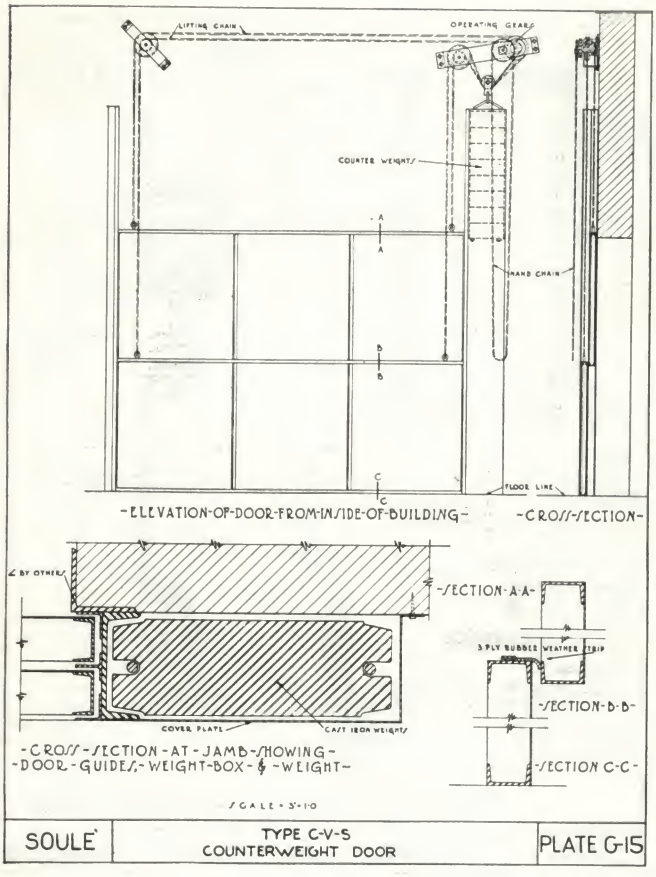


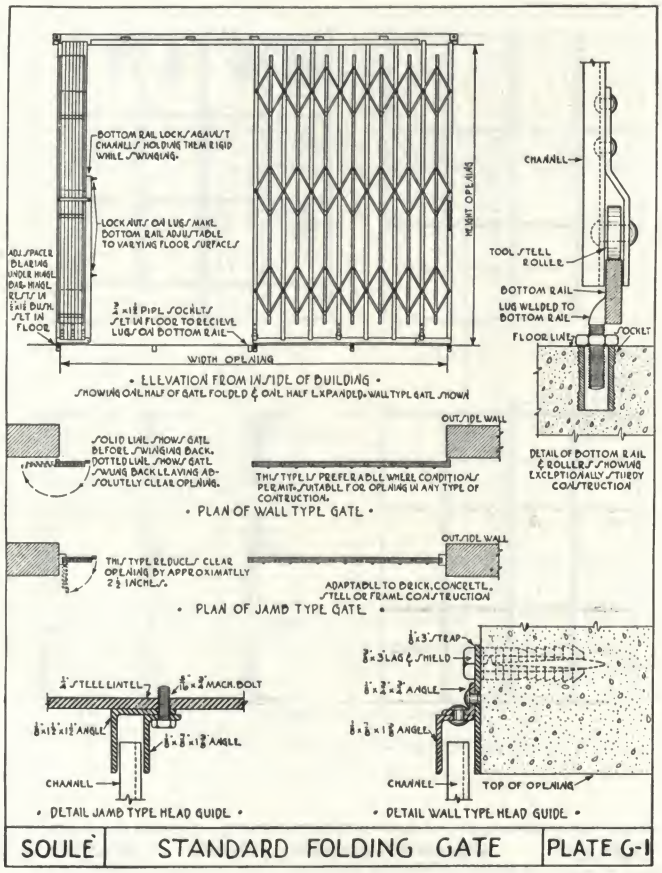


Continued on next page



Vertical Sliding Doors, Clarence Saunders Chain Store Warehouse
W. P. Neil Co., Architects **Los Angeles, Calif.** Central Manufacturing District, Builder





Continued on next page

VERTICALLY SLIDING DOORS

SOULÉ Vertically Sliding Doors provide an ideal installation for openings up to 25 ft. wide where there is sufficient clearance above the opening for the operating mechanism. Due to their accurate construction and perfect balance they are very easy to operate. Doors are hung on heavy steel chains traveling over special cast iron sheaves which preclude the possibility of slippage and keep the door sections in proper relationship at all times. When opened the door is entirely out of the way. No special construction of the building is required for the installation of SOULÉ Vertically Sliding Doors as they are located on the inside face of the wall.

Specification

Where shown or indicated on plans provide and install SOULÉ Type CVS Vertically Sliding Doors complete with all necessary operating hardware and fittings.

Door leaves shall be constructed of a 2-in. channel frame with 1½-in. intermediate Tee bars solidly welded together with exposed faces ground smooth. Panels shall be covered with sheets of 14-gauge steel welded to frame members. Provide flexible rubber weather strip at horizontal meeting rail.

Doors shall slide in guides at jambs constructed of 5-in. steel channels with angles and Tee bars welded together to form a continuous guide in which the door sections will operate easily. Provide pressed steel cover of 16-gauge steel which shall be fastened to one jamb-guide with machine screws and to masonry with expansion bolts to form cover and guide for counterweights.

Doors shall be hung on heavy steel chains passing over combination cast iron sheaves of two diameters so that lower door section will operate at twice the speed of the upper section and both doors will reach the opened position simultaneously.

Chains from both sides of door sections shall pass over sheaves to one side where they shall all be connected together and pass through another sheave attached to a single counterweight. Counterweight shall be of cast iron sections tied together with through bolts and shall be of proper weight to exactly balance the weight of the door sections.

Sheaves shall be mounted in substantial steel bracket on hardened steel shafts fitted in bronze bearings lubricated through Alemite fittings.

Doors less than 8 ft. high and not over 80 sq. ft. in area shall be manually operated by means of a handle attached to bottom rail of door.

Larger doors shall be chain operated by means of endless hand chain and steel gearing connected to sheave at weight side of door.

All doors shall have heavy throw bolt at horizontal meeting rail which shall engage in channel guide and which may be locked by means of a padlock (supplied by others with finish hardware).

Paint all parts of doors one coat SOULÉ gray paint at factory before shipment.

Doors shall be installed by manufacturer or his agent who shall furnish all necessary anchors, bolts, clips, etc., required for a complete operating installation.



Metropolitan Market, Los Angeles
WALTER R. HAGEDOHN, Architect MORRIS ROSENBERG, Owner

COLLAPSIBLE GATES

SOULÉ Collapsible Steel Gates are a machine made product with every part made to fit accurately together to make a gate that will operate easily and silently. A SOULÉ gate will give better and longer service because of its sturdy construction and accurate assembly.

Specification

Where collapsible steel gates are shown or indicated on plans they shall be manufactured by the SOULÉ STEEL COMPANY.

Gates shall be constructed with alternate 1-in. rolled steel channels and ⅜x⅝-in. steel bars connected together with expander-arms of ⅛x¾-in. steel. Expanders shall be pivoted in the center to the channels and at one end to the intermediate bar with ¼-in. iron rivets and washer bearings. The other end of each expander shall be attached to the intermediate bar by means of a die-formed steel guide which is machine riveted to the expander ends. All rivets shall be well peened over but shall permit free movement of the connected parts. Pressed steel roller shall be attached to bottom of each third channel by means of a formed steel clip securely riveted to channel. Roller shall roll freely between clip and channel on ½-in. iron rivet. Bottom rail shall be of ⅜x1½-in. steel and shall fold down and be located on floor by means of threaded steel pins and adjustable nut which are welded thereto and which fit into pipe sockets placed in floor. Top guide rail shall be constructed of a continuous steel plate and angle welded together to form a guide for the channels. Pivot bar at end of gate shall be fitted with pivot pin at lower end fitting into pipe socket in floor and at the upper end a pivot pin fitting into angle clip welded to top guide.

Provide hinged bar for locking hinged portion of bottom bar and channels together when gate is collapsed and hasp for locking gate with padlock from outside (or inside).

Paint all parts of gate one coat SOULÉ gray paint at factory before shipment.

Gates shall be installed by manufacturer or his agent so that both bottom and top rails are level and gate operates easily.

Continued on next page

SLIDING DOORS

Soulé Sliding Steel Industrial Doors are serviceable and yet economical. They are the most economical type of steel door to use on any size opening where there is sufficient clearance at one side for the door to slide back of the wall. These doors are made in two types for small and large openings. The Tee-Type Single Sliding Door (Type T-HS-1) is used for openings up to 100 sq. ft. and the Double Door (Type T-HS-2) is used for openings up to 160 sq. ft. where neither dimension exceeds 12 ft. for each door. The Channel Type Single Sliding Door (Type C-HS-1) can be used for openings up to 240 sq. ft. and the Double Door (Type C-HS-2) for openings up to 480 sq. ft. where neither dimension exceeds 22 ft. for each door.

Specifications

Tee-Type—All sliding doors shown on plans shall be manufactured by the Soulé Steel Company.

Frame members and cross members of doors shall be 1½x1½x⅜-in. hot rolled Tee bars electrically welded together at all intersections and ground smooth on all exposed faces. Solid panels shall be 16-gauge steel sheets bedded in mastic cement and welded to ⅜x⅝-in. bars which are in turn welded to the Tee bars in such a manner as to allow for expansion of sheets without buckling.

Provide open panels divided for glass where shown. Glass shall be held in place with continuous steel glazing angles.

Doors shall be hung on four wheel roller bearing adjustable hangers rolling in tubular steel track attached to lintel with brackets and expansion bolts.

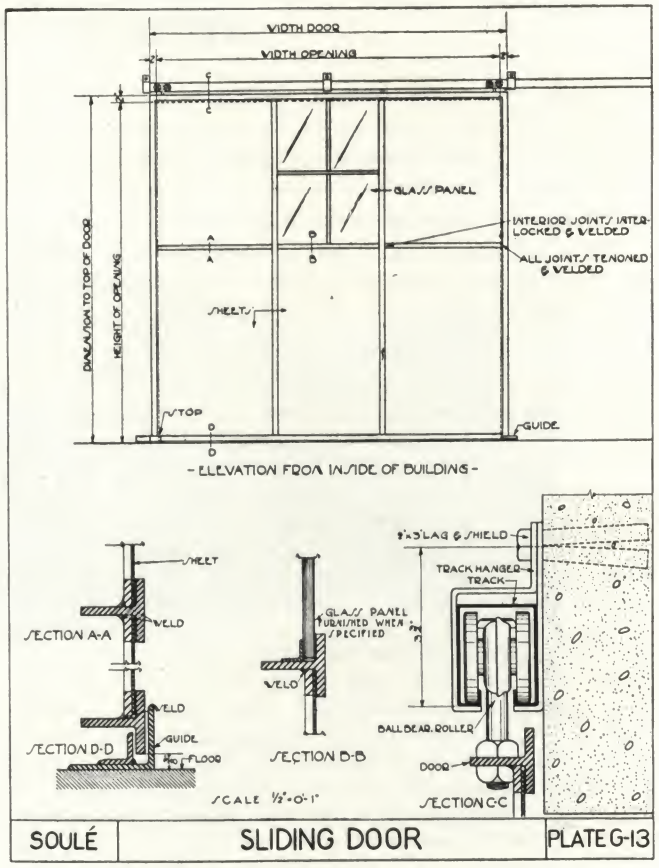
Provide floor guide at one jamb and floor stop at opposite jamb or at center of opening on double doors. Weld hasp to inside (or outside) of door for locking with padlock (supplied with finish hardware).

Paint doors one coat Soulé gray paint at factory before shipment.

Doors shall be installed by manufacturer or his agent plumb and level and made to operate easily without binding or rubbing on jambs. Clearance of ⅜ in. shall be maintained at jambs and floor.

Channel Type—All sliding doors shown on plans shall be manufactured by the Soulé Steel Company.

Outside frame members shall be 3-in. 4.1 lb. hot rolled channels. Interior members shall be 2x2x¼-in. hot rolled Tee Bars. All members shall be electrically welded together and ground smooth on all exposed faces. Solid panels shall be 16-gauge steel sheets bedded in mastic cement and welded to ⅜x⅝ in. bars which are in turn welded to the frame members, so that sheet can expand without buckling.



SOULÉ | SLIDING DOOR | PLATE G-13

BIFOLDING DOORS—TYPE J-1

Soulé Type J-1 Bifolding Doors can be used on openings where there is neither jamb clearance nor head clearance for other types of doors and where a sturdy, serviceable door is required. They are made to withstand the hard usage to which service doors are subjected and are not rendered inoperative when subject to ordinary damage. There are no springs or other parts to get out of adjustment and once installed they will give perfect service.

Specification

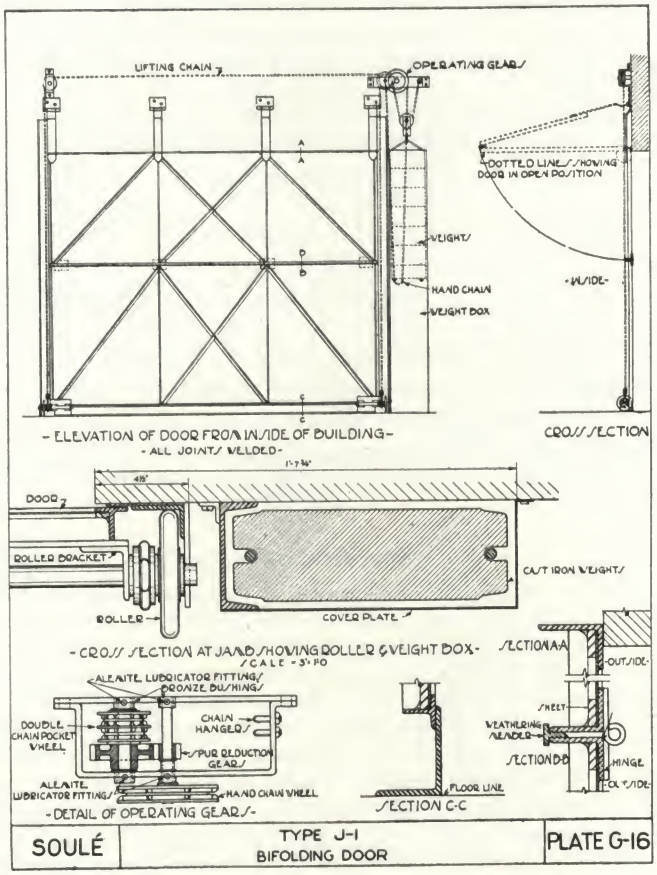
Plate G-16—Where shown or indicated on plans provide and install Soulé Type J-1 Bifolding Doors manufactured by the Soulé Steel Company.

Doors shall be constructed in accordance with manufacturer's standard details with all frame members of doors electrically welded together and ground smooth on exposed surfaces. Panel plates shall be of 14-gauge steel, welded to the door frame. Hinges shall be die-cut and machine-forged with hardened steel pins. Hinges shall be of the proper size and weight for the size of the door. Guide rollers shall be of cast iron securely mounted on steel shaft rigidly connected to the lower corners of the door. These rollers shall roll on angles attached to door jambs. Counterweights shall be of cast iron and shall be enclosed by a formed steel cover. The lifting chains shall be heavy chain of proper size for the size of the door and shall be attached to the lower corners of the door with adjustable connections. Chains shall be carried over grooved wheels, one set of which is operated by means of hand-pull chain and spur reduction gears, to the counterweight. Gearing shall be designed so that a light pull will operate the door.

Provide locking levers on each jamb at meeting rail to lock the door securely from the inside with provision for a padlock where desired.

All parts of doors shall be painted one coat Soulé gray paint at factory before shipment.

Doors shall be installed by the manufacturer or his agent. Hanging hinges shall be bolted to the wall with through bolts where practicable or with expansion bolts at least 6 in. long. Chain wheels and gear housing may be attached to wall with expansion bolts. Doors shall be hung plumb and square and so adjusted as to operate smoothly without binding and all gears shall be well lubricated.



SOULÉ | TYPE J-1 BIFOLDING DOOR | PLATE G-16

Continued on next page

AIRPLANE HANGAR DOORS

Soulé Airplane Hangar Doors of both the Tubular and Channel Types with their hardware are made with a precision and finish which makes for ease of operation and pleasing appearance. The trucks are made in our own plant and are of much heavier construction than those ordinarily used.

While the catalogue illustrates but two kinds of doors for the same type of opening we are prepared and equipped to furnish around-the-corner type doors, overhead track type, or electrically driven doors of any type.

The tubular type door is lighter than any other type of door and therefore much easier to operate. Being constructed, however, of steel tubing it is very strong and can be constructed to withstand any designated wind pressure.

The channel type door, being constructed of structural shapes, is more economical to manufacture than the tubular type. Although much heavier than the tubular door, our own specially constructed trucks make it surprisingly easy to operate and it will stand an immense amount of hard service and abuse.

Specifications

Tubular Type—Doors for all large hangar openings shall be Soulé Tubular Type Hangar Doors manufactured by the Soulé Steel Company.

All frame and intermediate members of doors shall be of steel tubing electrically welded together at all intersections and ground smooth on all exposed faces.

Solid panels shall be of 14-gauge steel sheets attached to frame members with machine screws not over 9 in. on centers. Open panels for glazing shall be standard Soulé Industrial Type steel window sections arranged for inside glazing with spring steel clips and putty. Window sections shall be attached to door members in the same manner as the solid panels.

Roller trucks and top guide rollers for door shall be manufactured by the Soulé Steel Company. Trucks shall have 12 in. heavy cast iron wheels mounted with roller bearings on 1½ in. hardened steel axle. Truck housing shall be constructed of ⅜ in. steel sides with heavy cast iron bearing blocks and hardened spacers at ends. Wheel shall be mounted between side plates with steel thrust washers between hub of wheel and plates. Wheel shaft shall be drilled so that bearing can be lubricated through an Alemite fitting screwed into the end of the shaft. Wheels shall be machined to fit the particular rail used on the job and firm supplying the rails shall furnish section of rail to door contractor. Trucks shall be mounted within the door and shall be bolted thereto with four bolts in slotted holes permitting of vertical adjustment. Load of door shall be transferred to wheel through two adjusting bolts with locknuts which bear on the wheel housing bearing blocks.

Top rollers shall be of cast iron with graphited bronze bushings and hardened steel axles.

Doors shall be weatherstripped around sides and bottom with 3-ply rubber which shall be attached to door with continuous steel bar and brass machine screws.

Provide heavy cast iron flush door pull on the outside and handle pull on inside of each door. Locking device shall consist of a steel bolt mounted in a suitable guide with a coil spring which will engage in a socket set in the floor. (Or when specified the following device will be furnished.)

Locking device shall consist of a lever handle located approximately 30 in. above the floor which is linked to a vertical bolt, having a heavy steel shoe on the lower end, in such a manner that a downward pressure on the lever will effectively brake the door or lock it by transferring the weight from the roller to the locking device.

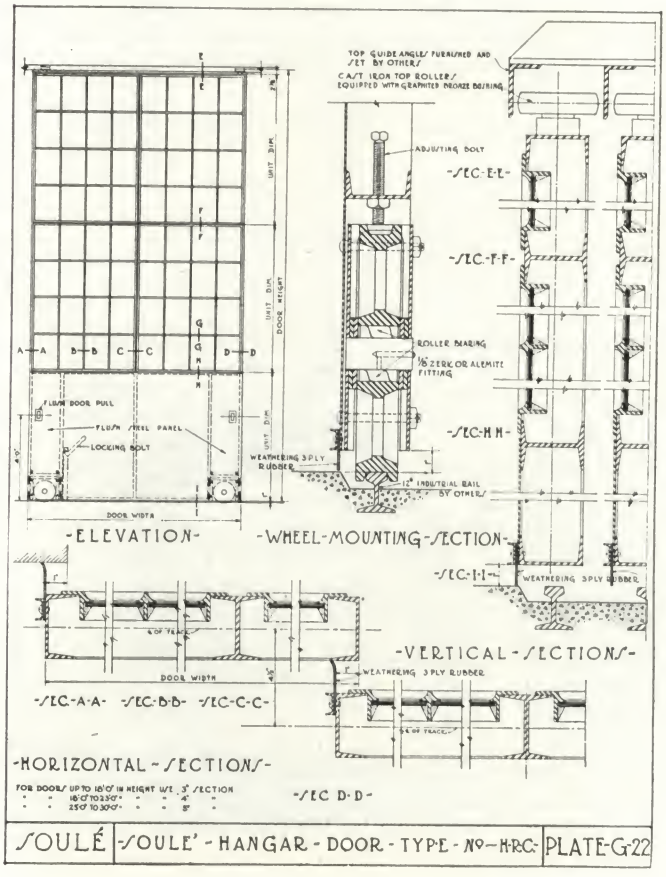
Doors and hardware shall be painted one coat Soulé gray paint at factory before shipment.

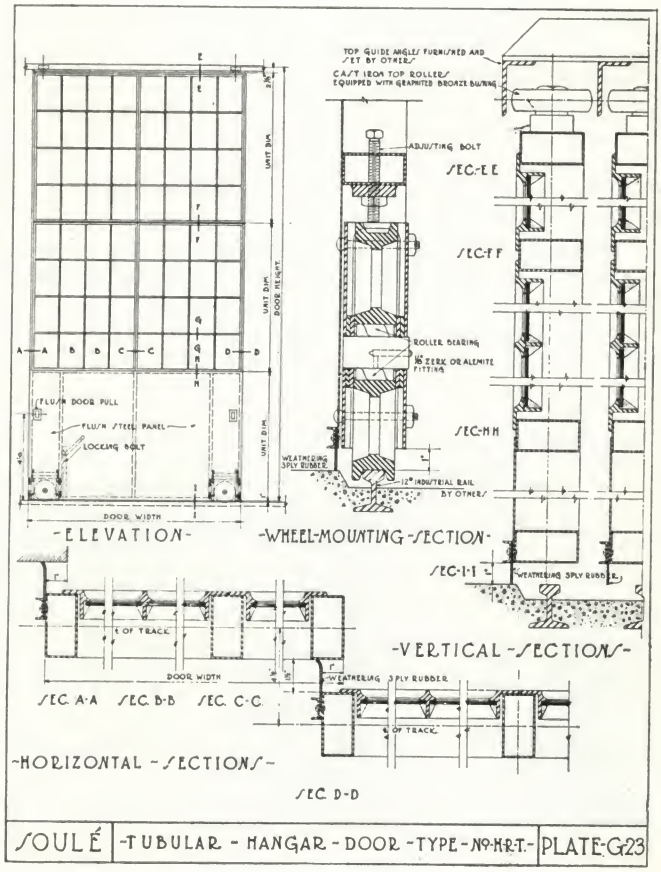
Doors shall be erected on track and in guides (supplied by others) by the manufacturer or his agent and trucks shall be adjusted so that doors are plumb and square. All bearings shall be well lubricated and doors made to operate easily and without binding.

Channel Type—Doors for all large hangar openings shall be Soulé Channel Type Hangar Doors manufactured by the Soulé Steel Company.

Outside stiles and rails of doors shall be of 3 in. (4 or 5 in.) hot rolled steel channels and interior members shall be of 3 in. (4 or 5 in.) I beams all electrically welded together and ground smooth on exposed faces.

Balance of specification same as for Tubular Type Hangar Doors.





Continued on next page

DOUBLE HUNG WINDOWS

Specification

All windows, where shown on plans, shall be SOULÉ double hung steel windows as manufactured by the SOULÉ STEEL COMPANY.

Frames shall be constructed from 22-gauge galvanized steel sheets with sills constructed from 16-gauge steel sheets. All frames shall be well assembled with rivets and cleats.

Sash portions shall be of special SOULÉ rolled sections, welded at the corners and ground smooth. Sash portions shall slide in brass (for Underwriters' labeled window substitute "galvanized iron") guides held in place by machine screws. Sash shall be counterbalanced by cast iron weights connected to the sash by galvanized iron chains carried over roller bearing pulleys.

SOULÉ standard hardware of malleable iron (or bronze) consisting of two handles for lower sash, one handle for upper sash and a sash lock shall be furnished for each window opening.

All windows shall be painted one shop coat of SOULÉ gray paint at factory, before shipment.

All windows shall be erected, trued and plumbed, and left in a satisfactory, workmanlike manner, by the manufacturer. Glazing, field painting and grouting are covered under another specification and are not included under this item.

Underwriters' Labeled Windows

SOULÉ Double Hung Steel Windows are also furnished with the label of the Underwriters' Laboratories, Inc., and when bearing the Underwriters' label are limited to a maximum size of 5 ft. x 9 ft. 11⅝ in. If larger openings in width are desired, they may be had by using mullions.

On SOULÉ Underwriters' double hung windows it is necessary to use glazing angles to hold the glass in place. This is clearly shown in the details.

Underwriters' Labeled Windows are fitted with galvanized running guides as required by the Underwriters' Laboratories, Inc.

Glass sizes are limited to a maximum of 350 sq. in. of exposed glass area and muntin bars must be included.

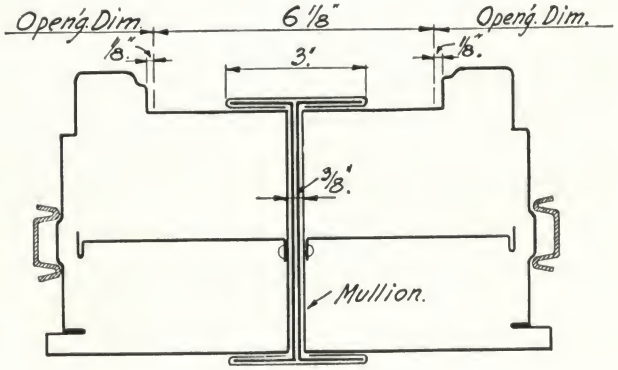
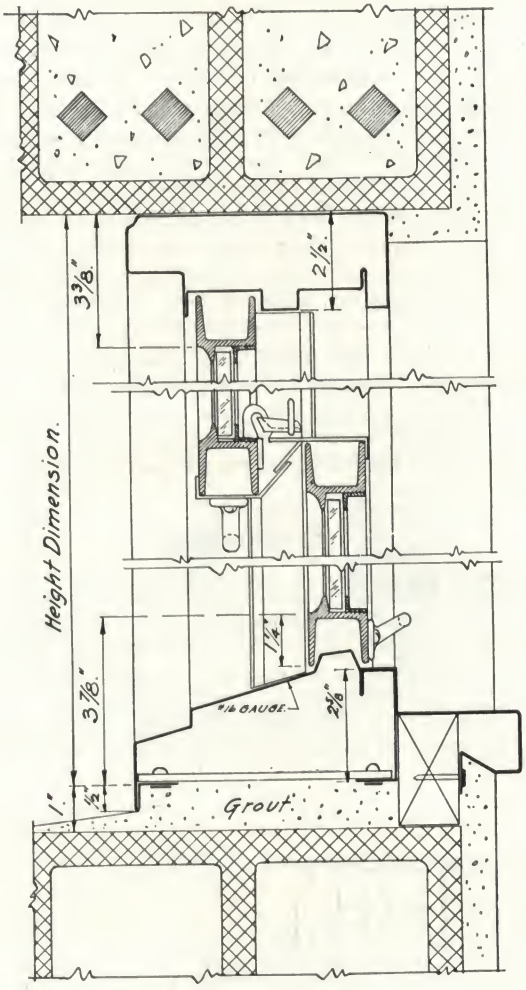
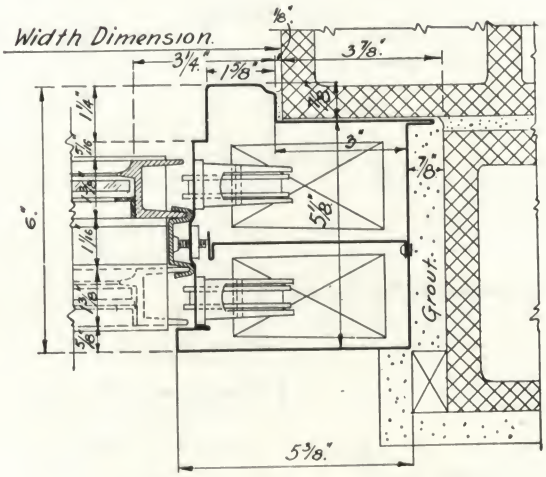


Figure 2.



VERTICAL SECTION.



SECTION THROUGH JAMB.

Continued on next page

HEAVY TYPE WINDOWS

In the following pages, we have endeavored to give architects and designers a sufficient amount of information to assist in the design of heavy section window openings of practically every type and description, for use in monumental, office, school, hospital and residential buildings.

We have standardized in the construction, workmanship and preparation of windows for hardware. This, however, does not limit the architect or designer to standard sizes and designs, as we realize that on the type of buildings for which windows of this class are used there must be individuality.

Our salesmen are trained to give you the information you require for preliminary study and our designing department will gladly make up sketches and details and submit them to you without obligation on your part.

On several of the pages which follow, we have reproduced details of actual installations which we have recently made.

Sub-frames of other dimensions than those for the windows on drawing No. HC-53 can be supplied.

All finish hardware is made of solid bronze and may be furnished to match any finishes ordinarily used.

Mechanical operators which are furnished as standard are shown on drawing No. HC-64 and are furnished only when specified. Other means of operating windows are also employed, depending on type of ventilating unit.

Maximum Sizes of Ventilators—

Projected Casements, each leaf: width 2 ft. 6 in., height 6 ft.

Side Hinged Casements, each leaf: width 2 ft. 9 in., height 8 ft.

Project Out or In Ventilators: width 5 ft., height 3 ft. 6 in.

Specification

All windows shown on plans shall be SOULÉ Heavy Section Windows with ventilators to swing as indicated. All corners of frames and ventilators shall be electrically welded and ground smooth. Ventilators shall be carefully fitted into the frames to insure perfect weather tightness and easy operation.

Projected Casements and Ventilators—Where called for, projected casements and ventilators shall operate on SOULÉ sliding cleaning hinge, so that they may be cleaned from the inside. When vent is in a closed position no part of the hinge shall project either inside or outside of the plane of the window.

Hinged Casements and Ventilators—Where called for, casements and ventilators shall be mounted on extruded bronze hinge No. 124, with hardened steel pin. Supply solid bronze adjuster No. 161, one for each hinged casement leaf.

Glazing Beads—Moulded steel glazing beads shall be supplied for holding glass in place. Miters at corners shall be neatly and accurately fitted. (Miters of solid rolled beads may be butt welded at additional cost.)

Hardware—All casements not over 5 ft. 0 in. high shall be furnished with single casement fasteners. Casements over 5 ft. 0 in. high shall be furnished with two point casement fasteners. All open in or out transoms out of reach of floor shall be supplied with transom catches.

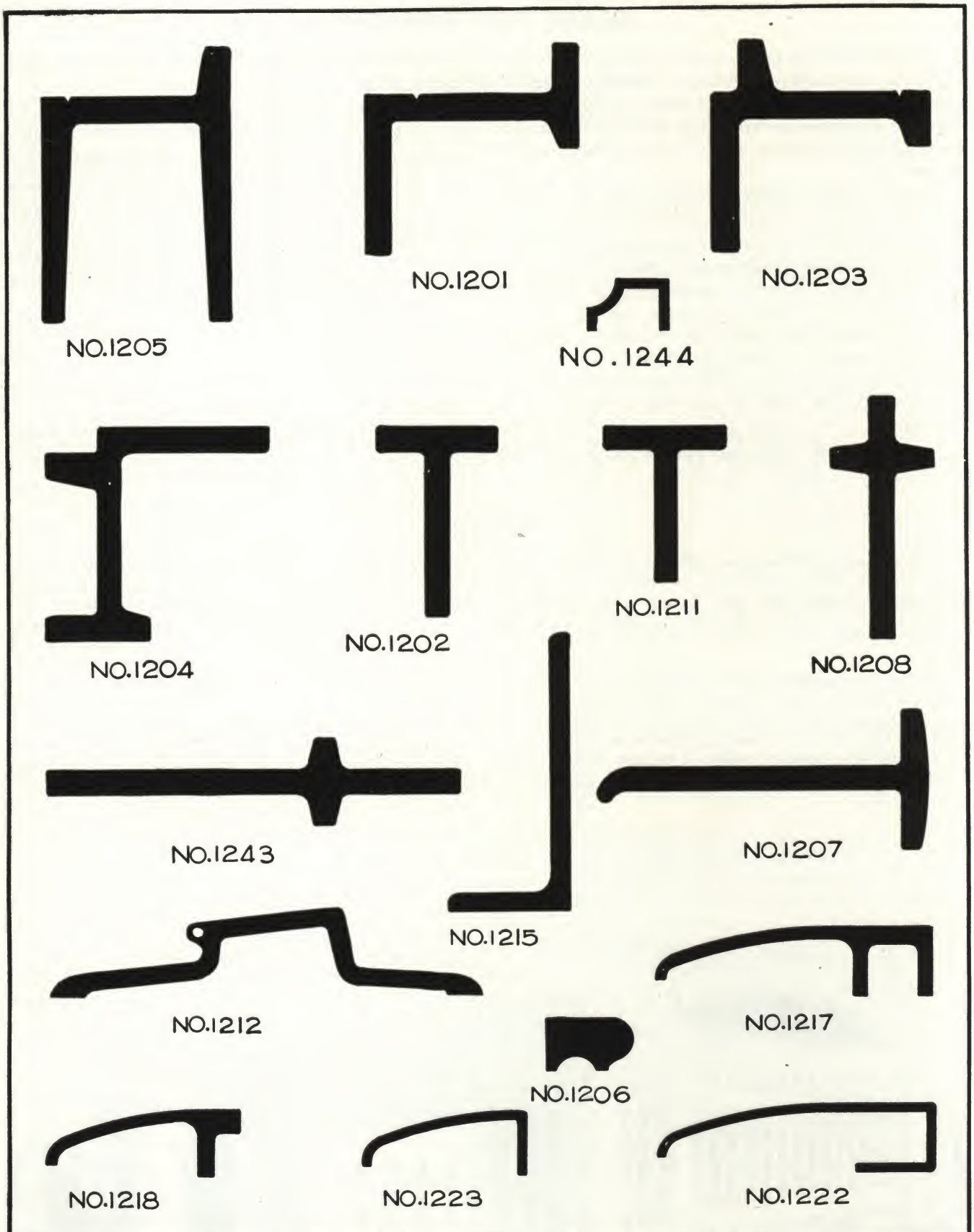


Life Science Building, University of California, Berkeley, Calif.

GEO. W. KELHAM, Architect — DINWIDDIE CONSTRUCTION CO., Builders

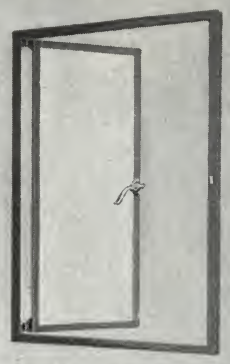
SOULÉ heavy section windows are installed on all exterior elevations. SOULÉ type "K" windows are installed in light courts

Continued on next page

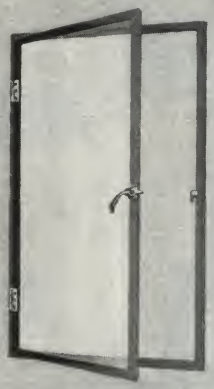


SOULÉ	CASEMENT ~ SECTIONS HEAVY ~ TYPE	DRAWING NO. H.C.65 SCALE: FULL SIZE

Continued on next page



Side Hinged Open OUT Casement with Friction Cleaning Hinge No. 137
(Side Hinged Casement may also be mounted on Bronze Butts No. 124. In this case use Stay Bar Adjuster No. 161.)



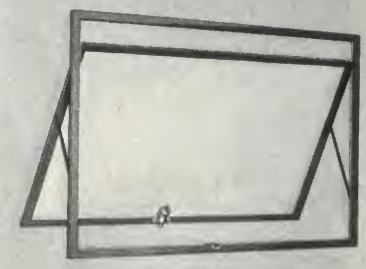
Side Hinged Open IN Casement with Bronze Butts No. 124



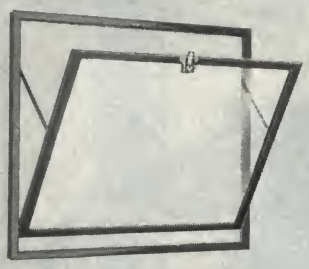
Projected OUT Casement



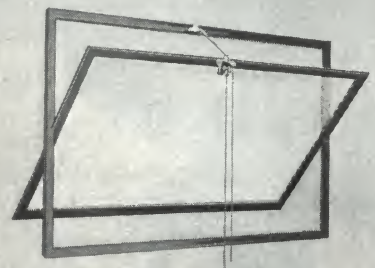
Vertically Pivoted Casement



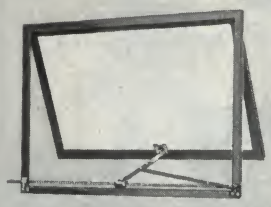
Projected OUT Ventilator



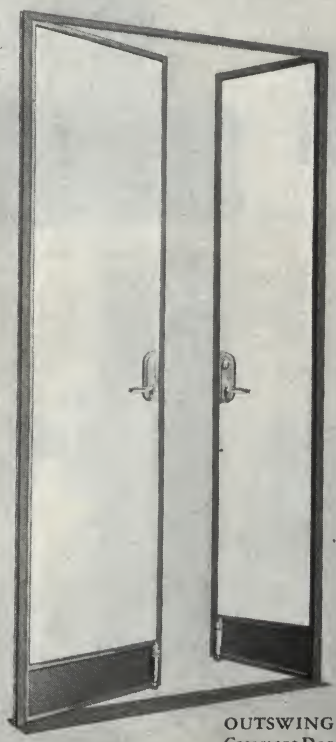
Projected IN Ventilator



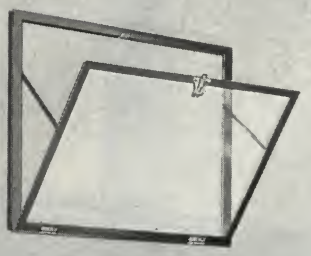
Center Pivoted Ventilator



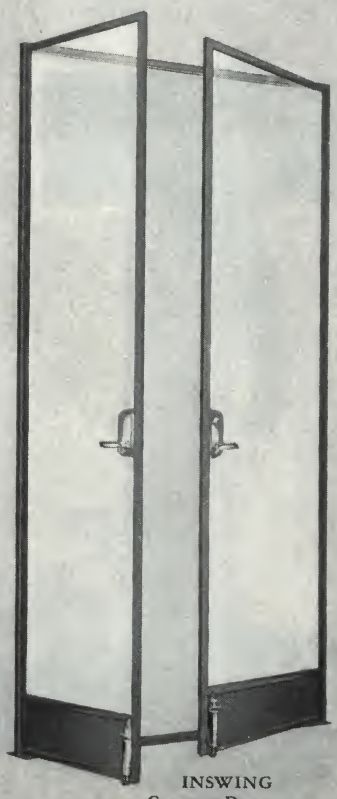
Top Hinged Open OUT Ventilator Prepared for Mechanical Operator



OUTSWING Casement Doors



Bottom Hinged Open IN Ventilator



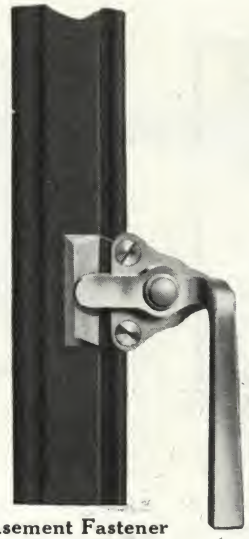
INSWING Casement Doors

Opening Positions of Soulé Windows and Ventilators

Continued on next page



Casement Fastener
No. 183-D



Casement Fastener
No. 182



Casement Fastener No. 185



Casement Fastener
No. 185-D



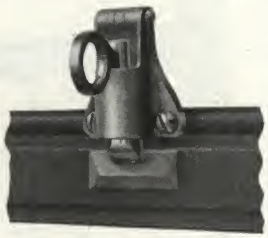
Latch No. 186



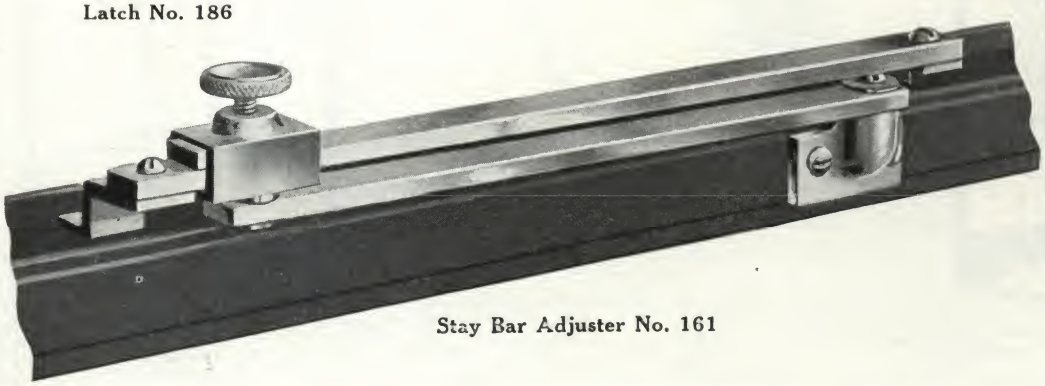
Transom Catch No. 134



Transom Catch No. 128



Transom Catch No. 127



Stay Bar Adjuster No. 161



Casement Fastener
No. 164

Soulé Casement and Transom Hardware

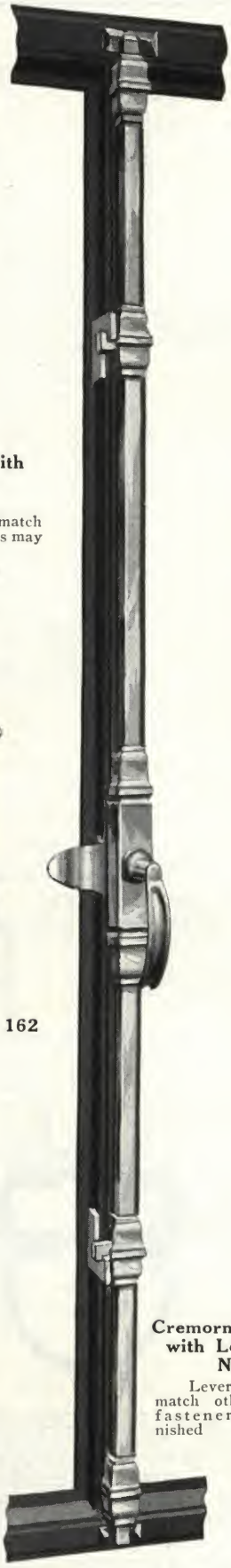
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Latch No. 174 with Lever Handle No. 159

Lever handles to match other casement fasteners may be furnished

Interior Elevation



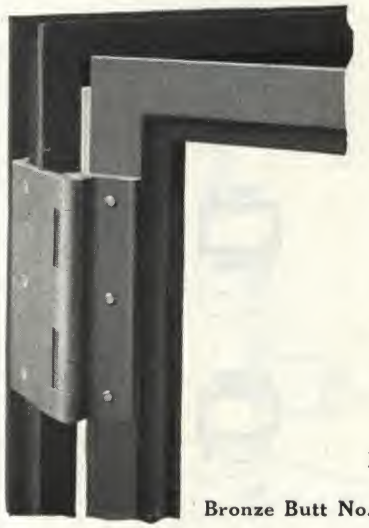


Cylinder Lock No. 154 with Lever Handle No. 158

Exterior Elevation



Transom Eye No. 102





Door Stop No. 162

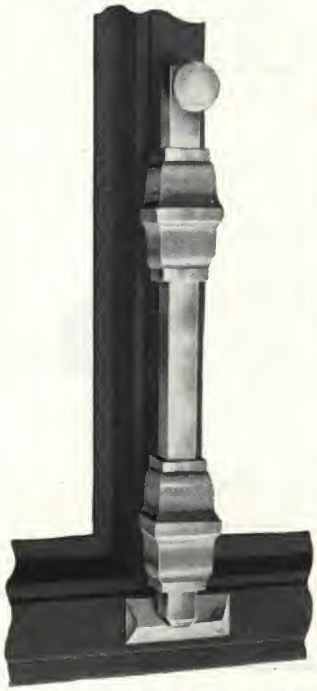
Bronze Butt No. 124



Friction Cleaning Hinge No. 137

Cremorne Bolt No. 145 with Lever Handle No. 159

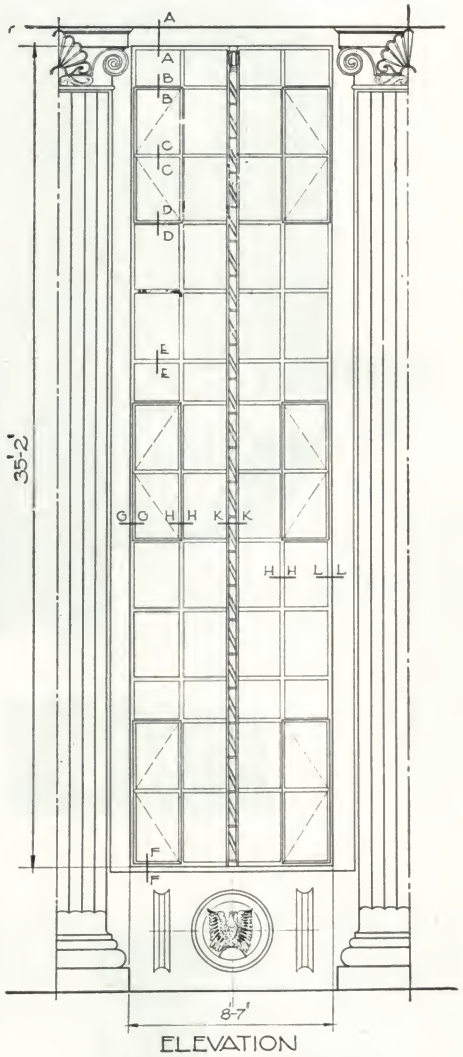
Lever handles to match other casement fasteners may be furnished



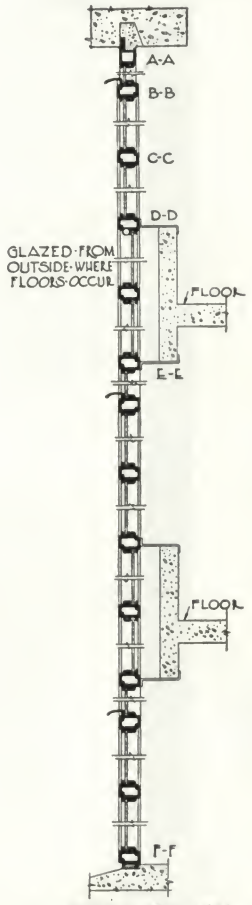
Surface Bolt No. 144

Soulé Casement Hardware

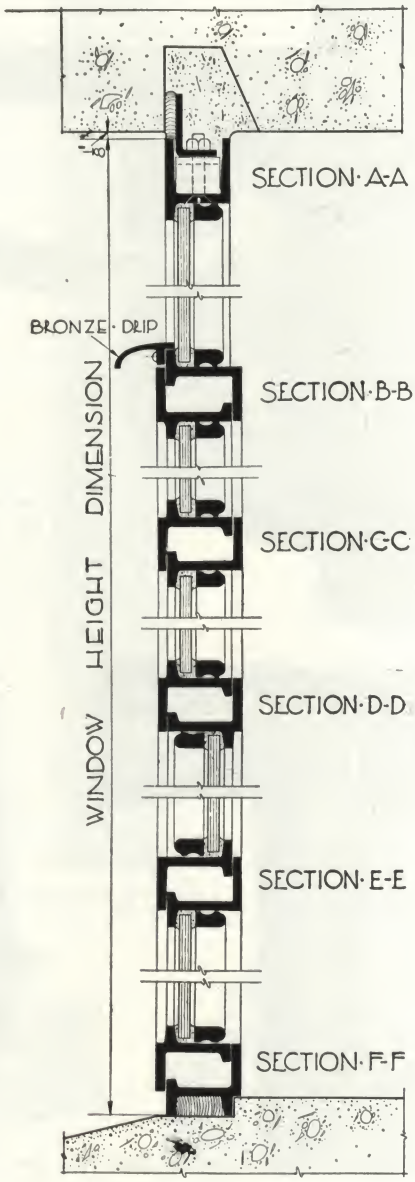
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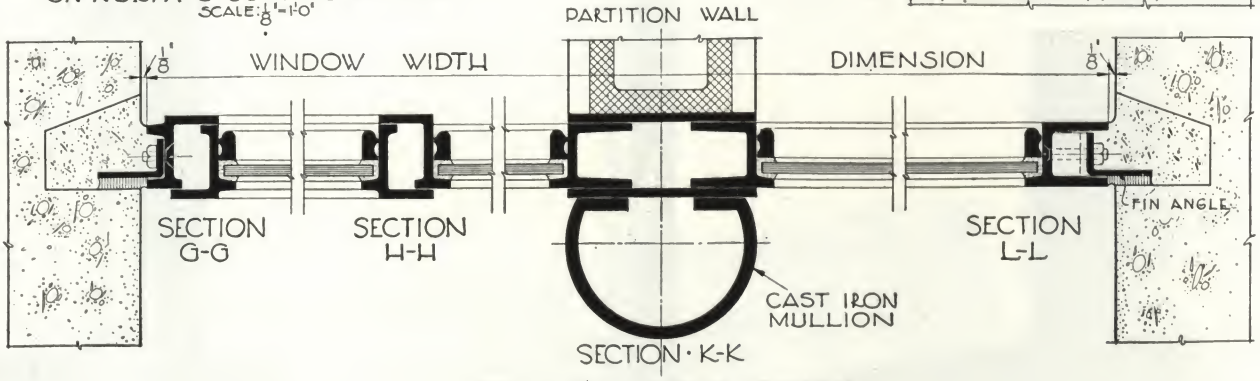


ELEVATION
TYPICAL WINDOWS
ON NORTH & SOUTH ELEVATION
SCALE: 1/8"=1'-0"



VERTICAL SECTION
SHOWING ARRANGEMENT
OF INTERMEDIATE FLOORS





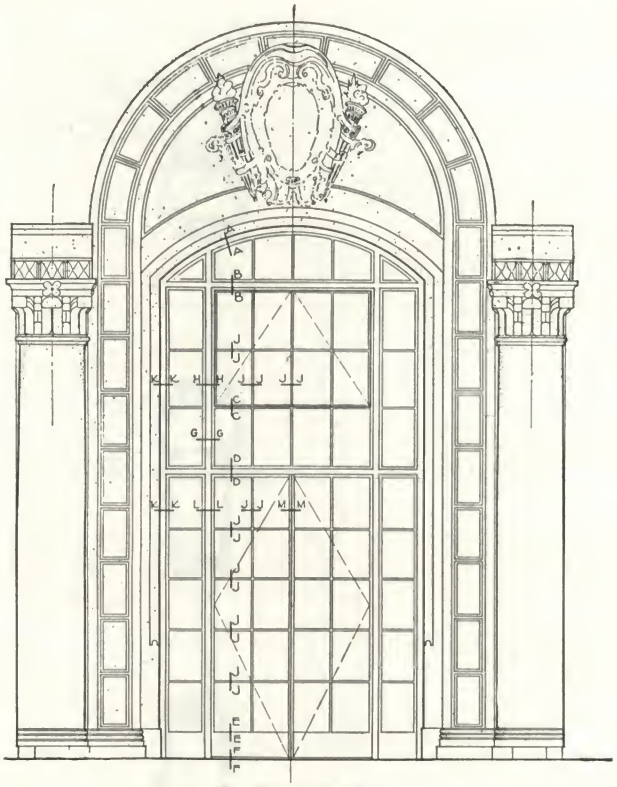
SECTION K-K

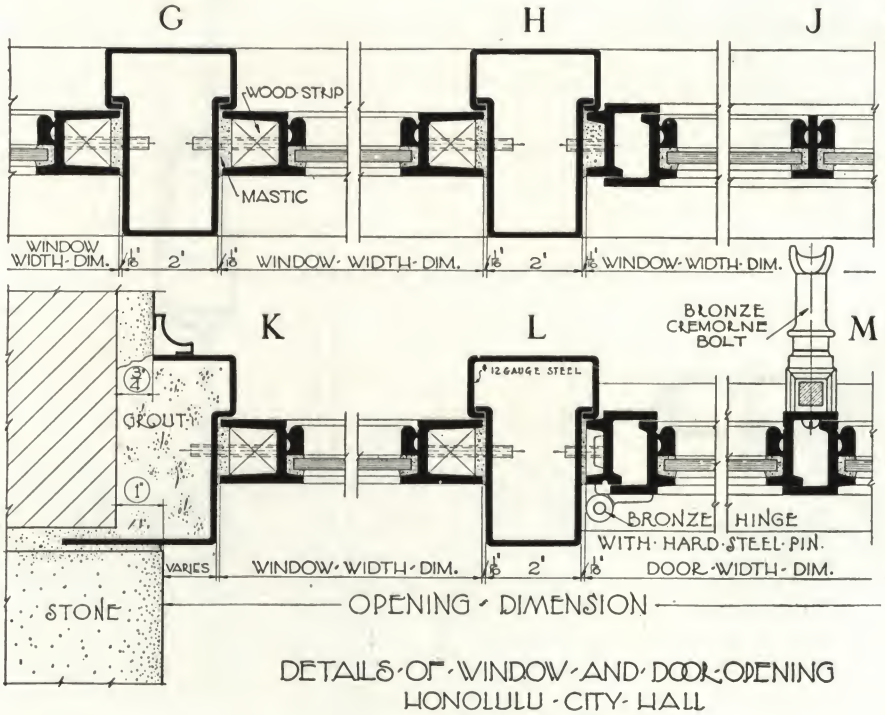
DETAIL OF WINDOW OPENING
LIFE SCIENCE BUILDING
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIF.

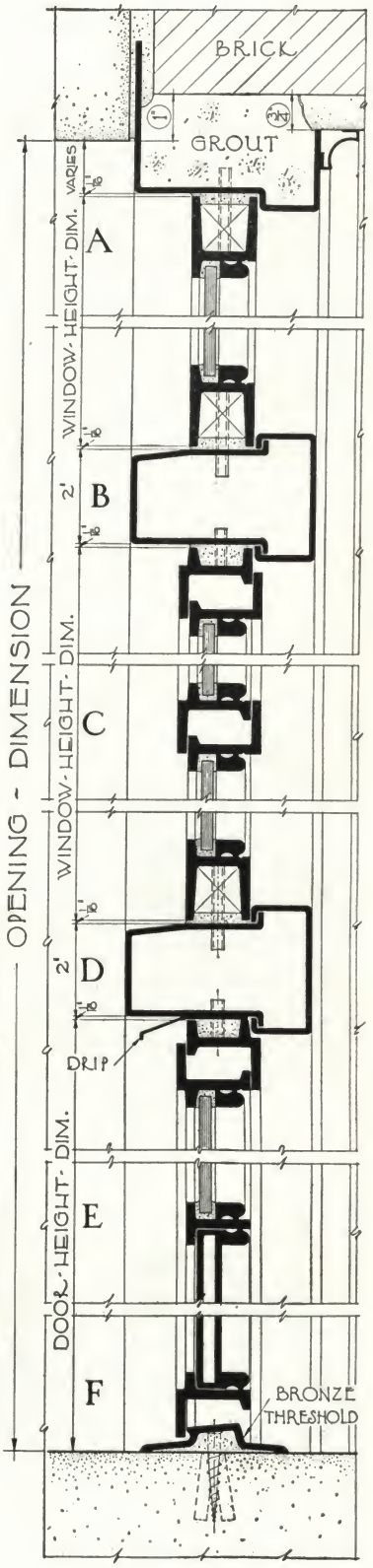
DETAIL SCALE: 3"=1'-0"

SOULE'	SPECIAL WINDOW DETAILS HEAVY SECTION TYPE	DRAWING NO. H.C.73

Continued on next page



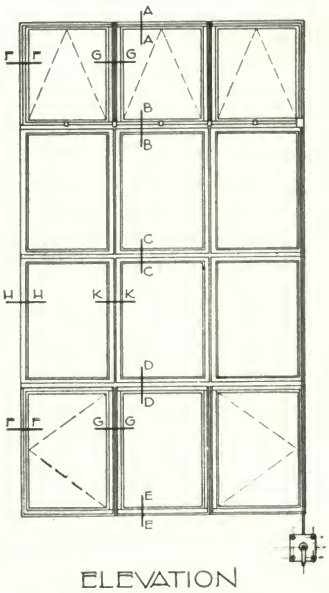




DETAILS OF WINDOW AND DOOR OPENING
HONOLULU CITY HALL
HONOLULU, HAWAII

SOULE'	COMPOSITE WINDOW OPENING WITH STEEL CASEMENT DOORS & SUB FRAMES	DRAWING NO. H.C.53

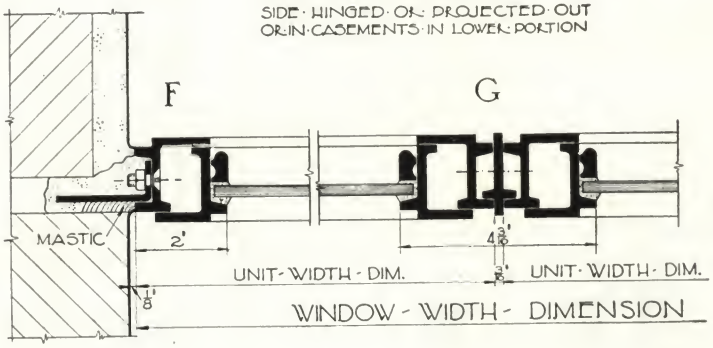
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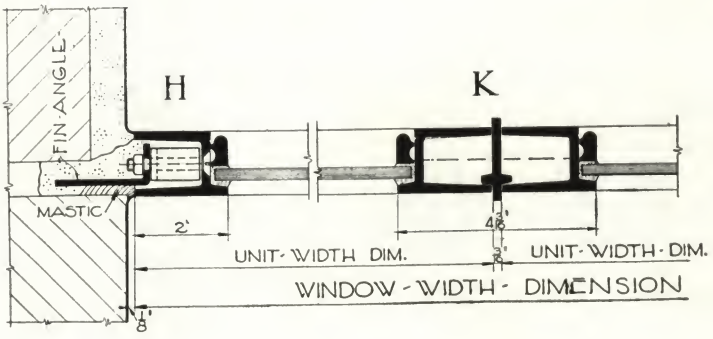


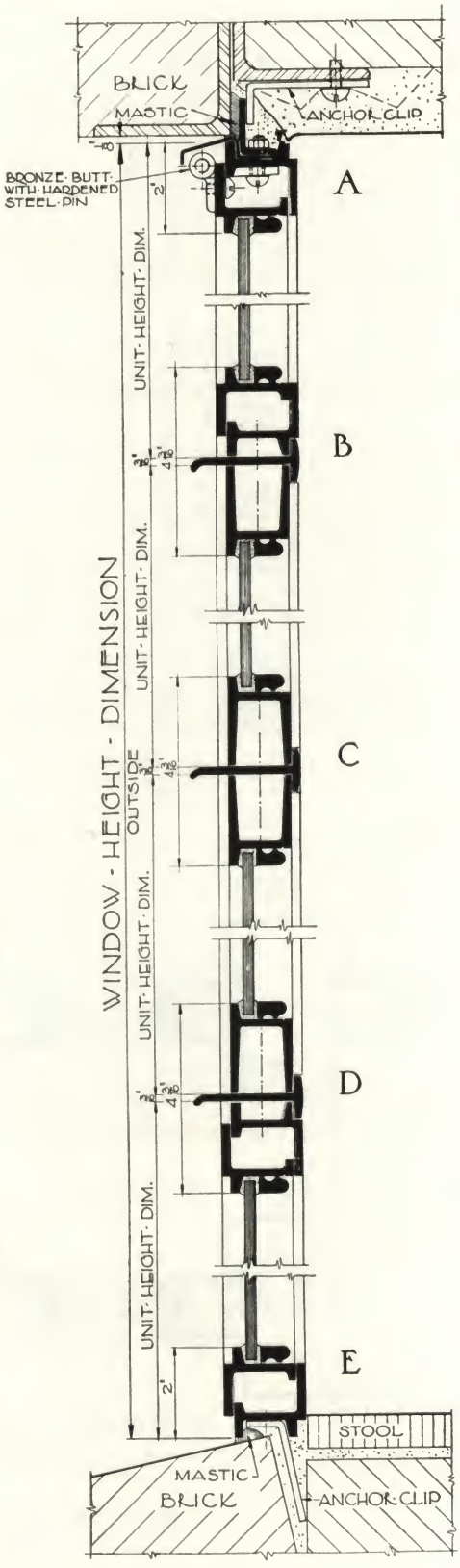
ELEVATION

SEE DETAIL DRAWING NO. H.C. 64 FOR OPERATOR

TOP HINGED OPEN OUT VENTILATORS AT TOP
FIXED UNITS IN CENTER
SIDE HINGED OR PROJECTED OUT OR IN CASEMENTS IN LOWER PORTION







SOULE′	BANK TYPE WINDOWS	DRAWING NO. H.C.67

Continued on next page

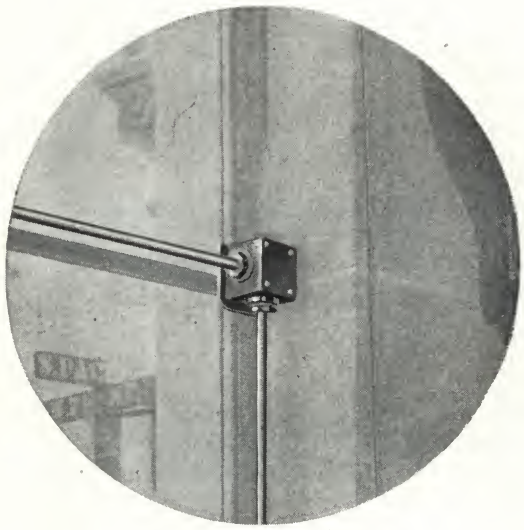
SCREW TYPE OPERATOR

This operator is equipped with a compound lever arm which requires a clearance of only 1¾ in. inside the plane of the window, thus allowing the use of drapes or Venetian blinds.

When desirable both lower and upper mitre gear boxes may be concealed in the wall behind ornamental cover plates of steel, bronze or other material harmonizing with other decorations. Gear boxes and traveling thrust blocks are of tobin bronze while threaded shafts are of heat treated steel. Gears are accurately machined and gear boxes are provided with a special device to prevent leakage of the lubricant in which the gears are packed.

Handles are removable with handle shafts recessed into rosettes so that nothing projects beyond their smooth surface.

Either top hinged or side hinged casements may be operated singly or in groups.





Specification

Casement operators where shown or indicated on plans shall be B-1 screw type operators as manufactured by SOULÉ STEEL COMPANY. All miter gear boxes, thrust blocks, traveling blocks and shaft bearings shall be of tobin bronze. Threaded shaft shall be of heat-treated steel with double Acme thread. Gear boxes shall be rough (or polished) finished with rosette and handles of polished bronze.

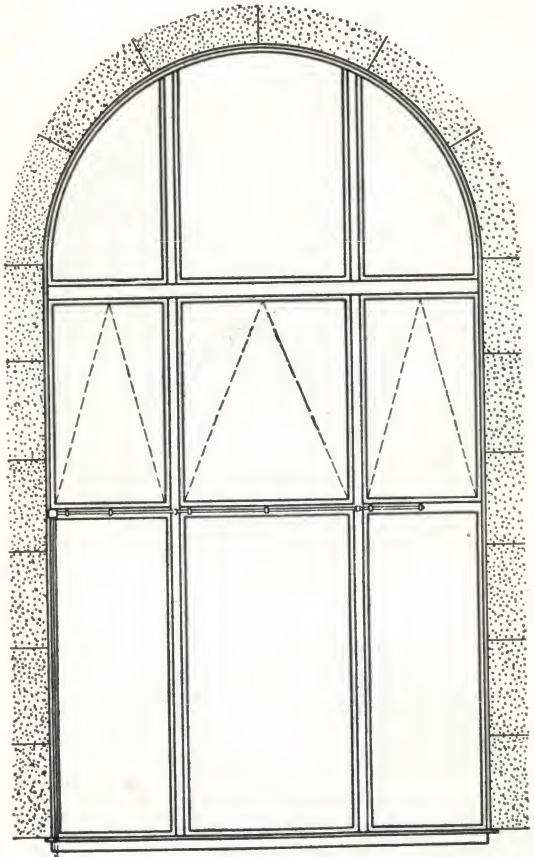
Operators shall be erected by window manufacturer and shall operate windows easily and smoothly.



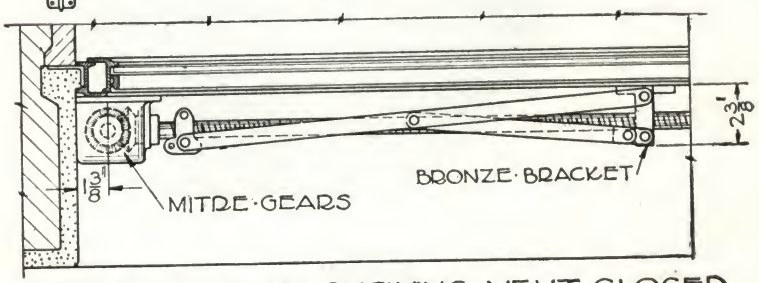
Hibernia Bank, San Francisco, Calif.
ALBERT ROLLER, Architect BARRETT & HILP, Contractors



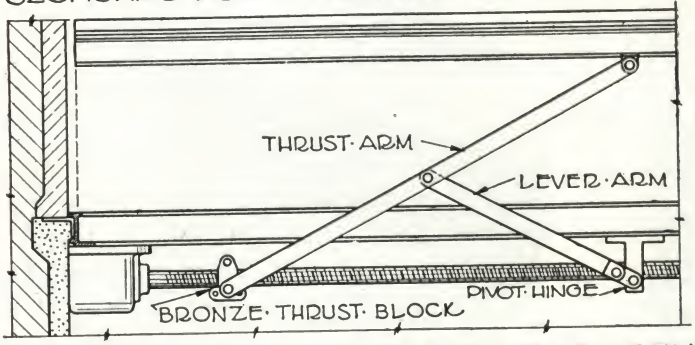
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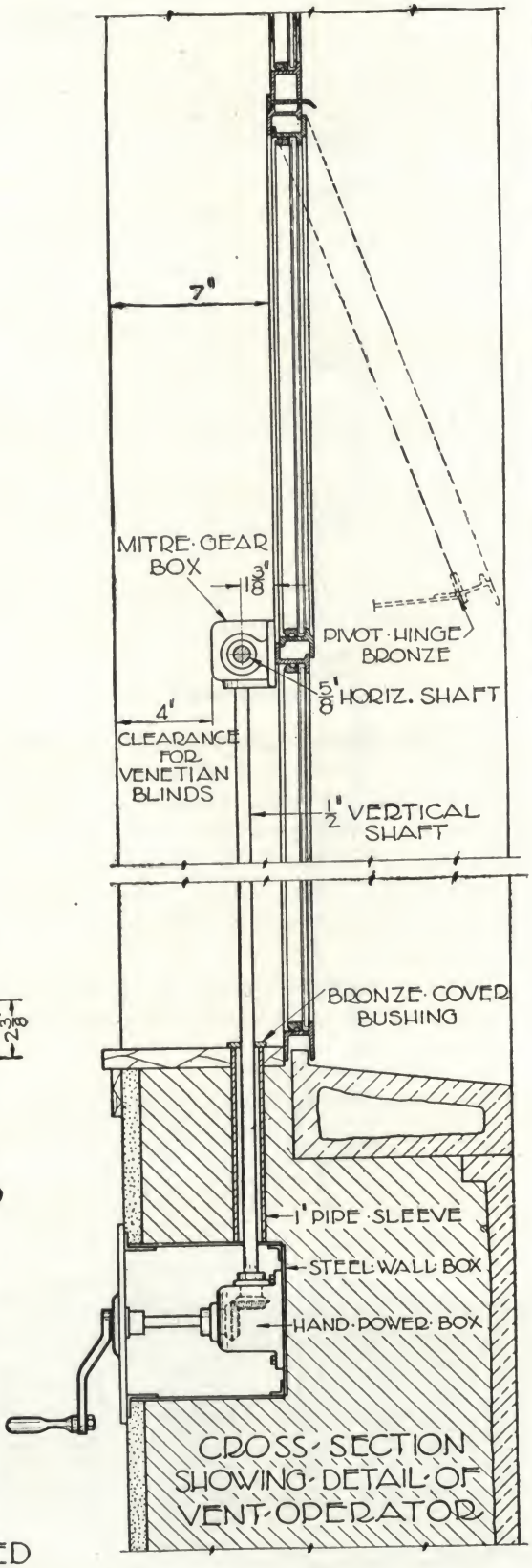
ELEVATION OF WINDOW WITH OPERATOR



SECTIONAL PLAN SHOWING VENT CLOSED



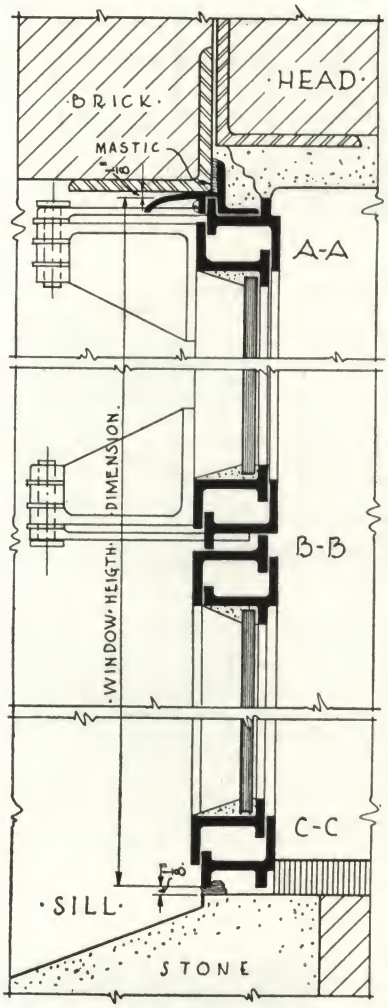
SECTIONAL PLAN SHOWING VENT OPENED



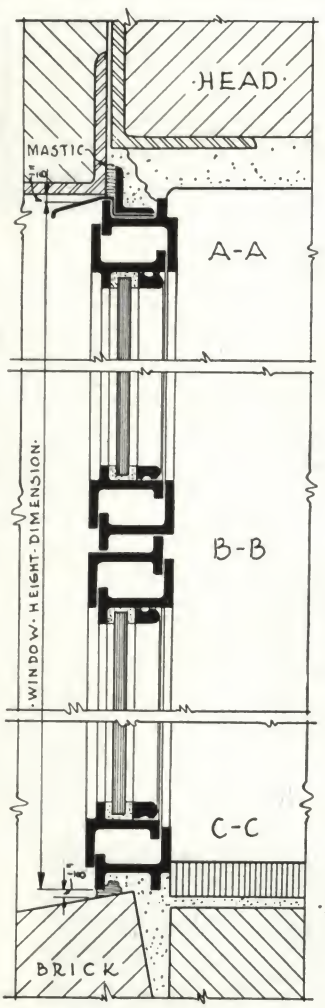
CROSS SECTION SHOWING DETAIL OF VENT OPERATOR

SOULÉ	TYPE B-1 MECHANICAL OPERATOR	DRAWING No. H.C.64

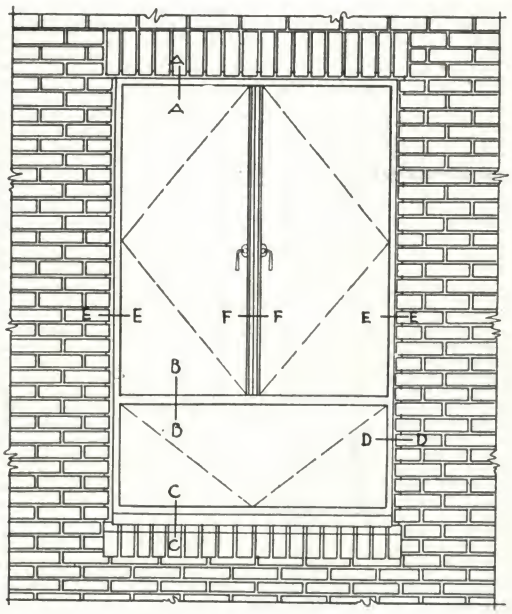
Continued on next page



·SECTION·WITH·PUTTY·OUTSIDE· ·EXTENSION·FRICTION·HINGE· ·PROJECTED·IN·VENT·AT·BOTTOM·

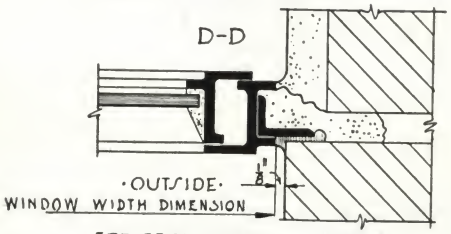


·SECTION·WITH·GLAZING·BEADS· ·CASEMENTS·PROJECTED·OR·BRONZE·BUTTS· ·PROJECTED·IN·VENT·AT·BOTTOM·
[GLAZING·BEADS·EXTRA]

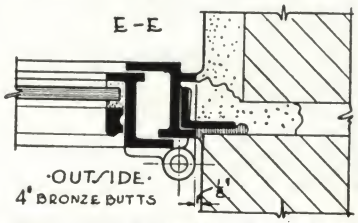


·TYPICAL·EXTERIOR·ELEVATION·

·JAMB · SECTIONS·



·FOR·PROJECTED·IN·VENTS·

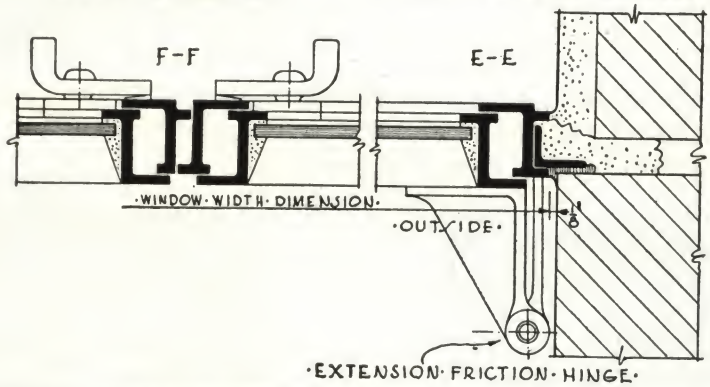


·FOR·OUT·SWINGING·CASEMENTS·

VENTILATED·TRANSOMS·TO·OPEN OUT·OR·IN·OR·FIXED·TRANSOMS MAY·BE·HAD·EITHER·AT·TOP·OR BOTTOM·AS·REQUIRED.
FRICTION·CLEANING·HINGES, BRONZE·BUTTS·OR·REVERSIBLE FIXTURES·MAY·BE·USED·WITH CASEMENTS.
BRUSHED·BRONZE·HARDWARE IS·FURNISHED·AS·STANDARD. OTHER·FINISHES·ARE·FURNISHED AS·EXTRAS.
FOR·OTHER·TYPES·OF·HARDWARE SEE·ILLUSTRATIONS·ON ANOTHER·PAGE.
WINDOWS·MAY·BE·PUTTY·GLAZED OUTSIDE·OR·INSIDE·GLAZED·WITH METAL·BEADS·AS·SPECIFIED.

·SCALE·
·ONE·FOURTH·FULL·SIZE·

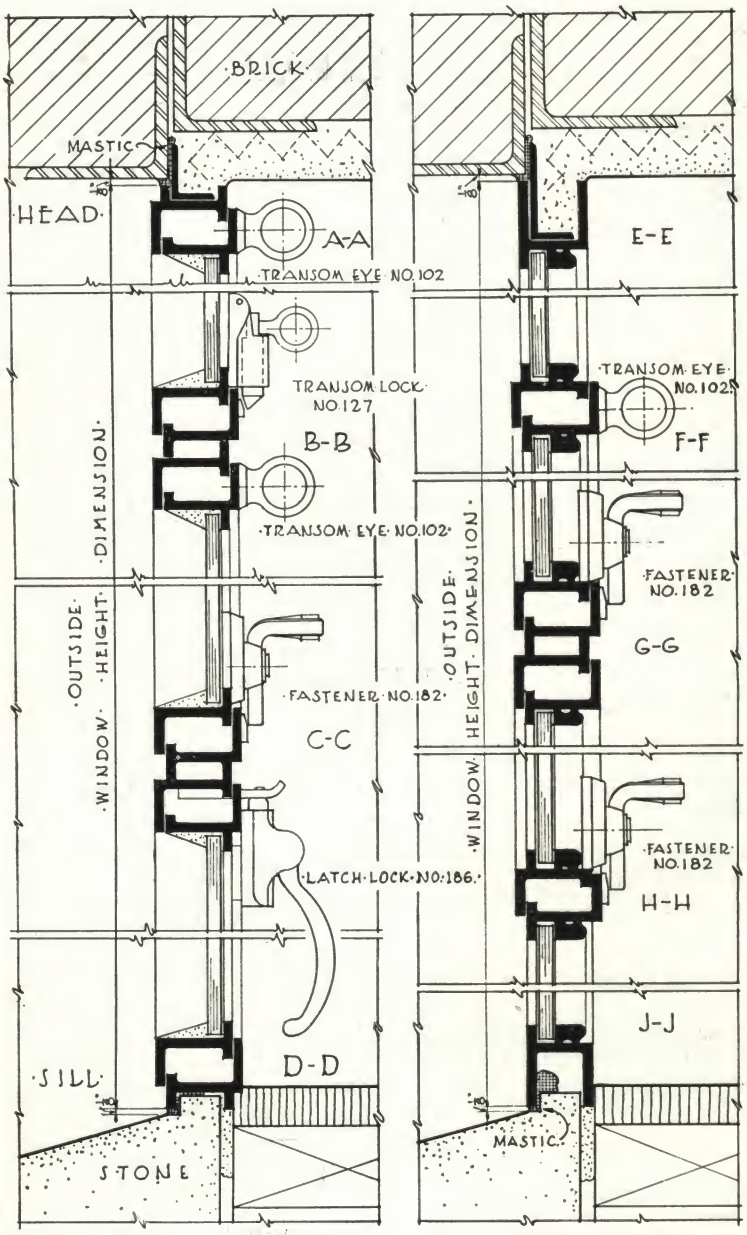
·MEETING·RAIL·



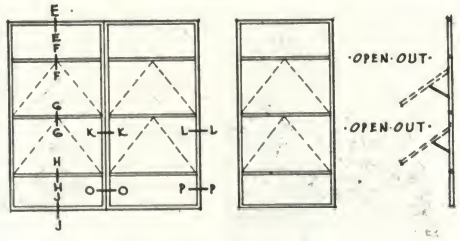
·EXTENSION·FRICTION·HINGE·

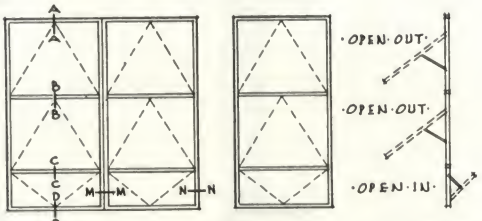
SOULÉ	HEAVY·TYPE·CASEMENTS	DRAWING No. H.C.9.S.

Continued on next page



VERTICAL SECTIONS





TYPICAL ELEVATIONS & SECTIONS

OTHER COMBINATIONS OF VENTILATORS MAY BE USED

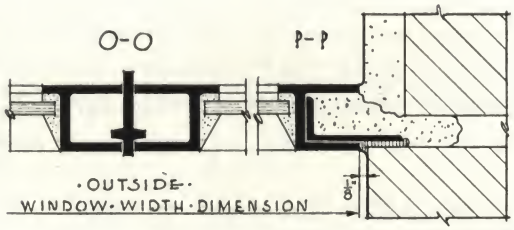
STANDARD FEATURES

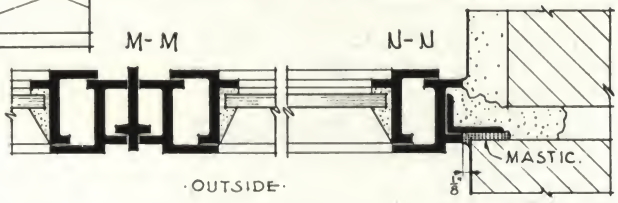
SOULÉ HEAVY PROJECTED WINDOWS ARE MADE WITH VENTILATORS OPENING EITHER IN OR OUT

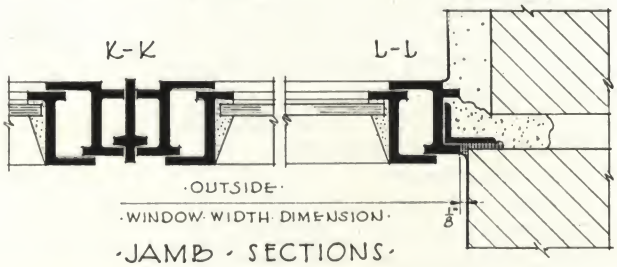
BRUSHED BRONZE HARDWARE IS FURNISHED AS STANDARD

HARDWARE OF OTHER DESIGNS OR FINISHES IS FURNISHED AS AN EXTRA

METAL GLAZING BEADS ARE FURNISHED WHEN SPECIFIED







JAMB SECTIONS

FOR OPEN IN VENTILATORS CASEMENT FASTENERS CAN BE USED INSTEAD OF LATCH LOCK #186 SHOWN EITHER ONE OF THE FASTENERS AS ILLUSTRATED ON ANOTHER PAGE CAN BE SUBSTITUTED FOR THOSE SHOWN

SCALE: ONE FOURTH FULL SIZE

SOULÉ	HEAVY TYPE PROJECTED WINDOWS	DRAWING No. H.C.10.S.

Continued on next page

TYPES "K" AND "L" WINDOWS

SOULÉ Types "K" and "L" projected steel windows are adaptable for use in offices, apartment houses, hotels, and other commercial buildings where windows of high quality and convenient operation are desired.

All ventilators are mounted on SOULÉ sliding shoe fixtures, which permit maximum convenience in cleaning from the inside of the building. All parts of the sliding shoes that hinge to the sash are concealed when the ventilators are closed.

Appropriate bronze hardware, in water-rolled finish and of a beautiful light statuary bronze color, is furnished as standard. Other colors and finishes are supplied at a slight extra charge.

Drawings on following pages give necessary information regarding details and standard sizes.

SOULÉ engineers will be glad to assist you with your layout when windows other than standard are required.

Specification

Where shown on plans, furnish and install SOULÉ Type "K" or "L" projected steel windows. Windows shall be made of hot rolled shapes made expressly for the purpose.

Corners of all frames and vents shall be electrically welded and all exposed surfaces cleaned of excess metal.

Vents shall operate on SOULÉ sliding shoe fixtures with pivoting arms made of spring steel and attached to both the vents and frames with brass rivets. The bronze sliding shoe shall fit in a brass track of special patented construction, which diverts the shoe toward the inside and causes vents to be in tight contact when closed. Project-out-at-side ventilators shall be equipped with casement fasteners No. 116 or No. 130.

Project-out-at-bottom ventilators shall be equipped with casement fasteners No. 116 or No. 130 when within reach of floor, otherwise furnish No. 127 spring catch and transom eye No. 102.

Project-in-at-top vents shall be equipped with No. 116 or No. 130 handle when within reach of floor, otherwise furnish No. 128 spring catch.

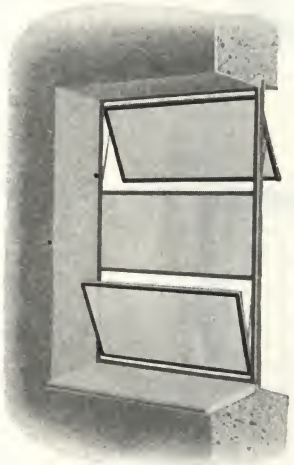
All finished hardware shall be solid bronze in light statuary finish.

When two or more units are used for one opening, supply mullions and bolts for connecting units.

Paint windows and mullions one priming coat of gray paint at the factory.

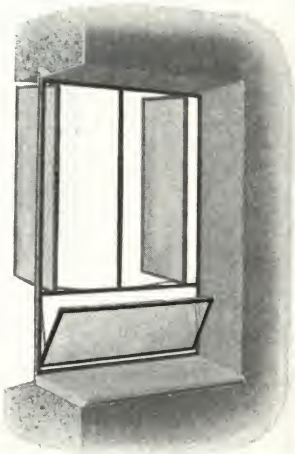
Windows shall be erected by the manufacturer in openings prepared to the manufacturer's details, and shall be set plumb and true without distortion so that a weather tight installation is obtained.

Glass and glazing shall be supplied by another contractor, but the window manufacturer shall supply spring wire clips for holding glass in place. All windows shall be glazed from the outside.



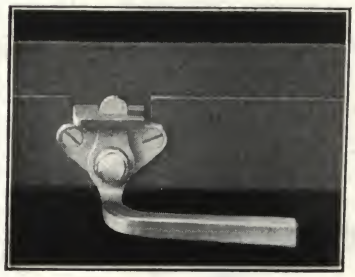
Type "K" Window

Made with either project-in or project-out ventilators or a combination of both



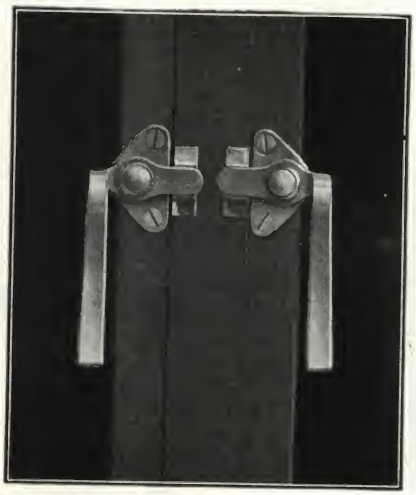
Type "L" Window

Casement ventilators always open out. Transoms, whether located at top or bottom of windows, can be made either to open in or to open out



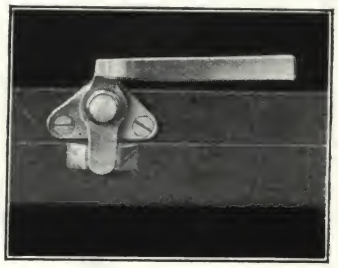
Casement Fastener No. 116

As used on projected ventilators opening in and within reach of the floor



Casement Fastener No. 116

Used on double casements



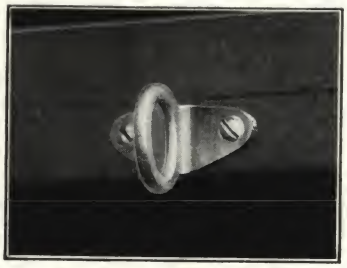
Casement Fastener No. 116

Used on open-out projected ventilators



Transom Catch No. 128

Used on ventilators opening in and occurring out of reach



Transom Eye No. 102

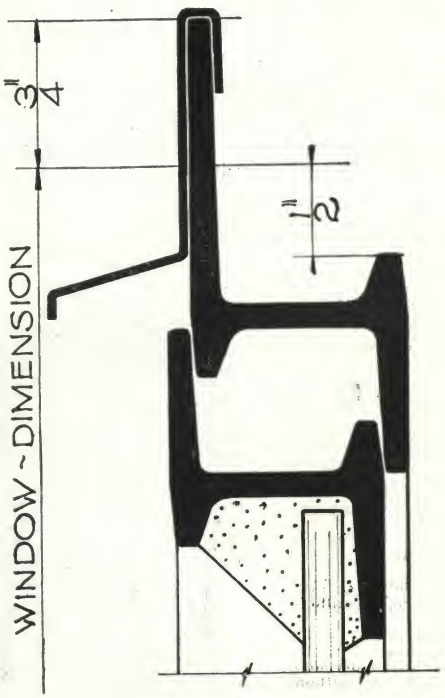
Used at top of ventilators when catch 127 is used



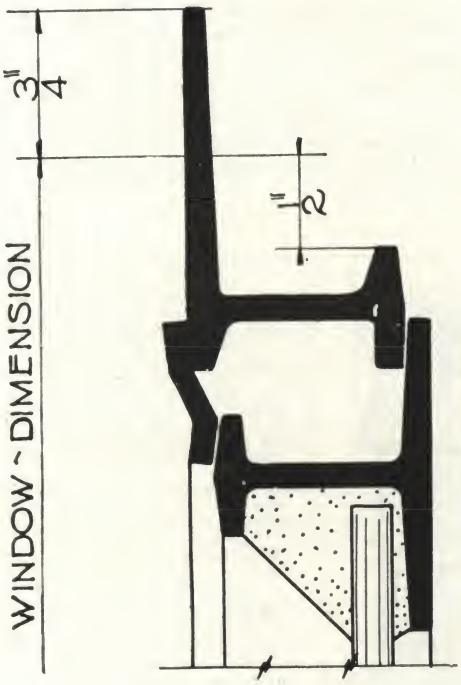
Transom Catch No. 127

Used at bottom of open-out ventilators that occur out of reach

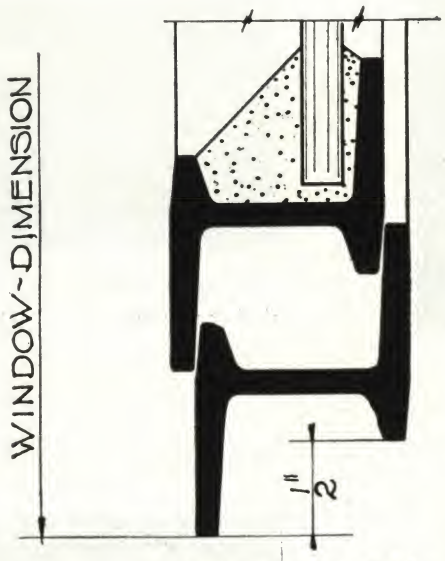
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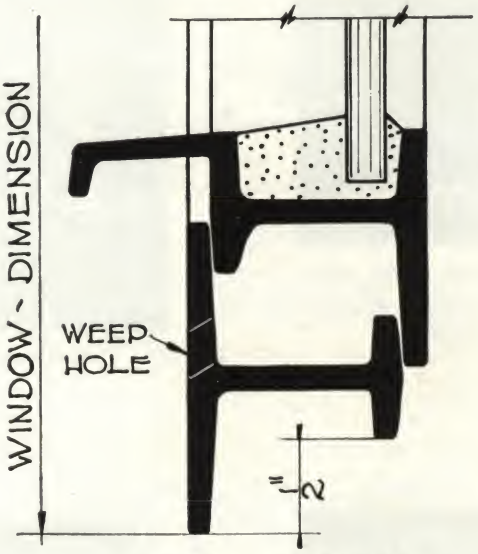
HEAD - DETAIL
FOR · OUTSWING · CASEMENTS
AND · PROJECT · OUT · VENTS
(JAMB · DETAIL · SIMILAR
WITHOUT · WEATHERING)



HEAD - DETAIL
FOR · PROJECT · IN · VENTS
(JAMB · DETAIL · SIMILAR)



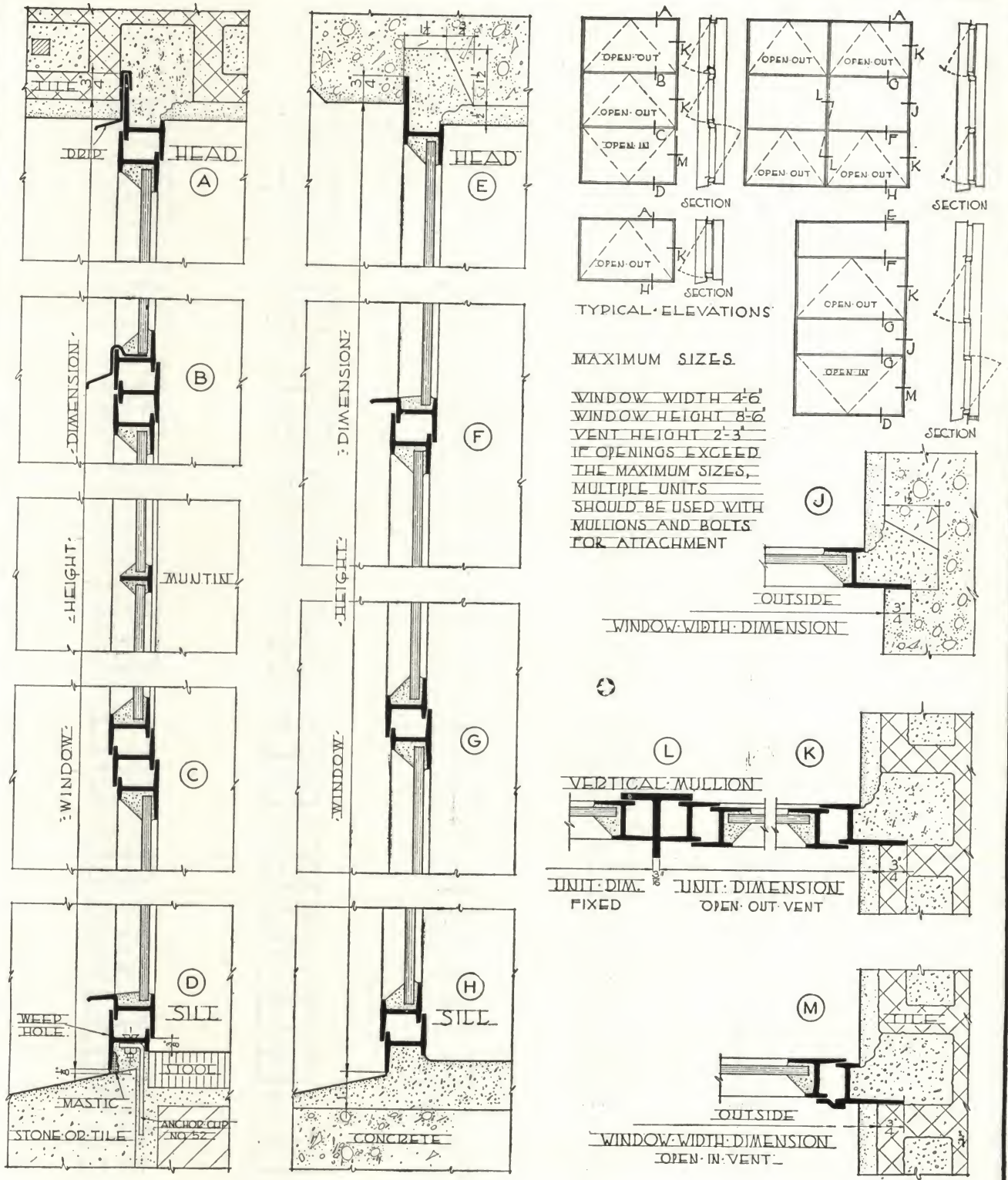
SILL - DETAIL
FOR · OUTSWING · CASEMENTS
AND · PROJECT · OUT · VENTS



SILL - DETAIL
FOR · PROJECT · IN · VENTS

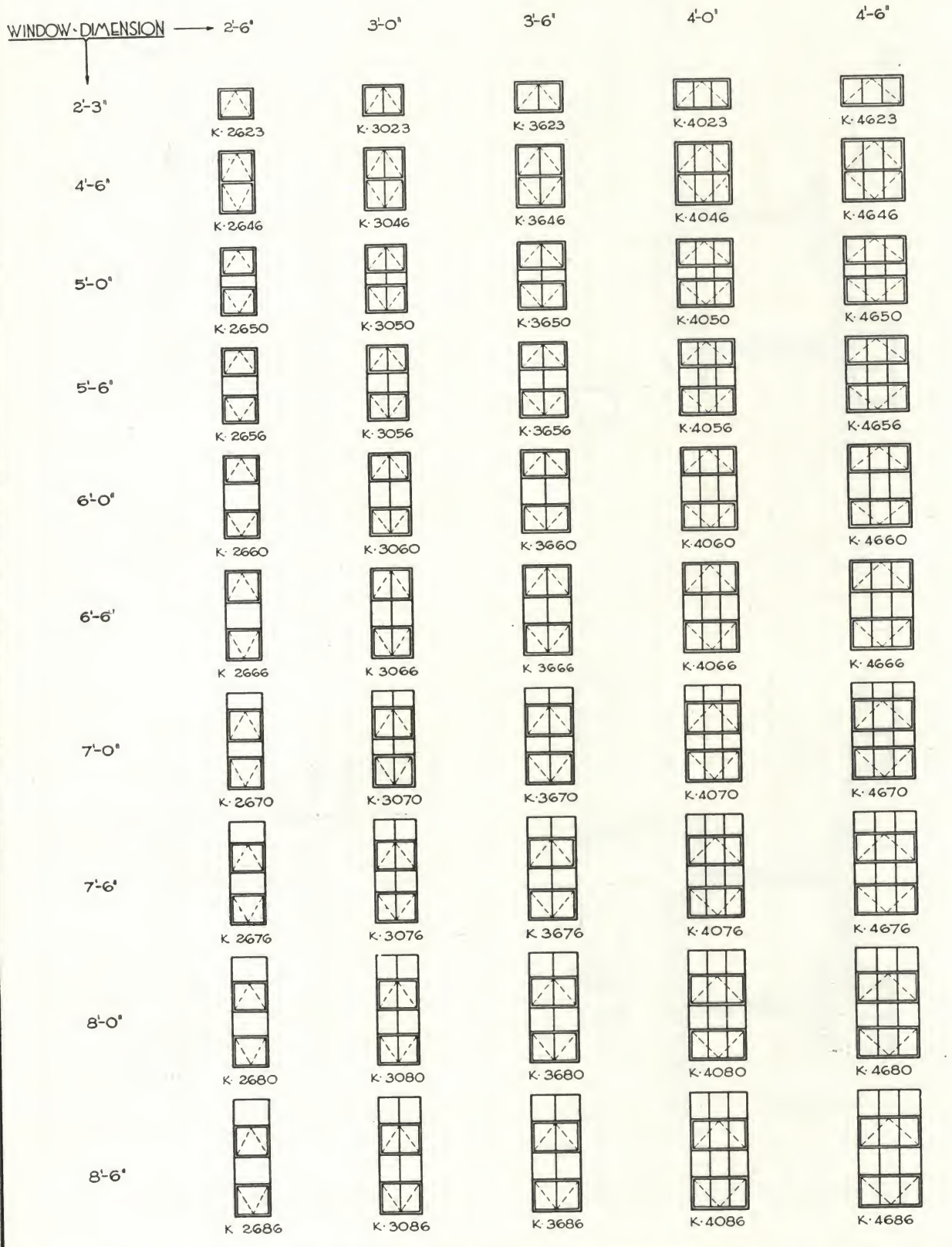
SOULÉ	OUTSIDE-FRAME-DETAILS TYPE "K" & "L" WINDOWS	DRAWING NO. R.51 SCALE · FULL SIZE

Continued on next page



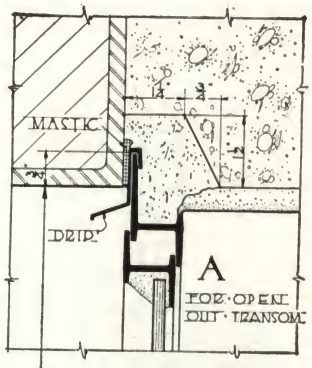
SOULÉ	PROJECTED STEEL WINDOWS TYPE-K	DRAWING NO. P.39

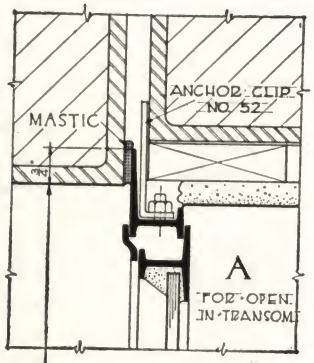
Continued on next page

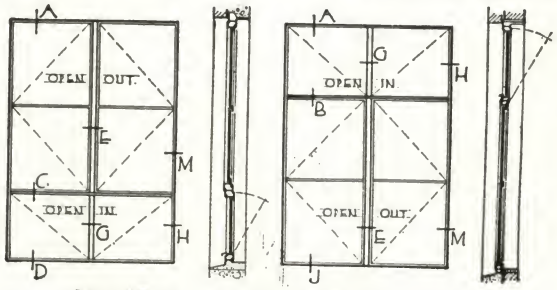


SOULÉ	PROJECTED WINDOWS TYPE·K STANDARD·TYPES·AND·SIZES	DRAWING NO.R.48

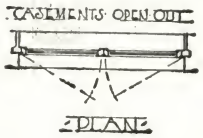
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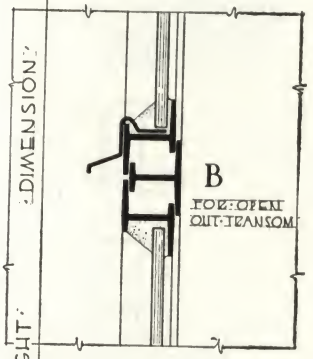


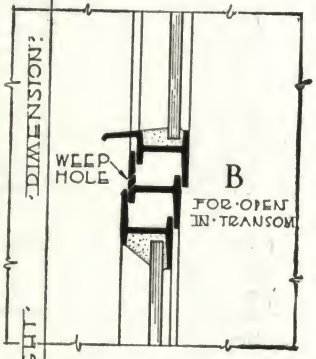




TYPICAL ELEVATIONS

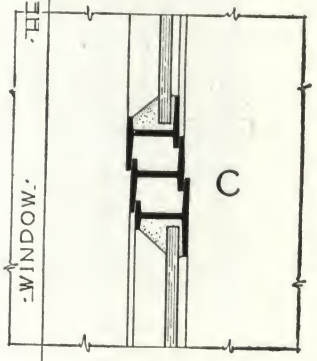


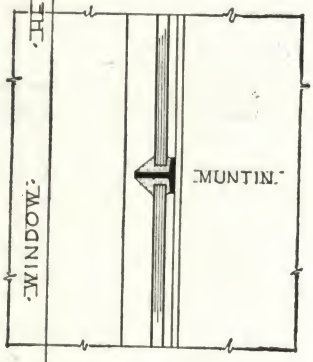




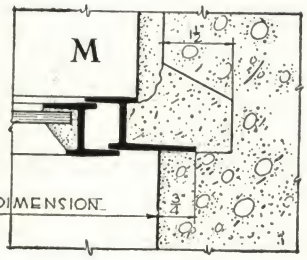
MAXIMUM SIZES

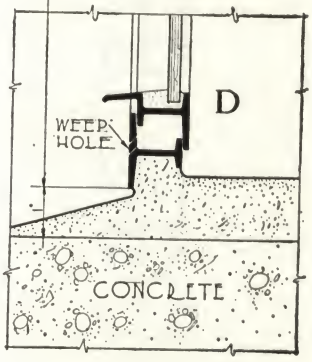
WINDOW HEIGHT 8'-0"
WINDOW WIDTH 4'-6"
CASEMENT HEIGHT 5'-0"
TRANSOM HEIGHT 2'-3"
IF OPENINGS EXCEED THE MAXIMUM SIZES, MULTIPLE UNITS SHOULD BE USED WITH MULLIONS AND BOLTS FOR ATTACHMENT

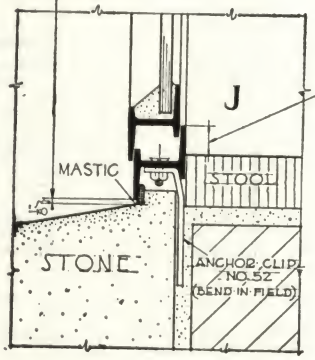




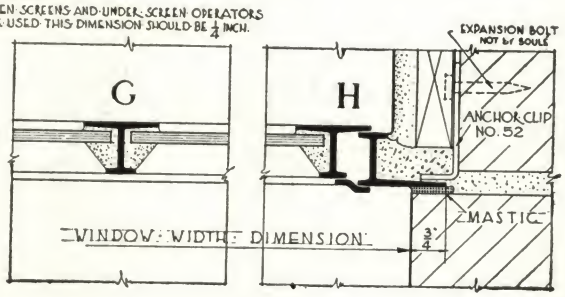








IMPORTANT: WHEN SCREENS AND UNDER SCREEN OPERATORS ARE USED THIS DIMENSION SHOULD BE ¼ INCH.



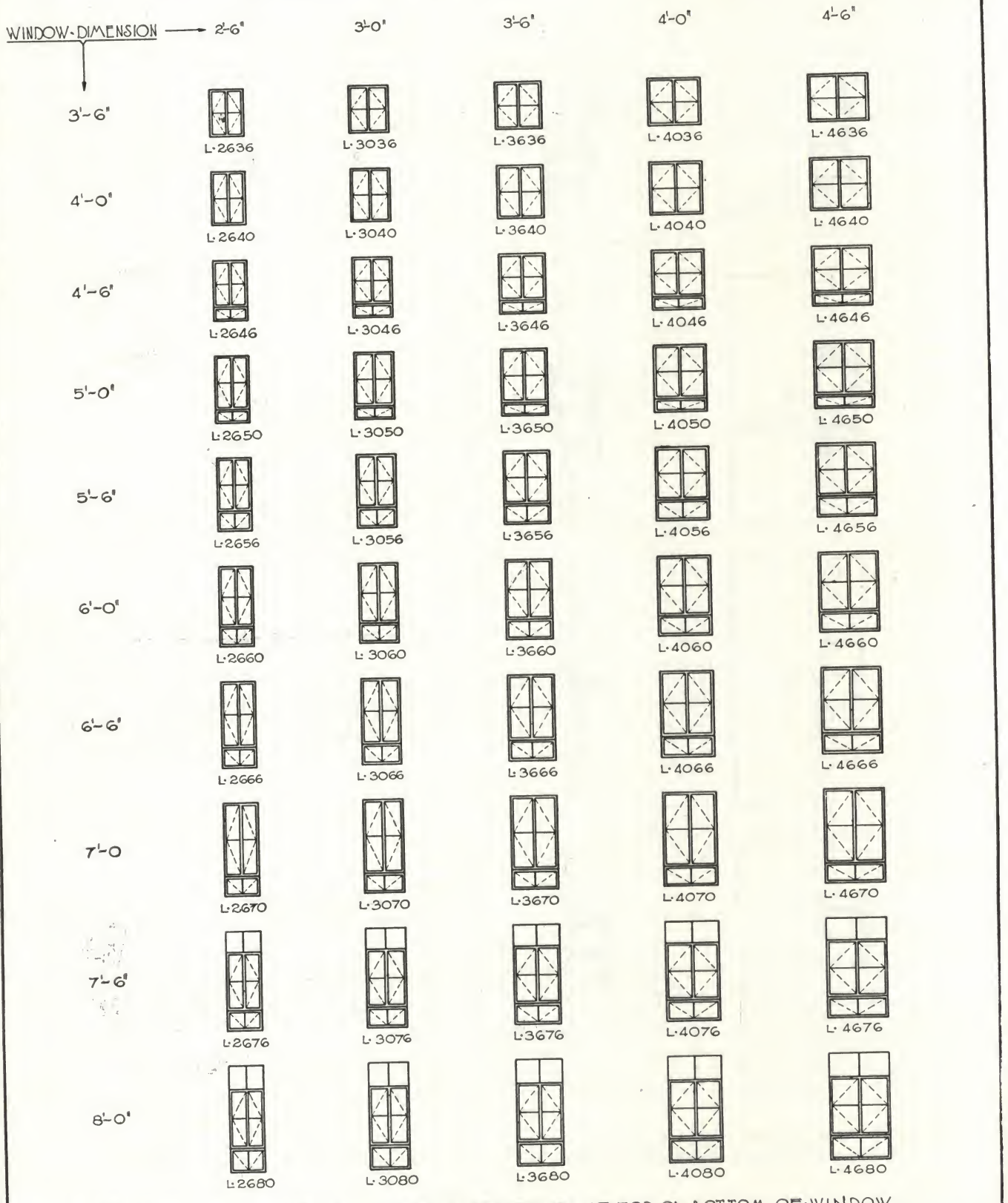
VERTICAL SECTIONS

JAMB SECTIONS

SCALE 3"=1'-0"

SOULÉ	PROJECTED STEEL CASEMENTS TYPE L	DRAWING NO. P.40

Continued on next page



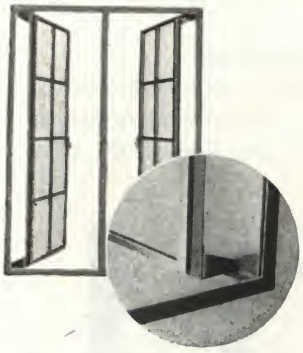
NOTE: VENTILATED TRANSOMS MAY BE PLACED EITHER AT TOP OR BOTTOM OF WINDOW

SOULÉ	PROJECTED WINDOWS TYPE L STANDARD TYPES AND SIZES	DRAWING NO. R. 49

Continued on next page

RESIDENTIAL CASEMENTS

To meet the requirements of the average home builder SOULÉ Steel Casements are made with either extended or projected cleaning hinges. Both hinges permit accessibility to the outside glass surface for cleaning purposes.



Friction Cleaning Hinge
Standardized casements are equipped with this hinge. Ample clearance is left between frame and sash for cleaning purposes

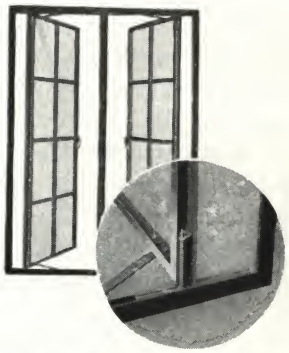
Soulé Standardized Casement — In order to produce an economical window we have designed a casement equipped with friction cleaning hinges and a large stock of various types and sizes is carried.

Soulé Projected Residential Casement—This very popular style of casement is operated on sliding cleaning hinges. It is made to standard dimension and may be had also in special sizes and odd shapes.

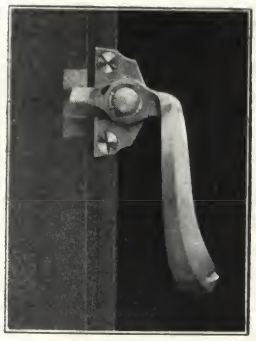
Screens—Both types can be easily screened and this subject is covered under "Screens" on the following page. Screens are not furnished with casements, except as an extra.

Hardware — Solid bronze casement fasteners No. 130 of design as illustrated, are supplied detached. They are dull bronze finished. Other finishes will be furnished at a small extra charge, to match other hardware in the building.

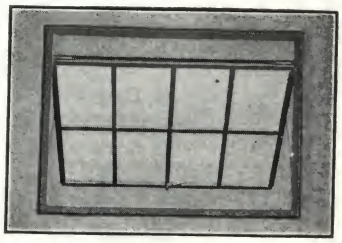
Details—In Drawing R-36 (page 45) we have shown, included with other shapes, a full sized detail of section 1507. This is shown again on Drawing R-37 (page 46) detailed into concrete and brick construction. This section may be obtained on any windows except standardized casements, at a small extra charge.



Projected Type Casement
Shows clearance available for cleaning exterior glass surface



Solid Bronze Fastener No. 130
Furnished with casements and transoms



Projected Type Transom
These may be had as a separate unit or as a part of the casement unit. See note regarding this, under types and sizes on drawing R-27

Specifications

Standardized Casements—Install SOULÉ Standardized Casements of types and sizes shown on the plans.

Casements to be made from hot rolled shapes specially rolled for the purpose.

The corners of all frames and sash shall be electrically welded, and shall be cleaned of all excess metal on the exposed surfaces.

Ventilators shall be equipped with extended cleaning hinges designed to permit adjustment of friction to withstand wind pressure. Method of obtaining friction shall be one which will insure against loosening of bolts or nuts.

Note: The following portion of Specifications shall be included under Projected Residential as well as Standardized Casements.

Casement fasteners of solid bronze, with water rolled finish and light statuary bronze color shall be supplied by the manufacturer and attached by the window erector.

Give windows one shop coat of gray rust-resisting paint at the factory.

Erect the casements, in prepared openings, well bedded in mastic. (Window manufacturer to supply one pound of mastic to each ten linear feet of frame perimeter.) Care must be taken that casements are not twisted or distorted out of shape while installing.

Glass and glazing will be covered in another contract but this contractor shall supply spring wire clips for holding glass in place.

When grouting is required, it is not to be included by the Window Erector.

Projected Residential Casements—Install SOULÉ Projected Residential Casements of types and sizes shown on plans.

Casements shall be made from hot rolled shapes specially rolled for the purpose.

The corners of all frames and sash shall be electrically welded, and shall be cleaned of all excess metal on the exposed surfaces.

Ventilators shall be equipped with sliding cleaning hinges, constructed with bronze sliding shoes, pivotally connected to the ventilators and having sufficient compression to hold ventilators in any desired position. No part of hinge shall project outside the face of the window.

Continued on next page

SCREENING OF CASEMENTS

SOULÉ Steel Casements may be easily screened. One method is with roller screens; the other, with fixed screens, using underscreen operators as illustrated.

Roller Screens—As there are a number of roller screens to choose from, we are omitting details for preparing openings where they are used. Our sales engineers will gladly assist you in getting information regarding the make desired.

Underscreen Operators and Fixed Screens—When casements are operated through fixed screens, they are prepared for screens and hardware as covered by the illustrations and specifications. We will quote prices on this equipment when desired.

Specification

Casements shall be equipped with SOULÉ standardized casement operators and flat screen units. Equipment shall consist of the following:

Screens shall have a heavy gauge steel frame strongly reinforced at corners, screened with the highest grade 16 mesh solid bronze wire in antique finish.

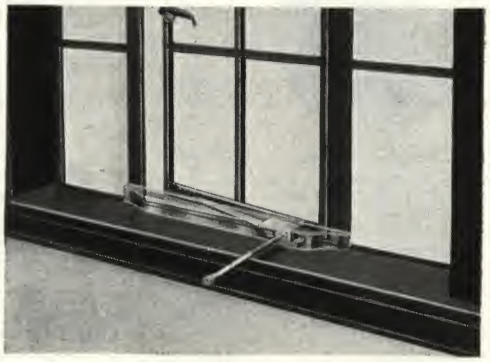
Operating Hardware provided with a solid bronze worm and bronze bushed gear and with one iron operating handle for each window.

Metal Stool of standard sizes made of 16-gauge steel, to house casement operator and provided with an upstanding lip for screen contact.

Locking Handles: Cast, flat type locking handles of iron are to be provided with suitable brackets for convenient attachment. (Bronze Handles may be had at an additional expense.)

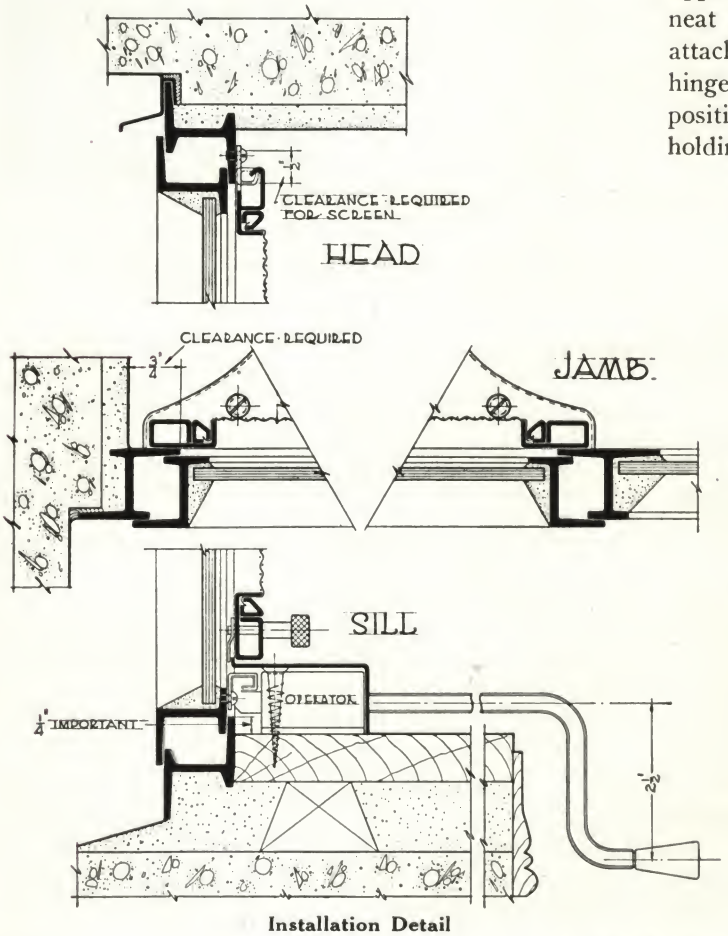
Position of Operator

Illustration shows the operator in position beneath its cover or metal stool. The positive control operator works without disturbing or cutting through the screen.



Ease of Placement

Screen Units require no special tools to place them in position. The screen hangs from its own upper frame—recessed on either side to engage over neat hangers. It is the work of a moment to either attach or remove it. The screen can be raised as on a hinge at any time it is desired or locked in the closed position by turning a simple catch on the bottom rail holding it tight all around.



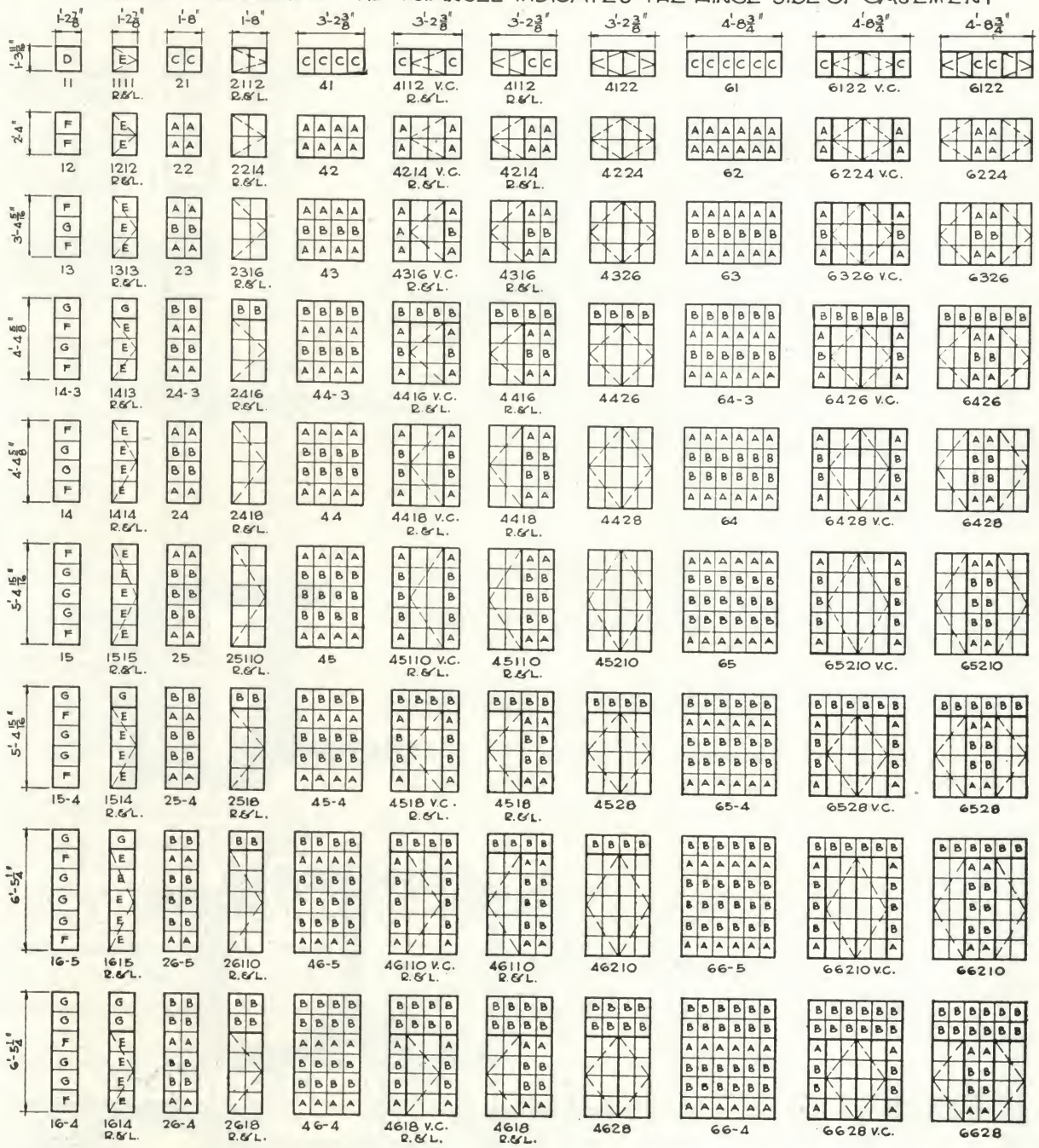
Installation Detail



Screen Is Easily Set in Place

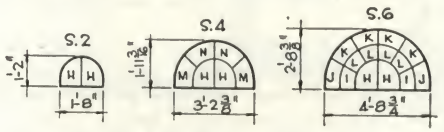
Continued on next page

NOTE - THE APEX OF THE TRIANGLE INDICATES THE HINGE SIDE OF CASEMENT

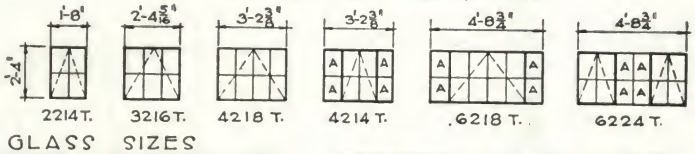


NOTE - HANDING OF CASEMENTS IS DETERMINED BY THE HINGE LOCATION VIEWED FROM OUTSIDE

FIXED CIRCULAR HEAD TRANSOMS



PROJECTED TRANSOMS



GLASS SIZES

UNLETTERED	A	B	C	D	E	F	G	H	I	J	K	L	M	N
8"×12"	8⅞"×12⅞"	8⅞"×12"_	8⅞"×13¾"	12⅛"×13¾"	11⅜"×12"	12⅛"×12⅞"	12⅛"×12"	USE B PANES	10"×12"	9¾"×17"	9¾"×13¾"	9⅛"×9⅛"	10"×16½"	9½"×13⅝"

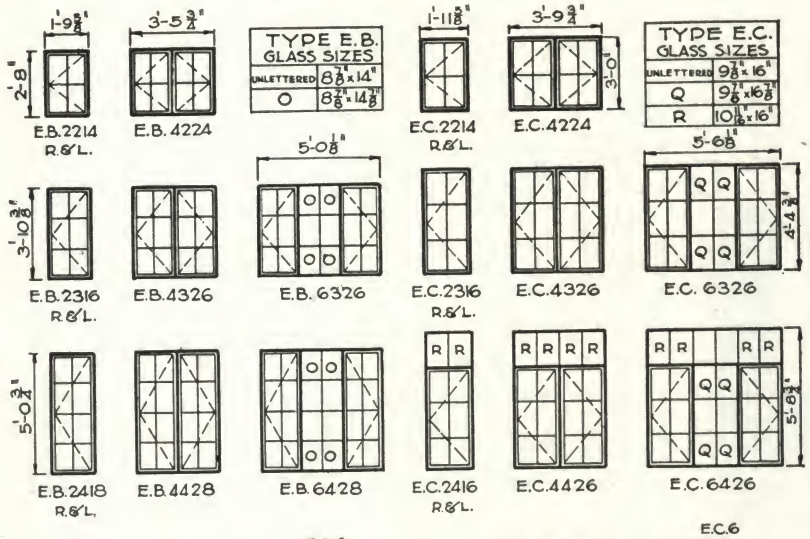
SOULÉ STEEL CASEMENT WINDOWS STOCK TYPES AND SIZES

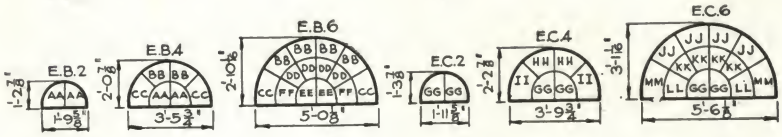
DRAWING NO. R.27

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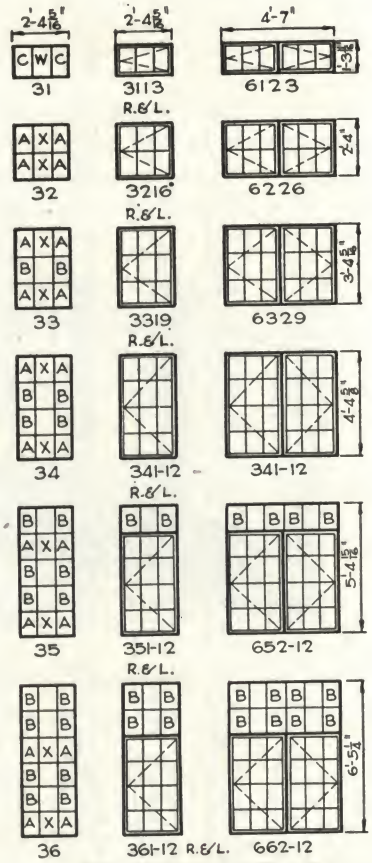
ENGLISH - CASEMENTS - LARGE - SIZES - TYPE - "E"

E.B. AND E.C. TYPES ARE MADE TO MEET A DEMAND FOR CASEMENTS WITH LARGE LIGHTS IN BUILDINGS WHERE THE ENTIRE SCALE OF THE BUILDING IS LARGER THAN IN RESIDENTIAL STRUCTURES

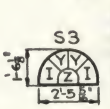




AA	BB	CC	DD	EE	FF	GG	HH	II	JJ	KK	LL	MM
9¾"×12¾"	14⅞"×10⅜"	12½"×17¾"	9½"×10"	8½"×12"	10⅜"×12⅝"	10¼"×13¾"	16½"×11¾"	13¾"×18⅜"	16¼"×11⅜"	10⅝"×11"	12"×13½"	13½"×19"



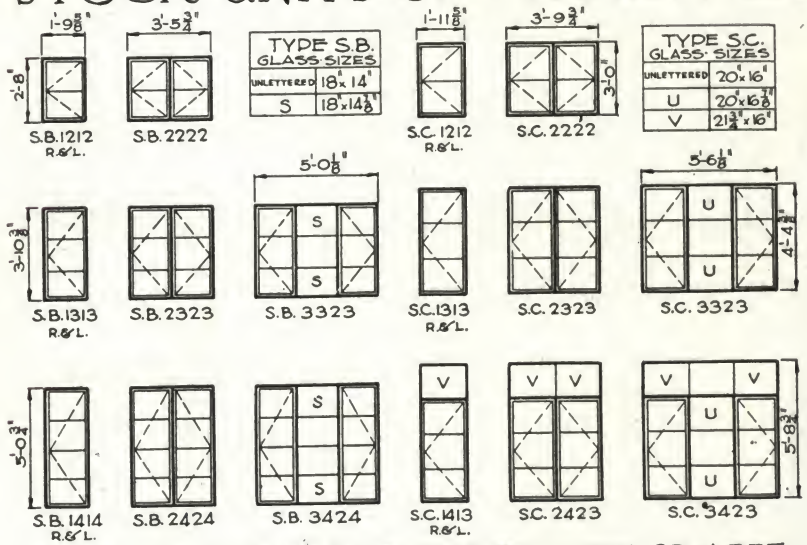
NOTE - THE · APEX · OF · THE · TRIANGLE · INDICATES · THE · HINGE SIDE · OF · CASEMENT. HANDING · OF · CASEMENTS · IS DETERMINED · BY · THE · HINGE · LOCATION · VIEWED · FROM · OUTSIDE.

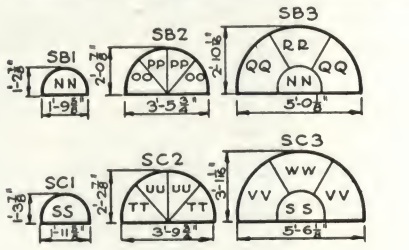


GLASS SIZES	A	B	C	I
	8⅞"×12⅛"	8⅞"×12"	8⅞"×13⅜"	10"×12"
UNLETTERED	W	X	Y	Z
	8"×12"	8"×13⅜"	8"×12⅞"	9⅝"×9⅝" 8"×7"

STOCK - UNITS - OF - SPANISH - CASEMENTS - TYPE - "S"

GLASS SIZES IN TYPE "S" CASEMENTS ARE IN ACCORDANCE WITH ACCEPTED STANDARDS OF MEDITERANEAN ARCHITECTURE



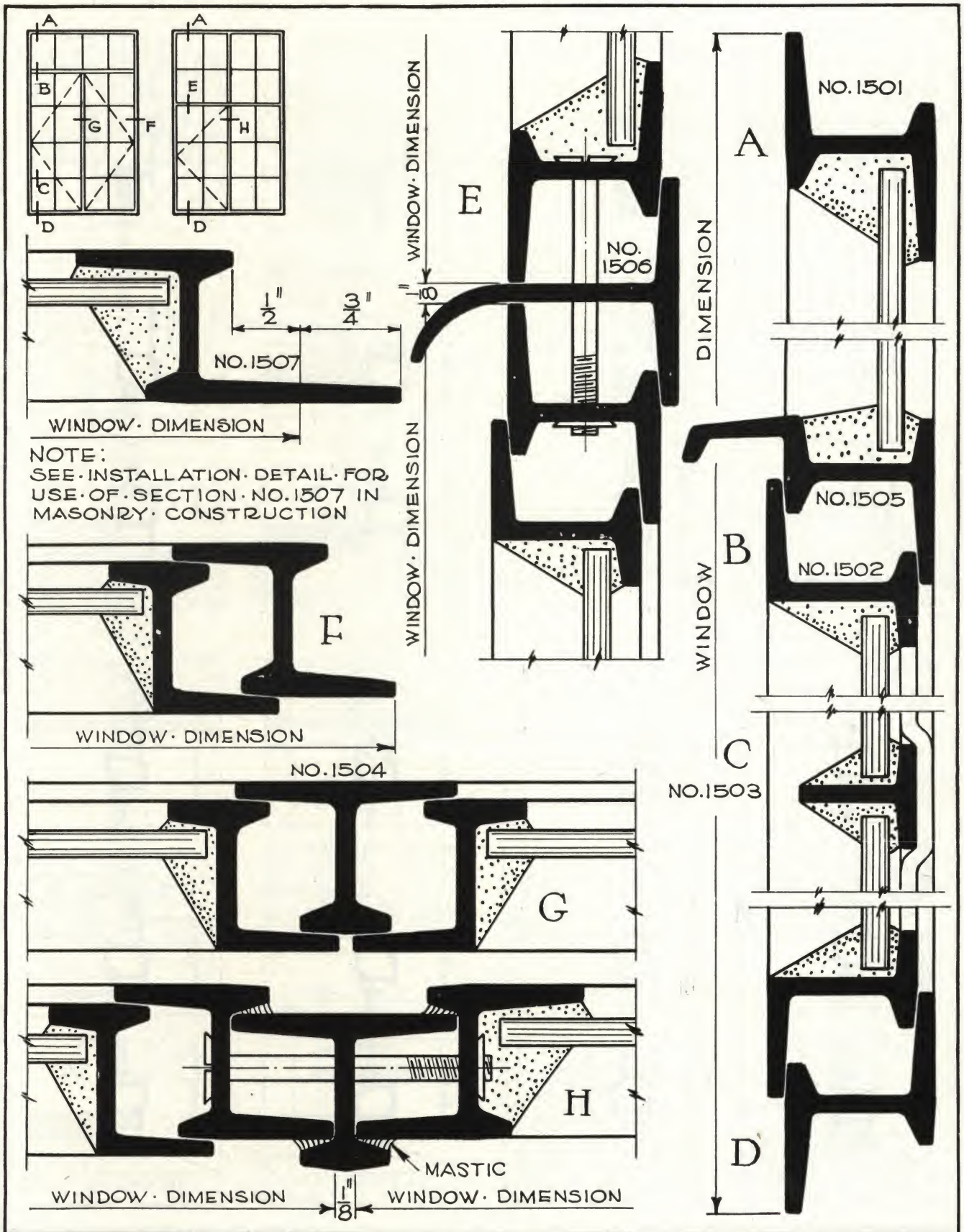


NN	OO	PP	QQ	RR
19¾"×12¼"	19½"×16⅜"	13¾"×22⅝"	24¼"×28⅛"	28⅜"×20⅜"
SS	TT	UU	VV	WW
21¾"×13¾"	21½"×18⅝"	15¼"×24⅝"	26¾"×30¾"	31⅜"×23"

SINGLE - UNIT - CASEMENTS - FURNISHED - RIGHT - OR - LEFT

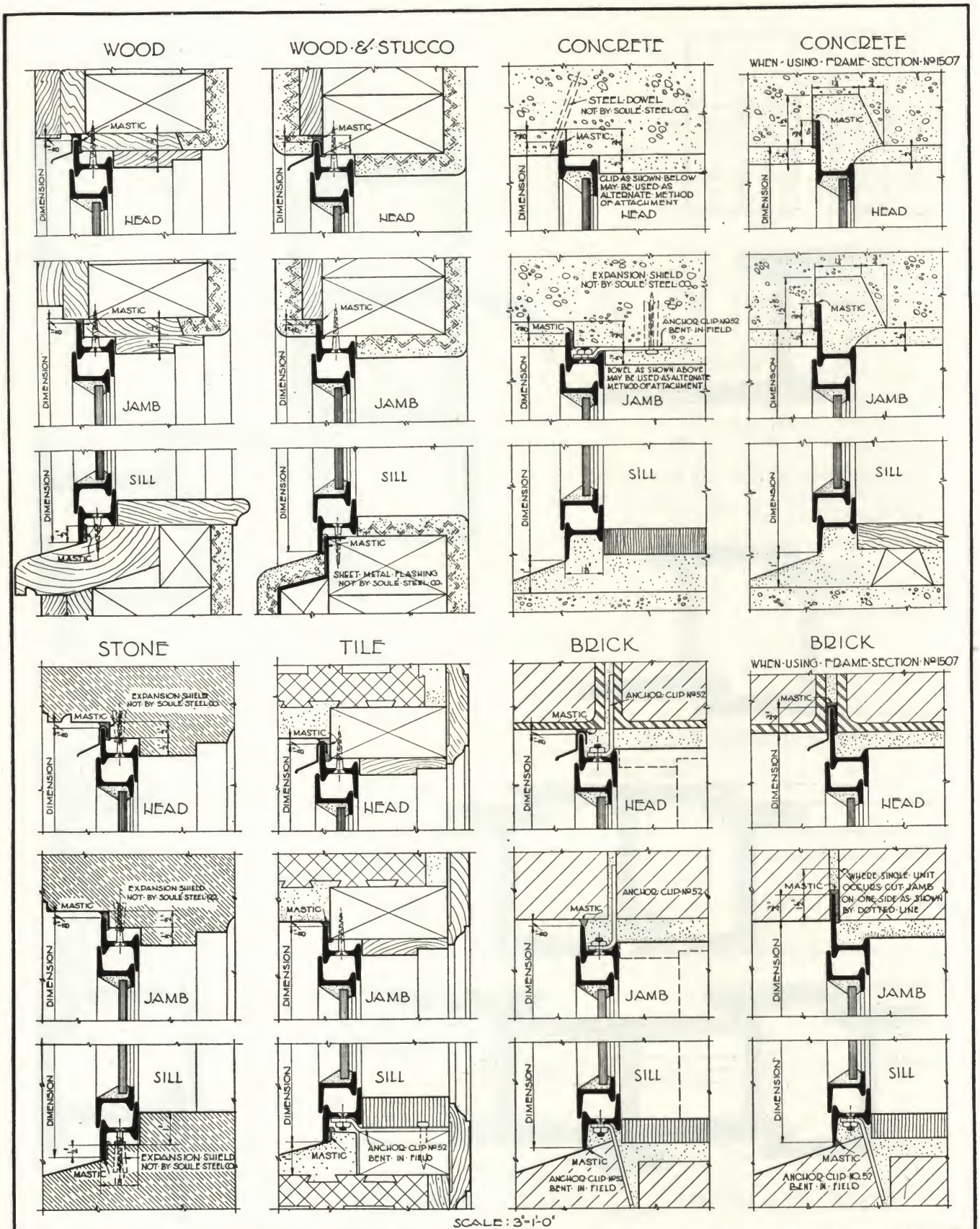
SOULÉ	STEEL - CASEMENT - WINDOWS ENGLISH AND SPANISH TYPES	DRAWING NO. R.22

Continued on next page



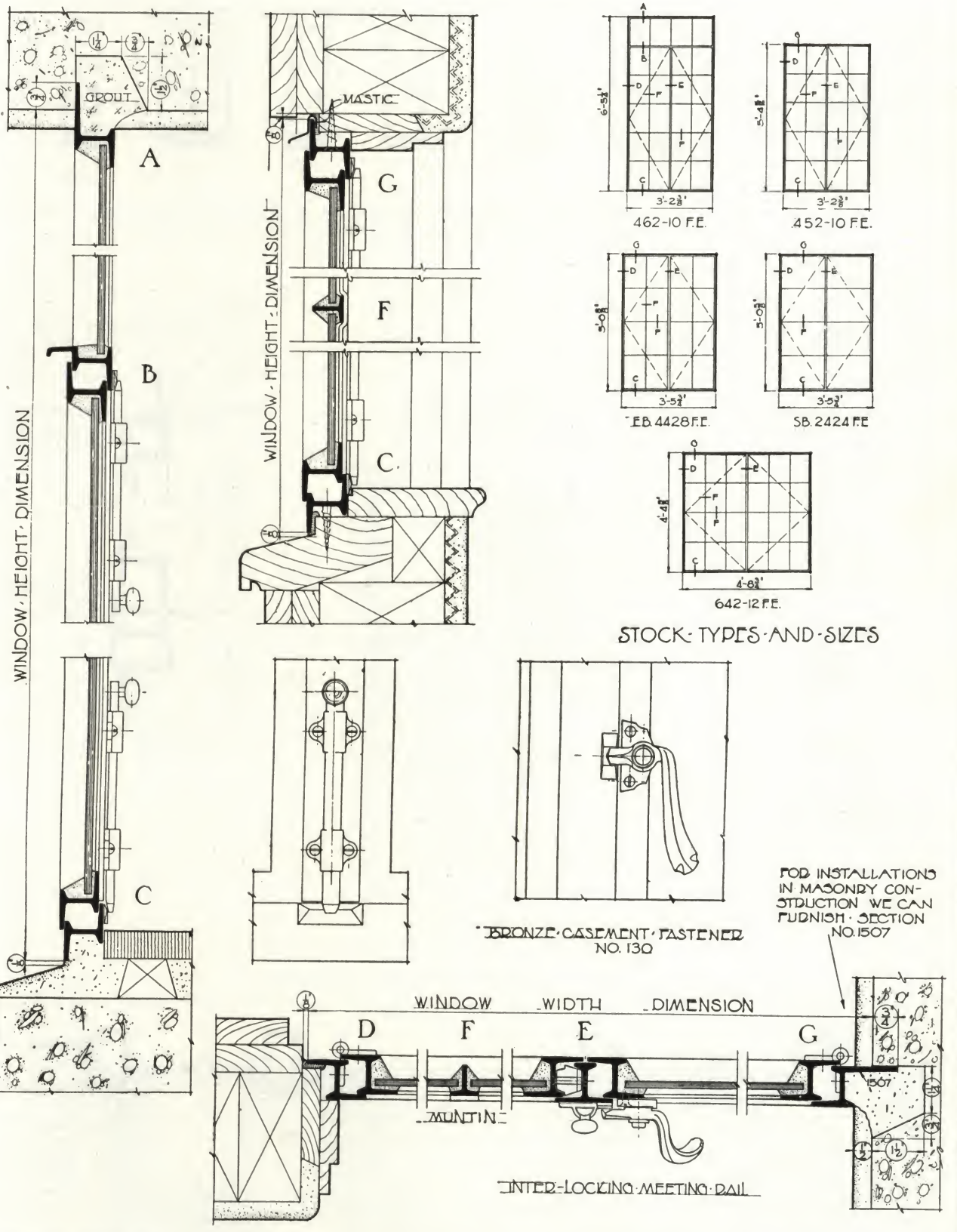
SOULÉ	STEEL · CASEMENT · SECTIONS	DRAWING NO. R-36 SCALE: FULL · SIZE

Continued on next page



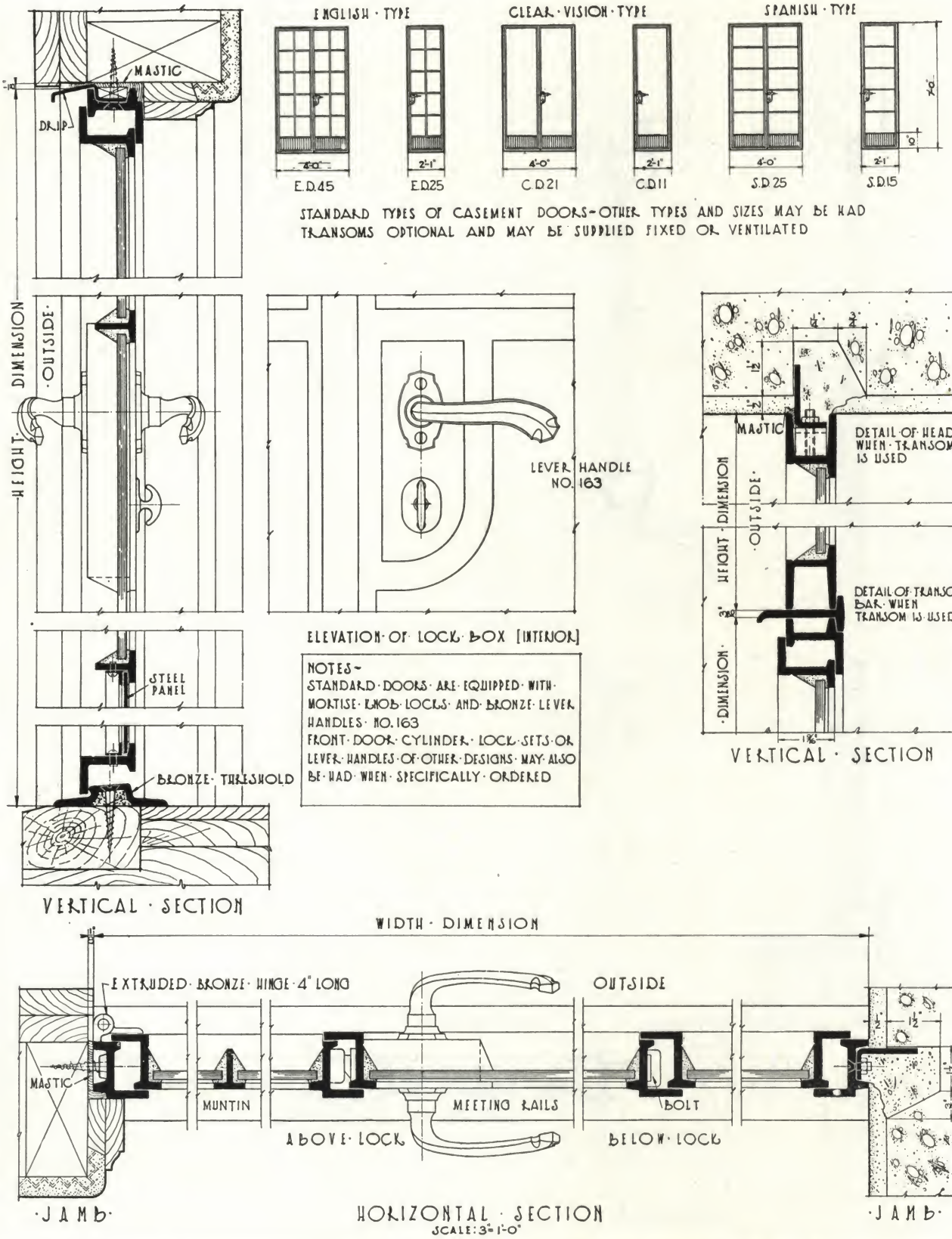
SOULÉ	STEEL CASEMENT WINDOWS INSTALLATION DETAILS	DRAWING NO. 37

Continued on next page



SOULÉ	FIRE ESCAPE WINDOWS	DRAWING NO. R.38

Continued on next page



SOULE'	STEEL CASEMENT DOORS	DRAWING NO. HC.42

J. S. THORN COMPANY

Manufacturers of Solid Steel Casement Windows

Allegheny Avenue and Twentieth Street, PHILADELPHIA, PA.

BRANCH OFFICES

NEW YORK, N. Y. CHICAGO, ILL. BOSTON, MASS.

Products

THORN STANDARD RESIDENCE and MANOR TYPE CASEMENTS and DOORS for residences, apartments, dormitories, etc.

THORN COTTAGE CASEMENTS.

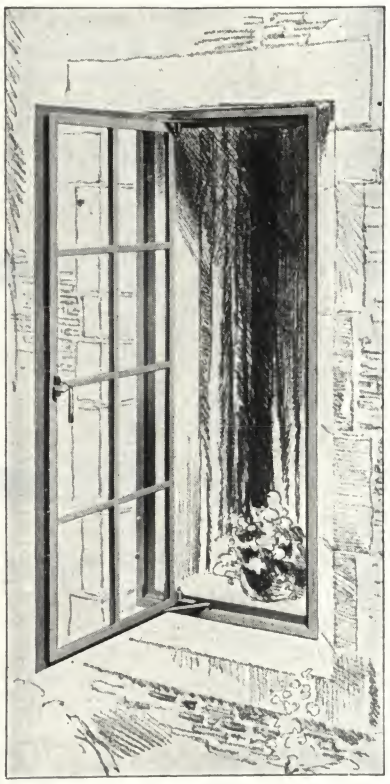
THORN MEDIUM and HEAVY TYPE CASEMENTS—Side Hung and Projected.

For our other Sash Products, Sash Operators and Vertical Lift Doors, see Manufacturers' Index.

Thorn Standard Residence Type Casements

Produced in standard sizes, made of specially rolled solid steel casement sections of substantial weight, and designed to produce a most rigid construction. At all corners the sections are mitered, electrically butt-welded and ground to a smooth finish. Steel muntins have a 5/8-in. face and all intersections are flush and electrically welded. All casements are accurately made, carefully fitted and when properly installed in the building are weathertight under all conditions. Casements are equipped with Thorn solid bronze straight handles and strikes, and Thorn cleaning hinges of solid bronze.

Thorn Cleaning Hinge—A new type sliding hinge of solid bronze for Thorn solid steel casements, which, when closed has the appearance of an ordinary butt hinge and, when open, permits cleaning of the glass from the inside. Not only is the unsightly extension or offset hinge eliminated, but also the sill adjusters, as the Thorn sliding hinge, with friction adjustment, holds the casement securely, top and bottom, in any position.



Thorn Residence Casement

Advantages—Thorn metal casements are of the finest quality and create an architectural appearance which can not be obtained by the use of wood windows. They have all the advantages of double hung windows and, in addition, they provide 100% ventilation. They control ventilation by conducting breezes into the building and to a certain extent will exclude rain while the windows are open. They are economical, costing no more than a good quality wood casement and are more reasonable in price than double hung windows. They need not be weatherstripped because of their weathertight construction. They can not warp, shrink, or swell as do wood windows.

Thorn Cottage Casements

Thorn Cottage Casements are for use in the more modest homes where economy must be exercised, and the allowance for windows will not permit the use of the Thorn Residence and Manor types.

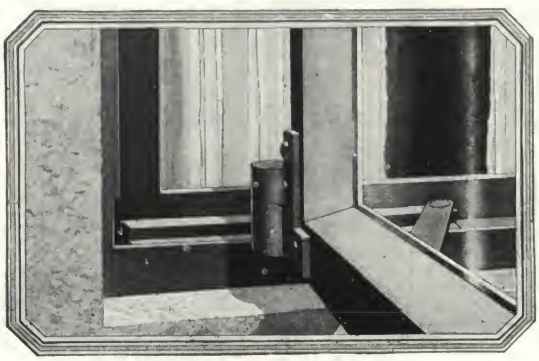
The general construction is similar to the Thorn Residence type, although steel sections of lighter weight are employed, and they are fitted with iron friction extension hinges to permit glass cleaning from within and iron fasteners are furnished.

They can be furnished with bronze fittings, or with a type of under-screen operator at an extra cost.

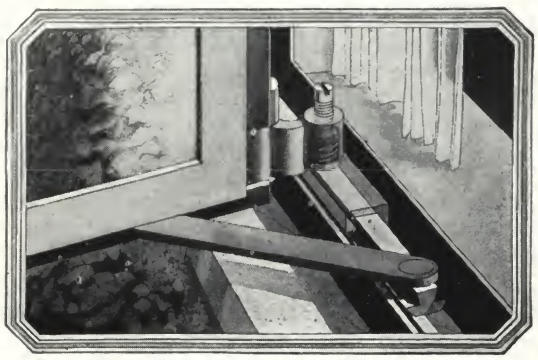
Catalogues

Thorn Casements for Residences and Apartments—R.C-5, M.C-2 and C.C-1.

Thorn Medium and Heavy Type Casements—M.H-1.

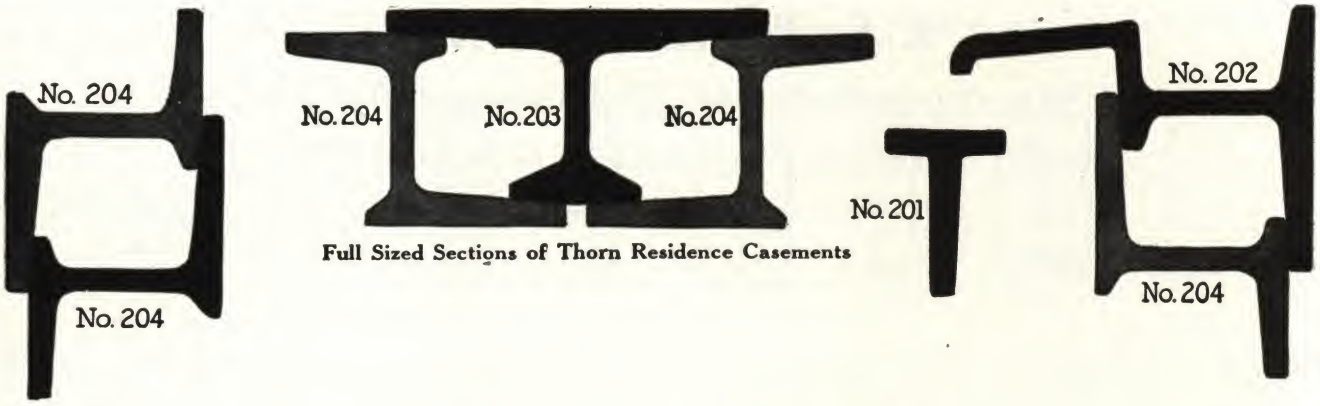


Thorn Cleaning Hinge Open

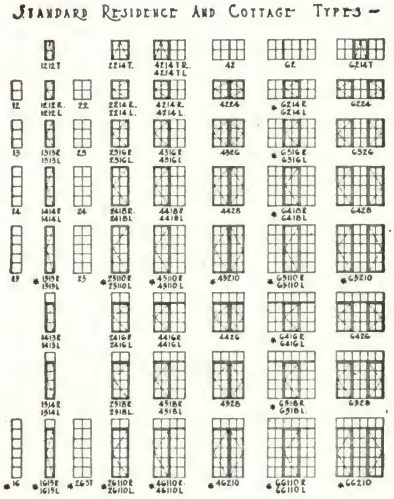


Thorn Cleaning Hinge, Showing Slide and Friction Adjusting Screw

Continued on next page



Full Sized Sections of Thorn Residence Casements



CASEMENT SIZES

RESIDENCE TYPE - RS			COTTAGE TYPE - CG		
No. Of Lights	Unit Width	Unit Height	No. Of Lights	Unit Width	Unit Height
1	11 7/16"	–	1	1 1/8	–
2	1'-8"	2'-1 1/2"	2	1'-7 5/8	2'-3 1/4"
3	–	3'-0 9/16"	3	–	3'-3 1/2"
4	3'-3"	4'-0 5/8"	4	3'-1 1/2"	4'-3 3/4"
5	–	4'-11 7/16"	5	–	5'-4"
6	4'-10"	5'-10 3/4"	6	4'-7 1/2"	–
CH 1	1'-8"	1'-2 3/16"	CH 1	1'-7 5/8	1'-1 5/16"
CH 2	3'-3"	1'-11 1/16"	CH 2	3'-1 1/2"	1'-10 5/16"

ADD 1/4" TO SIZES NOTED FOR CLEAR OPENING DIMENSION

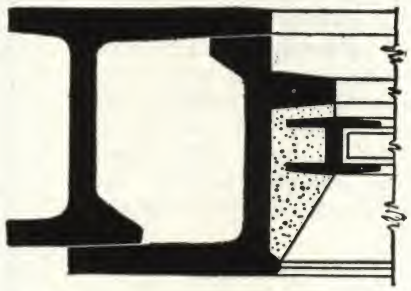
and windows, the lines are neat and pleasing. As in all Thorn casement construction, the corners are electrically butt welded, resulting in a strong solid unit.

The sections are especially designed for neat putty glazing with short bevels and with a putty stop which eliminates a ragged finish where the tapering putty bevel meets the window bar.

Vertical and horizontal sight lines are maintained in ventilated and fixed sections.

The famous Thorn friction hinge of forged steel and bronze is standard equipment.

The Manor is an accomplishment in steel window craft worthy of the finest architecture.



Full Size Section of Thorn Manor Casements

Thorn French Casement Doors

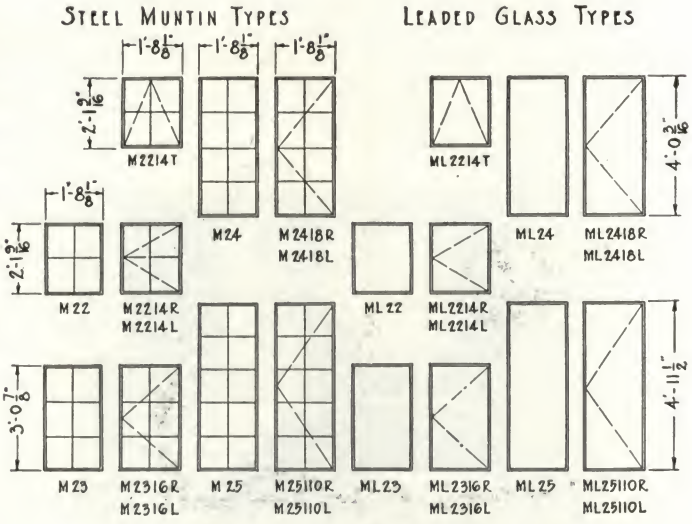
The very finest of materials and the highest quality of workmanship are incorporated in the standard Thorn French Casement Doors. They are made of heavy casement sections solidly welded at the corners, and the lower section of the door is arranged with a small kick panel of furniture steel. The sill of the frame is a heavy extruded bronze threshold riveted and brazed into the jamb members. They are fitted with beautiful bronze hardware including cremone bolts and friction adjusters at the head and receive two coats of gray enamel, oven dried, before leaving the factory.

The standard type is made to fit an opening 3 ft. 7¾ in. x 6 ft. $10\frac{3}{16}$ in. and can be arranged to open in or out.

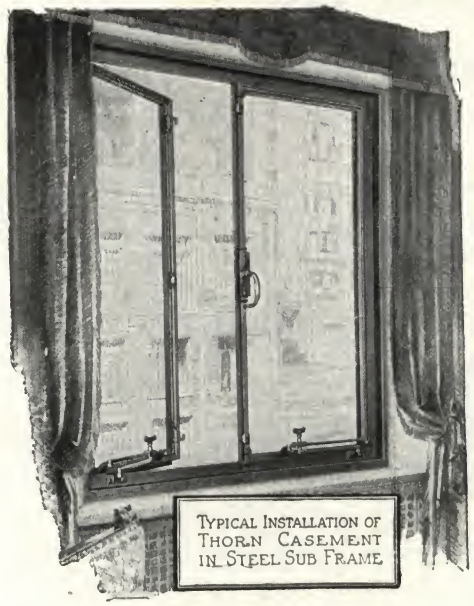
Thorn Manor Casement Windows

A standardized casement of the finest quality combining the very best of materials and workmanship.

Good, substantial, carefully designed sections are employed, and although much heavier than other stand-



Continued on next page



TYPICAL INSTALLATION OF THORN CASEMENT IN STEEL SUB FRAME

Thorn Medium and Heavy Type Metal Casements

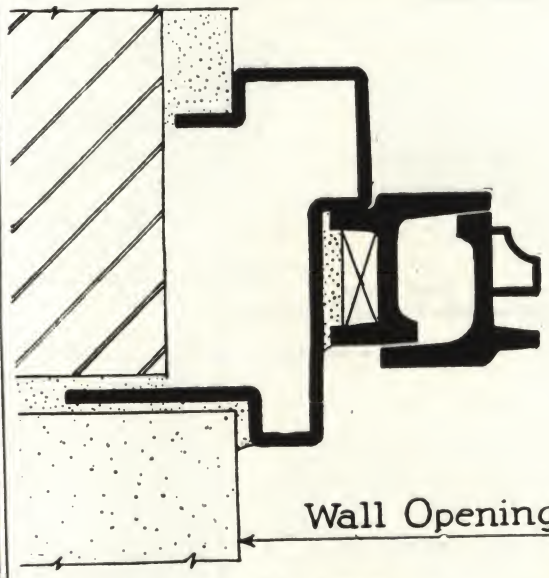
For use in more elaborate residences, churches, banks, office buildings, etc. Constructed of heavy 2-point specially rolled steel casement section. Constructed with great care and accuracy. Glazing may be provided for by the use of putty only or glass may be held in place with drawn steel glazing beads which are accurately mitered at the corners and held in place with brass oval head screws. Solid bronze hardware is used throughout.

Where desired, Thorn medium and heavy type metal casements may be provided with a pressed metal subframe which is built in and the casements placed after openings are prepared.

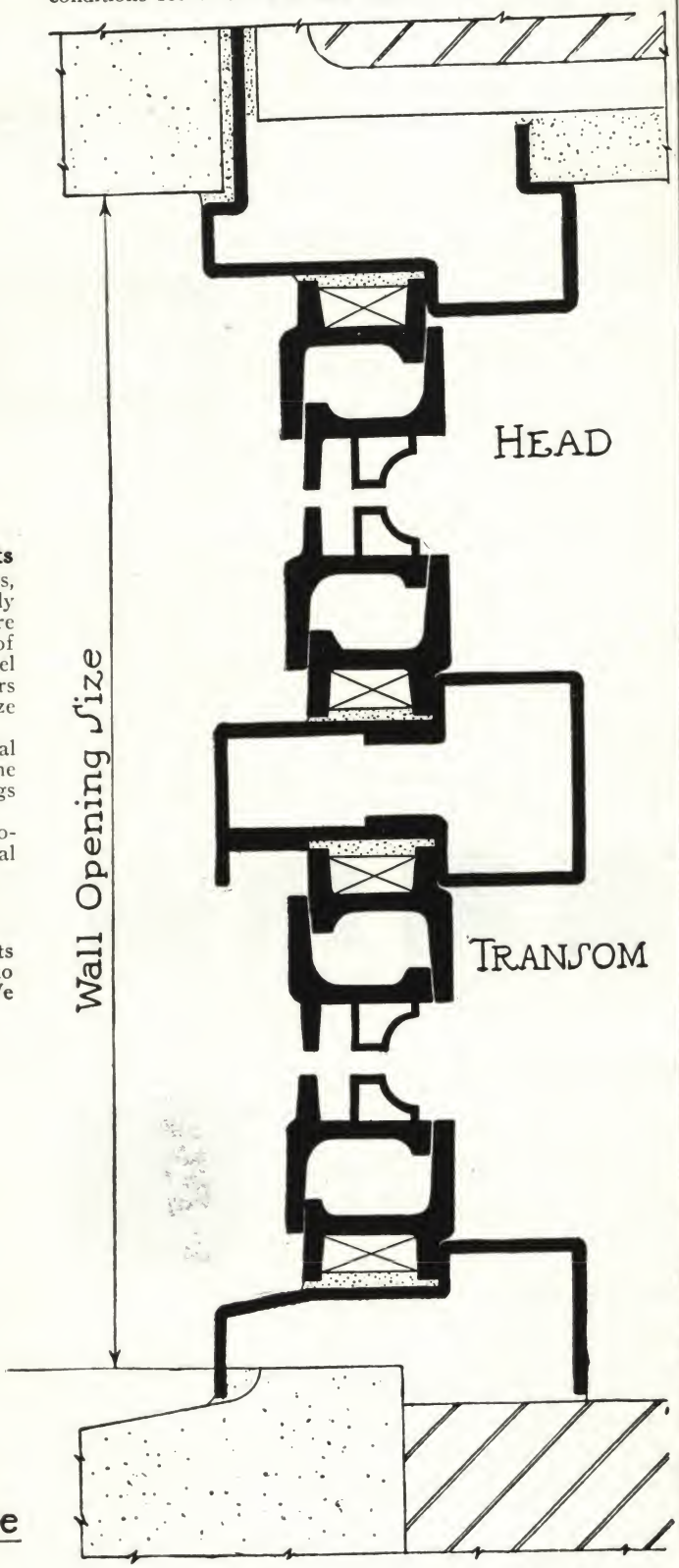
They are custom built, can be made side hinged, projected or pivoted and permit great flexibility of architectural design.

Architectural Service

In designing buildings in which Thorn metal casements are to be installed, it is always well to detail the openings to receive the windows after masonry work is completed. We will at all times be glad to co-operate with architects, owners and builders in the proper preparation of details and will forward on request our booklet covering usual installation conditions for Thorn standard units.



JAMB



One-half Full Size

THORN CASEMENTS

DETAILS OF HEAVY TYPE CASEMENTS

THORN CASEMENTS

TAYLOR STEEL PRODUCTS CO.

(THE W. H. TAYLOR CO.)

Manufacturers of Copper Steel Windows, Screens and Coal Chutes

326 S. W. 11th Street, DES MOINES, IOWA

Products

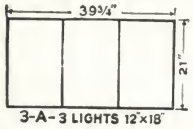
STEEL BASEMENT and UTILITY WINDOWS, Standard and Security Types; AJAX TOP PIVOTED STEEL SASH; STEEL SCREENS and STORM SASH; COAL CHUTES, Solid Steel Door, Daylight Door, Combination Hopper-door, Grade Line and Store. Also Flue Cleanout Doors and Ash Dumps. Distributed through dealers in building supplies, specialties, lumber, hardware or structural steel.

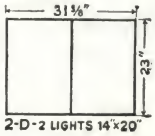
COPPER-STEEL ARC WELDED BASEMENT WINDOWS (PATENTED AND PATENTS PENDING)

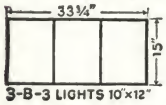
Special Features

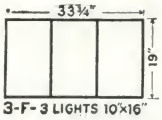
Wide Frame—(2⅜ in.) with double facing flanges keeps the masonry in line on *both* sides. See "Frame Corner" illustrated below. The wide and deep mortar pocket assures a secure setting.

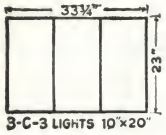












Standard Sizes of Basement Windows—Special Sizes Built to Order

Easy to Screen—The frame is rabbeted to receive screens and storm sash eliminating interference of stucco or rough masonry surfaces. Slotted lugs, permanently attached to the screen with brass screws, operate in slots provided in the window frame.

Tayco Screen—Steel frame, grooved for galvanized rod. Furnished with 16 Mesh Galvanized or Bronze wire.

Type R Screen—Round steel frame with extra heavy galvanized wire 12-mesh, 25 gauge strand, eight gauges heavier than standard. This screen will stand much scuffing and abuse.

Lever Latch—Easy to take hold of and positive in action. Forces the sash snugly up against the frame. See illustration below.

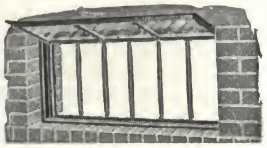
Self-Weathering Lift Out Hinge—The design of the hinge slots utilizes the full weight of the glazed sash in securing a tight contact.

Electric Arc Welded Throughout—All joints are full welded, producing a stiffer window.

Copper Steel for Permanence—Both frame and sash are built of rust-resisting copper steel.

Security Basement Windows

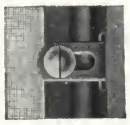
Complete protection for the opening is provided by five ½ in. solid steel bars, welded into the window frame at top and bottom. Bars do not interfere with screening. It is safe to leave a Security Window open.



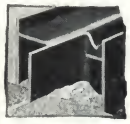
Security Window

Steel Storm Sash

Attached by the same system as the screens. Brass screws insure easy removal. Storm sash save fuel and keep the windows free of frost.



Screen Fitting



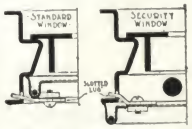
Frame Corner



Lift Out Self-Weathering Hinge



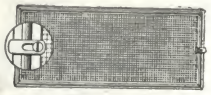
Lever Latch



Screen Detail



Type R Screen



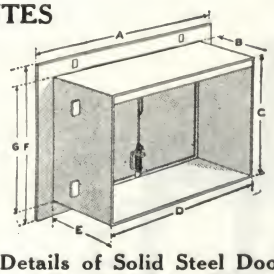
New Tayco Screen

COAL CHUTES

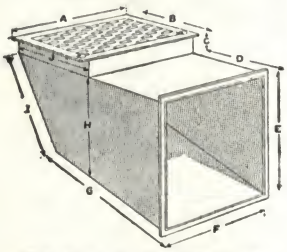
Characteristics

Built entirely of rust-resisting copper steel, every joint arc welded. Curved frame and embossed door provide ample reinforcement. Oversize anchors prevent chute from shaking loose in the wall. The double, break-proof hinges allow the close fitting door to operate without binding. Finished in battleship gray.





Details of Solid Steel Door and Daylight Door Chutes



Details of Grade Line Chutes

Types and Sizes

Made in two sizes and three wall thicknesses.

Solid Steel Door Chutes—Door is held open and locked automatically. Furnished without hopper unless specified.

Daylight Door Chutes—The heavy glass (¼ in. thick) is set in heavy rubber channel and is protected by a steel shield. Furnished without hopper unless specified.

Grade Line Chutes *(Oversize)*—For use where floor line is low. Have a large, clear opening. Door is made of safety tread floor plate. Wings prevent scattering of fuel.

Store Chutes *(Oversize)*—Used in business buildings where the floor line is level with the sidewalk.

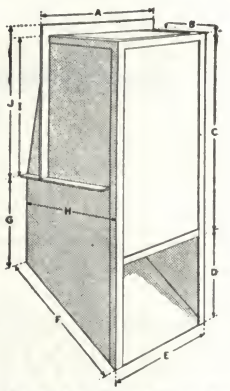
Combination Hopper Door—Full details on request.

DIMENSIONS OF COAL CHUTES—ALL DOOR TYPES, IN.

No. Solid door	No. Daylight door	No. comb. hopper door	Rough wall opening W	Rough wall opening H	A	B	C	D	E	F	G
109	709	409	24	17	25	8½	16	21¾	8½	19¾	16
113	713	413	24	17	25	13	17¾	21¾	13¼	19¾	16
39	79	49	33	22	33½	8½	21¾	30	8½	25½	21¾
33	73	43	33	22	33½	13	23¾	30	13½	25½	21¾
38	78	48	33	22	33½	18	23¾	30	18½	25½	21¾

DIMENSIONS OF GRADE LINE CHUTES, IN.

No.	Door opening Width	Door opening Depth	A	B	C	D	E	F	G	H	I	J
40	24	20	28	24	3	16	27½	24½	29	21	20½	20½
41	30	26	34	30	3	18	34	30½	36	27½	27½	26½
Store Chutes												
55	21	15	25½	12	27	16½	22	18½	18	16	16	18
56	29½	21	33½	12	32	16½	30½	18½	18	16	21½	23½



Details of Store Chutes

Continued on next page

COPPER STEEL UTILITY WINDOWS

Description

A splendid window for larger basement openings, and for stores, garages, warehouses and farm buildings. Both frame and sash are copper steel. Frames are built of same sections as the basement windows.

There are four standard sizes. Special sizes will be made to order.

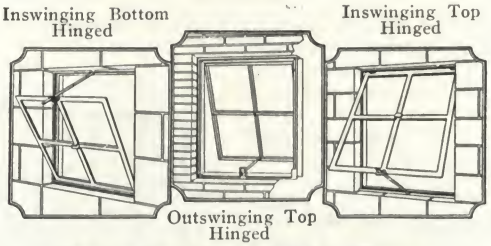
Built to swing *in* or *out*. Direction of swing should be specified. The inswinging type may be set to open from the top or bottom, after delivery.

Screens—Furnished for the Inswinging type, and are very easily attached or removed, by the same system used in the basement windows. Frames are rabbeted to receive screens, which have permanently attached fittings with brass screws. See screen details on preceding page.

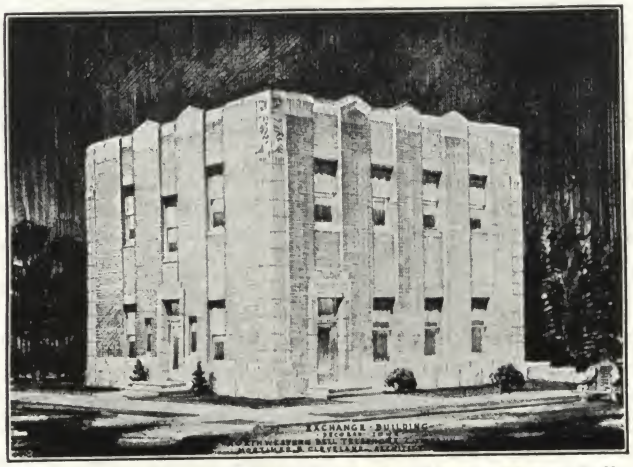
Choice of three screens: Tayco galvanized (16-mesh), Tayco bronze (16-mesh) or Type R extra heavy galvanized wire (12-mesh). Also storm sash.

Ventilating Wings—Furnished when specified. If mentioned when ordered, lugs will be built into windows, so the ventilating wings can be added at any time.

Security Utility Widows—Furnished with five (or more) ½ in. solid steel bars welded into the frame for protection of the opening when specified. Bars do not interfere with screening.

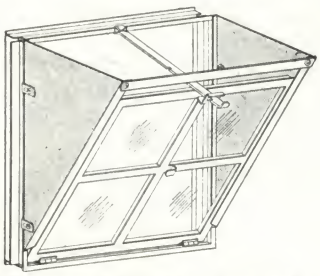


Taylor Des Moines Utility Window



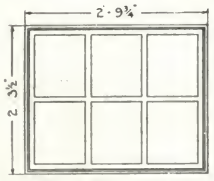
Exchange Building, Decorah, Iowa—Northwestern Bell Telephone Company

Mortimer B. Cleveland, Architect, Waterloo, Iowa
Taylor Utility and Basement Windows used

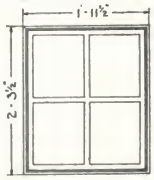


Ventilating Wings (Optional)

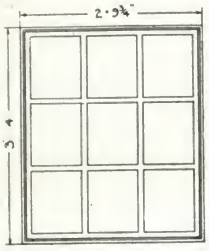
Standard Sizes of Utility Windows



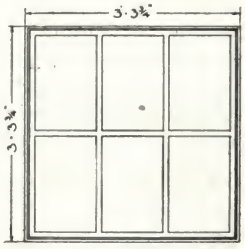
No. 6F, 6 lights 10x16 in.
Use 4 lights 10x16 in.
2 Lights 10⅝x16 in.



No. 4BI } 4 lights
No. 4BO } 10x12 in.



No. 9BI } 9 lights
No. 9BO } 10x12 in.



No. 6AI } 6 lights
No. 6AO } 12x18 in.

Full ventilation furnished. To swing in or out as specified.
Inswinging window may be set to open at either top or bottom.
Notched Bar Operator is standard.
Cam Latch and Chain optional.

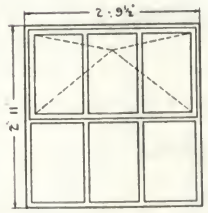
COPPER STEEL AJAX WINDOWS—All Bar Frames

Sturdy arc-welded copper steel windows for any building where moderate sizes are needed.

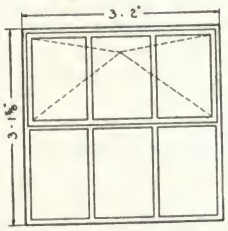
Built in three standard sizes. Other sizes built to order.

Ventilators are top-pivoted and swing out.

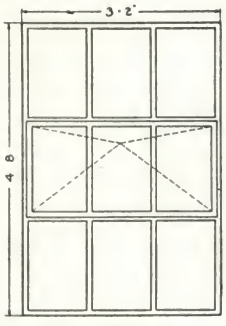
Standard Sizes of Ajax Windows



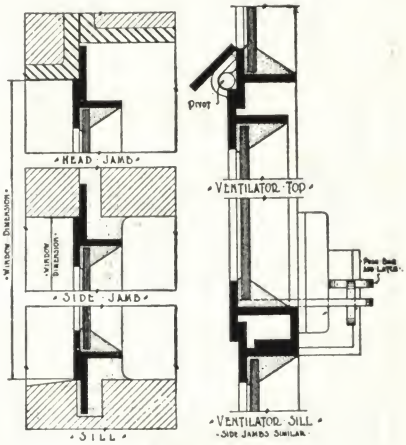
No. 6BI (Inswinging) }
No. 6BO (Outswinging) }
6 lights 10x12 in.



No. 6H, 6 lights 12x18 in.
Use 3 lights 12x18 in.
2 lights 11¼x16⅝ in.
1 light 12x16⅝ in.



No. 9H, 9 lights 12x18 in.
Use 6 lights 12x18 in.
2 lights 11¼x16⅝ in.
1 light 12x16⅝ in.



Ajax Window Details

J. S. THORN COMPANY

Manufacturers of Steel Windows, Skylights, Sash Operating Devices, and Vertical Lift Doors

Allegheny Avenue and Twentieth Street, PHILADELPHIA, PA.

BRANCH OFFICES

NEW YORK, N. Y. CHICAGO, ILL. BOSTON, MASS.

THORN STEEL WINDOWS

Thorn Products

PIVOTED WINDOWS, PROJECTED WINDOWS, CONTINUOUS WINDOWS, WINDOW OPERATORS, SKYLIGHTS.

BURVETT VERTICAL LIFT DOORS.

Also Industrial Steel Doors, Counterbalanced Windows, Double Hung Windows.

For our pages on Steel Casements, see Manufacturers' Index.

Industrial Steel Window Catalogue

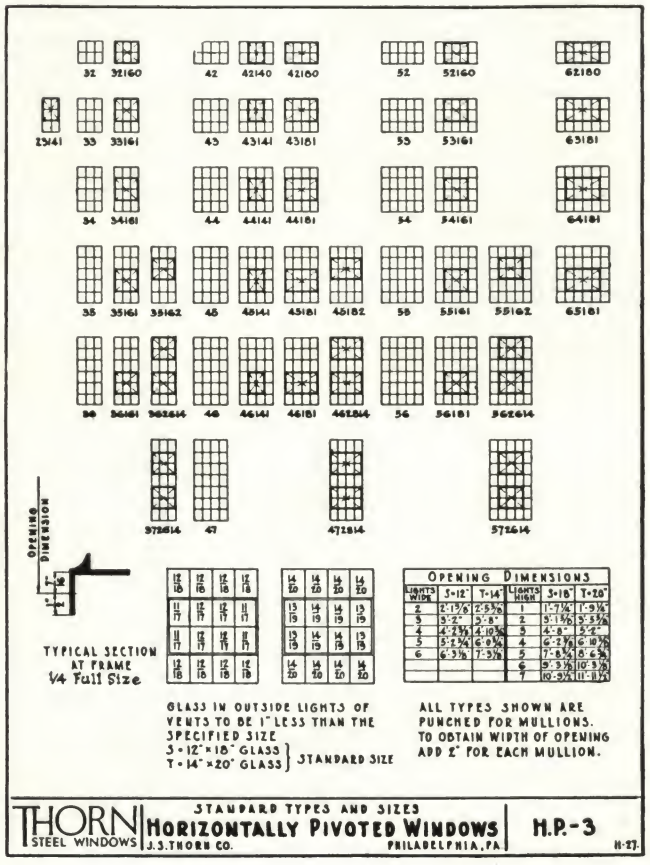
New Catalogue F-S-5 shows Thorn steel windows for industrial plants. It will be sent on request.

Thorn Pivoted Windows

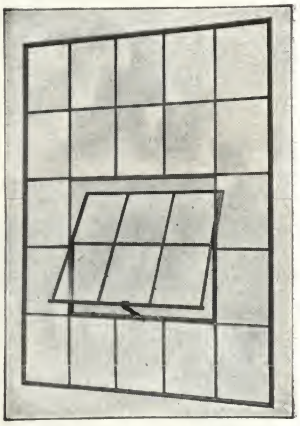
Designed for use in all types of industrial buildings and constructed of solid steel sections 1⅜ in. deep. They are of substantial construction having all muntin joints welded. Ventilators are double weathered and hung on strong steel butts. Thorn windows are given one good priming coat of gray enamel at factory but should receive two coats of paint after erection.

Standard windows are furnished only in 12x18 and 14x20-in. glass sizes, except in the lights of vents where it is 1 in. less on each outside edge.

Standard windows may be combined to form a great variety of widths and are made with uniform punching in the jamb members to match the slots in the standard mullion bars. Any combination of standard units may be obtained by joining them together with standard mullions. For heights greater than obtainable with standard units they may be joined with horizontal mullions.



Underwriters' Type — The Underwriters' label can be furnished when specified and as an extra. No unit shall exceed 7x12 ft. and ventilators shall not exceed 4x5 ft. No more than two vents shall be in a single window unit. Ventilators must be pivoted above center. Ventilator hardware must conform to rules of local board.



Thorn Pivoted Window

Thorn Projected Windows

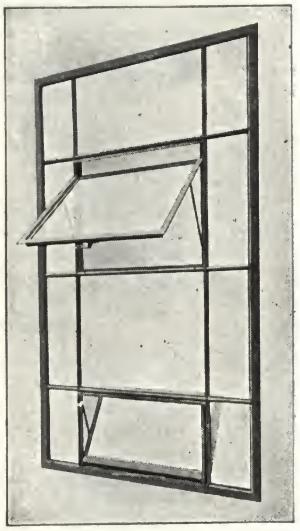
Economical office windows for industrial buildings, offices, schools, hospitals, etc., where screens and shades are necessary. Made of the same steel members and the same welded construction as Thorn pivoted windows.

They are made in commercial and architectural designs. The commercial type contains equal lights of 12x18 or 14x20-in. glass and are similar to pivoted window standards. The architectural type are made with combinations of large and small lights similar to typical window shown.

They are fitted with bronze shoes with friction adjustment which slide up and down in the stationary jamb members of the vent openings as the ventilator is closed and opened. These friction shoes together with the steel side arms attached to each ventilator hold the vent in any position.

Projected windows may be combined by the use of mullions the same as pivoted windows.

Underwriters' Type — Underwriters' label can be furnished on commercial projected windows only. Size limits are the same as for pivoted windows and vents must open out.

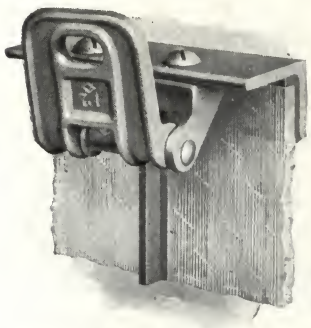


Thorn Projected Window

Thorn Continuous Windows

For use in roof construction. When properly incorporated in roof design they will perfectly daylight and ventilate buildings of great widths and lengths, increasing the efficiency of the workers and the quality of the product.

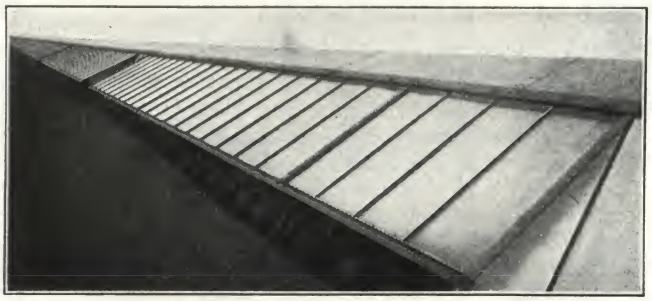
Continued on next page



Thorn Malleable Hinge

Controlled by long lines of the powerful Thorn tension operator they are particularly effective in quickly carrying off smoke, gases, etc. They form a great glass awning when open, the unbroken line of steel and glass permitting ventilation regardless of weather conditions. Stationary storm panels will be provided at the ends when ordered.

The continuous window is made of a series of window units connected together. Each unit is ruggedly built of heavy one-piece steel members. The windows are hung on heavy malleable iron, free movement hinges.



Thorn Continuous Windows

Whenever possible, continuous windows should be erected only by experienced men. We maintain a field organization to do this work and if erection is a part of the contract we assume full responsibility for a satisfactory installation.

Flashings, when necessary at head, sill and jambs of openings or gaps in the window lines, should be furnished by the contractor for the sheet metal work. They are not included with the windows.

Thorn Window Operators

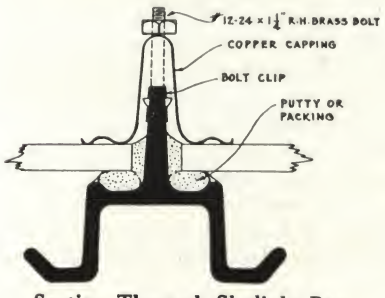
Made in two types, tension operators and torsion operators.

Tension Operator—Is designed for long and heavy lines of windows. It is a smooth working mechanism free from friction. Practically the entire load is carried by compound lever arms, eliminating strain on the tension line. Made for manual or motor operation.

Torsion Operator—Is for short runs of ventilators. Consists of a revolving shaft to which are attached pressed steel arms which have a connecting link attached to the ventilators. Made for chain or pipe operation.

Thorn Steel Skylights

Composed of a series of heavy rolled steel bars of special design. These bars provide permanency and strength in skylight construction and have made possible glass roofs of vast areas. The bar provides wide glass rests which permit extreme expansion and contraction. It also provides wide gutters to carry off large amounts of condensation. Bars can be furnished in a single length of 30 ft. and roof purlins may be spaced as much as 8 ft. without danger of sag.



Section Through Skylight Bar No. 30

Parts of the bar subject to elements from within, such as steam, gases, etc., are accessible for painting without disturbing the skylight in any way. Portions of the bar above the glass are covered with a pressed metal cap of galvanized iron or copper and attached by brass screws.

Thorn skylights may be entirely fixed or arranged with a ventilating section operated by a Thorn torsion operator.



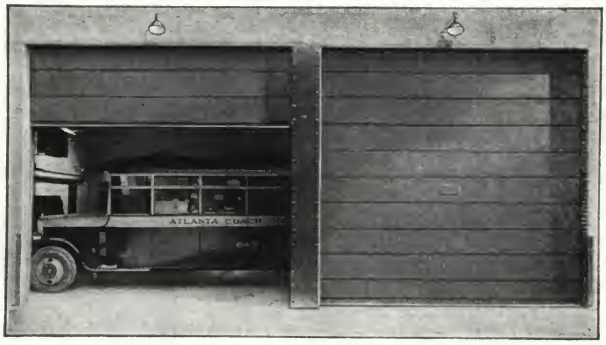
Thorn Steel Skylight

Burvett Vertical Lift Doors

The improved Burvett Vertical Lift Door, manufactured by J. S. Thorn Company, is, we claim, the most modern development in steel door construction and fills a long-felt need for a sturdy, burglar, fire and weather proof barrier that operates with the utmost simplicity, requires no wall space, and on which the cost of maintenance is extremely low.

The limitations of other types of doors used in the past have been fully overcome in this new design.

It is built of a series of 16 gauge galvanized steel plate interlocking panels, which lift vertically, telescoping into a compact group to the height of a single panel



Burvett Vertical Lift Doors

and requiring a head clearance of about only 24 in. when completely raised. The door is raised by means of a hand chain or motor power, turning a grooved drum and spiral and winding two lines of heavy steel cable attached to the bottom plate panel.

A third cable is attached to counterweights and winds around a spiral which compensates for the additional load as the plates stack.

As each section lowers, lugs attached to the extreme ends of the panels are guided by rollers attached to the bottom panel into pockets formed in the heavy channel jamb guides, hold each panel securely and allow only a slight deflection under extreme wind pressure.

The bottom panel is equipped with two plungers, which automatically lock the door when fully closed.

The great utility of this door, and the ease with which the plates can be removed and repaired, make it particularly desirable for warehouses, piers, freight stations, loading platforms, garages, factories, aeroplane hangars, and buildings of similar character, for it is built to stand hard usage.

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Steel Windows

YOUNGSTOWN, OHIO

OFFICES (*) AND WAREHOUSES (†)

*ALBANY, N. Y.
*ALTOONA, PA.
*AMARILLO, TEX.
*ATLANTA, GA.
*†BALTIMORE, MD.
*†BIRMINGHAM, ALA.
*†BOSTON, MASS.
*BROOKLYN, N. Y.
*†BUFFALO, N. Y.
*CHARLESTON, W. VA.
*CHATTANOOGA, TENN.
*†CHICAGO, ILL.
*†CINCINNATI, OHIO
*†CLEVELAND, OHIO
*COLUMBUS, OHIO
*†DALLAS, TEX.
*DAYTON, OHIO
*DENVER, COLO.
*DES MOINES, IOWA
*†DETROIT, MICH.
*EL PASO, TEX.
*ERIE, PA.
*FT. WAYNE, IND.
†GARDEN CITY, N. Y.
*GRAND RAPIDS, MICH.
*†GREENSBORO, N. C.
*HARRISBURG, PA.
*HARTFORD, CONN.
*HEMPSTEAD, N. Y.
*†HOUSTON, TEX.
*WICHITA, KAN.
*†INDIANAPOLIS, IND.
*†JACKSONVILLE, FLA.
*†KANSAS CITY, MO.
*†LOS ANGELES, CALIF.
†LONG ISLAND CITY, N. Y.
*LOUISVILLE, KY.
*LUBBOCK, TEX.
*MADISON, WIS.
*MEMPHIS, TENN.
*†MILWAUKEE, WIS.
*MINNEAPOLIS, MINN.
*MOLINE, ILL.
*†MOUNT VERNON, N. Y.
*†NEWARK, N. J.
*NEW HAVEN, CONN.
*NEW ORLEANS, LA.
*†NEW YORK, N. Y.
*†NORFOLK, VA.
*†OMAHA, NEB.
*OKLAHOMA CITY, OKLA.
*†PHILADELPHIA, PA.
*PHOENIX, ARIZ.
*PITTSBURGH, PA.
*†PORTLAND, ORE.
*PROVIDENCE, R. I.
*RICHMOND, VA.
*ROCHESTER, N. Y.
*ROSWELL, N. M.
*†YOUNGSTOWN, OHIO
*SALT LAKE CITY, UTAH
*SAN ANTONIO, TEX.
*†SAN FRANCISCO, CALIF.
*†ST. LOUIS, MO.
†ST. PAUL, MINN.
*SCRANTON, PA.
*SEATTLE, WASH.
*SOUTH BEND, IND.
*SYRACUSE, N. Y.
*TAMPA, FLA.
*TOLEDO, OHIO
*TULSA, OKLA.
*WASHINGTON, D. C.

Products

STEEL WINDOWS.

For other Truscon Products, see pages in this edition on Concrete Reinforcing Steel, Steel Joists, Steeldeck Roofs, Standardized Buildings and Structural Steel, Steel Doors, Metal Laths and Accessories, as listed in Manufacturers' Index.

General

The complete line of Truscon Steel Windows includes types for every kind of building and purpose. Their design, materials, construction, workmanship and equipment represent the last word in modern steelcraft. Each type is built to meet the practical requirements of its particular installation. All windows are standardized to insure low cost in production and maximum value to the purchaser.

Window Service

The objective of Truscon Window Service is to co-operate with architects in securing the most satisfactory window installation. Practical requirements, investment value, easy operation, simple installation, maintenance and permanence are important considerations.

Recommendations are made without bias as Truscon furnishes all types of windows and is solely interested in their successful use.

Erection

The success of steel windows depends in a large degree on the manner of their installation. To assist architects, contractors and owners in obtaining dependable results, Truscon has built an organization of experts to undertake completely the erection and adjustment of steel windows. With this erection service, the TRUSCON STEEL COMPANY assumes entire responsibility for the steel window installation, including fabrication, delivery, erection and installation.

Literature

Steel Window Handbook, 8½x11 in., 160 pages, containing details of all types of steel windows for various building constructions, will be sent to architects on request. Separate catalogues on each type of window can be furnished.

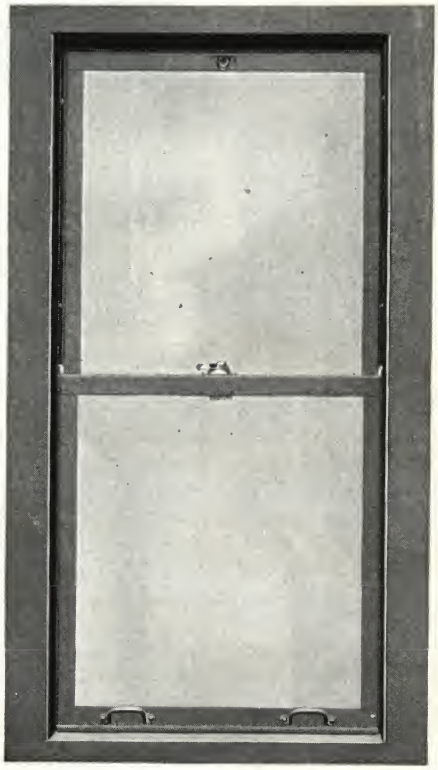
TRUSCON DOUBLE-HUNG STEEL WINDOWS

Counterweighted Model No. 28

Model No. 28 Truscon Double-Hung Steel Windows meet the modern demand for artistic design and quality workmanship. They are equally satisfactory in the practical advantages of easy operation and enduring, care-free service.

Their narrow, clean-cut members add to the attractiveness of any building and increase the daylighting of interiors. Their solid steel construction provides fire protection at the most vulnerable part of the building. The galvanizing of all parts prevents corrosion. The spring bronze weather stripping shuts out draughts and insures constant easy operation.

The details of construction, finish and hardware have been perfected so as to adapt Truscon Double-Hung Steel Windows to use in the finest buildings. Their cost



under efficient Truscon manufacturing methods is so moderate as to make them practical for general use.

Complete catalogue containing installation details furnished on request.

Truscon Counterbalanced Steel Windows

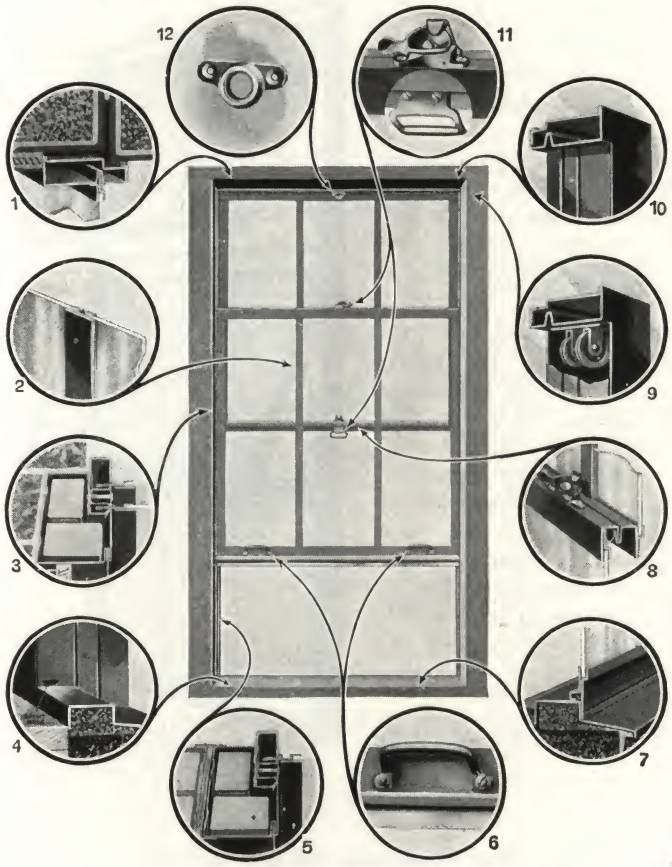
Truscon Counterbalanced Steel Windows combine beauty and high quality with ease of operation, unusual fire-resisting qualities and weathertightness. Made in a variety of models, Truscon Counterbalanced Steel Windows can be furnished simply with two counterbalanced sash, with two sash and projected type transom, with two sash and projected type bottom ventilator and with more than two sash. They may be arranged in bays or in a number of ways to meet building requirements.

Continued on next page

TRUSCON DOUBLE-HUNG STEEL WINDOWS

Counterweighted Model No. 28

Construction Details and Hardware



(1) Section Through Head of Frame—Showing one-piece channel construction with recess to receive upper sash rail; staff mould formed from two thicknesses of metal and head cover welded to frame section.

(2) Muntin Bars—Can be furnished horizontally and vertically to secure small glass-light effects.

(3) Section Through Jamb—Illustrating the dual function of the jamb frame, as weight box and sash guide. Proper weathering is secured through spring bronze weatherstripping attached to the sash stiles.

(4) Concealed Grout Holes—Assure a firm and weather-tight bed for the window.

(5) T-Shaped Mullions—For joining two or more windows in a single opening. Held in place by means of concealed steel straps.

(6) Pair of Lifting Handles—Tap-screwed to the bottom rail of the lower sash.

(7) Section Through Bottom of Window—Showing double contact weathering between sash and sill.

(8) Section Through Meeting Rail—Showing interlocking contact between the upper and lower sash, and the spring bronze weatherstripping on upper rail of lower sash.

(9) Cutaway View of Jamb Frame—Showing the bronze-bushed, pressed steel chain pulleys that turn on hardened steel pins in heavy, pressed steel housings.

(10) Section Through Head of Window—Showing adaptability of head section to any type of construction and positive contact between sash and frame.

(11) Combination Sweep Lock and Pull-down Handle—The sweep lock is adjustable to secure proper contact and locking.

(12) Pole Socket—Attached to the top rail of the upper sash facilitates opening and closing this sash.

Note: Standard Hardware is sherardized malleable iron. Solid bronze can be supplied when bronze hardware is specified.

Condensed Specifications

(1) General—All window openings shown on drawings, unless otherwise specified, shall be equipped with solid steel, plate type (galvanized and weatherstripped) Model "28" Double-Hung Windows, as manufactured by the TRUSCON STEEL COMPANY, of Youngstown, Ohio.

(2) Material—All windows throughout shall be constructed of TRUSCON special hot-rolled new billet steel, galvanized. Sills shall be of 12-gauge; weight boxes, jambs, pulley stiles, heads and head covers 16-gauge; rails and stiles of sash 12-gauge; inside glazing strips at jambs 14-gauge, and at top and bottom rails 12-gauge.

(3) Construction—Frame members: head, sill and jamb construction, each one piece of metal exclusive of parting stop, weight box cover and head cover; all members formed straight and true with welded joints ground smooth; staff bead formed on exterior of frame of double thickness of metal.

(4) Pulley Stiles shall be formed with deep weathering and the pulley stile and weight box cover held in place with one line of oval head screws passing through a heavy reinforcing piece on inside of jamb. Adjustment of sash and frame shall be secured by these screws which hold the pulley stile and weight box cover. The weight box cover shall run the full height of the jamb from sill to head, and shall be removable.

(5) A brass check plate shall be attached at meeting rails to insure proper weathering.

(6) A window stop shall be provided to prevent air entering room from slot under upper sash.

(7) Sash members shall be so designed that the distance from masonry opening to glass line at jambs and head will be 2½ in.

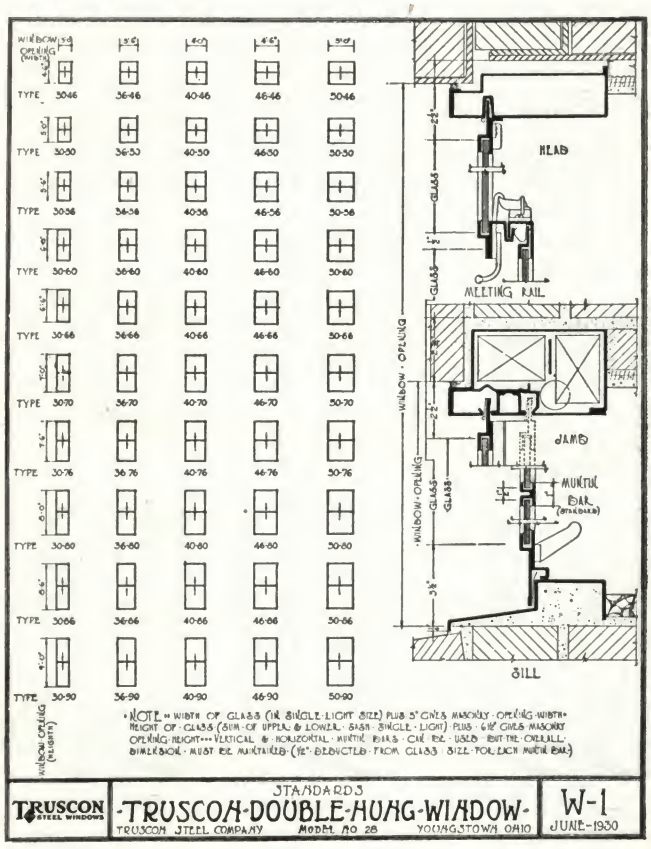
(8) Corners of sash shall be welded and ground smooth.

(9) Where muntin bars are required they shall fit into the sash members and be so welded that a flush surface is secured at joints and intersections.

(10) The meeting rails shall be formed so as to interlock.

(11) Glazing strips secured with oval head screws permit inside glazing.

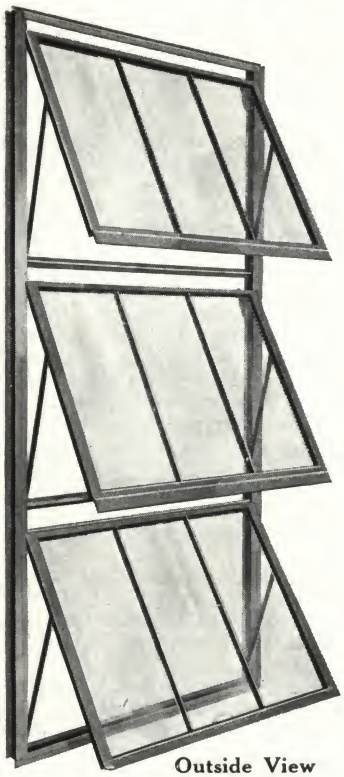
(12) Weatherstripping—Weatherstripping shall be provided of spring bronze and applied to sash members at sill, jambs, meeting rails and head. A spring bronze closure shall be applied to lower half of outer sashway.



Continued on next page

TRUSCON DONOVAN AWNING TYPE STEEL WINDOWS

Model No. 29



Outside View
Three lights high—all sash open

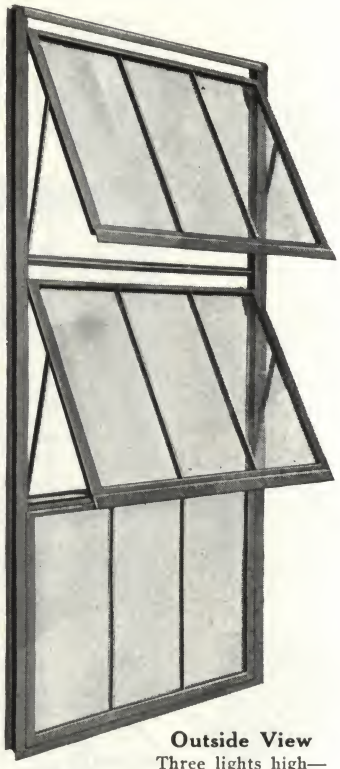
Daylight illumination without sun glare, and natural ventilation without draughts are provided for schools, hospitals, offices, hotels, apartments and public buildings by Truscon Donovan Awning Type Steel Windows, Model No. 29.

Shades attached to the lower rail of each sash act as awnings. Thus the open sashes deflect the sunshine and air currents upward toward the ceiling, thereby diffusing the sun glare, illuminating every corner of the room and maintaining a healthful circulation of fresh air.

Movement of the lower sash operates the upper sash—no window poles are required. By merely moving a lever the lower sash may be opened or closed independently of the others. All sashes may be opened for 100% ventilation, or the upper or lower sash may be closed. Sashes, being adjustable in any position, may be easily cleaned from the inside.

Made of copper bearing steel, Truscon Donovan Awning Type Windows are superior in design, construction, workmanship and operation. They are furnished complete, fabricated, assembled and painted. Their moderate cost makes them practical for any building.

Catalogue with full information furnished on request.



Outside View
Three lights high—lower sash closed

Condensed Specifications for Donovan Awning Type Steel Windows, Model No. 29

(1) General—All windows so indicated on the plans and elevations and called for in these specifications shall be of the Model No. 29 Donovan Awning type window as manufactured by the Truscon Steel Company of Youngstown, Ohio.

(2) Operation—The lower sash shall be the manual of operation controlling the opening and closing of the upper sashes.

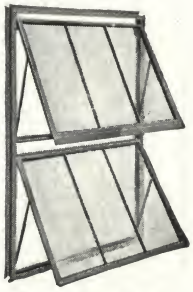
(3) The construction of the component parts shall be such that not only shall all sashes open and close simultaneously but so arranged that the upper sash or sashes may be left open while the bottom sash is closed, or the bottom sash open with the upper sash closed. The sash shall be connected with a $\frac{3}{8}$x$\frac{7}{8}$ in. flat bar concealed in the frame and so fixed by the engaging pins of the clutch on the lower sash that with the clutch in its normal position with the pins engaged in the holes in the bar, the two or three sashes in the unit may be operated simultaneously, the traveling bar riding up and down in the channel frame section as the lower sash is operated. The engaging pins of the spring pivot in the lower sash shall be so constructed that they may be disengaged allowing the lower sash to be operated singly and also that when the lower sash is used as the manual of operation to open the upper sash, the lower sash may be closed by disengaging the clutch pins.



Outside View
Three lights high—lower sash open



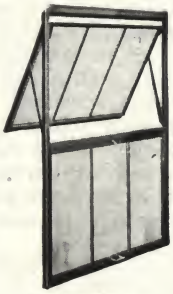
Inside View
Two lights high—closed



Outside View
Two lights high—all open



Inside View
Two lights high—all open



Inside View
Two lights high—bottom closed



Outside View
Three lights high—all sash closed

Continued on next page

(4) **Construction**—All joints shall be mortise and tenon, and air-hammer riveted.

(5) The four corners of all sash and frames shall be welded and ground smooth where necessary.

(6) Muntins shall be mortised and tenoned at sash members and air-hammer riveted.

(7) Ventilators shall have double contact weathering on all four sides.

(8) The outside section of the window shall be a heavy, solid rolled steel channel.

(9) There shall be two heavy supporting arms attached to the sash and frame, designed to be concealed when the ventilator is closed. The rivet holes in supporting arms shall have brass bushings.

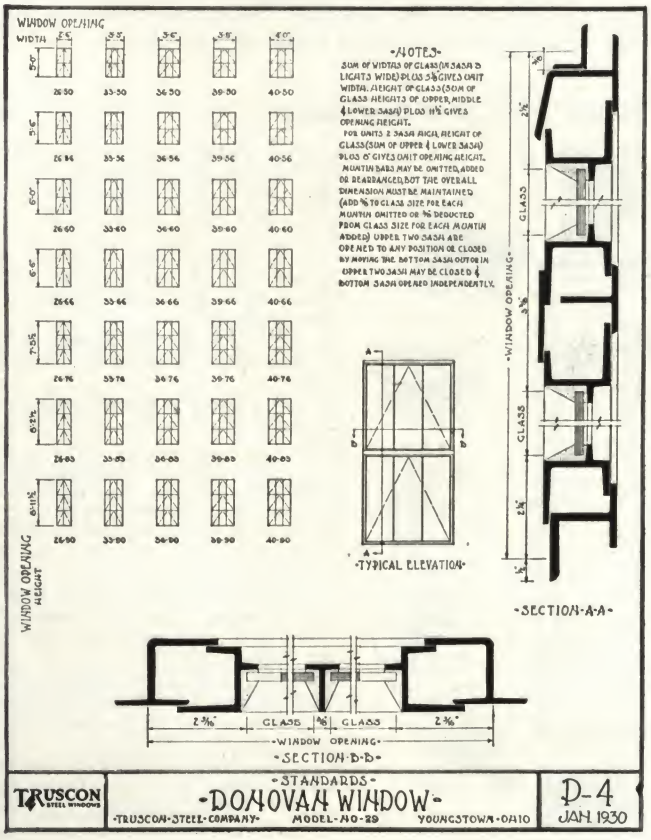
(10) A pressed steel cover plate shall be applied to the upper rail of lower sash to conceal clutch operating mechanism.

(11) **Hardware**—The bottom sash of all windows shall be equipped with water-rolled bronze locking handle fitted to the lower rail and a clutch handle at the center of the upper rail of the lower sash. (Polished bronze or malleable iron can be furnished if required.)

(12) All supporting arms for sash units shall be of flat steel, sherardized with pivot points brass bushed.

(13) The upper sashes shall be equipped with trunnion hinges so placed as to obtain perfect balance and leverage of the sashes with one (1) leaf of the hinge riveted to the sash and the other pivoted to a shoe on the traveling bar. The lower sash shall be equipped with a spring pivot.

(14) Each sash in the window shall be equipped with shade brackets and cord rollers. The shade brackets shall be attached to the lower rail of each sash and the cord rollers at the center of the upper rail of sashes. Shade brackets and cord rollers shall be so placed to allow shades to be drawn up from the bottom to secure the awning effect.



Construction Details of Truscon Donovan Awning Type Steel Window Model No. 29

(1) **The Head Construction**—Utilizes a heavy Tee section as a bearing against which the top ventilator makes a two-point contact that is positive and weathertight. An angle welded to the Tee bar provides an anchorage fin that insures a tight installation in the wall.

(2) **The Meeting Rails**—Are Tee sections which provide a two-point flat contact bearing for the bottom rails of the ventilators to which drip strips are welded for further weatherproofness. Note that the shade bracket is placed close to the ventilator to prevent infiltration of light.

(3) **The Bottom Ventilator Pivots**—Are ruggedly constructed. When the bottom ventilator is released from the others, the pivot pins are pulled and the bottom ventilator guided by shoes, as shown. Spring pressure snaps the pins back into position for regular operation.

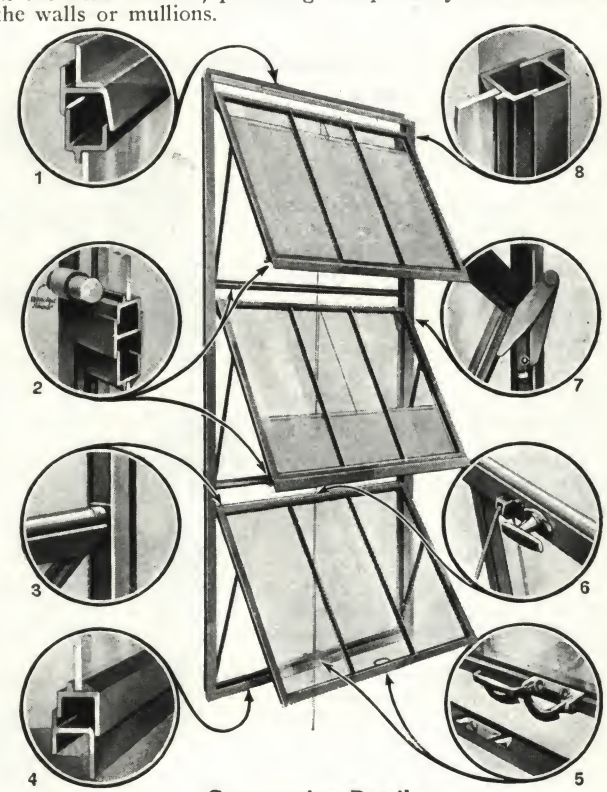
(4) **The Sill**—Also utilizes two-point flat contact construction to assure weathertightness, and in addition, the longest leg of the sill member is placed on the outside to make weathertight contact with the masonry.

(5) **The Locking Handle and Strike**—Permit the window to be locked by a simple down and inward pull, practically automatic. The handle is shaped and placed so that the knuckles of the operator cannot be scraped on the sill. This handle provides complete operation of all superposed sash.

(6) **The Releasing Handle**—Disconnects the bottom ventilator from the others so that each ventilator may be moved separately and left in any desired position without reference to the position of the others.

(7) **The Upper Ventilator Hinges**—Are fastened to the connecting bars by screws and to the ventilators by welds. The tightness of the ventilators can be increased or relieved by moving these hinges up or down on the bars. The adjustment is easily made with a screwdriver.

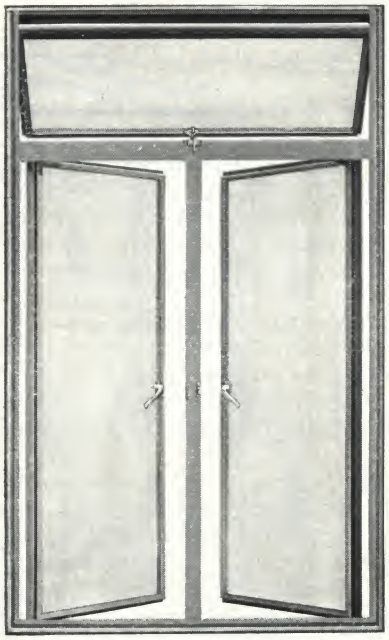
(8) **The Jambs**—Also utilize the two-point flat contact weathering system, the same Tee section being used here as at the head and sill, providing exceptionally fine contact with the walls or mullions.



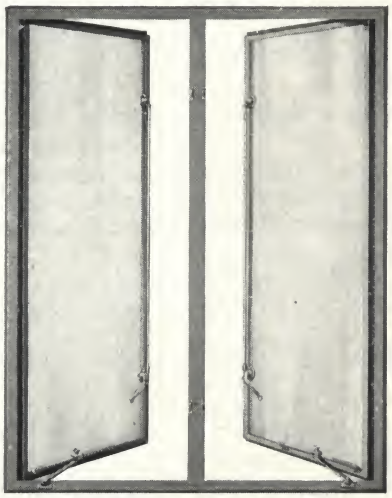
Construction Details

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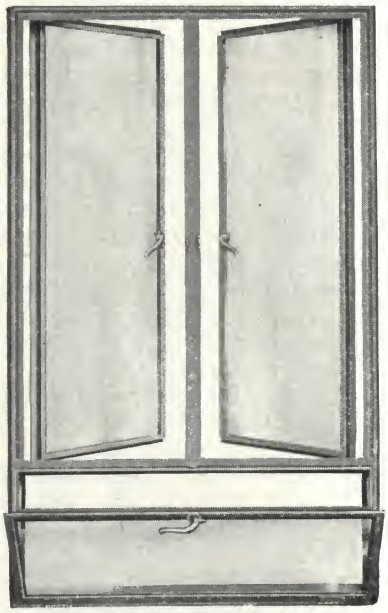
TRUSCON HEAVY TYPE STEEL CASEMENTS



Double Casement with Transom



Double Casement



Double Casement with Hopper Vent

Truscon heavy type steel casements have been designed to fill the need for a heavier type of casement for better class residential and apartment work and for a similar type of casement with pressed steel frames to harmonize with the architectural treatment of monumental and office buildings.

Manufactured in single or double casement units, double casement with transom and double casement with hopper vent, they are adaptable to any building design or room requirement.

Truscon heavy type casements are designed for either outside putty glazing with angle or spring wire clips, or inside glazing with solid section, hot-rolled glazing bead. Swing-out units are furnished with either close offset or close-up type friction hinge—or swing-in units with extruded bronze butt hinges. Swing-out ventilators are recommended.

Handles are furnished either in U. S. Government Standard No. 11, solid cast bronze, antique finish, of latest modernistic design, or in malleable iron, black finish, of same design.

Extension type friction hinges make window washing from the interior possible and preclude the necessity of dangerous cleaning from the outside.

Construction Details for Truscon Heavy Type Steel Casements

(1) Head of Ventilated Transom—Cross section of outside frame, ⅝ in. double contact weathering and top rail of transom vent.

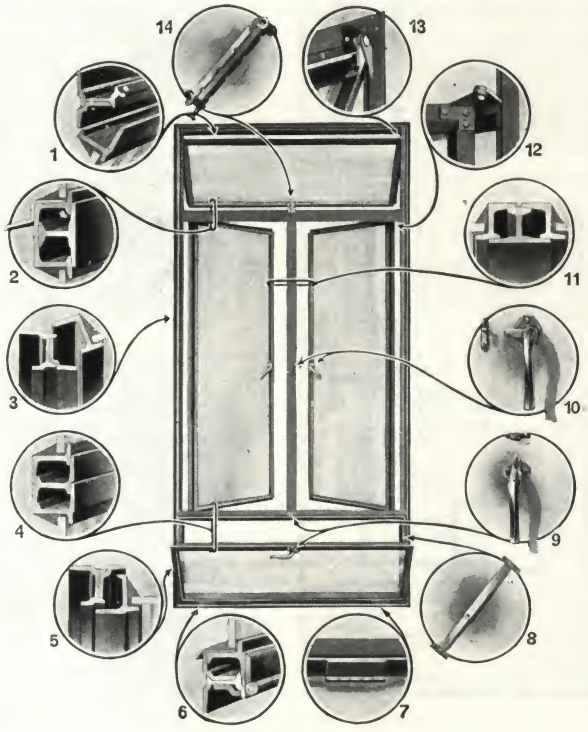
(2) Transom Bar Between Swing Casement and Transom—Note heavy Tee section, compact assembly with ⅝ in. double contact weathering and drip section of rustless KA-2 Enduro steel.

(3) Jamb of Ventilated Casement — Showing outside frame, ⅝ in. double contact weathering and side rail of ventilator.

(4) Meeting Rail Between Hopper Vent and Swing Casement—Illustrating special Zee section, compact assembly and ⅝ in. double contact weathering.

(5) Jamb of Hopper Vent—Section through outside frame ⅝ in. double contact weathering and hopper side rail.

(6) Sill of Hopper Vent—Note position and attachment of hinge, outside frame and bottom rail of hopper vent with drip section of KA-2 Enduro rustless steel and ⅝ in. double contact weathering.



(7) Hinge — Special Five-knuckle, 3½ in. Extruded Bronze Hinge with ⅜ in. cold-rolled steel pin, hinge screwed to frame and ventilator.

(8) Vent Stop—Vent stop of bronze, antique finish, designed to hold hopper vent open in any desired position.

(9) Cam Latch Handle and Strike—For in-swinging hopper vent.

(10) Cam Latch Handle and Strike — For swing-out casement.

(11) Vertical Meeting Rail Between Swing Casements—Note heavy Tee section flush on inside with frame, compact assembly and ⅝ in. double contact weathering.

(12) Extension Type Friction Hinge, Bronze Bushed—Holds the swinging casement in any desired position.

(13) Extension Type Friction Hinge for Transom—Can be adjusted for friction and simplifies cleaning of glass.

(14) Bronze Push Bar with Latch—For use with transom vents. Holds transom open in any desired position and may be operated with window pole.

Continued on next page

Condensed Specifications for Truscon Heavy Type Steel Casements

(1) General—All window openings shown on drawings shall be fitted with heavy type Steel Casements as manufactured by the Truscon Steel Company of Youngstown, Ohio.

(2) Scope of Work—This contractor shall include in his work the furnishing of all Steel Casements complete, in accordance with design and sizes as shown on drawing and covered by these specifications: the erection, the adjusting after erection and before glazing, and the attaching of hardware. This contractor shall also furnish and apply the necessary mastic to insure a weathertight installation.

(3) Work and Material Not Included—Glass, putty, glazing and field painting are not included in this contract.

(4) Material—Truscon specification, new billet, hot-rolled, copper-bearing steel shall be used in the manufacture of all members, with the exception of pressed drip strips which shall be formed from KA-2 Enduro rustless steel, securely welded to sash section.

(5) Construction—(A) All units shall be square and true and constructed of sections not less than $1\frac{7}{8}$ in. deep. The outside framing section shall be a channel leg section, continuous from sill to head, and jamb to jamb, and shaped for perfect double flat contact and not less than $\frac{3}{8}$ in. between frames and sash. Each corner of sash and frames shall be mitered, butt welded joint, ground smooth before assembly. The ventilators and frames shall be made perfectly straight and true to insure perfect weathering and ease of operation.

(B) Muntins, where required, shall be a specially designed Tee Bar Section and shall be continuous between rails and stiles. At intersections there shall be a mechanical joint rigidly interlocking the muntins flush with each other. Joints of muntins and frames, stiles and rails shall be tenoned, mortised and air-hammer riveted.

(C) All stiles, rails, frames and muntins shall be prepared for outside putty glazing with spring clips where muntin bars are used, and angle clips in units without muntin bars. (Inside putty glazing with spring or angle clips will be furnished if required. Solid section, hot-rolled glazing beads, with oval head screws, will be also furnished if specified.)

(D) All swing-out ventilators shall be equipped with Truscon specially constructed, heavy, bronze bushed, extension type friction hinge, designed to hold window open in any desired position, securely riveted to rails of sash and electrically welded or riveted to frame. (Close-up extension type friction hinge will be used on transoms.) (Five-knuckle, $3\frac{1}{2}$ in. extruded bronze hinge with $\frac{3}{16}$ in. cold-rolled steel pin will be furnished if so specified at slight extra cost.)

(E) All swing-in ventilators shall be equipped with five-knuckle, $3\frac{1}{2}$ in. extruded bronze hinge with $\frac{3}{16}$ in. cold-rolled steel pin.

(F) All units with transoms or hopper vents shall be constructed with continuous frame section.

(G) A horizontal or vertical mullion can be used if desired for assemblying combination units and shall be a special shape, two-point contact lug bar, bolted between the outside sash section and buttered at all contact points with mastic cement.

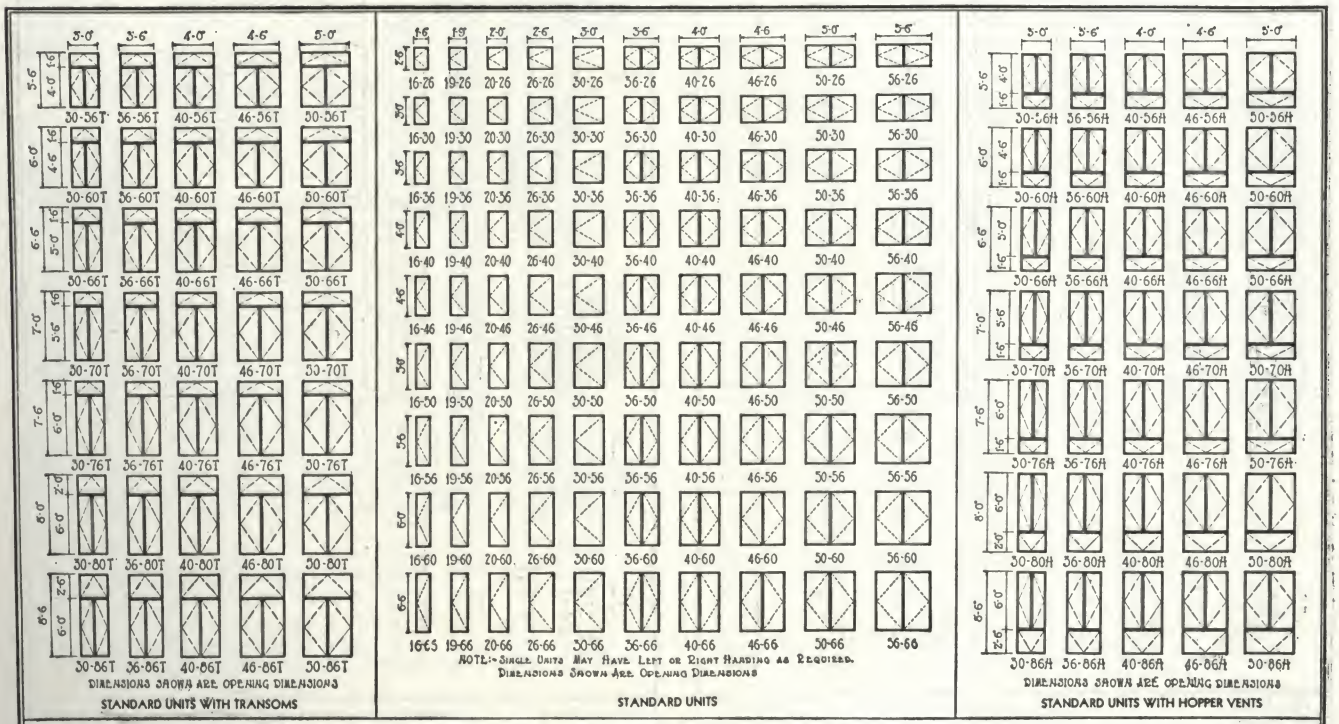
(6) Painting—Casements shall be given one prime coat of Truscon specially prepared gray lacquer mineral paint at factory, capable of being sanded to a hard, smooth surface to which either lacquer or oil paints or enamels can be applied for finish coats. Paint shall be subject to a six-hundred (600) hour test in a weatherometer of cycles composed alternately of thirty (30) minutes of ultra-violet light and thirty (30) minutes of water spray (equivalent to nine months outside exposure).

(7) Glazing—All casements shall be either inside or outside glazed. If inside glazed, glass shall be bed puttied and held in place with special section hot-rolled glazing bead, attached with oval head screws or with glazing angle clips; if outside putty glazed, either spring clips or glazing angle clips shall be used. Putty shall be Truscon special casement window putty.

(8) Erection—(A) Each unit shall be set plumb and true in opening, securely wedged and held in alignment during construction. After windows have been placed in opening and before glazing, the ventilators shall be carefully adjusted so as to provide continuous contact between ventilators and frame and equal clearance shall be maintained around entire perimeter.

(B) Mastic in sufficient quantity shall be used in setting and bedding frames when they come in contact with mullions or wall construction.

Note: Mastic (1 lb. per 6 ft. perimeter dimension of each unit) is furnished and shipped with casements without additional charge.



TRUSCON HEAVY TYPE CASEMENTS

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TRUSCON MONUMENTAL PROJECTED STEEL WINDOWS

Truscon Monumental Projected Steel Windows are especially adapted for use in buildings of a monumental character.

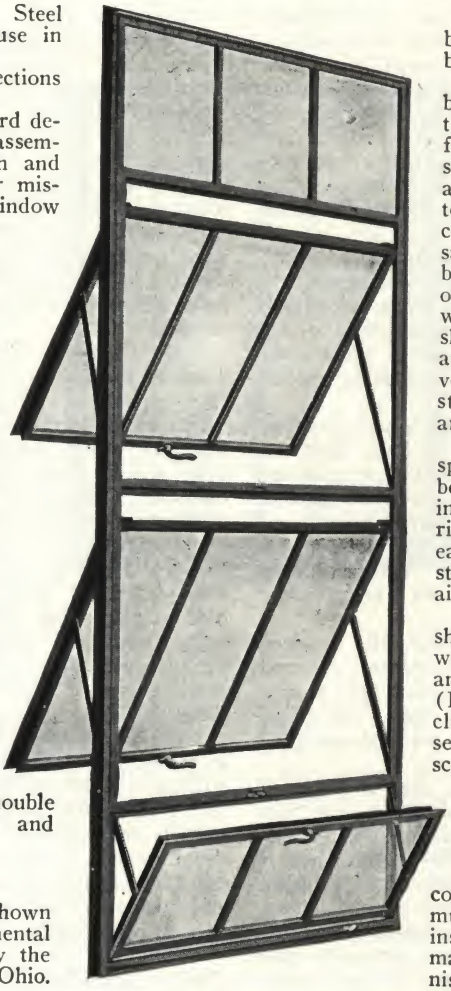
They are built of solid hot-rolled sections made of copper bearing steel.

Continuous frame sections in standard designs exclude the necessity of built-up assembled units, making a rigid installation and preventing the possibility of bowing or misalignment. Hopper vents at bottom of window solve the problem of ventilation and eliminate the need for window guards.

The design of Truscon Monumental Projected Steel Windows permits of easy cleaning of the outside of the window from the interior of the building, eliminating the danger and providing the economy that cleaning from the inside allows. These windows give complete control of ventilation, as the ventilators may be set at any angle. The narrow steel members give the maximum amount of daylight that is possible for any masonry opening. The friction device that holds the ventilators open is of bronze, insuring against corrosion. Being adjustable, they make for permanently smooth, easy operation.

Handles are furnished in either U. S. Government Specification No. 11 solid cast bronze, antique finish, of latest modernistic design, or in malleable iron, black finish, of same design.

Maintenance costs are reduced with Truscon Monumental Projected Windows. They do not warp, shrink or swell, and are rugged and permanent. All units are square and true. Perfect ⅝-in. double flat contact weathering between sash and frame is maintained throughout.



Condensed Specifications

(1) General—All window openings shown on drawings shall be fitted with Monumental Projected Windows as manufactured by the Truscon Steel Company of Youngstown, Ohio.

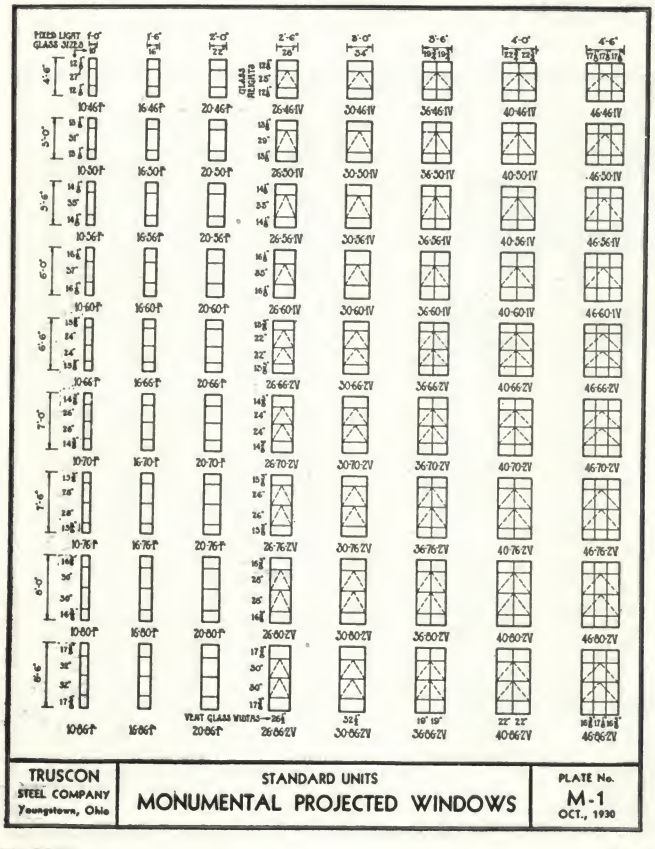
(2) Material—Truscon specification, new billet, hot-rolled, copper bearing steel shall be used in the manufacture of all members.

(3) Construction—(A) All units shall be square and true and constructed of sections not less than $1\frac{7}{16}$ in. deep. The outside frame shall be an unequal leg section, designed for ⅝-in. anchorage on outside leg and continuous from head to sill and jamb to jamb, and shaped for perfect double flat contact weathering not less than ⅝ in. between sash and frame weathering. Intermediate bars between ventilators shall be a Zee section with offset baffles allowing ⅝-in. double contact weathering. Each corner of sash and frame shall be electrically welded, rigid and tight and ground smooth before assembly. The ventilators and frame shall be made perfectly straight and true to insure perfect weathering and ease of operation.

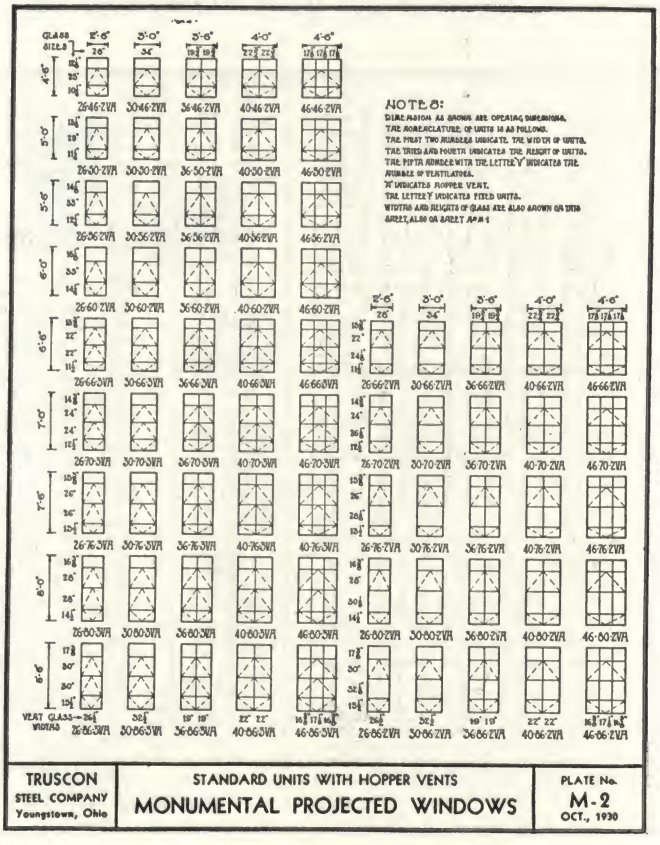
(B) Muntins where required shall be a specially designed Tee bar section and shall be continuous between rails and stiles. At intersections there shall be a mechanical joint rigidly interlocking the muntins flush with each other. Joints of muntins and frames, stiles and rails shall be tenoned, mortised and air-hammered riveted.

(C) All stiles, rails, frames and muntins shall be prepared for outside putty glazing with spring clips where muntin bars are used, and angle clips in units without muntin bars. (Inside putty glazing with spring or angle clips will be furnished if required. Solid section, hot-rolled glazing bead, with oval head screws, will also be furnished if specified.)

(D) Horizontal or vertical mullions can be used if desired for assembling combination units and shall be a special two-point contact lug bar, bolted between the outside frame section and buttered at all contact points with mastic cement. Plate type mullion with ⅜-in. steel plate on outside and inside face of frame with 20-18 round head machine bolt and acorn nut will also be furnished if desired.



TRUSCON STEEL COMPANY Youngstown, Ohio — STANDARD UNITS MONUMENTAL PROJECTED WINDOWS — PLATE No. M-1 OCT., 1930



TRUSCON STEEL COMPANY Youngstown, Ohio — STANDARD UNITS WITH HOPPER VENTS MONUMENTAL PROJECTED WINDOWS — PLATE No. M-2 OCT., 1930

Continued on next page

TRUSCON STANDARD STEEL CASEMENTS

Model No. 5



Truscon Standard Steel Casements, Model No. 5, are the ideal casements for homes. They admit plenty of sunlight and fresh air into the rooms and are handsome in appearance and modern in character. They are substantial in construction, economical in application, rigid and fireproof. They do not shrink, warp, swell or decay, and protect draperies and decorations against dust and the elements.

Ventilation is well controlled with Truscon Standard Steel Casements, Model No. 5, and draughts and glare are eliminated.

Due to quantity production, they are economical in cost. Assembled in single units or combinations in the factory, they require no building up or assembling in the field.

The inside screens, of either the Rol-up or Side Hinged type, that can be used with these steel casements, are designed by Truscon to fit exactly the openings and harmonize with the handsome appearance of the casements.

Truscon Steel Casement Doors

Truscon Steel Casement Doors make a practical door installation for porches, terraces, etc. Handsome in appearance, mechanically perfect and correct in architectural design, they are adaptable to many styles of buildings, including homes, city and country clubs, apartments with private porches and penthouses. Their large glass area allows maximum daylighting and insures the brightness of the rooms from which they open.

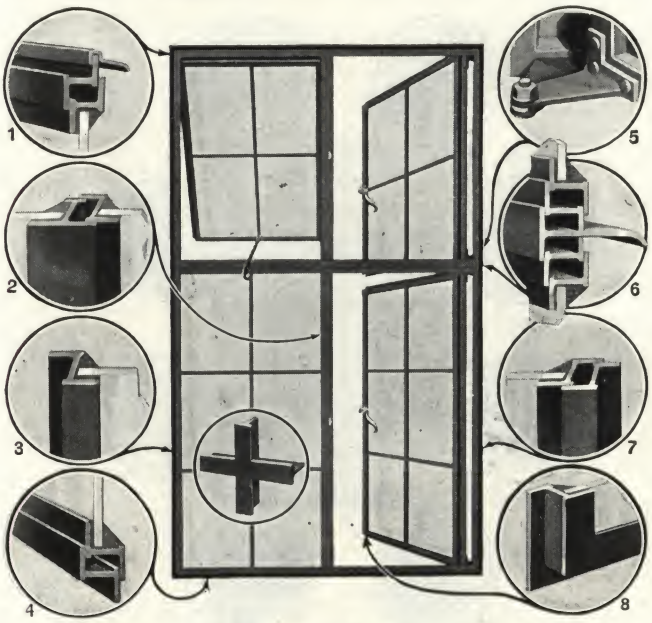
Construction Details of Truscon Standard Casements

(1) Continuous Head Drip—Showing the shape and proper position when attached.

(2) Vertical Meeting Rail—Of heavy hot-rolled section, smoothly finished on inside. Used in all combination units having both fixed and swing portions.

(3) Zee-Bar Sections—Used on outside frame members of all combinations and around swing portion of casement.

(4) Sill Sections of Zee Bars—Showing the wide lap double contact for positive weathering.



(5) Friction Type Extension Hinge—Allows for easy cleaning of windows on the outside and holding the ventilator open without the use of an adjuster.

(6) Transom Bar Tee—Section used between upper and lower units in transom combinations.

(7) Stiles of Sash and Frame—Showing the wide lap double contact and insulating air space and baffle.

(8) Corners of Sash and Frame—Mitered, electrically butt welded and ground smooth making the frame members one continuous piece.

(9) Muntin Intersections—Made with a mitered and mechanically interlocked joint obtaining the maximum strength of muntin bars and securing a neat, flush surface on the inside.

Condensed Specifications for Truscon Standard Steel Casements—Model No. 5

(1) General—All window openings shown on drawings unless otherwise specified shall be fitted with a standard type of casement as manufactured by the Truscon Steel Company of Youngstown, Ohio.

(2) Construction—(A) All casements and standard combinations shall be manufactured in complete units at factory. The nominal glass size shall be 8x12 in.

(B) All frames, and stiles and rail members of swing leaves, shall be Zee bars. All corners to be mitered and electrically butt welded. Exposed faces at welds to be ground smooth.

(C) All muntins shall be Tee bars with a ⅝ in. face and a depth of ⅞ in. and shall be continuous between rails and stiles. At intersections there shall be a mechanical joint rigidly interlocking the muntins flush with face on the inside. Joints of muntins with frames, stiles and rails shall be tenoned, mortised, and air-hammer riveted. Horizontal muntins shall be punched for glazing clips.

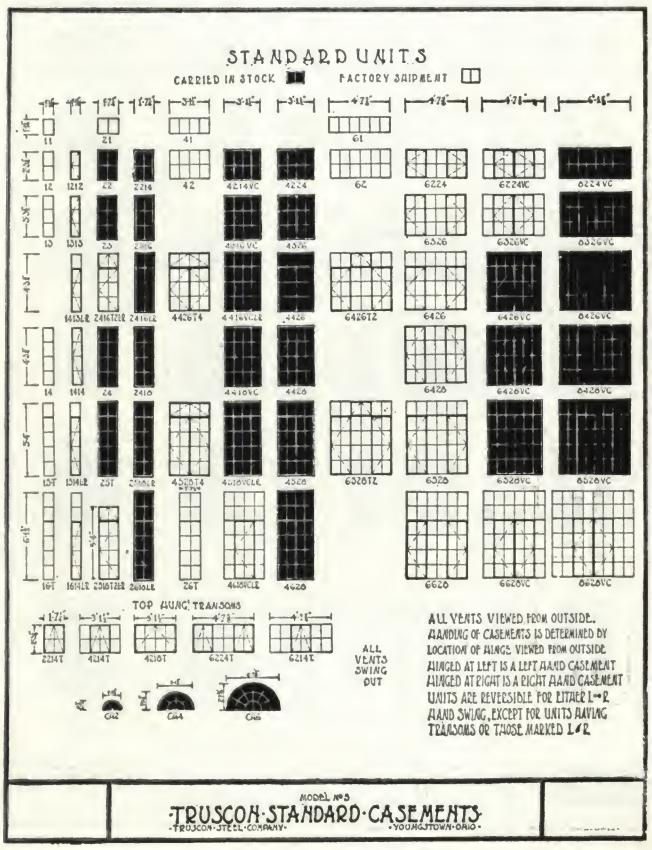
(D) All side hung swing leaves shall open outwardly and be equipped with heavy extension (cleaning) hinges that are securely riveted to rails of sash and electrically welded or riveted to frames.

(E) Hinges shall be of the special Truscon friction type, designed to hold window open in any desired position.

(F) Windows shall be hinged to swing right or left as indicated. Continuous double contact weathering between swing leaves and frame shall be provided.

(G) Where combinations of standard units are required for any single opening, vertical and horizontal mullions shall be used to join them.

(H) A continuous drip strip (flashing) shall be provided on transom bars of all standard swing leaf combinations.

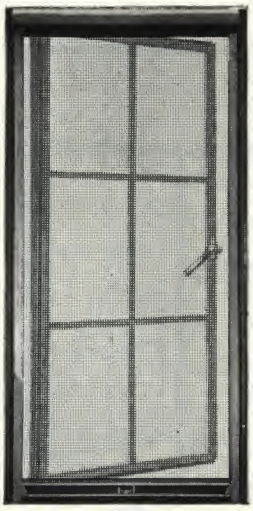


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Truscon Standard Steel Casements with Screens

Standard Casement Rol-up Screens

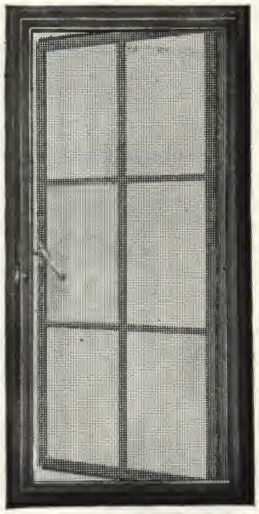
The Truscon Casement Rol-up Screen is a handsome, efficiently operating, durable accessory that rolls up out of sight when not in use, thus protecting the screen against wear, the elements and possible damage, while allowing additional light when required. It is economical in cost, and with proper care will give a lifetime of efficient use. As the installation requires only the setting of six screws, a Truscon Casement Rol-up Screen can be set up in two minutes, materially reducing labor cost.



Truscon Casement with Rol-up Screen

Standard Casement Side Hinged Screens

Hospitals, offices, apartment hallways and general screening purposes, where low cost, permanence and simplicity of operation are all required, will find Truscon Casement Side Hinged Screens meet their need. The screen frame is designed to fit Truscon Standard Steel Casements exactly, and to harmonize with the design of the casement. No special fitting or mouldings are necessary.



Truscon Casement with Side Hinged Screen

Condensed Specifications for Truscon Rol-up Screens

(1) General—All Truscon Steel Casement Windows, unless otherwise specified, shall be equipped with "Casement Rol-up Screens," as furnished by Truscon Steel Company of Youngstown, Ohio.

(2) Material—All exposed and working parts shall be of rust-resisting alloy steel. Wire screen cloth shall be especially woven 16-mesh Silver Finish, so manufactured as to have stiff horizontal strands to provide rigidity and soft vertical strands to withstand constant rolling action. All selvage edges shall be reinforced with additional vertical strands.

(3) Construction—(A) Housing shall be of hexagonal shape 1¾ x 1½ in. with end caps provided with a 4½ in. telescoping projection.

(B) Guides shall be ⅝ in. wide and 1⅛ in. deep and so designed as to constantly interlock the bottom rail.

(C) The bottom rail shall be of reinforced double-ribbed construction with right angle end projection interlocking with guides. A double ply Flexo Rubber Cushion shall be installed in all bottom rails to assure perfect stool contact. The bottom rail shall be equipped with a positive locking device.

(D) Roller mechanism shall be of all-metal construction with a ¼-in. solid steel mandrel running the entire length of roller and provided with special alloy steel bearing and high tension spring capable of maintaining a sufficient and constant pull.

(4) Finish—All "Casement Rol-up Screens" shall receive an electroplated antique bronze finish.

Condensed Specifications for Truscon Side Hinged Screens

(1) General—All Truscon Standard Casements Model No. 5, unless otherwise specified, shall be equipped with "Casement Side Hinged Screens" as furnished by the Truscon Steel Company of Youngstown, Ohio.

(2) Materials—(A) Frame shall be of cold-rolled galvanized steel, 20-gauge.

(B) Wire cloth shall be of 16-gauge mesh, antique finish solid bronze.

(3) Construction—Frames shall be ⅜ in. in depth and 1 in. in width, of tubular construction, and all corners shall be reinforced. Frames shall be provided with a removable spleen so as to make it easily re-screenable. Pivot rods shall be provided on each end. The lower pivot rod shall be adjustable so that the screen can be easily removed. Hardware for installing and positive locking catch shall be provided.

(4) Finish—All "Casement Side Hinged Screens" shall receive one standard shop protective coat at factory.

(Where so desired, the Erection Division of the Truscon Steel Company will contract for the installation of all "Casement Side Hinged Screens.")

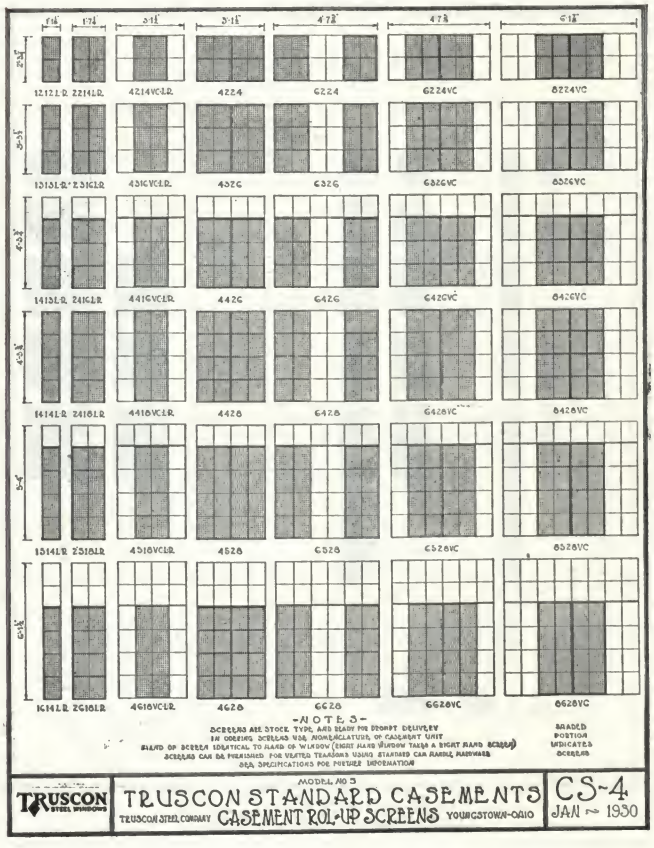
Construction Details Standard Steel Casements with Casement Rol-up Screens

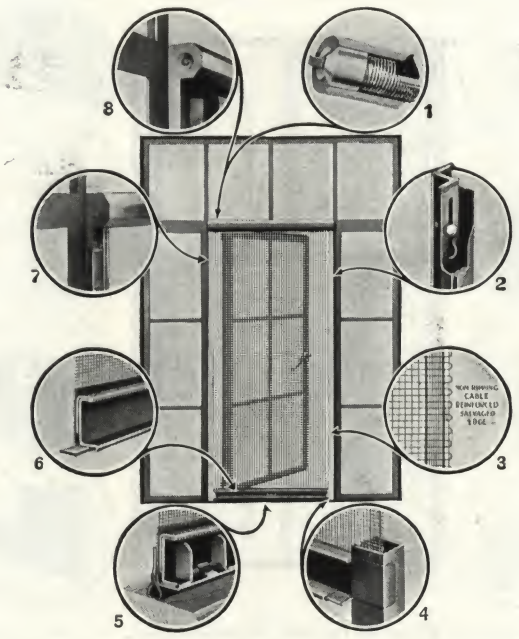
(1) Operating Mechanism—Special oversize tempered coil spring, properly lubricated.

(2) Screw Slot—Six screws project slightly from the casement frame and engage in slots in the screen guides. When the screws are tightened, the entire screen is firmly held in place.

(3) Wire Cloth—16 mesh "Silver Finish" wire cloth. Rigid horizontal strands prevent bulging, soft vertical strands provide flexibility, and reinforced selvage edge insures added strength.

(4) Interlocking Bottom Rail—Keeps the rail always in a correct operating position, and assures an even pull on the screen.





(5) Flexo Rubber Cushion—Protects finish and keeps out insects.

(6) Section of Bottom Rail—Insures sufficient strength and rigidity for all widths of screens.

(7) End Cap Projection—Allows the necessary vertical adjustments to take care of all installation conditions. Fits neatly into the guides, permitting the use of the same standard screen whether housing is attached to transom bar or below head jamb.

(8) Hexagon Housing—Only 1½ in. high and so inconspicuous that it appears an integral part of the frame.

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TRUSCON PROJECTED STEEL WINDOWS—ARCHITECTURAL TYPE

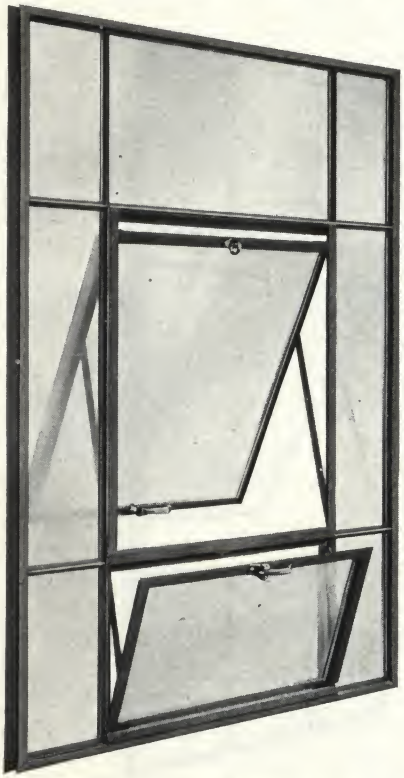
Truscon Projected Steel Windows—Architectural Type, are designed for appearance as well as practicability. They are furnished in a wide variety of types and sizes, combined as desired, enabling the architect to choose the exact window that will best harmonize with his building design.

By means of an outside frame that is formed of a heavy channel, these windows emphasize the massiveness that is basic in the design of so many modern buildings. Their slender steel muntin bars impart to projected windows a delicate beauty without sacrificing strength or daylighting.

Glazing angles, which are standard with Truscon Projected Windows—Architectural Type, also enhance the appearance of the window, as does the practice of using large glass sizes. Heavy bronze hardware completes the window's luxuriousness.

Ventilation is entirely controllable, as the ventilators may be opened to any desired degree. These windows, obtainable with either in-swinging or out-swinging ventilators, admit plenty of air and deflect it so as to protect the occupants of the room from draughts.

Weathertightness is assured by the rigid construction of the window and the Truscon double contact weathering.



Condensed Specifications for Projected Steel Windows—Architectural Type

(1) General—All windows so indicated on the plans and elevations and called for in these specifications shall be the Architectural Projected Type as manufactured by the Truscon Steel Company of Youngstown, Ohio.

(2) Construction—All joints shall be mortise and tenon, and air-hammer riveted.

(3) The four corners of all ventilators and sash shall be welded and ground smooth.

(4) The intersection of horizontal and vertical muntins shall have a dovetail miter, rigidly interlocking the bars.

(5) No excess metal or projecting surfaces shall be permitted where muntin bars intersect.

(6) Muntin bars except where ventilators occur shall be continuous from head to sill and from jamb to jamb.

(7) Ventilators shall have double contact weathering on all four sides.

(8) The sliding pivots shall be constructed of screw stock brass.

(9) The outside section of the window shall be a heavy, solid rolled copper bearing steel channel (210-A or 210-B section).

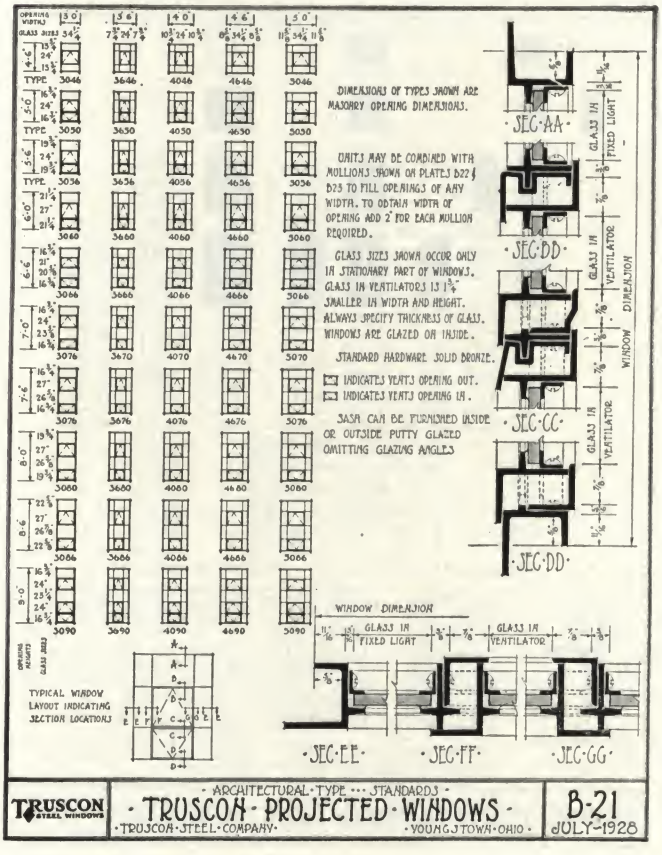
(10) The side of the window or ventilator frame shall act as a guide for the sliding pivot, and shall be constructed without recess or slot.

(11) Uniform tension to hold ventilators in any desired position shall be gained by the use of a spring applied between sliding pivot and ventilator.

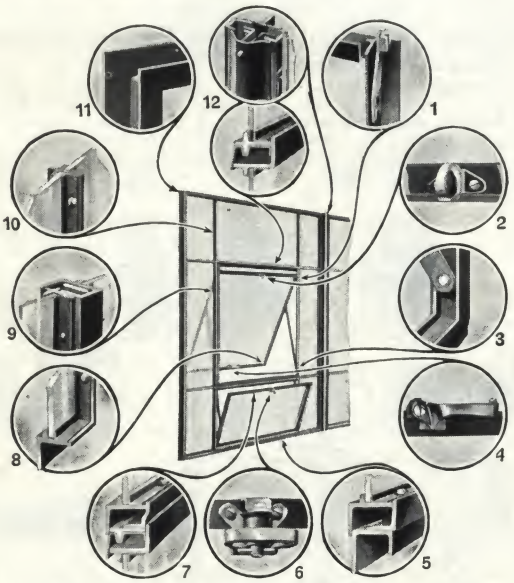
(12) There shall be two heavy supporting arms attached to the ventilator and frame, designed to be concealed when ventilator is closed. The rivet holes in supporting arms shall have brass bushing.

(13) Ventilators Projected Out when opened shall have no part of the ventilator projecting inside the normal plane of the windows.

(14) Ventilators Projected In shall not project outside the normal plane of the windows.



Construction Details of Truscon Projected Steel Windows—Architectural Type



(1) Solid Brass Sliding Pivot—Glazing bead of sash section acts as guide, eliminating recess for collection of dirt and ice. Coil spring provides tension.

(2) Bronze Pole Hook Ring—Allowing operation of outswing ventilators, out of reach from floor, with window pole.

(3) Heavy Brass Bushed Pivot—⅜ x 1-in. supporting arms concealed when ventilator is closed.

(4) Locking Handle—Designed with strike plate of solid bronze.

(5) Double Contact Weathering—Through ventilator at sill.

(6) Automatic Spring Latch—Of solid bronze for ventilators opening in for hand or pole operation.

(7) Double Contact Weathering—Through sill of out-swinging and head of in-swinging ventilators.

(8) Ventilator Frame—Rigid angle section, mortised and tenoned, electrically welded and ground smooth.

(9) Double Contact Weathering at the Jambs.

(10) Continuous Metal Glazing Angles—Glass is bedded in Truscon Steel Window putty and held in place with glazing angles attached to sash with brass bolts.

(11) Corners—Heavy frame members of unequal leg channels are mortised and tenoned, electrically welded and ground smooth.

(12) Vertical Mullions—Exterior Tee-bar with pressed metal interior cover to give rigidity and pleasing appearance.

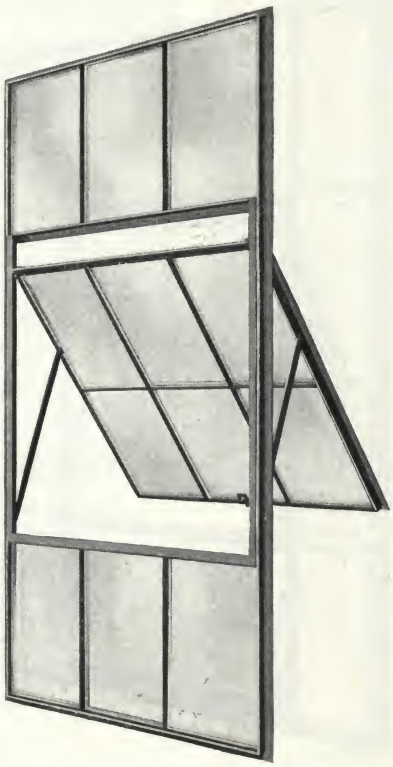
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TRUSCON PROJECTED STEEL WINDOWS—COMMERCIAL TYPE

Truscon Projected Windows — Commercial Type, are well adapted for garages, filling stations, printing plants, warehouses, and other buildings. The ability of these windows to protect the interior from driving rain and snow when opened allows the circulation of fresh air and the elimination of impure air to take place at all times. Projecting entirely outside, they do not interfere on the interior with passageways, machinery or equipment.

Daylight is also obtained in a maximum amount by the use of Truscon Projected Windows—Commercial Type. Their rigid construction and narrow muntin bars allow great areas to be daylighted with these windows with a minimum of obstruction.

Being manufactured in standard types and sizes, in large volume, decided economies in production costs are passed on to the consumer in the form of economical prices for these windows.



Truscon Utility Steel Windows

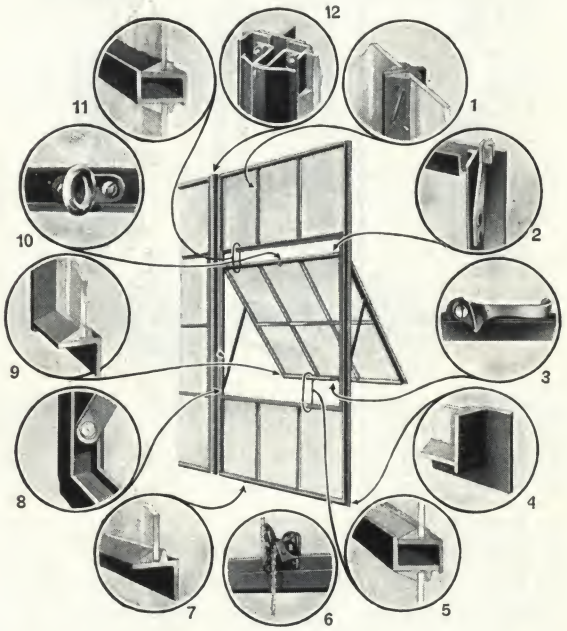
An economical type of Projected Window made in one standard size, 3 ft. 3¾ in. wide by 3 ft. 7⅜ in. high. They are especially suitable for lighting and ventilating garages, filling stations, stores, shops, basements, area-ways, etc. Truscon Utility Steel Windows are well designed, being made of hot-rolled billet steel, and having the strength to withstand hard usage. Double contact weathering on all sides insures the windows being weathertight, and standardized production makes them economical to purchase.

Construction Details of Truscon Projected Steel Windows—Commercial Type

(1) Glazing—Glass is bed and face puttied and held in place with clips; staggered holes and flexible clips allow various thicknesses of glass.

(2) Forged Brass Sliding Pivot—Glazing head of sash section acts as guide, eliminating recess for collection of dirt and ice.

(3) Locking Handle—Of malleable iron sherardized.



(4) Corner Construction—Heavy frame members of unequal leg channels are mortised, tenoned, and air hammered.

(5) Weathering at Sill—Double contact weathering makes tight fit and assures weathertightness.

(6) Automatic Chain Latch—Automatic kick-out allows operation by chain when ventilator is out of reach from floor.

(7) Frame—Heavy angle section at head, sill and jambs, mortised and tenoned, electrically welded and ground smooth.

(8) Supporting Arms—Heavy pivots are brass bushed. The $\frac{3}{16}$x1-in. supporting arms for ventilator are concealed when ventilator is closed.

(9) Ventilator Frame Corner—Heavy, rigid angle section, mortised and tenoned, air hammer riveted and ground smooth.

(10) Pole Hook Ring—To be used with window pole.

(11) Weathering at Head—Provides double contact at two points.

(12) Vertical Mullion—Exterior Tee-bar to give necessary rigidity, with pressed metal cover on the inside to give pleasing appearance.

Condensed Specifications for Truscon Projected Steel Windows—Commercial Type

(1) General—All windows so indicated on the plans and elevations and called for in these specifications shall be the Commercial Projected type as manufactured by the Truscon Steel Company, Youngstown, Ohio.

(2) Construction—All joints shall be mortise and tenon, and air-hammer riveted.

(3) The corners of all ventilators to which pivots are attached shall be welded.

(4) The intersection of horizontal and vertical muntins shall have a dovetail mitre, rigidly interlocking the bars.

(5) No excess metal or projecting surfaces shall be permitted where muntin bars intersect.

(6) Muntin bars except where ventilators occur shall be continuous from head to sill and from jamb to jamb.

(7) The members of the windows shall not be bent or deformed during process of manufacture.

(8) Ventilators shall have double contact weathering on all four sides.

(9) The sliding pivot shall be constructed of screw stock brass.

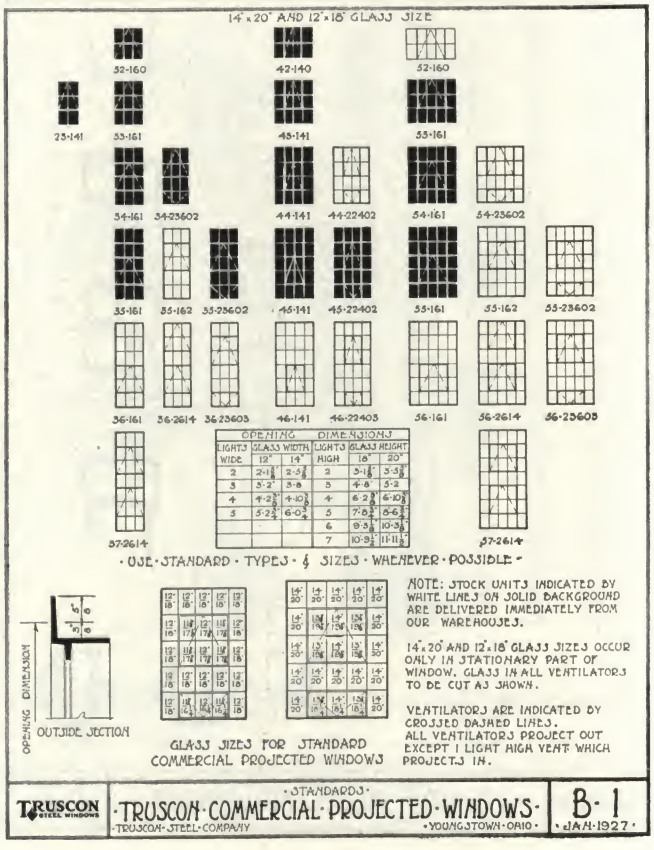
(10) The side of the window or ventilator frame shall act as a guide for the sliding pivot, and shall be constructed without recess or slot in which dirt or ice may collect, to interfere with the free movement of the ventilator.

(11) Uniform tension to hold ventilator in any desired position shall be gained by the use of a spring applied between sliding pivot and ventilator.

(12) There shall be two heavy supporting arms attached to the ventilator and frame, designed to be concealed when ventilator is closed. The rivet holes in supporting arms shall have brass bushings.

(13) Ventilators Projected Out when open shall have no part of the ventilator projecting inside the normal plane of the window.

(14) Ventilators Projected In shall not project outside the normal plane of the window.

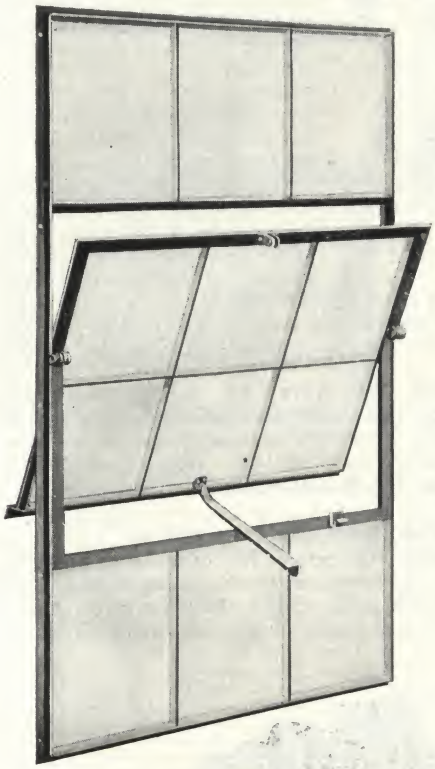


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TRUSCON PIVOTED STEEL WINDOWS

Proper light and flexible control of ventilation are obtained by use of Truscon Pivoted Steel Windows, adaptable to every type of industrial building. They are constructed of heavy, hot-rolled, rust-resisting steel sections, are permanent and fireproof, and will never stick, shrink or warp in any kind of weather. Slender muntin bars admit maximum daylight.

Ventilator operates so as to swing easily at the touch on a cam acting push bar if accessible from the floor and otherwise by means of a spring latch and chain.



Truscon Pivoted Steel Windows are glazed from the inside and glazing clips are supplied with them. Double contact weathering is provided on all four sides of the ventilator.

These windows can be supplied in a wide range of standard sizes and can be combined with standard mullions to fit almost any size window opening. Twenty types of sash illustrated in diagram are available for quick delivery from Truscon warehouse stocks.

All windows are given one dip coat of protective paint before leaving the factory.

Condensed Specifications for Truscon Pivoted Steel Windows

(1) General—All windows so indicated on the plans and elevations and called for in these specifications shall be the Horizontally Pivoted type as manufactured by the Truscon Steel Company of Youngstown, Ohio.

(2) Construction—All joints shall be mortise and tenon, and air-hammer riveted.

(3) The intersection of horizontal and vertical muntins shall have a dovetail mitre rigidly interlocking the bars.

(4) No excess metal or projecting surfaces shall be permitted where muntin bars intersect.

(5) Muntin bars except where ventilators occur shall be continuous from head to sill and from jamb to jamb.

(6) The members of the windows shall not be bent or deformed during process of manufacture.

(7) Double contact weathering shall be provided on all four sides of the ventilator.

(8) Unless otherwise specified, the ventilators shall be Horizontally Pivoted 2 in. above the center line.

(9) The pivots shall be solid steel securely riveted to the ventilator and side bar of window, and equipped with ⅜ in. steel removable pins held in place with washers and cotter pins.

(10) Top and bottom rails of ventilators shall be cambered in shop before being fitted to windows, so, when closed, the corners shall engage first, allowing the ventilator to be evenly drawn up to the weathertight bearing by means of standard locking device.

(11) Mullions—Where two or more window units, less than 6 ft. 3 in. in height, are used in the same opening, they shall be connected with Truscon Standard Plate Mullions (Type T-1).

(12) For window units over 6 ft. 3 in. high, and up to and including 10 ft. 9½ in. high, Truscon Standard T-Bar Mullions (Type T-2) shall be used.

(13) For all window openings over 10 ft. 9½ in. Truscon Standard double T-Bar Mullions (Type T-3) shall be used.

(14) All mullions shall be 2½ in. wide (2 in. mullion distance) with slotted holes to allow for adjustment.

(15) Mullions shall extend 1⅜ in. below the leg of window at sill to provide a firm anchorage in sill construction.

Construction Details of Truscon Pivoted Windows

(1) Double Contact Weathering at Head—Assures protection from rain and wind.

(2) Double Contact Weathering at Jamb—Provides proper weathering same as on head.

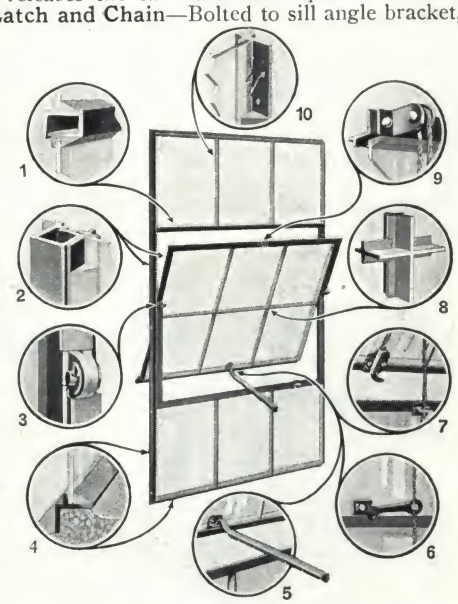
(3) Solid Steel Pivot with Removable Pin—Assures easy operation and indefinite service.

(4) Heavy Angle Section at Sill and Jamb—Provides positive anchorage in masonry or mullion connections.

(5) Cam Acting Push Bar—The lower edge of bar is notched to engage edge of weathering member at bottom of ventilator and hold it open at any desired angle. The ventilator is securely locked by folding push bar back against sash and engaging in the cleat.

(6) Gravity Cam Latch and Chain—Tapped to bracket at sill of ventilator and securely held with a locking nut. A pull of the chain releases the cam latch and opens ventilator.

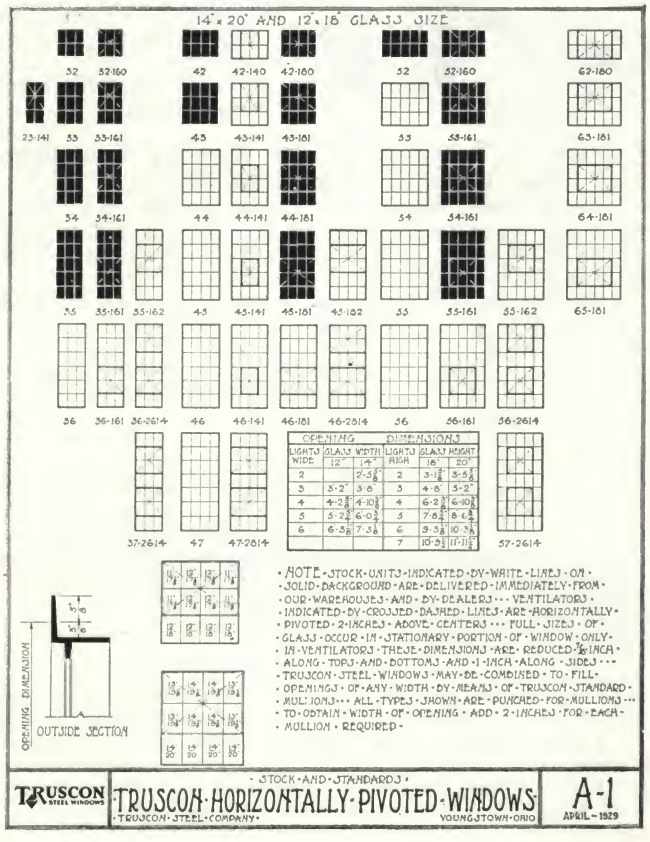
(7) Spring Latch and Chain—Bolted to sill angle bracket, which is securely riveted to sill of ventilator. The chain passes through the roller bracket at head of ventilator.



(8) Dovetail Mitre Joints at Muntin Intersections—Joints are skillfully fitted together and assure great strength and rigidity.

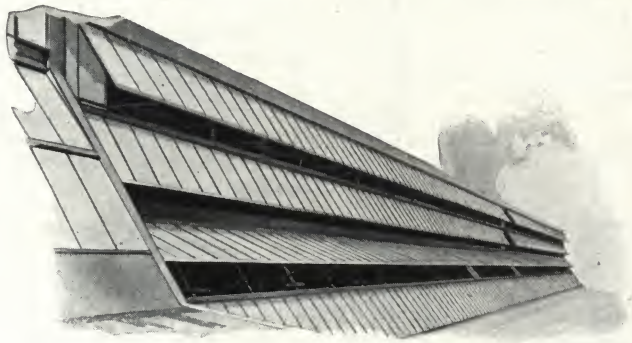
(9) Roller Bracket at Head of Ventilator—Permits the use of chain operators on windows when out of reach from floor.

(10) Spring Steel Wire Glazing Clips.



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TRUSCON CONTINUOUS STEEL WINDOWS

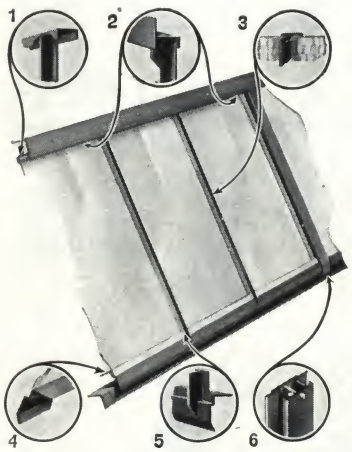


Truscon Continuous Steel Windows are ideally suited for industrial plants where the nature of the factory work requires frequent complete and instant ventilation of the building.

Besides providing for the entrance of a great volume of air in minimum time, and consequent perfect regulation of temperatures for working conditions, Truscon Continuous Steel Windows admit a maximum amount of daylight into the plant.

Combinations of Top and Bottom Hung Continuous Steel Windows have been devised by Truscon for use in glass factories, foundries and similar industries. By this means, air currents, excessive heat and smoke are released without change in direction.

Truscon Continuous Steel Windows are made entirely of rust-resisting steel, important in resisitng corrosion and injurious gases which would escape through roof openings.



Construction Details of Truscon Continuous Steel Windows

(1) **Welded mortise and tenon joint** prevents twisting.

(2) **Hinge member** forms continuous bearing giving perfect weathering.

(3) **Glazing clips** of heavy brass on vertical muntin bars.

(4) **Wide flange** for the attachment of mechanical operator.

(5) **Mortise and tenon joint** showing welding.

(6) **Vertical expansion mullion.**

Condensed Specifications for Truscon Continuous Steel Windows (Top Hung Type)

(1) General—All windows so indicated on the drawings and elevations and called for in the specifications shall be Continuous Windows as manufactured by the TRUSCON STEEL COMPANY of Youngstown, Ohio.

(2) Construction—All sash members shall be of solid rolled sections designed to secure maximum strength without excessive weight.

(3) Joints shall be mortise and tenon and air-hammer riveted. In addition, vertical muntin bars shall be arc welded to top and bottom rails.

(4) Sash shall be so constructed that the glass will be set in a putty bed of even thickness on all four sides.

(5) The hinge shall be formed by bolting a continuous formed member to the structural steel. The member shall interlock with the channel head section of the sash unit, resulting in continuous bearing and positive weathering without the addition of built-up members or flashing. The hinge construction shall provide for expansion or contraction of the sash units. Stay clips attached at intervals to the muntins shall lock the hinge and sash members together.

(6) Provisions shall be made for punching hinge members in the field to insure correct alignment of continuous windows, irrespective of irregularities in the structural steel construction.

(7) The design of sill members shall be such as to provide a flange on the inside for attachment of operators, a glazing ledge and a long overlapping weathering leg. This member shall have a depth of not less than 2½ in. and a height of 3½ in.

(8) Muntin bars shall be constructed of not less than 1¼x1¼-in. T-Bar.

(9) There shall be a fixed panel at the ends of sash runs to afford the means of attaching the sash to the building construction in a weather-tight manner. The flashing between the building and the sash shall be furnished and installed by another contractor.

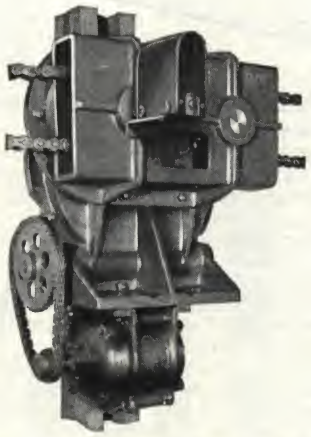
(10) Attached to the fixed end panel and recessed from same shall be a storm panel over which the swing sash shall lap at least 24 in. This panel shall be arranged to drain to the outside.

(11) When continuous windows are used in side wall construction, storm panels shall be omitted and a special channel weathering used.

(12) Mechanical Operators—All runs of continuous windows, except those marked "fixed," shall be equipped with a mechanical operating device of the toggle type as manufactured by the TRUSCON STEEL COMPANY. Fixed runs shall be equipped with hinges for possible future operation.

Truscon Mechanical Operators

Truscon Mechanical Operators for opening and closing Truscon Continuous Steel Windows are furnished in either hand operated or power driven units. With the latter, a mere push of a button will instantly open or close a whole series of long run windows.



Type "D" Duplex (two-way) Operator

Type "G" Power Operator—Most frequently used for the control of long runs of Truscon Continuous Steel Windows. It is also used, however, with top and bottom hung continuous windows as well as with a sidewall tension operator, for the control of Center Pivoted Windows.

Type "GM"—The motorized form of Type "G" and has the advantage over the hand operated power of being more even and steady in operation, assuring preservation of all parts as well as adding to the life of the equipment and the sash itself.

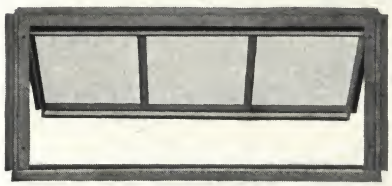
Type "EM"—A heavy duty tension operator capable of handling continuous windows in runs up to 300 feet. Because of the additional load of long window runs, this model is designed for motor drive only.

Type "D"—Designed for the operation of especially long runs of continuous windows. It is mounted in the center of a run instead of at the ends, and controls the sash in both directions.

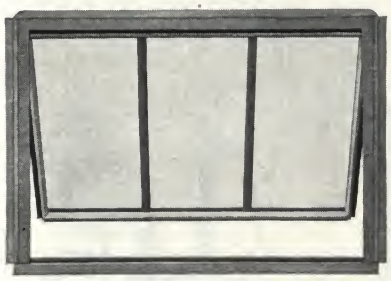
Master Control—Master control of groups of smaller stations is obtained by a switchboard which maintains temperature and ventilation under constant electric control.

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TRUSCON BASEMENT WINDOWS, LINTELS AND COAL CHUTES



2 ft. 9⅝ in. wide, 1 ft. 3⅛ in. high



2 ft. 9⅝ in. wide, 1 ft. 11⅛ in. high

Truscon Basement Steel Windows

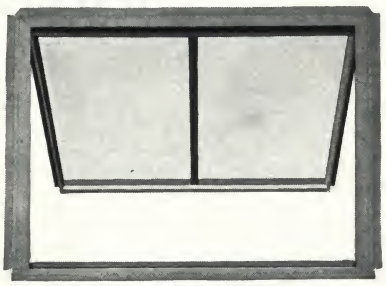
Four Standard Sizes

Truscon Basement Steel Windows satisfy the demands for performance, permanence and economy. They are furnished completely assembled and painted with removable pin hinge and cam acting latch. Head and jambs are formed as a unit, giving added strength and preventing distortion.

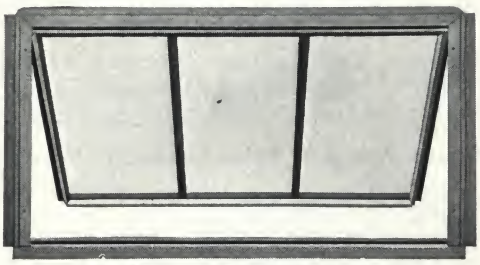
Their narrow, extra rigid frame admits more light and the continuous, double contact weathering makes them storm tight. They cannot warp, swell or stick, and can be easily screened.

They may be installed in concrete, masonry or any other type of construction, at a cost less than ordinary wood windows.

Window opening	Lights wide	Glass size
2′ 9⅝″ x 1′ 3⅛″	3	10″ x 12″
2′ 9⅝″ x 1′ 11⅛″	3	10″ x 20″
2′ 7⅛″ x 1′ 11⅛″	2	14″ x 20″
3′ 3⅝″ x 1′ 9⅛″	3	12″ x 18″



2 ft. 7⅝ in. wide, 1 ft. 11⅛ in. high



3 ft. 3⅝ in. wide, 1 ft. 9⅛ in. high

Condensed Specifications for Basement Steel Windows

(1) General—All windows so indicated on the plans and elevations and called for in these specifications shall be Standard Steel Basement Windows as manufactured by the Truscon Steel Company of Youngstown, Ohio.

(2) Construction—Jambs and head member shall be one continuous piece bent at corners. Sill corner joints shall be formed with a mortise and tenon and air-hammer riveted.

(3) The major part of all sections shall be at least ⅛ in. in thickness.

(4) The sash and frame shall be constructed to give double contact weathering at side jambs, head and sill when closed.

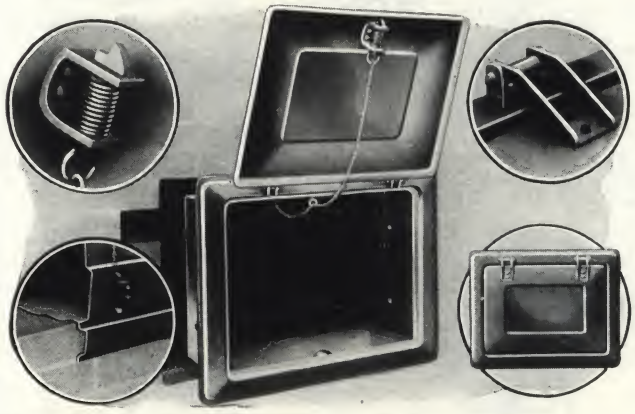
(5) The sides and head of frame shall be of Zee-bar construction with a "U" shaped section welded to jambs for anchorage into the masonry. The inside and outside legs acting as positive guides for masonry construction.

(6) The inside leg of Zee-bar frame shall bear against the masonry and act as a guide for same, providing the necessary clearance for opening and closing of window.

(7) The bottom section shall have a 1⅛-in. vertical face on the exterior overlapping the masonry sill.

(8) All frames shall be provided with two holes at each side jamb for attachment of screens.

Truscon Pressed Steel Coal Chutes



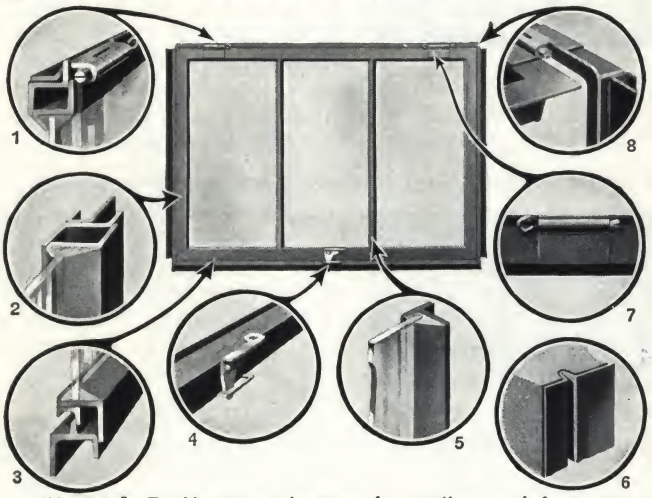
The Truscon Pressed Steel Coal Chute meets the demand for an indestructible, neat appearing, efficiently operating coal chute for home use.

Being made of pressed steel, the Truscon Coal Chute is unbreakable, weathertight, thief-proof and of simple construction. The door and frame design develops maximum strength while keeping the weight of the unit to a minimum. The door is pressed out of a single piece of steel and the entire frame is electrically welded into one unit.

TWO STANDARD SIZES CARRIED IN STOCK

Frame: 27x21¼ in. Door opening: 22x16 in. Depths: 8 or 12 in. Weights: 33 or 39 lb.

Construction Details of Basement Steel Windows



(1) Head—Double contact between the ventilator and frame members assures absolute weathertightness when window is in closed position.

(2) Jamb—Double contact weathering, rigid Zee-bar section with additional channel section.

(3) Sill—Double contact weathering with additional projecting overhang drip absolutely preventing leakage.

(4) Cam Acting Latch—Operates free and easy, also assures positive lock and tight contact.

(5) Glazing—Putty on inside assuring security and pleasing effect from outside. Special cup glazing section forms vacuum holding putty.

(6) End Plate—For use in concrete, making groove better to accommodate steel sash.

(7) Hinge—Removable Pin Type Hinge specially formed to prevent rattling when closed. Hinges solidly welded to frame and ventilator.

(8) Corners—Zee-bar frame member specially curved at upper corners making one-piece frame continuous around three sides of unit preventing distortion. Bottom corners mortise and tenon jointed and air-hammer riveted.

Truscon Pressed Steel Lintels



Truscon Pressed Steel Lintels are light in weight, easy to handle, have maximum load capacity and are low in cost. They are strong, durable and rust-resisting. The turned edges give a neat appearance, and cross ribs placed at proper intervals give the maximum degree of rigidness to the lintel and ample support to the masonry above it.

3½ x 3½ in. x 11 gauge, weight 2.72 lb. per lin. ft.

Standard lengths: 2 ft. 6 in., 3 ft. 0 in., 3 ft. 6 in., 4 ft. 0 in., 4 ft. 6 in., 5 ft. 0 in.

4 x 4 in. x 9 gauge, weight 3.91 lb. per lin. ft.

Standard lengths: 5 ft. 6 in., 6 ft. 0 in., 6 ft. 6 in., 7 ft. 0 in., 7 ft. 6 in., 8 ft. 0 in.

VENTO STEEL SASH COMPANY

INCORPORATED

Puttyless Steel Windows and Steel Bound Screens

MUSKEGON, MICH.

Products

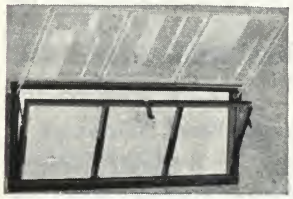
PUTTYLESS STEEL BASEMENT WINDOWS; PUTTYLESS STEEL FACTORY WINDOWS, and SASH OPERATING DEVICES.

STEEL BOUND BASEMENT SCREENS and FACTORY SCREENS.

Also Steel Thresholds and Steel Puttyless Coal Chutes. Patented March 4, 1924, December 11, 1928, and July 30, 1929, U. S. Patent Office. Other patents pending.

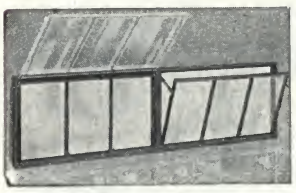
New U. S. Pat. July 30, 1929
Covering 11 Features

Vento Puttyless Steel Basement Windows



Frame of heavy gauge steel, bridge construction, electrically welded at all corners into solid unit 2 in. wide with anchorage fin in center. Jigged square. Sash of 1x1x⅛-in. tee bar, electrically welded at all joints of muntins and corners. Sash opens in at top for ventilation; also lifts up and opens full wide. When open for ventilation can be locked at bottom with safety lock. Makes basement secure.

Vento Puttyless Steel Mullion Basement Windows



Vento basement window has a ⅝-in. outside watershed at bottom and a ⅜-in. condensation ledge at bottom of pane of glass. All water runs out keeping basement dry. This window does not stick, bind or sag and can be opened in winter, as well as in summer. Open in at top breaks away ice and snow, and when open is safe and all rain and water runs out. The glass is held against a cushion of cork (bed putty) by Vento patented glazing clips which saves contractor and owner cost of putty and glazing. Guaranteed waterproof and weatherproof. Any one can set a pane of glass or fit a screen in place of glass.

Vento Puttyless Steel Storm Window and Combination Screen



Vento steel basement window can be fitted with a steel storm sash that can be made into a screen. Being puttyless, the pane of glass is held against the (bed) cork with clips during the winter and a pane-size screen replaces the glass in summer and is held by the same puttyless clips. Can be changed from the basement in a few minutes' time. A storm window is needed in cold weather. Keeps the basement warm and helps keep the house warm.

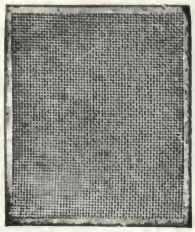


Vento Metal Bound Outside Screen

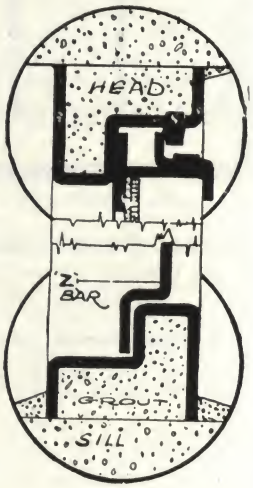
Each Vento basement window is drilled and tapped ready to be fitted with a Vento 16-mesh galvanized or copper screen or storm window.

Vento Metal Frame Pane-size Screens

Vento windows can also be fitted with a pane-size screen. Remove the pane of glass (puttyless) and replace with metal bound pane-size screen (16-mesh galvanized or copper wire cloth).

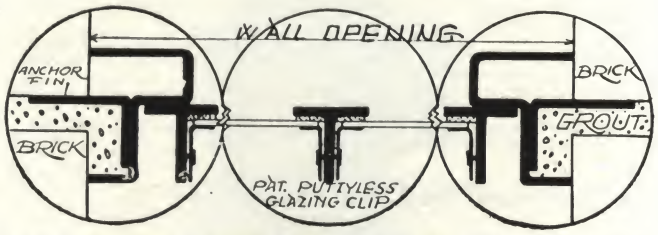


Pane-size Screen



Detail Basement Installation Through Head and Sill (At Right)

Bridge formation of frame, made of 12 gauge steel with grout, makes extra heavy and firm

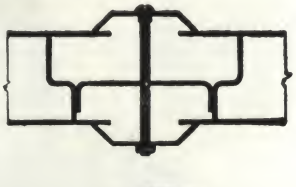


Detail Basement Window Section Through Jambs and Muntin

Right

Detail of Vertical Mullion Bars

Vento vertical mullion bars for basement windows are made of 12 gauge steel held secure by square carriage bolts. If the space between mullion bar and window is filled with cement it makes a solid concrete steel covered jamb. This window can be fastened in combinations of units





Vento Patented Glazing Clip



Vento Patented Safety Lock at Bottom of Sash

STANDARD SIZES OF VENTO BASEMENT SASH

Number of lights	Size of lights, in.	Wall opening required, in.	Net shipping weight, lb.
2	10 x 12	23½ x 15	17
2	14 x 20	31⅜ x 23	21
3	10 x 12	33¾ x 15	18
3	12 x 18	39¾ x 21	23
3	10 x 20	33¾ x 23	23
3	10 x 16	33¾ x 19	22
3	12 x 20	39¾ x 23	23
3	10 x 24	33¾ x 27	28
2	14 x 24	31⅜ x 27	23

Special sizes made upon order.

Continued on next page

Vento Type Number for Sidewall Units

Vento windows should be specified by letter and number, also to avoid error give pane size. "A" means 12x18-in. glass. "B" means 14x20-in. glass. First figure in type means number of panes wide. Second figure in type means number of panes high. Third figure in type means number of ventilating sections. Fourth figure in type means number of panes in ventilating sections.

For example: 4 panes or lights wide and 5 lights high with two ventilating sections of 2 panes each, placed as per our standard layout, Type, A 45-2-2=12x18-in. pane.

If ventilating sections are wanted in different location, this would be a special window and a detailed sketch of what is wanted should be attached.

The Vento Puttyless Steel Window is the only sash that can be made with any section to ventilate, if ordered special.

A 55-1-3 can be made into a 55-2-3 or all sections to ventilate at an additional cost per section. A 55-1-3 can be changed to a 55-1-6 or a 35-2-3 to a 35-1-6 or all sections to ventilate. (A 36-2-3 can be made into a 36-2-6 or a 36-4-3.) These changes all come under the head of Specials and require 10 days to manufacture and ship.

To Measure Vento Sidewall Openings

The outside frame of the Vento sidewall sash is electrically welded into a solid bar. It is so constructed that the outside leg of the tee should embed in the masonry or fasten to the frame or steel construction of building between ½ to ⅝ in. Vento is made to fit standard openings, so in measuring disregard that part that embeds in the building. Vento dimensions are identically the same as the standard masonry openings.

To Install a Single Vento Unit

There are no wires on Vento windows except those holding the puttyless glazing clips.

Place the Vento window in wall opening with a block under lower frame, and remove same when ready to point up to sill.

Vento windows are not of the pivoted type. The ventilating section opens in at top and does not swing outside the building.

Vento frame is extra wide so that grout will not interfere with ventilating sections.

Combination of Vento Units

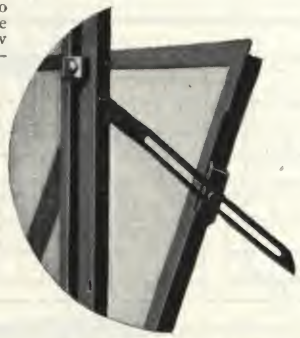
For example: A wall opening 23 ft. 9½ in. long, 6 ft. 9⅜ in. high will take 5 Vento units and 4 mullion bars as follows—2 only—No. B54 Vento windows, 3 only—No. B34.

GLASS SIZES

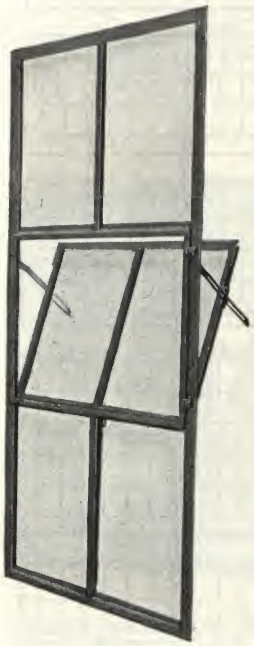
A—12x18 in.		B—14x20 in.				
Lights high	Height, ft. in.	Lights high	Height, ft. in.	Number of lights in total width of opening	Number of sash units to fill opening	Number of lights in each unit and number units to fill opening
2	3 1⅝	2	3 5⅝			
3	4 8	3	5 2			
4	6 2⅜	4	6 10⅜			
5	7 8¾	5	8 6¾			
6	9 3⅛	6	10 2⅛			
The over-all widths shown below may be had in any of the above heights		The over-all widths shown below may be had in any of the above heights				
ft.	in.	ft.	in.			
2	1⅝	2	5⅝	2	1	2
3	2	3	8	3	1	3
4	2⅜	4	10⅜	4	1	4
5	2¾	6	0¾	5	1	5
6	3⅛	7	3⅛	6	1	6
8	6	9	10⅜	8	2	4,4
9	10	11	4	9	3	3,3,3
10	7½	12	3½	10	2	5,5
10	10⅜	12	6⅜	10	3	3,4,3
11	10¾	13	8¾	11	3	3,5,3
12	11⅛	14	11⅛	12	3	4,4,4
13	11½	16	1½	13	3	4,5,4
13	11½	16	1½	13	3	5,3,5
14	11⅞	17	3⅞	14	3	5,4,5
15	2¾	17	6¾	14	4	3,4,4,3
16	0¼	18	6¼	15	3	5,5,5
17	3½	19	11½	16	4	4,4,4,4
18	6¾	21	4¾	17	5	3,4,3,4,3
19	4¼	22	4¼	18	4	4,5,5,4
20	7½	23	9½	19	5	5,3,3,3,5
21	5	24	9	20	4	5,5,5,5

Vento Puttyless Steel Window Ventilating Sections

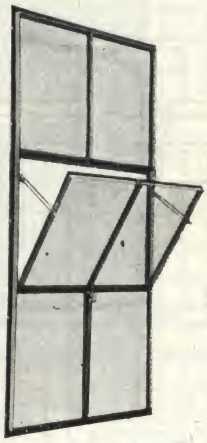
The illustrations are of a 23-1-2 Vento Puttyless Steel Window but will operate on any size Vento window and the ventilating section can be a 2, 3, 4 or 6-light section



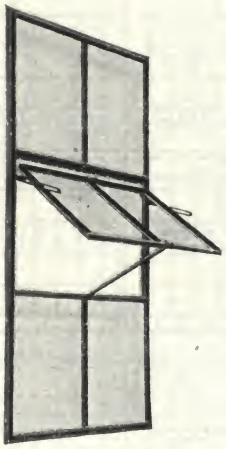
2. Close-up of Vento hinge with spring stage opener that holds window at any given point—"stays put"



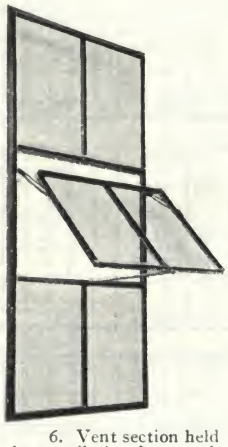
1. Vento Puttyless Steel Window with overhead ventilating section and outside screen



3. Regular overhead indirect ventilation



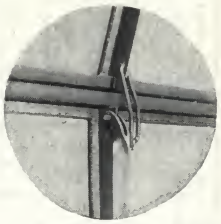
5. Vent section lifted up and held out as pivoted window by the ventilating bar—pushed up against upper sash



6. Vent section held by ventilating bar—sash is at end of hinge giving 5-in. opening at top, overhead ventilation, and direct ventilation at bottom



4. Vent section removed and hung against sash — overhead ventilation



7. Close-up of attached ventilating bar—held by cotter pin—can be installed on any Vento factory type window

Continued on next page

Vento Puttyless Steel Factory Type Window

General—Patented March 4, 1924, December 11, 1928, and July 30, 1929, U. S. Patent Office. Easy to install and keep glazed (no putty). Each pane can be removed, washed on both sides and replaced. The window gives overhead ventilation, has interchangeable ventilating sections and is especially suitable for creameries, bakeries, ice cream plants, public and private garages and factories. (Illustrated on following page.) Has four distinct methods of opening for ventilation.

Construction—Frame constructed of 1½x1x1⅛-in. structural steel tee, electrically welded making a solid steel frame. Sash constructed of standard 1x1x⅛-in. tee, electrically welded at each muntin contact and at each corner into a solid unit. Vento being puttyless, each pane of glass is held against a cushion of cork (bed putty put on at factory) by Vento patented glazing clips, making a weatherproof and waterproof job. (See following page for details.)

Ventilating Sections—Any section of window can be ventilated (other than standard) if ordered. The opening is top hinged to swing in at top, yet can be lifted open full width. Also has ventilating bar so that the vent section can be opened full width, a pivoted feature yet allowing outside screening. (See illustration.) Fitted with high tension spring stage openers. Cam lock at top. The frame is tapped and drilled to take a flat outside (16-mesh) galvanized or copper screen.

Two Standard Glass Sizes—"A" made for 12x18-in. and "B" for 14x20-in. glass. The ventilating sections for "A" hold glass 11⅜x16¾ in. in 3-pane vent (center pane is 12x16¾ in.) and for "B" 13⅜x18¾ in. in 3-pane vent (center pane is 14x18¾ in.).

All sidewall sash will hold single and double strength as well as ¼-in. wire glass. Special clip for wire glass. See table of types for "A" and "B."

Paint—Painted one coat of "Vento" waterproof ship paint.

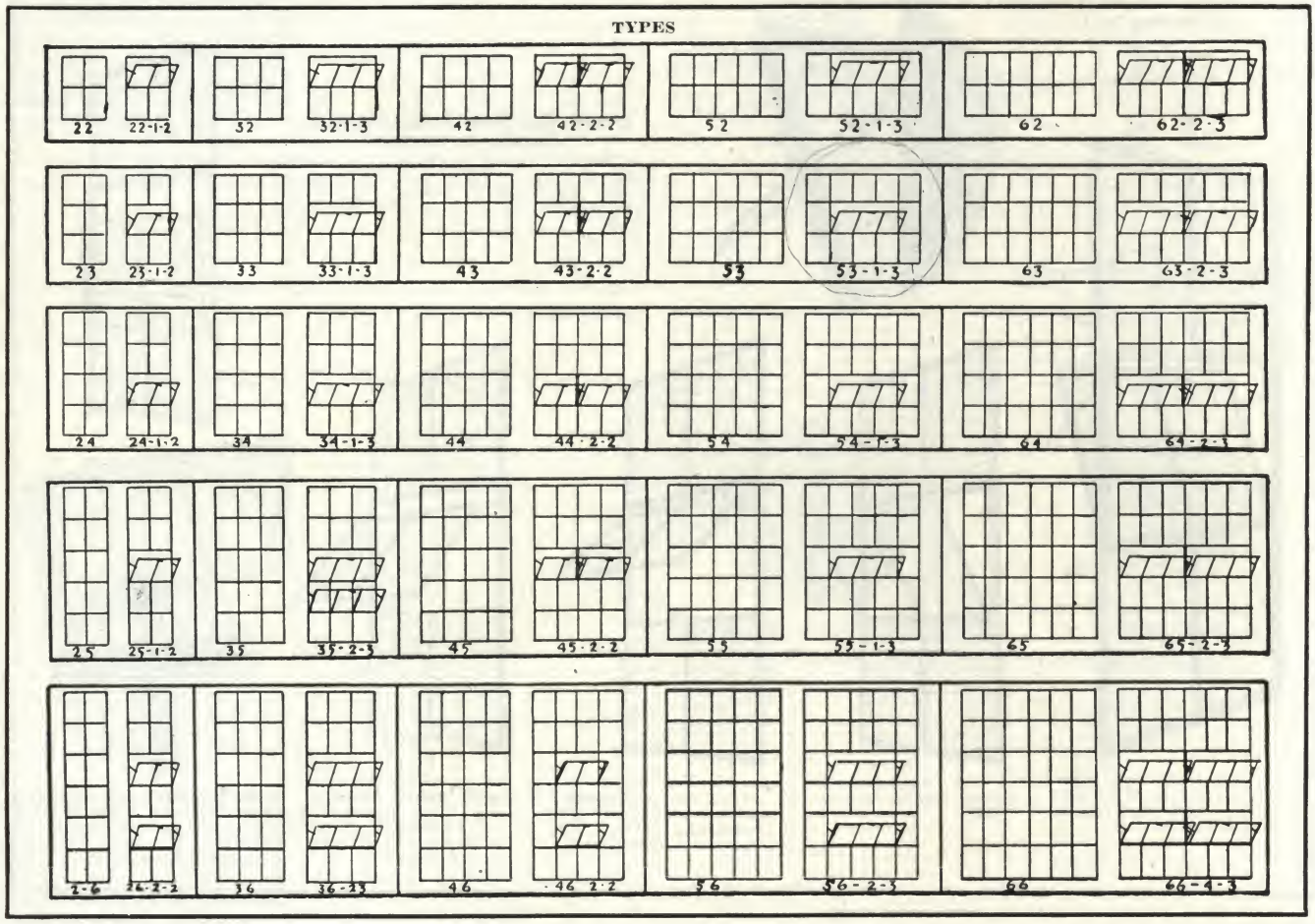
DIMENSIONS, TYPES, AREAS, AND WEIGHTS FOR 12x18-IN. GLASS, "A"

	Width, ft. in.	2′ 1⅝″		3′ 2″		4′ 2⅜″		5′ 2¾″		6′ 3⅛″	
Height, 3′ 1⅝″	Type	22	22-1-2	32	32-1-3	42	42-2-2	52	52-1-3	62	62-2-3
	Area, sq. ft.	6	6	10	10	13	13	16	16	20	20
	Weight, lb.	14	22	20	28	28	36	34	40	40	52
Height, 4′ 8″	Type	23	23-1-2	33	33-1-3	43	43-2-2	53	53-1-3	63	63-2-3
	Area, sq. ft.	10	10	15	15	20	20	24	24	29	29
	Weight, lb.	20	24	26	32	32	40	45	51	51	63
Height, 6′ 2⅜″	Type	24	24-1-2	34	34-1-3	44	44-2-3	54	54-1-3	64	64-2-3
	Area, sq. ft.	12	12	20	20	26	26	32	32	39	39
	Weight, lb.	30	34	36	42	47	55	54	60	62	74
Height, 7′ 8¾″	Type	25	25-1-2	35	35-2-3	45	45-2-2	55	55-1-3	65	65-2-3
	Area, sq. ft.	15	15	25	25	33	33	40	40	48	48
	Weight, lb.	36	42	50	64	62	70	73	79	81	93
Height, 9′ 3⅛″	Type	26	26-2-2	36	36-2-3	46	46-2-2	56	56-2-3	66	66-4-3
	Area, sq. ft.	20	20	29	29	39	39	48	48	57	57
	Weight, lb.	42	50	52	64	63	75	80	92	93	105

DIMENSIONS, TYPES, AREAS, AND WEIGHTS FOR 14x20-IN. GLASS, "B"

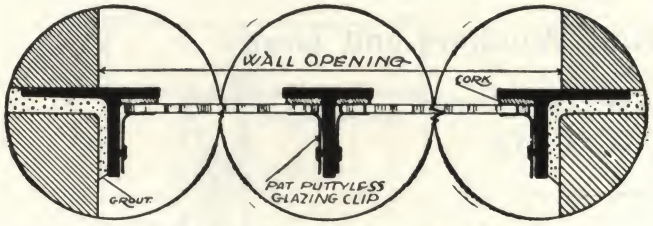
	Width, ft. in.	2′ 5⅝″		3′ 8″		4′ 10⅜″		6′ ¾″		7′ 3⅛″	
Height, 3′ 5⅝″	Type	22	22-1-2	32	32-1-3	42	42-3-2	52	52-1-3	62	62-2-3
	Area, sq. ft.	8	8	13	13	17	17	21	21	25	25
	Weight, lb.	18	23	23	30	34	44	38	45	44	58
Height, 5′ 2″	Type	23	23-1-2	33	33-1-3	43	43-2-2	53	53-1-3	63	63-2-3
	Area, sq. ft.	13	13	19	19	25	25	31	31	37	37
	Weight, lb.	25	30	30	37	40	50	50	57	59	73
Height, 6′ 10⅜″	Type	24	24-1-2	34	34-1-3	44	44-2-2	54	54-1-3	64	64-2-3
	Area, sq. ft.	17	17	25	25	33	33	42	42	50	50
	Weight, lb.	34	39	39	46	52	62	63	70	70	84
Height, 8′ 6¾″	Type	25	25-1-2	35	35-2-3	45	45-2-2	55	55-1-3	65	65-2-3
	Area, sq. ft.	21	21	31	31	42	42	52	52	62	62
	Weight, lb.	40	50	54	68	66	76	77	91	85	99
Height, 10′ 3⅛″	Type	26	26-2-2	36	36-2-3	46	46-2-2	56	56-2-3	66	66-4-3
	Area, sq. ft.	25	25	38	38	50	50	62	62	74	74
	Weight, lb.	49	59	59	73	72	86	87	101	96	110

TYPES



Continued on next page

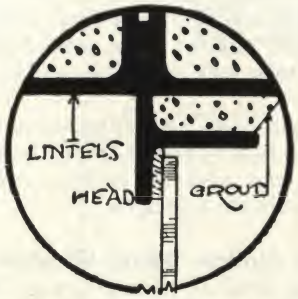
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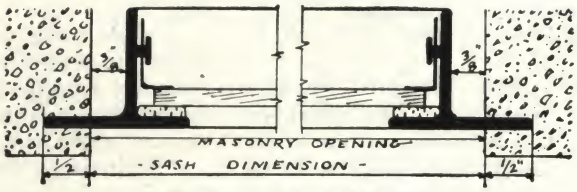
Detail Section Through Jambs and Muntin



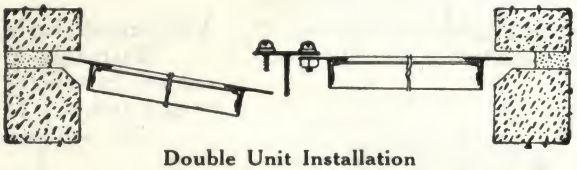
Extra Heavy Vertical Mullion Bar



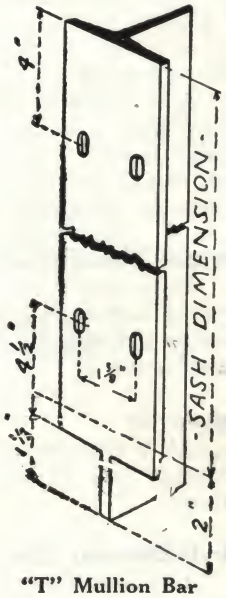
Detail at Head Double Angle Lintels



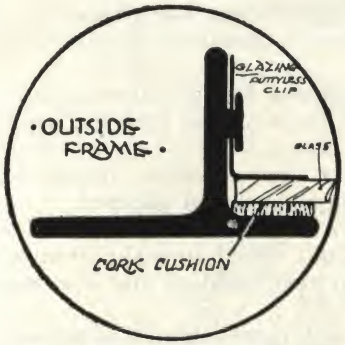
Single Unit Installation



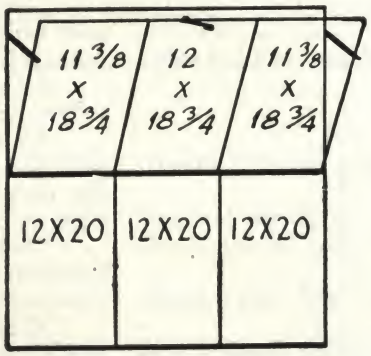
Double Unit Installation



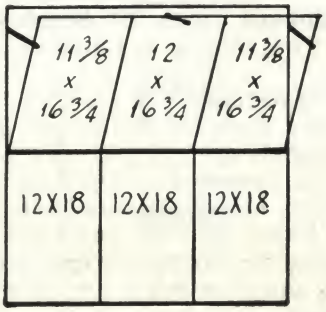
"T" Mullion Bar



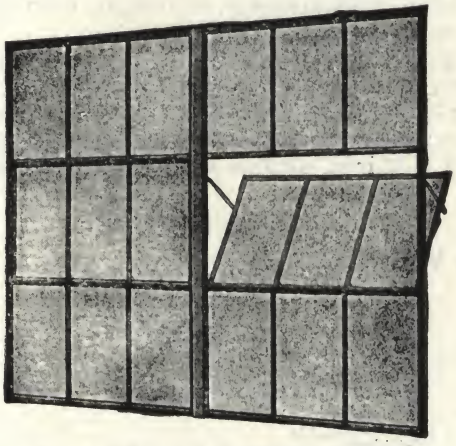
Detail of Factory Type Window Frame



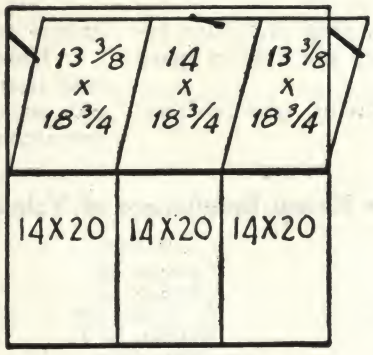
6 LT. 12X20



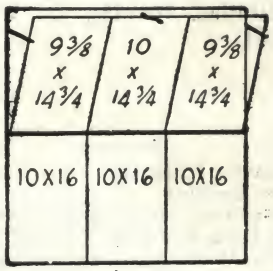
6 LT. 12X18



Ventilating Section Opens in 11 Inches
One, two, or all sections may be ventilated



6 LT. 14X20



6 LT. 10X16

Dimensions of Smaller Sized Windows for Utility, Small Store or Garage Installation

VENTO PUTTYLESS STEEL FACTORY WINDOWS

DETAILS

VOIGTMANN & COMPANY

Manufacturer of Metal Windows and Doors

2543-59 West 22nd Street
CHICAGO, ILL.

Products

VOIGTMANN TYPE "E" DOUBLE HUNG WINDOW—14 gauge.

VOIGTMANN HOLLOW METAL DOUBLE HUNG WINDOW—24 Gauge.

Also Pivoted, Double Pivoted, Standard Pivoted, Top Hinge, Casements and Stationary. An approved mullion may be used when it is necessary to use more than one unit in an opening. Voigtmann Hollow Metal Doors No. 18 gauge steel.

Pioneer Manufacturer

VOIGTMANN & COMPANY is a pioneer manufacturer of metal windows, being engaged in perfecting the window through 36 years of experience and successful manufacture.

Approvals

All Voigtmann windows and doors have been tested and approved by the National Board of Fire Underwriters.

Air Infiltration Test

The air infiltration test for the Type "E" Window was made by the University of Wisconsin and has stood the real value of the scientific test.

Voigtmann Type "E" Window

This window is a product of long years of experience.

Material—It is made of No. 14 gauge hot galvanized steel for frame and sash, No. 12 gauge hot galvanized steel for sill.

All members formed straight and true, neatly mitered, lapped and interlocked.

Head, sill and jambs are acetylene welded thus making the frames a rigid unit. The sash is 1⅛ in. thick and all members are likewise acetylene welded together.

Glass rabbets inside are ¾ in. deep and have removable glazing caps at stiles which are held in place with oval head screws.

Muntins are 1¾ in. wide having underwriters' approval.

Hardware—Frames are equipped with cast iron pulleys with bronze axles with No. 14 gauge housings.

Sash hung on substantial sherardized steel sash chain and properly counterbalanced by cast iron weights. Sash are equipped with one pair of lifts, solid bronze, one malleable iron plated sash lock, one pole socket and bronze upper sash pull.

Painting—Frames and sash to be given a shop coat of manufacturers' metallic paint before delivery. The Type "E" Window can also be had in copper, bronze or aluminum in equivalent gauges.

Voigtmann Light Gauge Hollow Metal Window

Material—Metal used shall be No. 24 gauge tight coated galvanized steel throughout or No. 22 gauge frame and No. 24 gauge sash.

The walling in fin to be formed as part of the jamb.

The continuous weather stops are adjustable and easily removed from frame to permit hanging of weights and sash.

The continuous slots and fins at outer surface of sash rails and stiles prevent wind and dust getting past outer surface of sash.

All frame members are carefully formed and miters neatly cut, lapped, riveted and soldered.

All sash members are neatly mitered, riveted and soldered, and are carefully fitted into the frames at the factory to insure perfect operation and a weathertight job.

Sash to be divided with muntin bars into lights, not exceeding 720 sq. in. as required by the Underwriters' Laboratories, Inc.

Muntin caps are removable from inside to permit glazing without removing sash from frame.

Sills are filled with concrete to comply with the underwriters' requirements.

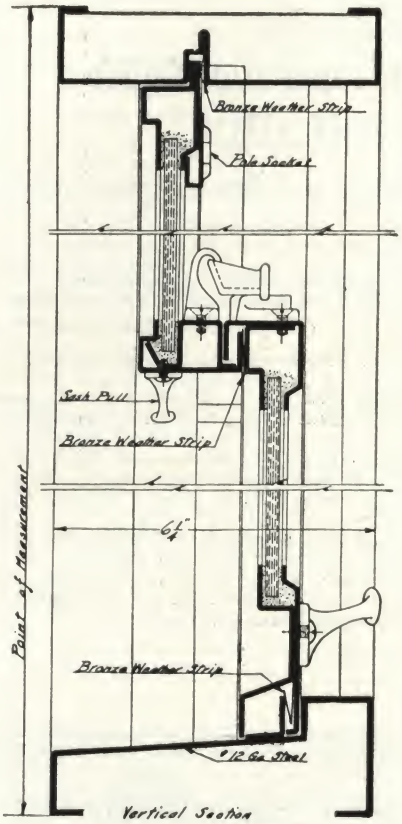
The light gauge window can also be had in copper, bronze or aluminum in equivalent gauges.

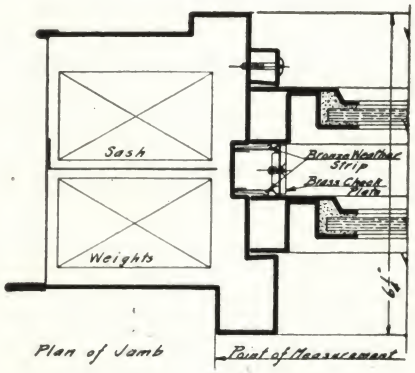
Hardware—Malleable iron plated locks and lifts; cast iron pulley; heavy steel sash chain sherardized; pole socket and cast iron weights as per underwriters' requirements.

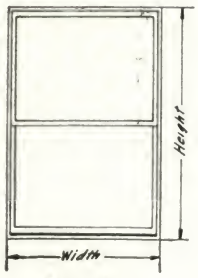
Some Recent Installations of Voigtmann Windows

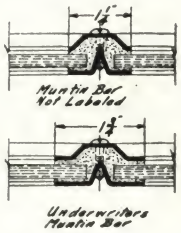
BUILDING	LOCATION	ARCHITECT
State Bank of Chicago	Chicago, Ill.	Graham, Anderson, Probst & White
Lawyers Building	Chicago, Ill.	A. S. Graven
Shell Building for Roxana Petroleum Co.	St. Louis, Mo.	Jamieson & Spearl
Liberty Bank Building	Buffalo, N. Y.	Alfred C. Bossom
Magnolia Building	Dallas, Tex.	Alfred C. Bossom
Free Press Building	Detroit, Mich.	Albert Kahn
Stop & Shop Building	Chicago, Ill.	Schmidt, Garden & Erickson
F. W. Woolworth Company	Chicago, Ill.	Walter Ahlschlager
Michigan-Chestnut Building	Chicago, Ill.	Holabird & Root
Chicago Women's Club	Chicago, Ill.	Holabird & Root
Illinois Bell Telephone Company Addition to Franklin Office Building	Chicago, Ill.	Holabird & Root
Illinois Bell Telephone Company Wabash Office Building	Chicago, Ill.	Holabird & Root

Continued on next page

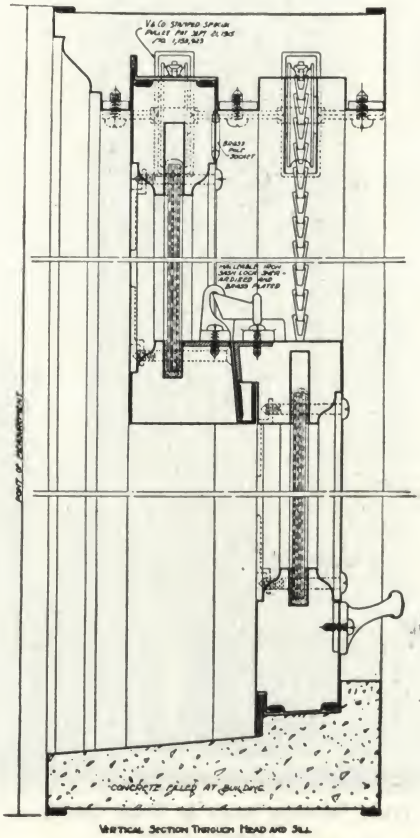


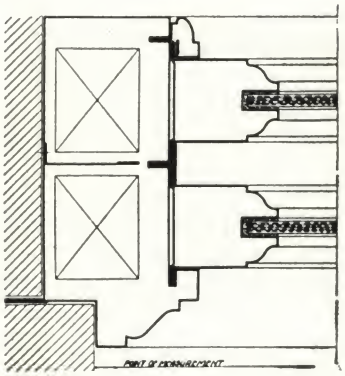


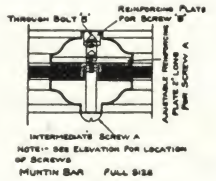




Detail of No. 14 Gauge Voigtmann Metal Window







Detail of No. 24 Gauge Voigtmann Metal Window

VOIGTMANN METAL WINDOW CORPORATION

DIVISION OF CAMPBELL METAL WINDOW CORP.

Double Hung Metal Windows in Steel, Copper and Bronze

TELEPHONE 2-0156
All Departments

Reed and Fulford Streets, KALAMAZOO, MICH.

NEW YORK OFFICE: Campbell Metal Window Corporation, Pershing Square Building

CHICAGO OFFICE: 1912 Builders Building, 228 No. La Salle Street

DISTRICT REPRESENTATIVES

ATLANTA, GA., Luke Seawell, 144 Spring Street
BOSTON, MASS., H. A. Seeley, 73 Tremont Street
BUFFALO, N. Y., Shults Eng. Co., Morgan Building
CINCINNATI, OHIO, A. W. Frank, 707 Gerke Building
CLEVELAND, OHIO, Walters-Seidel Co., 2341 Carnegie Avenue
DALLAS, TEX., Gilbert Mfg. Co., 510 Marvin Building
DENVER, COLO., Builders Service Bureau, 1413 Court Place
HARRISBURG, PA., O. L. Preble, Jr., 25 So. 3rd Street
INDIANAPOLIS, IND., Stackhouse Building Specialties Co., Hume Mansur Building
KANSAS CITY, MO., C. S. Hawley Co., 1012 Baltimore Avenue
LOS ANGELES, CALIF., J. Royden Estey, Transportation Building
MEMPHIS, TENN., Akers & Co., 242 Madison Avenue
MIAMI, FLA., Brinson Builders Material Co., Security Building
NASHVILLE, TENN., Geo. W. Ruth & Co., 151 Fourth Avenue, No.
NEW ORLEANS, LA., Ole K. Olsen, 325 No. Cortez Street
OKLAHOMA CITY, OKLA., Bissell Builders Supply Co., 705 Colcord Building
OMAHA, NEB., Kraus & Trustin, 634 Paxton Block
PHILADELPHIA, PA., L. S. Lucus, 1524 Chestnut Street
PITTSBURGH, PA., P. Larsen Co., Inc., Commonwealth Building Annex
ROCHESTER, N. Y., Francis Metal Door & Window Corp., 46 Cortland Street
SALT LAKE CITY, UTAH, S. A. Roberts & Co., 222 Dooley Building
SAN FRANCISCO, CALIF., Fire Protection Products Co., 1101 16th Street
SCHENECTADY, N. Y., Steel Supply Co., 110 Wall Street
SCRANTON, PA., A. D. Parsons, Cedar Avenue
SYRACUSE, N. Y., Arnold Metal Door & Window Corp., 315 Hills Building
ST. LOUIS, MO., Randolph Sales Co., 1104 Chemical Building
TOLEDO, OHIO, S. L. Everitt, 615 Ohio Building
TULSA, OKLA., Murray R. Womble Co., 417 Thompson Building
WASHINGTON, D. C., William S. Graham, Investment Building
WICHITA, KAN., Lusco Brick & Stone Co.

Products

Voigtmann Heavy Section Steel Windows, Double Hung.

Voigtmann Hollow Metal Windows, Double Hung.

Tested and listed as standard by the Underwriters' Laboratories, Inc.

Also Radiator Hangers and Supports, Stools, Underwriters' Labeled Fusible Links and Window Ventilator Brackets.

Improved Features

New double weathering at all points of contact between sash and frame, adjusted to give maximum weather tightness. Sash operate in double guides, assuring extremely smooth and easy operation. Elimination of all exposed screws and simplified method of hanging and adjusting sash. Architecturally correct and new design throughout, combined with smooth finish and first-class workmanship.

Neat Appearance

Voigtmann windows have neat and slender lines and present very pleasing appearance.

More Light

Voigtmann windows give maximum exposed glass area, due to these slender lines and narrow margins.

Better Weathering

Spring bronze weatherstrips at sill and meeting rails and double integral two-point contact weathering throughout entire perimiter of sash.



Ohio Savings Bank & Trust Building
Toledo, Ohio
Mills, Rhines, Bellman & Nordhoff, Architects
A. Bentley & Sons Co., Builders

Continued on next page

SPECIFICATIONS FOR DOUBLE HUNG WINDOWS

Scope—All windows where shown on drawings to be double hung heavy metal construction as manufactured by VOIGTMANN METAL WINDOW CORPORATION, of Kalamazoo, Mich.

Material—All windows shall be constructed of hot-dipped galvanized steel of the gauges listed below.

Note: Material may be copper bearing steel, cold rolled copper or sheet bronze of the same gauges if desired.

Voigtmann Model 18-V Heavy Metal Double Hung Windows—Sills shall be 14 gauge; pulley stiles, sash stiles and heads 18 gauge; jambs, sash rails and muntins 20 gauge.

Voigtmann Model 20-V Double Hung Windows—Sills shall be 14 gauge; pulley stiles 20 gauge; jambs, heads, sash stiles, sash rails and muntins 24 gauge.

Sash Construction—Sash shall be of moulded design. Sash stiles and rails shall be constructed of one piece of metal, closed construction, interlocked at seam, reinforced in tubular chamber by interlocking construction to insure great rigidity and uniformity. Joints between members shall be neatly mitred, lapped, spot welded and soldered absolutely watertight. Sash stiles and upper sash socket rail shall be formed to produce ¾-in. double interlocking flanges which shall engage in double weathering grooves. Meeting rails shall have channel flanges and interlocking spring bronze weatherstrip to insure weathertight contact. Lift rails shall be constructed with interlocked spring bronze weatherstrip to insure weathertight contact at sill. Glass rabbets in stiles and bottom rails shall be ¾ in. deep and those in top rails 1⅜ in. deep.

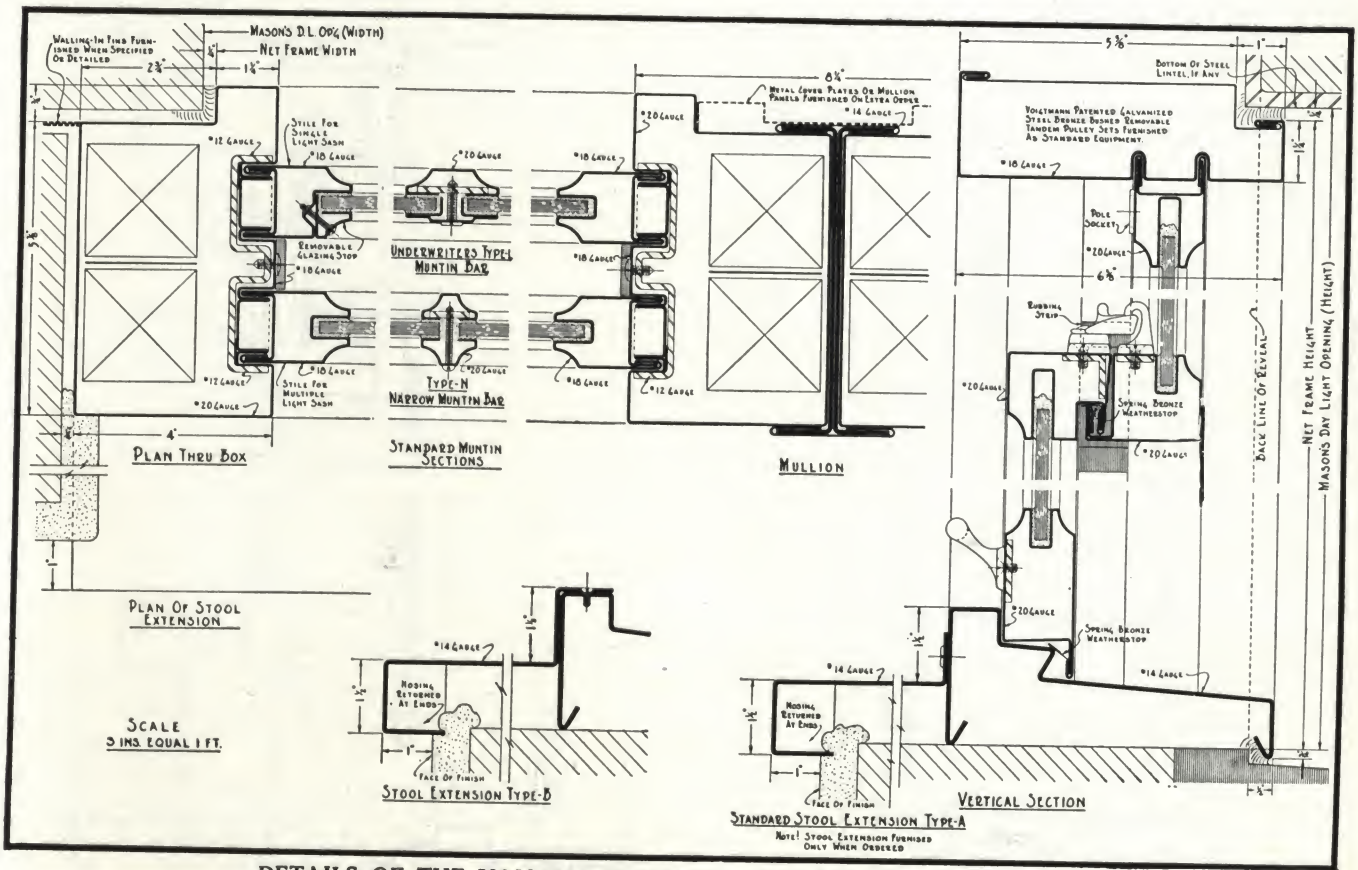
Frame Construction—Sills shall be formed with deep weather stops, ample drain pitch and without slots. Jambs, head and sill shall be constructed of one piece of metal exclusive of pulley stiles and closure strip. All members shall be formed true, neatly mitred, lapped, flush riveted and soldered watertight. Pulley stiles shall be rolled with ½-in. quadruple weather fins to form double slots and guides for each sash stile, removable to afford access to weight boxes and pulleys, and held in place with machine screws tapped to heavy adjustable reinforcing plates spanning the inside of jambs.

Muntins—Exterior muntin bars shall be moulded and reinforced with 12-gauge steel lugs. Interior removable caps shall be formed with offset bead and double flange putty stops.

Hardware Equipment—Frames shall be equipped with 12 and 14-gauge galvanized steel tandem pulley sets. Wheels shall be bushed with 16-gauge seamless bronze cylinders and rotate on ⅜-in. steel axles. Pulley sets shall be adjustable, removable from frame and secured in place with machine screws. Pulley stiles shall be equipped with adjustable bronze rubbing strips to secure weathertight contact at ends of meeting rails. Sash shall be hung on galvanized steel chain No. 130 and properly counterbalanced by cast iron weights. Sash shall be equipped with one pair of moulded bar lifts, one sash lock and pole socket, polished bronze or iron plated as required, of Voigtmann standard design.

Painting—Frames and sash shall be given one coat of Voigtmann special prepared metallic gray primer sprayed on to completely cover all surfaces.

Labels—Where Underwriters' approval is desired their label shall be attached in evidence of their inspection and acceptance.



DETAILS OF THE VOIGTMANN MODEL 18V DOUBLE HUNG WINDOW

Note: Design and details for Model 20V are the same as Model 18V.

THE WILLIS MANUFACTURING COMPANY

INCORPORATED 1891

Manufacturers of Hollow Metal Windows and Tin Clad Fire Doors

HOME OFFICE and FACTORY
GALESBURG, ILL.

Willis Paramount Hollow Metal Double Hung Window, Type "20-24"

Materials—All as indicated in detail drawings. Sills of No. 16 gauge galvanized iron.

Jamb and head members of No. 20 gauge galvanized iron.

Sash No. 24 gauge galvanized iron.

Pulleys are heavy steel wheels with bronze bushings and ⅜-in. steel axles with No. 16 gauge housings.

Chain is sherardized finish steel.

Finish hardware is solid bronze, bronze plated, or black finish, as desired.

Each window is equipped with one sash lock, two bar lifts and one pole socket.

Sash weights are of cast iron, of sizes to properly counterbalance the sash.

Assembly—All frame members are fastened together with butt joints reinforced with plates riveted on the inside.

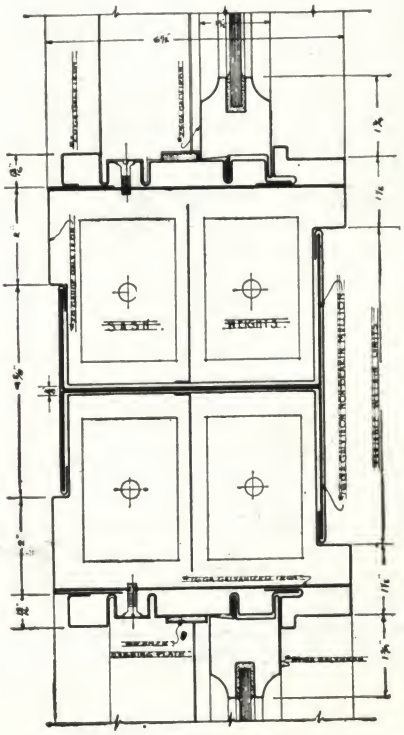
Sash joints are offset, lapped, riveted and soldered.

Glazing strip is attached to sash members with screws as shown on details.

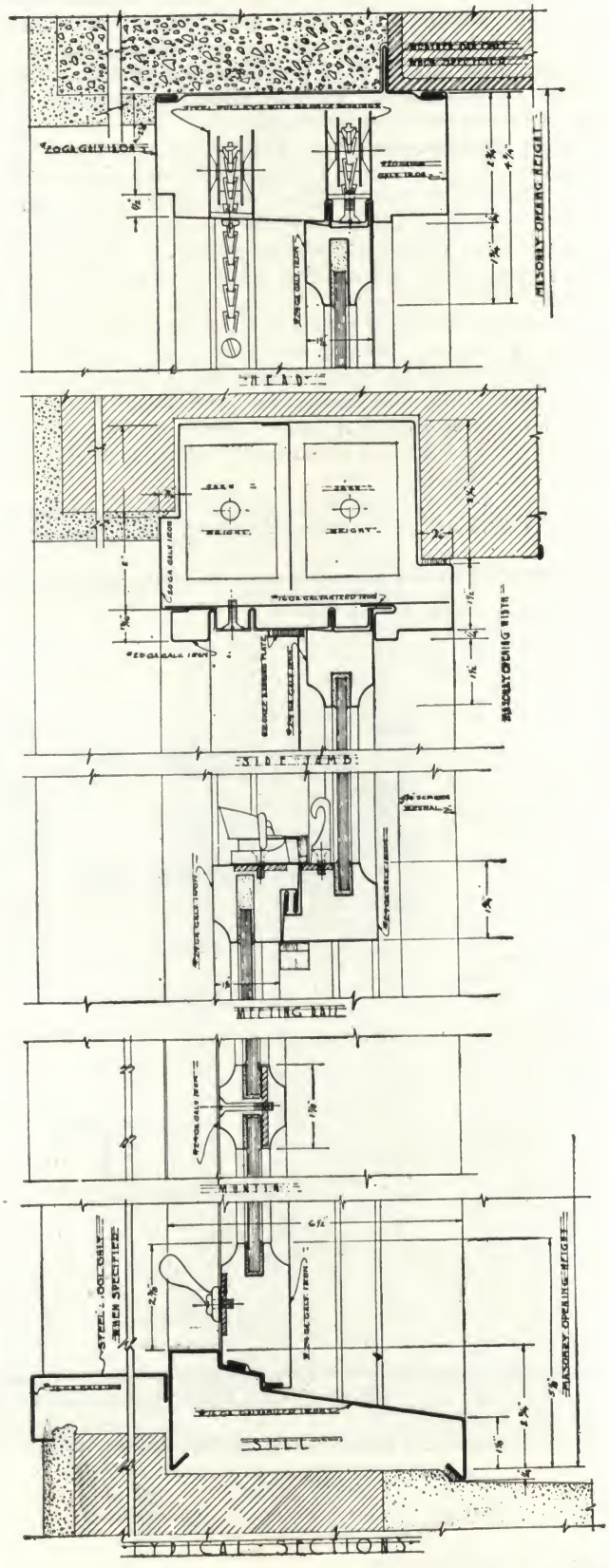
Finish—All parts receive one coat of best grade metal priming paint, inside and outside, before shipping.

Underwriters' Labels—When required, windows shall bear the labels of the Underwriters' Laboratories, Inc.

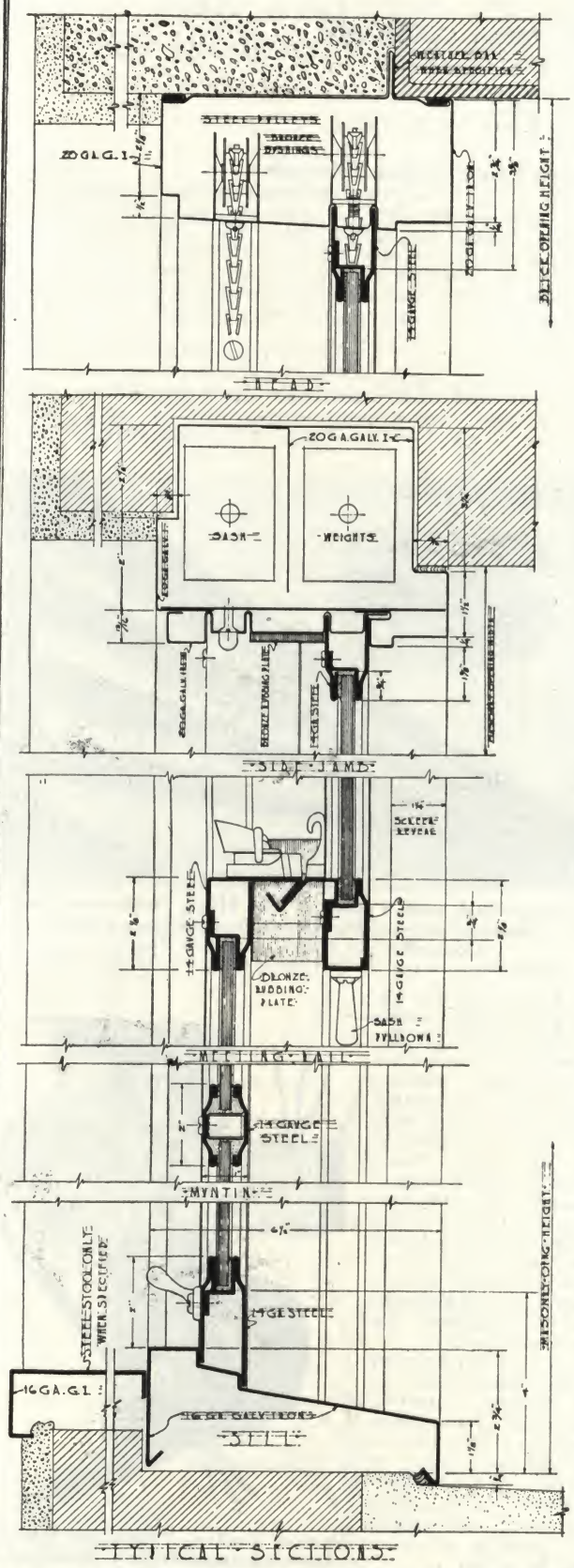
Write for full size details.

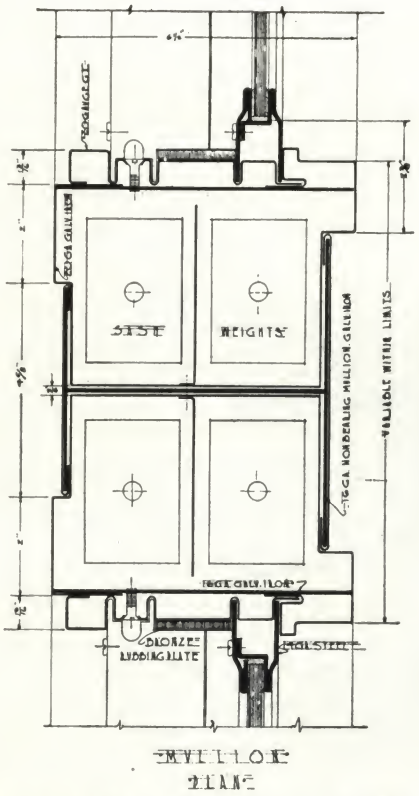


Patented Feb. 9, 1926
Scale: 3″=1′-0″



Continued on next page





Willis Paramount Windows—Heavy Gauge, Type "20-14"

Materials—All as indicated on detail drawing. Sills of No. 16 gauge galvanized iron. Jamb and head of No. 20 gauge galvanized iron.

Sash of No. 14 gauge soft rolled strip steel.

Pulleys are heavy steel wheels with bronze bushings and ⅜-in. steel axles with No. 16 gauge housings.

Chain is sherardized finish steel.

Rubbing plate is solid bronze and is placed at each end of the meeting rail.

Finish hardware is solid bronze, bronze plated, or black finish, as desired. Each window is equipped with one sash lock, two bar lifts, and one pull-down handle or pole socket.

Sash weights are of cast iron, of sizes to properly counterbalance the sash.

Assembly—All frame members are fastened together with butt joints reinforced with plates riveted on the inside. Sash joints are mitered and welded. Glazing strip is attached to sash members with screws as indicated on details.

Finish—All parts receive one coat of best grade metal priming paint, inside and outside, before shipping.

Underwriters' Labels—When required, windows shall bear the labels of the Underwriters' Laboratories, Inc.

Write for full size details.

PATENTED FEB. 9, 1926

WILLIS PARAMOUNT SOLID STEEL DOUBLE HUNG WINDOW

SCALE 3"=1'-0" DWG. T-35

DAYTON DIRECT-ACTION WINDOW OPERATORS

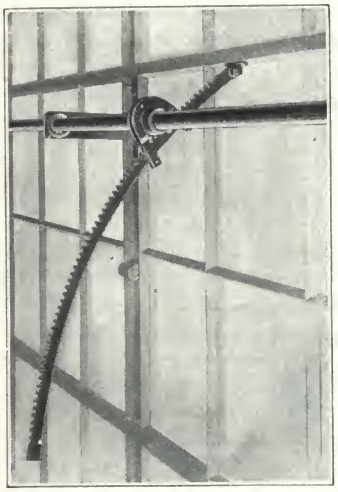
Manufactured by
THE DAYTON GREENHOUSE MFG. COMPANY
FORMERLY THE T. J. CALLAHAN COMPANY
DAYTON, OHIO

For our page on Greenhouses, etc., see Manufacturers' Index

Product

WINDOW OPERATING APPARATUS, hand and electrically controlled, for steel or wood sash in factories, foundries, machineshops, central stations, powerhouses, theaters, churches, gymnasia, exhibition buildings, etc.

Also special types for greenhouses and sludge bed covers.



Dayton Direct-Action Operator
Showing the convex rack and pinion operating arm

Types

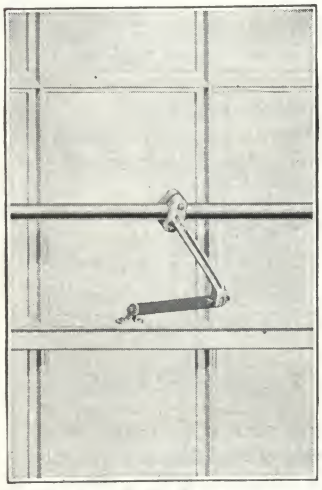
The 500 Series comprises manually operated open type powers handling shorter runs of windows. Easily adapted to average conditions.

The 700 Series has manually operated powers, chain or shaft drive, for long runs of either top hung or center pivoted windows. Gears enclosed in case packed with grease.

The 800 Series consists of manually operated powers using endless chain drive. Powers operate tension shaft for top hung continuous sash.

The 900 Series of motorized drives is the ideal sash control providing easy and convenient ventilation over large areas of floor space.

Large runs of sash are operated at the touch of a button from one central control station.

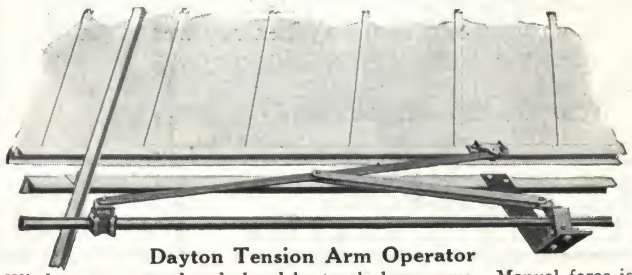


Dayton Split Lever Arm Operator
Can be clamped on pipe without dismantling present equipment

Dayton Direct-Action Window Operators

The Dayton Direct-Action type of window operator is remarkable in its simplicity and ease of operation. It will open a series of sash of great length from one operating station without variation in width of opening from end to end. This enables the builder to put the operating stations at the most convenient points, even at the ends of long runs, if necessary.

The Dayton Direct-Action Operator is fully patented, and it is recommended for all installations, large or small, because it provides the utmost in convenient, economical and durable window operators.

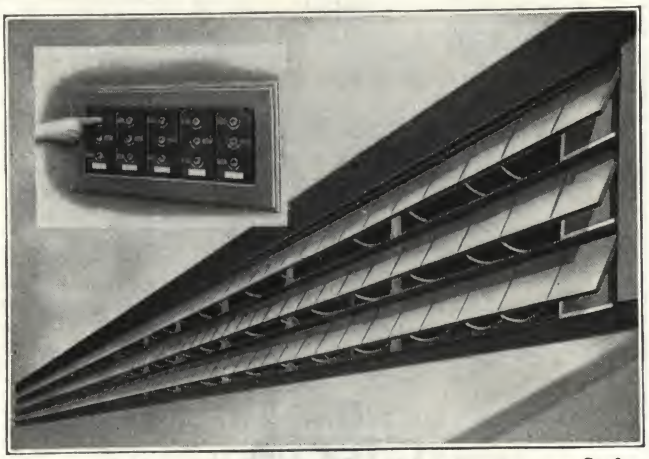


Dayton Tension Arm Operator
Windows are opened and closed by toggle lever arms. Manual force is applied by endless chain

Dayton Direct-Action Principle

The principle employed by these operators consists of a pinion gear fixed to the line shaft in a self-aligning yoke or housing opposite the hinged sash. The teeth of the pinion engage a circular cut steel arm or rack of any length needed. The distance from the center of the line shaft to pitch line of the rack is only 1¼ in., and this distance is always constant. The torque in the line shaft is thus reduced to an absolute minimum.

The short leverage permits operating stations to be located most conveniently in the building. All sash operate to the same height (as much as 90° opening) without any variation along the line and are pulled down easily, yet firmly. An absolutely tight close-down is always assured, preventing dripping, drafts and loss of heat.

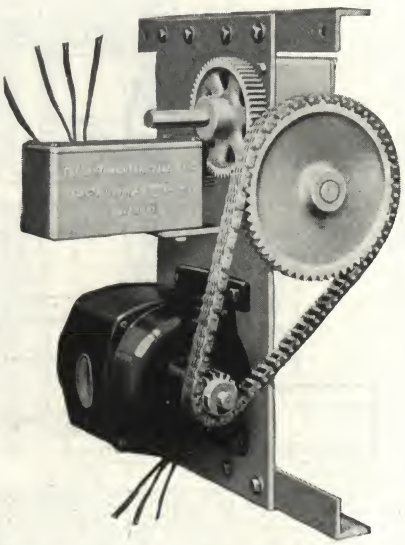


Monitor Sash with 3 Runs of Top Hung Continuous Sash Showing Dayton Direct-Action Operators Easily Controlled by Dayton Electric Power
Insert—Panel of push buttons operating all sash in this building

Long runs of top hung or heavy center pivoted sash may be operated with a minimum of operating stations, centralizing the control and substantially lowering cost of installation.

All Dayton equipment is painted in gray enamel. Only the best materials are used. Properly tempered steel shafting of large diameter and analyzed castings are used throughout to withstand the necessary loads.

Installations for center pivoted sash can be arranged to reverse up to 120°, for top hung sash up to 90°, and for bottom hung sash up to 60° from the closed position. This gives convenient accessibility for washing or cleaning the glass.



Dayton Electric Power for Dayton Direct-Action Window Operators

Engineering Service

The range of types offered in Dayton operators is such as to meet all demands. Our new catalogue gives complete information. Send for it.

Our Engineering Department will gladly co-operate and advise with you or your contractors. Your inquiry is solicited.

ESTABLISHED 1875

THE PAYSON MANUFACTURING COMPANY

Manufacturers of Sash Operating Devices and Builders' Hardware

2920 Jackson Boulevard

CHICAGO, ILL.

Products

Sash Operating Devices.

Also manufacturers of: Simplex Transom Lifter, for all types of transoms; Casement Adjusters, friction, geared, and thumbscrew control for all types of casement sash; Signal Sash Lock, for double hung windows; No. 49 Harris Concealed Transom Lifter, for transoms where concealed device is required.

Types of Payson Sash Operating Devices

Torsion Type Using Levers to Sash—Ideal, chain control, for pivoted sash.

Superior, hand wheel control, for pivoted sash.

Triumph, hand wheel control, for pivoted sash in monitors, also for store front transoms.

Torsion Type Using Racks and Pinions to Sash—Reliance, chain or hand wheel control, either straight or curved rack, for top hinged or heavy pivoted sash.

Gem, for single top hinged, skylight sash, chain control.

Star, for single top hinged skylight sash, pole control.

Screw Type Using Levers to Sash—Crown, for short runs of bottom hinged sash opening in.

Duplex, for heavy transoms.

Signet (new), for long runs of hinged sash opening in or out.

Globe, for large window control.

Tension Types—Peerless, chain control for top hinged continuous steel sash.

Victor chain wheel control for vertically pivoted sash.

Monarch, for short runs of vertically pivoted or side hinged sash.

All types furnished with electric equipment if desired.

Payson Products Give Satisfaction

This list of Payson products is selected with the hope that it may be used freely by architects in writing specifications. The list contains standard articles that are guaranteed to give perfect satisfaction.

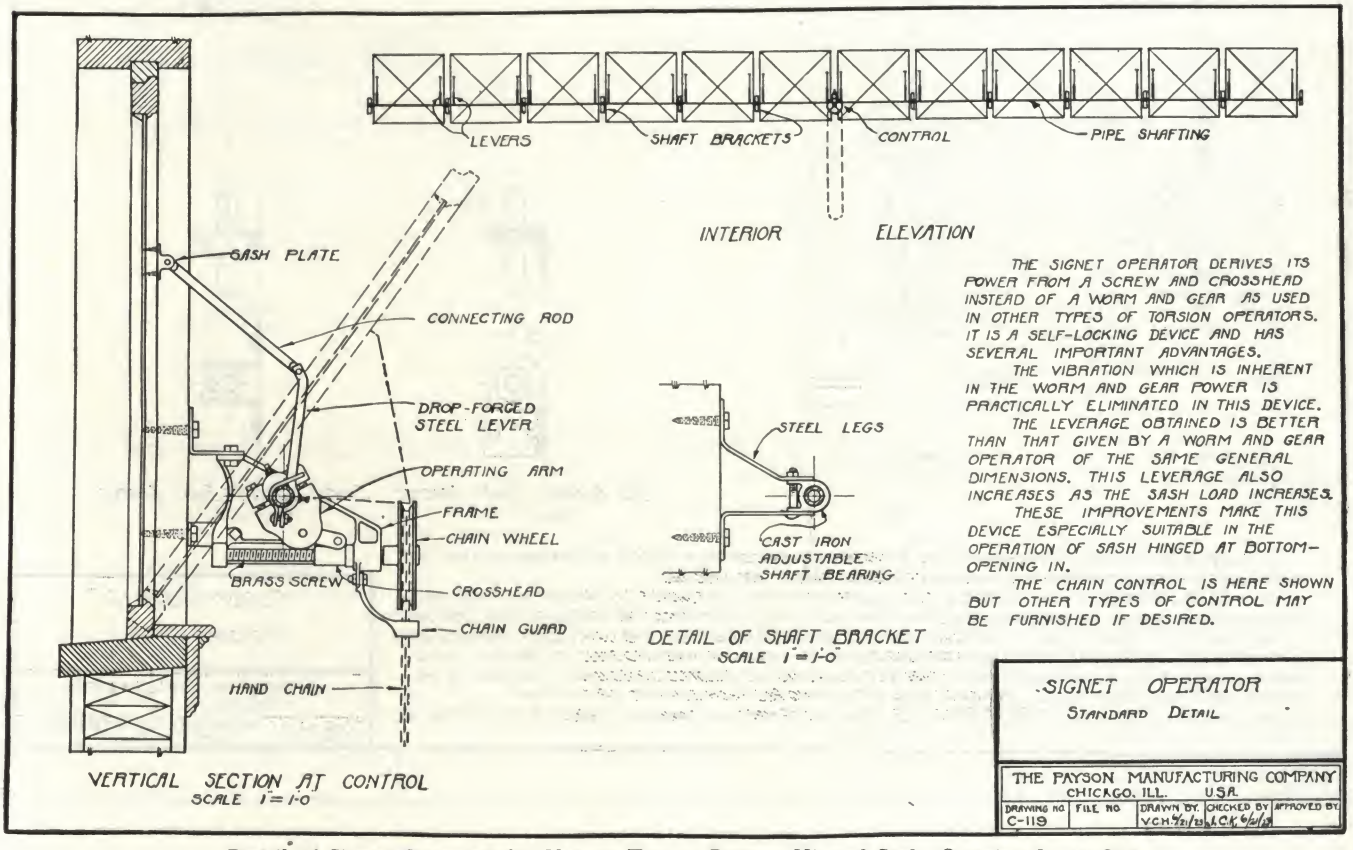
Service

Payson sash operating devices are made to order, using measurements taken from the plans and checked at the building. Every job is exhaustively studied by Payson engineers, and a drawing showing the scheme thought most satisfactory is prepared and submitted to the architect for approval as to layout and general design. After this approval is obtained, if there is any question as to measurements, drawings are forwarded to the building to be checked.

Time is really saved in this way, because the operators can then be erected from the blue print with the certainty that every part will fit the place for which it is intended.

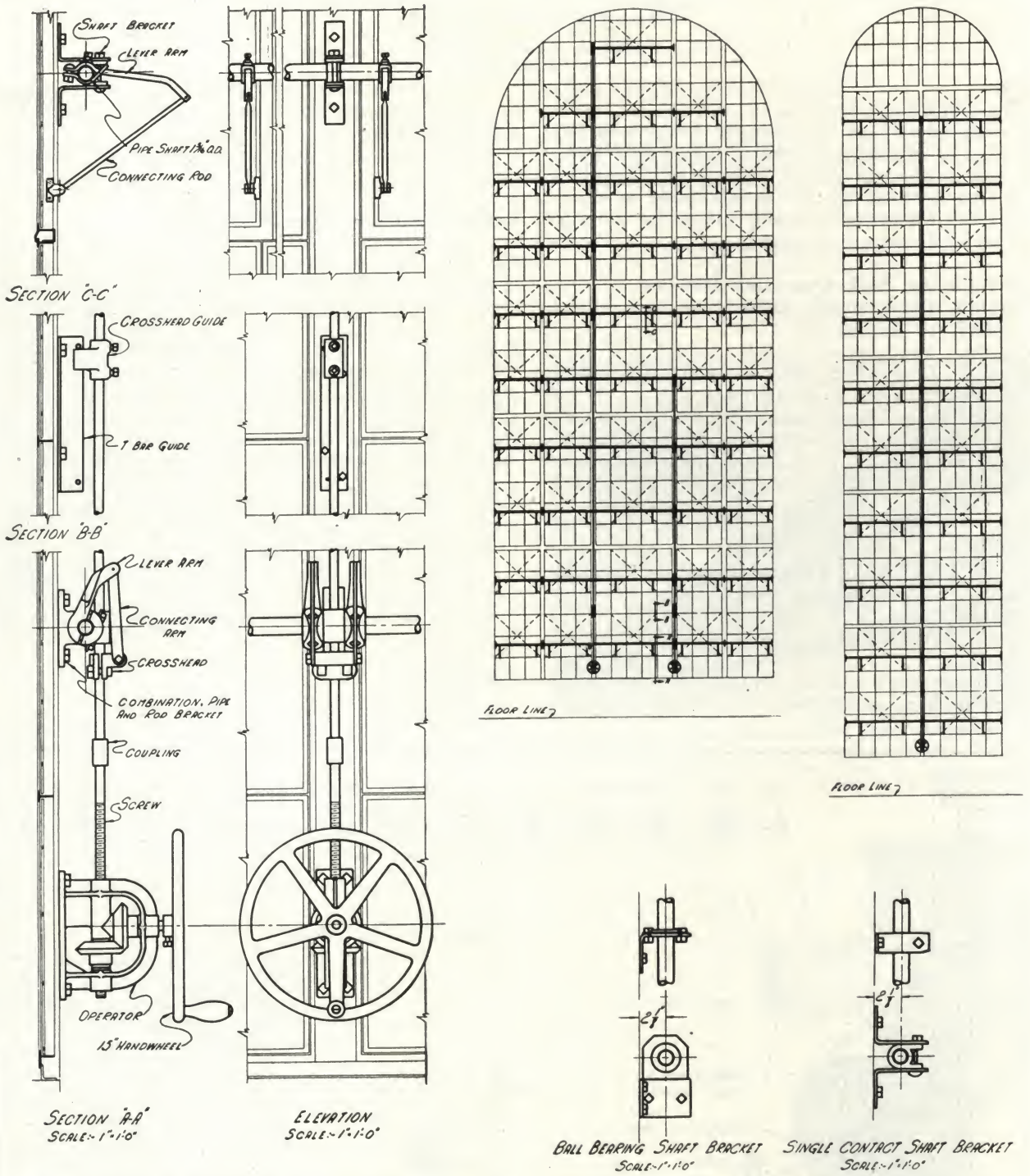
Catalogue

We have a very complete catalogue of Payson products which we would be glad to forward on request.



Detail of Signet Operator for Use on Top or Bottom Hinged Sash, Opening In or Out

Continued on next page



THE GLOBE OPERATOR HAS BEEN DEVELOPED FOR THE OPERATION OF HORIZONTALLY PIVOTED OR TOP HINGED SASH IN POWER HOUSES, PRISONS OR OTHER BUILDINGS WHERE SASH IN TANDEM ARE SPECIFIED.

THE DEVICE CONSISTS OF A POWER, VERTICAL SLIDING SHAFT, LEVERS AND CROSSHEADS TO TRANSMIT THE POWER FROM THE VERTICAL SLIDING SHAFT TO THE HORIZONTAL REVOLVING SHAFT AND LEVERS TO CONNECT THE HORIZONTAL SHAFT TO THE SASH.

THE POWER CONSISTS OF A HEAVY MITRE GEAR FRAME WITH DRIVING GEAR OF IRON AND DRIVEN GEAR OF BRONZE. GEARS HAVE MACHINE CUT TEETH. THE BRONZE GEAR HAS A THREADED BORE WHICH ENGAGES A THREADED STEEL ROD. THE STEEL ROD IS COUPLED TO THE VERTICAL SLIDING SHAFT WITH A THREADED COUPLING AND A SLOTTED CROSSHEAD IS FASTENED TO THE ROD AND MOVES WITH IT ON A STEEL "T" BAR GUIDE THUS PREVENTING ROD FROM SLIPPING OR TWISTING.

THE POWER IS EQUIPPED WITH THRUST BEARINGS TO TAKE THE UPWARD OR DOWNWARD THRUST AS THE CASE MAY BE.

GLOBE OPERATOR

STANDARD DETAILS

THE PAYSON MANUFACTURING CO.
CHICAGO, ILL. U.S.A.

DRWG. NO.	FILE NO.	DRAWN BY	CHECKED BY	APPR. BY
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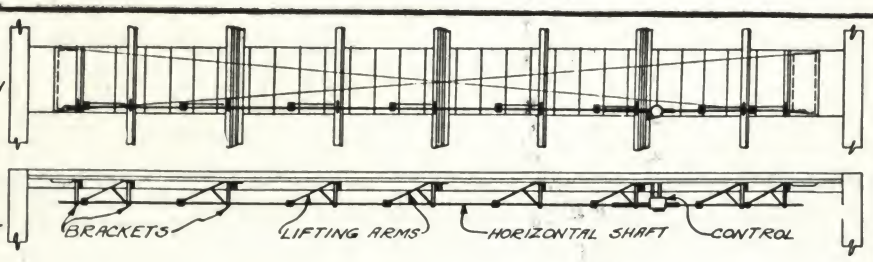
THE PEERLESS A OPERATOR IS INTENDED ESPECIALLY FOR THE OPERATION OF TOP HINGED CONTINUOUS SASH.

THE OPERATOR STATION IS AN OIL TIGHT BOX CONTAINING A HARDENED STEEL WORM AND BRONZE WORM GEAR. THE WORM SPINDLE IS EQUIPPED WITH THRUST BEARINGS. A CAST RACK AND A CUT STEEL PINION TRANSMIT THE POWER FROM THE OPERATOR BOX TO A HORIZONTAL SLIDING SHAFT.

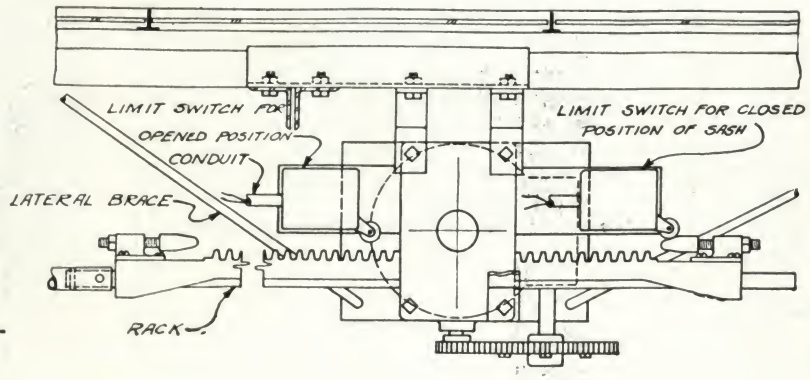
THE ELECTRIC MOTOR IS APPLIED TO THE OPERATOR BOX MAKING A COMPACT EFFICIENT UNIT. MACHINE CUT SPROCKETS AND SILENT CHAIN ARE USED FOR SPEED REDUCTION.

THE SHAFT IS SUPPORTED BY ROLLER BRACKETS ATTACHED TO THE TRUSSES AND TO INTERMEDIATE STEEL MEMBERS. THE LIFTING ARMS ARE ATTACHED TO THE BRACKETS AND ARE ARRANGED SO AS TO ELIMINATE ALL LATERAL THRUST ON THE SASH. ALL SWIVEL POINTS ON LIFTING ARMS HAVE BRASS WASHERS AND THE ROLLER BRACKETS ARE FITTED WITH BRASS SLEEVES.

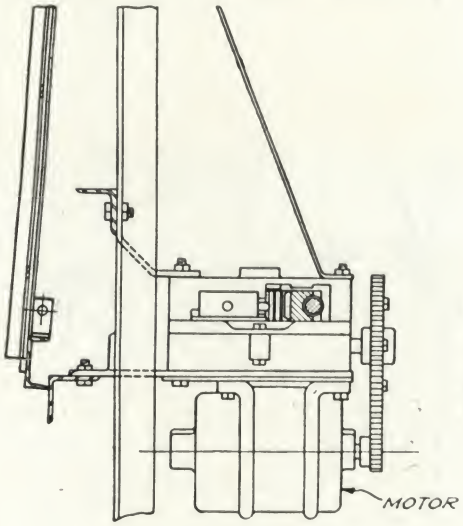
DIAGRAMS WILL BE FURNISHED WHICH WILL GIVE THE ELECTRICAL CONTRACTOR COMPLETE INFORMATION REGARDING THE NECESSARY WIRING AND CONTROL SWITCHES REQUIRED.



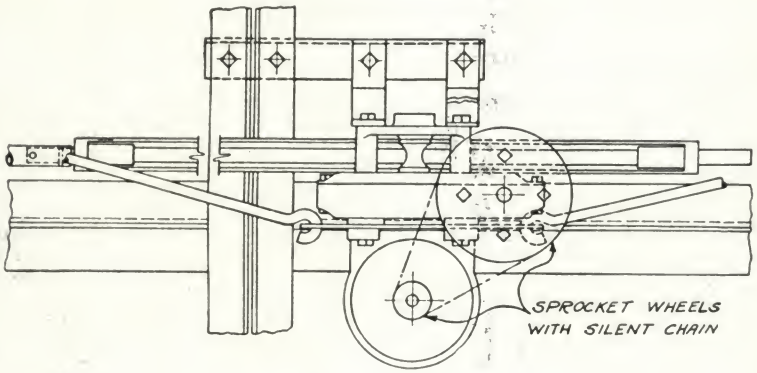
INTERIOR ELEVATION & PLAN VIEW



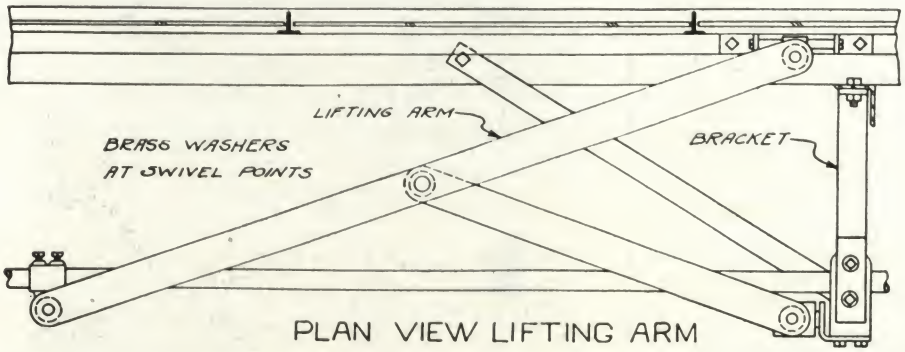
PLAN VIEW



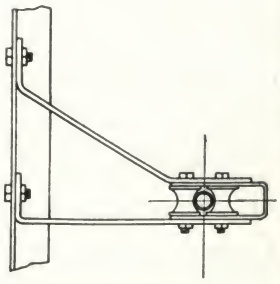
CROSS SECTION



ELEVATION



PLAN VIEW LIFTING ARM



BRACKET

PEERLESS "A" OPERATOR
ELECTRICAL

THE PAYSON MANUFACTURING CO. CHICAGO, ILL. U.S.A.				
DRWNG C-129	FILE NO	DRAWN BY VGS	CHECKED BY	APP. BY W.E.P.

METALLIC SASH OPERATOR COMPANY

4367 Duncan Avenue
ST. LOUIS, MO.

Product

Manually or electrically controlled SASH OPERATORS of SCREW, TORSION, TENSION, and RACK and PINION Types.

Company and Facilities

The METALLIC SASH OPERATOR COMPANY has been in the exclusive manufacture of sash operators of all types for the last 14 years. The company maintains a plant of sufficient size to guarantee ample and efficient service. Having furnished installations for every kind of sash for years, the company is in a position to furnish sash operators of the very best materials, substantially designed and manufactured by the best workmanship, easy to operate and operates without friction. Metallic Sash Operators will be found to be of lasting quality.

Service

The company being of the type of an engineering organization, architects and engineers are requested to submit their sash operator problems for solution. Our engineering staff is ready at all times to furnish proposed layouts, estimates or quotations, for the asking. We can also furnish details of the most efficient and economical line of sash operators of any kind and condition. There is no charge for such services.

Special Features

Screw Type—The company manufactures the latest improved type of this style of sash operator. All vertical shafts are of cold rolled steel, connecting arms are of steel, shaft brackets are of steel with adjustable bearings.

Torsion—Made of cut gears, cut steel worms; gear housings or brackets are of heavy materials. Torsion type connecting arms are made of steel, shaft brackets are of steel with cast iron adjustable bearings.

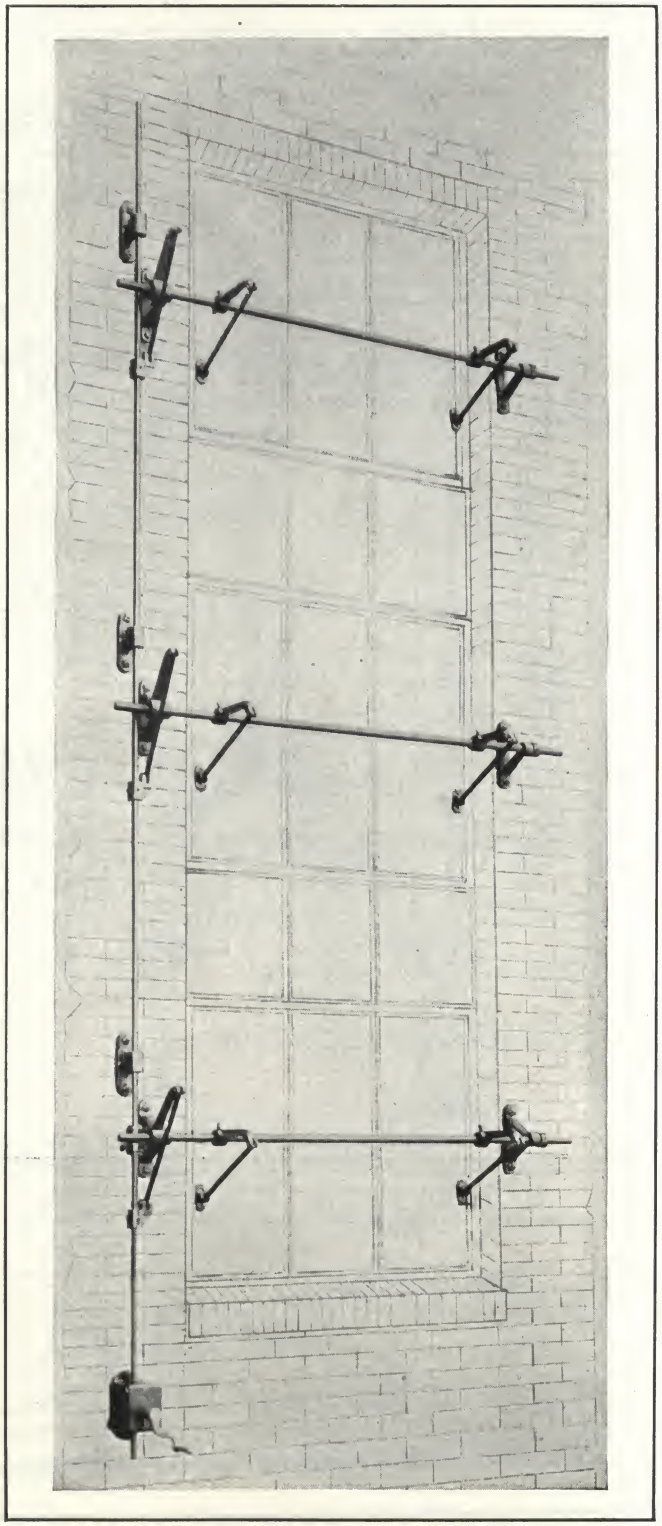
Tension Type—Contain cut worm gears enclosed in oil-tight housings free from dust or dirt, so designed that worm gears and worms are running in bath of oil at all times. Worms are made of solid steel, cut on the latest designed machines, held in place with thrust ball bearings to eliminate friction. Gear and worm shafts bronze bushed. Connecting arms are made of steel with all hinge points bronze bushed. Roller brackets are of steel rigidly attached to structural members, walls or sash members.

Rack and Pinion Type—All powers contain cut gears and cut worm, tooled out of solid steel, housed in substantial housings or frames, with heavy brackets which are rigidly attached to sash mullions, walls or structural members. Racks are made of cold rolled steel with teeth cut or generated on latest type of improved machines. Pinions are made of cold rolled steel with teeth cut on latest type of improved machines.

Screw Type Sash Operators

The very latest resign of sash operator for the control of large bays or groups of pivoted or hinged sash is found in the screw type sash operator. A single power is capable of controlling as many as 28 center side pivoted vents from one single control station. The greatest use for this type of sash operator is found in large windows containing a great number of ventilators, such as occur in power houses, turbine rooms or auditoriums. Screw type sash operators are not designed for use on long runs of sash.

METALLIC SASH OPERATOR COMPANY Screw Type operators, like other types, are manufactured of the very best materials, ample metals being provided to meet all strains put upon them in normal service. Considering the ample design, assurance of long life and ease of operation, METALLIC SASH OPERATOR COMPANY Screw Type sash operators will be found to be among the best and the most economical.



Screw Type Sash Operator

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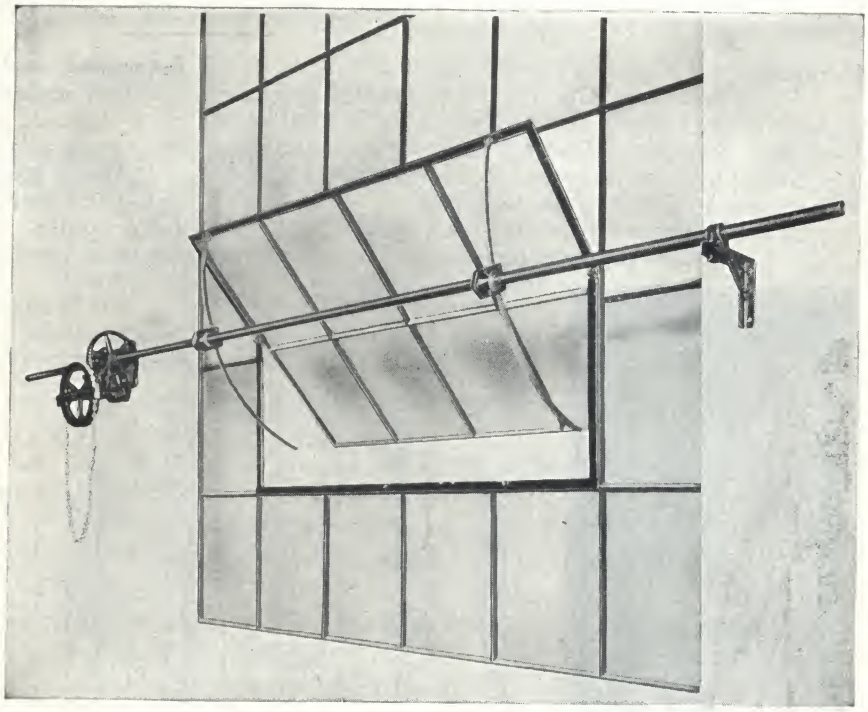
Torsion Type Sash Operators

Practical, simple, as well as economical operator for the controlling of side pivoted or hinged sash. Will control 100 ft. or less of pivoted sash and hinged sash according to their weight and position. Can be furnished in rod control type with bevel gears and hand wheels if desired. Gears are made in four sizes and the connecting arms in three. Shaft brackets can be furnished in any desired lengths. Gears are made of gray iron with machine cut teeth. Worms are cut from solid steel. Connecting arms are of steel rigidly attached to pipe shafting applying the power of operator to sash, opening them to any desired degree. All parts are substantial, and of sufficient weight to withstand the strains put upon them in the use for which they are intended.

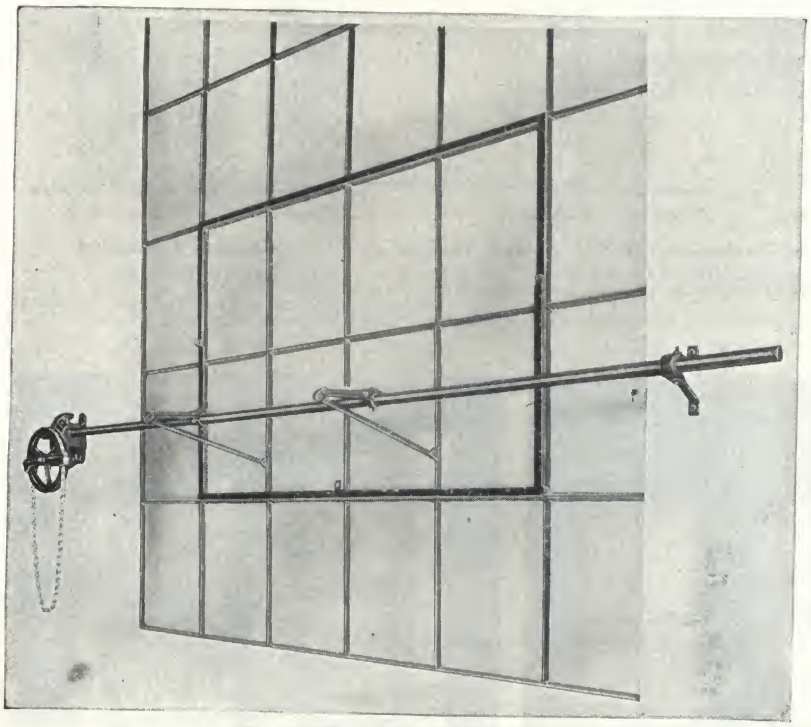
Tension Type Sash Operators

Powers are made up of cut cast worm gears, cut steel worms with steel ball thrust bearings all enclosed in dustproof housings and running in bath of oil at all times. Tension racks are made of cold rolled steel, also the rack pinions, both of which have teeth cut and generated on the latest type of improved machines. Connecting arms of toggle type are made of steel with all hinged points bronze bushed insuring ease of operation and absolute elimination of friction.

This type of sash operator will be found to be hinged continuous sash.



Rack and Pinion Type Sash Operator



Torsion Type Sash Operator

Rack and Pinion Sash Operators

These have proven to be the best type of sash operator that can be used for the control of long runs of side pivoted or hinged sash.

Both racks and pinions are made of cold rolled steel with cut teeth insuring positive action, lasting qualities, freedom from friction which makes them easy to operate.

Racks can be furnished in either straight or convex shapes.

Electrically Controlled Sash Operators

Any of the above types of sash operators can be furnished motor driven.

Whether preliminary estimates, sketches of layouts, or the final quotations are desired, we invite requests for such service, and will give them prompt, careful attention.

LORD AND BURNHAM COMPANY

SASH OPERATING DIVISION

Graybar Building, NEW YORK, N. Y.

FACTORIES

IRVINGTON, N. Y. DES PLAINES, ILL. ST. CATHARINES, ONT., CANADA

BRANCH OFFICES IN PRINCIPAL CITIES

Products

SASH OPERATING MECHANISM of the highest grade, architecturally suitable for Banks and Office Buildings, Churches, Libraries, Theaters and Public Buildings.

SASH OPERATING EQUIPMENT for Factories, Power Houses and Industrial Type Buildings.

SCREW THREAD OPERATORS for Transom Sash.

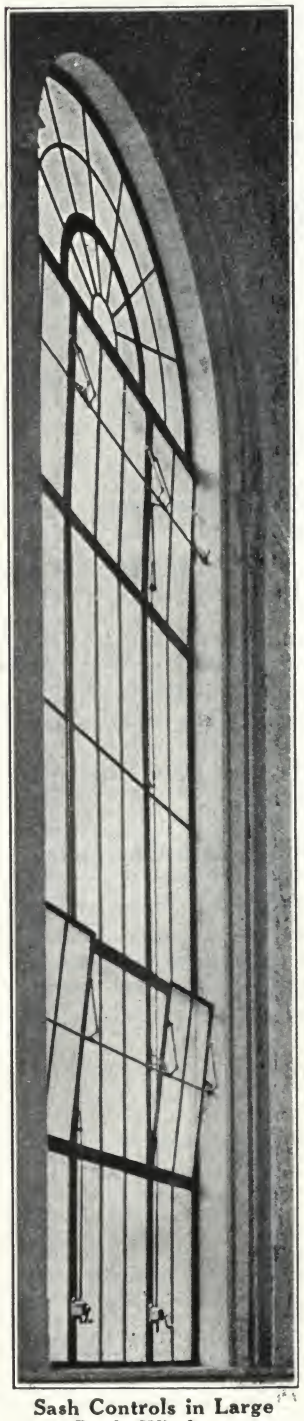
For our pages on Greenhouses, see Manufacturers' Index.

Estimating and Advisory Service

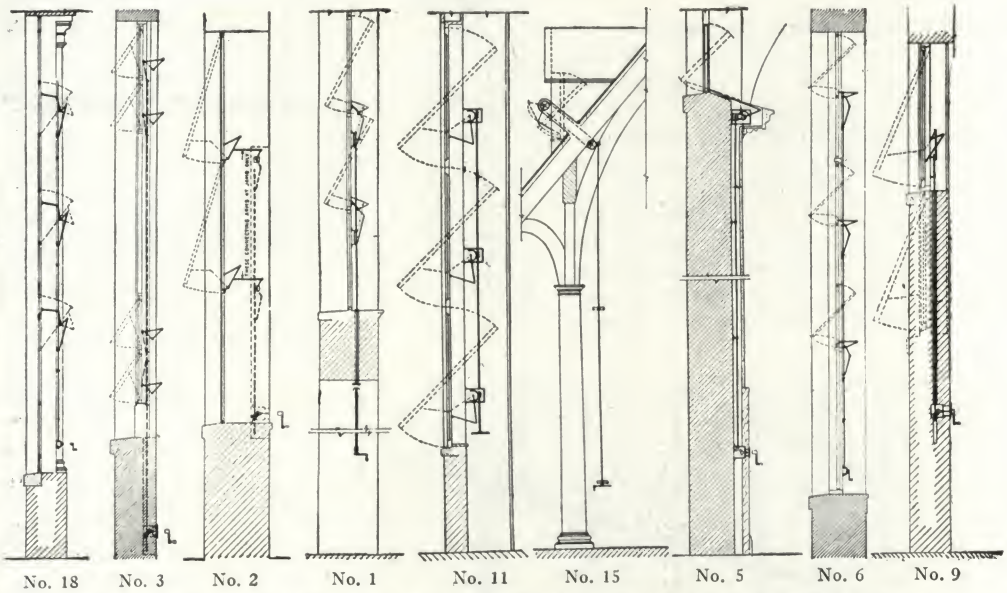
Our engineers are prepared to give full information regarding our products and their uses, to offer suggestions as to arrangements, to quote prices, etc.

These mechanisms are especially made to meet individual building conditions. Each problem is carefully studied by our engineers. Drawings showing the most practical solution are prepared for architects' approval.

Architects secure co-ordination of architectural treatment and utility, by using this service in the preliminary stages of their design.



Sash Controls in Large Bank Windows



No. 18 No. 3 No. 2 No. 1 No. 11 No. 15 No. 5 No. 6 No. 9

Arrangements of Mechanisms Which Solved Various Problems of Sash Operation

We have prepared a series of drawings and photographs showing solutions of twenty-one sash operating problems.

These include schools, churches, banks and other public buildings. The ideas illustrated will be found of help to architects and designers.

This series and our catalogues in an American Institute File Folder gladly sent upon request



Concealed Control of Gymnasium Sash



Exposed Control of Gymnasium Sash

METAL DOORS

Allen-Drew Co., Div. of Babcock-Davis Corp. A1508–1521
Art Metal Construction Co. A1317–1335
Atchison Revolving Door Co. A1420–1423
Bayer, A. J., Co. A1336
Cincinnati Mfg. Co. A1337
Coburn Trolley Track Mfg. Co. A1338–1339
Columbus Rolling Door Corp. A1428–1429
Cornell Iron Works, Inc. A1430–1432
Dahlstrom Metallic Door Co. A1340–1349
Door-Motive Corp. A1522–1523
Dusing and Hunt, Inc. A1475
Ellison Bronze Co., Inc. A1352
Empire Fireproof Door Co. A1350–1351
Equipment & Supply Co., Inc. A1353
Friedrich, E. H., Co. A1354–1355
Jamestown Metal Desk Co., Inc. A1356–1363
Johnson, Geo. W., Mfg. Co. A1462–1463
Kalman Steel Co. A1417
Kawneer Co. A1364
Kinnear Mfg. Co. A1453–1461
Lawton-Stephens Co., Inc. A1365–1367
Lyon-Carr Fire Door Co. A1476
Mahon, R. C., Co.—
Metal Covered Doors A1368
Rolling Doors A1433–1452
Majestic Iron Works, Inc. A1464–1465
Mayer, J. L., Co. A1369
Merchant & Evans Co. A1477
Metal Clad Doors, Inc. A1370
Metal Door & Trim Co. A1371–1375
Michaels Art Bronze Co., Inc. A1376
Moeschl-Edwards Corrugating Co., Inc.—
Metal Covered Doors A1377
Rolling Doors A1466–1467
Newman Mfg. Co.—
Metal Doors A1378–1385
Revolving Doors A1423a–1423d
New York Kalamein Co. A1386
Ogden, J. Edward, Co., Inc. A1524
Overly, W. F., & Sons A1387–1393
Peelle Co. A1478–1485
Peterson and Neville, Inc. A1418
Philipp Mfg. Co. A1394–1395
Quincy Elevator Gate Co. A1525
Reliance Bronze & Steel Corp. A1396–1399
Revolving Doors, Inc. A1419
Richards-Wilcox Mfg. Co. A1486
Richmond Fireproof Door Co. A1488–1493
Riester & Thesmacher Co. A1400
St. Louis Fire Door Co. A1494–1497
Security Fire Door Co. A1498–1501
Sykes Metal Products Co. A1401
Syracuse Fire Door Corp. A1404
Thorp Fire Proof Door Co. A1405–1409
Truscon Steel Co. A1502–1507
Trussbilt Steel Doors Inc. A1416
United Metal Products Co. A1410–1413
Van Kannel Revolving Door Co. A1424–1427
Variety Fire Door Co. A1414–1415
Variety Rolling Door Co. A1468–1469
Vulcan Rail & Construction Co. A1487
Wilson, J. G., Corp. A1470–1474

ART METAL CONSTRUCTION COMPANY

Hollow Metal Doors and Trim

JAMESTOWN, N. Y.

For Branch Offices, see Bank, Office and Library Equipment Section

For Sectional Metal Office Partitions, see Art Metal Construction Company in Manufacturers' Index; for Ornamental Bronze Work, see Art Metal Construction Company in Manufacturers' Index; for Bank, Office and Library Equipment, see Art Metal Construction Company in Manufacturers' Index

ART METAL DOORS AND TRIM IN STEEL AND BRONZE

Detail and Style Plates

In the following pages the aim has been to provide the essential information needed by the architect and builder in making a selection of hollow metal doors and trim to meet any situation.

The large number of styles and types of doors and the wide range of carefully selected mouldings make it possible to provide for any situation in a manner that will be gratifying to architect and owner alike.

Where it is absolutely required, tools and dies will be made for specially designed mouldings — and Art Metal facilities in this direction are most complete. The combinations of Art Metal mouldings with the various styles and types of doors offer such an unlimited field for individual effects, however, that the extra cost for special tools and dies is rarely deemed advisable.

With the plates following and the general description on the next page, it is possible to develop a specification that will be most exact and accurate in meeting the architect's requirements.

Art Metal engineers and representatives are at the service of the architect and builder in amplifying the information on any point.

Art Metal
Jamestown, New York
U. S. A.

TRADE-MARK

Types of Doors

The types illustrated in this catalogue cover Art Metal standard construction, with profiles carefully designed and selected to conform to the best in architectural detail.

Art Metal facilities make possible the fabrication of doors in any special type and profile where conditions warrant.

STANDARD FINISHES OF ART METAL DOORS

Class	Finish
No. 1	Olive "F"
No. 2	No. 29 Brewster green No. 30 Stone green No. 51 Medium green No. 52 Brown No. 53 Tan Maroon Black
No. 2½	No. 1 Dull bronze, light No. 2 Dull bronze, medium No. 3 Dull bronze, dark French gray
No. 3	No. 36 Dark mahogany, straight grain No. 36B Light mahogany, straight grain No. 54 Gold bronze No. 55 Silver bronze
No. 3 (cont.)	White Ivory Cream
No. 4	No. 36 Dark mahogany, crotch grain No. 61 Brown mahogany
No. 5	No. 57 Plain oak, medium No. 58 Quartered oak, medium
No. 6	No. 59 Light American walnut No. 60 Dark American walnut Circassian walnut
No. 7	No. 56 Verdigris green, stippled No. R-328 Mottled green, stippled

Casings and Mouldings

On plates 5 to 10 inclusive are illustrated some of the many shapes available in Art Metal mouldings. These have been grouped according to principal uses to which they are ordinarily put. However, many of these mouldings are equally suitable for other purposes and while it is hoped that the grouping shown will be of assistance to architects it is not to be considered as the only possible uses for any particular shape. All are made in both bronze and steel. The numbers on the plates are for bronze mouldings; for steel add the suffix ½.

All mouldings are made of specially selected stock and carefully rolled through accurate dies giving a sharp profile. Art Metal Construction Co. has unusual facilities for producing special mouldings to architect's designs where standard shapes will not meet the requirements.

FIRE UNDERWRITERS' REQUIREMENTS

The National Board of Fire Underwriters have tested and approved Art Metal products, authorizing their labels for the following situations:

Class "A," Units in Division Walls Between Separate Buildings or Sections of Buildings—Limitations: swinging type; single doors for openings not exceeding 4x7 feet, and doors in pairs not exceeding 5x7 feet, all steel with approved hardware.

Class "B," Units in Enclosures to Vertical Communications Through Buildings—Limitations: swinging type; single doors for openings not exceeding 4x10 feet, and doors in pairs not exceeding 8x10 feet, all steel with approved hardware.

Class "C," Units in Corridor and Room Partitions—Limitations: swinging type; single doors for openings not exceeding 4x10 feet, and doors in pairs not exceeding 8x10 feet, with or without panels of standard wire glass. Exposed area of individual lights not exceeding 399 square inches.

Class "D," Units in Exterior Walls Subject to Severe Fire Exposure—Limitations: swinging type; single doors for openings not exceeding 4x10 feet, and doors in pairs not exceeding 8x10 feet.

Class "E," Fire Escape Units Subject to Moderate Fire Exposure—Limitations: swinging type; single doors for openings not exceeding 4x10 feet; single doors in pairs not exceeding 5x10 feet. With or without panels of wired glass.

Exposed area of individual lights not to exceed 399 square inches.

Continued on next page

GENERAL DESCRIPTION FOR SPECIFICATIONS

Materials

Materials used are the best of their respective kinds, and those best suited for their particular purposes. All steel and ingot iron are the best grades commercial furniture stock of the United States standard gauge. All bronze is best grade commercial stock of Brown & Sharpe gauge, of suitable hardness and uniform color.

Workmanship

All work is executed by craftsmen, in accordance with the latest principles of construction and most modern methods of manufacture.

Doors and Sash

Stiles and rails are formed of No. 18 gauge stock with cold drawn panel mouldings securely keyed thereto and properly reinforced for hardware. Stiles are provided with compressed cork insulation for eliminating metallic sound.

Joints are fitted, reinforced, welded and dressed to produce invisible connections.

Metal panels consist of two plates of No. 20 gauge stock, separated by ¼-in. heat retarding insulation.

Glass panels are retained by removable cold drawn moulding frames closely fitted and secured to panel mouldings by No. 6-32 countersunk oval-head screws.

Muntins are constructed of cold drawn interlocking shapes fitted and welded to panel moldings.

Astragals are of cold drawn interlocking shapes welded to door stiles.

Jambs

For openings in walls up to 7½ in. thick, jambs are formed of No. 18 gauge stock; over 7½ in. No. 16 gauge with ½-in. plain or moulded stops for regular units, and ¾-in. for underwriters' units and secured to bucks by No. 8-32 screws.

Casings

Of No. 18 gauge cold drawn shapes, corners accurately mitered, welded and dressed to produce invisible joints. Casings are secured to bucks and jambs by concealed fastenings.

Pressed Steel Bucks

Of No. 14 gauge stock provided with anchor retainers and plaster bonds; corners reinforced with No. 12 gauge splices electrowelded; 2x¾ in. x No. 16 gauge channel spreaders with No. 12 gauge angle gussets screwed to bottoms; No. 18 gauge corrugated adjustable anchors furnished for each 25 in. of opening height.

Bucks for walls of plaster block construction are furnished with struts of ¼x3-in. bars, having No. 12 gauge 6x6-in. flanged gusset connections for securing to ceiling.

Bucks for openings more than 3 ft. 6 in. wide in tile or brick walls are provided with No. 12 gauge x 4 in. arched masonry supports welded to heads at ends.

Frames

Combination buck and jamb frames are formed of No. 10, 12, 14 or 16 gauge, corners accurately fitted, welded and dressed to produce invisible rigid joints. Trim members can be pressed into frames or be of drawn shapes applied by concealed fastenings. Frames are provided with spreaders, anchors, struts and masonry supports as specified for bucks.

Hardware

Hollow metal work is prepared and reinforced for proper reception of all hardware and appliances. Ordinarily the hardware is furnished under separate contract, but applied at our plant.

Transom Sash

Stiles and rails are formed of No. 18 gauge stock with cold drawn panel mouldings securely keyed thereto. Glass panels are retained by removable cold drawn moulding frames closely fitted and secured to panel mouldings by No. 6-32 countersunk oval head screws. Muntins are constructed of cold drawn interlocking shapes fitted and welded to panel mouldings.

Transom Bars

Transom bars are formed of 10, 12, 14, 16 or 18 gauge stock with plain, paneled or moulded faces and welded to jambs or secured by concealed screws as conditions warrant.

Mullions

Mullions are formed of 10, 12, 14, 16 or 18 gauge stock, with plain, paneled or moulded faces and welded to jambs or secured by concealed screws as conditions warrant.

Partition Lights

Partition lights, side lights or borrowed lights are made up similar to door frames under headings "Jambs" and "Frames" described above.

Trim Mouldings

Chair rail, staff or scribe, picture and wire mouldings are of No. 18 gauge cold drawn shapes, secured to walls by concealed fastenings.

Bases

Constructed of No. 18 gauge with plain or moulded profiles, fitted with bronze sanitary coves and secured to walls by concealed fastenings.

Window Trim

Jamb linings are of No. 18 gauge, plain or paneled, provided with adjustable stops secured by No. 6-32 countersunk oval head screws. Mullions are No. 18 gauge with plain, moulded or paneled faces, and provided with adjustable stops secured by No. 6-32 screws.

Stools are of No. 16 gauge with returns accurately mitered, dressed smooth and secured by concealed method.

Casings and aprons are of No. 18 gauge cold drawn shapes with corners and returns mitered, welded, dressed smooth and secured by concealed method.

Partitions

Of sectional type with units of size allowing for flexibility of arrangement. Units properly constructed of formed and drawn shapes of No. 18 gauge stock, reinforced and so assembled as to produce invisible connections. Owing to its perfected construction, installation is simple and can be performed economically and expeditiously, ceiling height partitions are secured by indirect method, causing no injury to ceiling.

Bronze Work

The foregoing description covers our standard products in steel. Bronze work is executed similarly except that materials are two gauges heavier, joints are made by riveting, screwing and brazing, and finish is produced in accordance with standard methods for durability and desired effects.

Finish—Baked Enamel

Material is thoroughly cleaned, primed and filled, followed by subsequent coats as required to produce a durable finish of color required. Each coat is uniformly applied, baked, and sanded with final coat rubbed to an eggshell gloss. Prime finish consists of ground-coat filler and dipped or sprayed finish coat.

Elevator Door Hardware

The general practice is to include the hangers for elevator doors in the door contract, the operating device and safety locks being installed under separate contract or with the elevator mechanism and car.

Hangers

Unless specifications state make required, we will use our best judgment in supplying hangers of dependable and recognized manufacture.

Continued on next page

NUMERICAL INDEX OF MOULDINGS

Moulding	Plate	Moulding	Plate	Moulding	Plate	Moulding	Plate	Moulding	Plate	Moulding	Plate	Moulding	Plate	Moulding	Plate
01	9	013272	8, 10	013320	8	013398	9	013456	9	013585	10	0194	6	030657	9
0100	6, 10	013273	6	013321	8, 9	013402	9	013457	7	013820	10	02	9	030675	8
0101	8	013274	6	013322	8	013403	8	013458	8, 10	013862	10	02241	10	030676	10
0102	9	013275	8	013323	9	013404	8	013459	7	013915	10	023	5	030683	5
0108	5	013277	10	013324	10	013409	7	013460	8	013916	9	024	5	030 85	7
011	9	013278	10	013325	9	013410	6	013461	9	013926	9	02402	9	030686	10
0111	10	013281	9	013326	8, 9	013411	7	013462	9, 10	013950	10	02403	7	030690	9
0114	8, 10	013282	9	013327	10	013412	7, 8	013463	10	013951	10	02404	8	030699	6
0115	7, 10	013287	8, 10	013328	9	013413	7	013464	9	013953	5	02405	6	030700	6
0116	7	013288	8, 10	013329	9	013414	7	013465	7	013954	5	02407	8	030711	5
0117	8, 9	013289	9	013330	10	013415	6	013466	9, 10	013955	5	02408	7	030744	5
0118	7	013290	9	013331	9	013416	7	013467	9	013957	10	02410	6	035	8, 9
0119	8	013291	10	013332	9	013417	7, 8	013468	9	013960	10	02413	9	044	9
0120	10	013292	10	013333	9	013419	5	013504	9	013964	6	02427	10	05	9
0125	9	013293	8, 9	013334	9	013420	6	013508	10	013975	10	02431	10	052	10
0126	9	013294	9	013345	8, 9	013421	5	013512	10	013976	7, 10	02433	8, 10	053	7, 9
0127	7	013295	9	013346	8	013422	5	013517	8, 10	013977	7	02439	10	05481	10
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0130	7	013298	10	013351	9	013428	5	013526	8	013997	8, 10	027	10	06045	9
0131	10	013299	10	013352	9	013429	5	013528	9	013999	5	030	9	06123	9
013143	10	013300	9	013353	9	013430	6	013531	9	0140	9	030102	5	06124	8
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013271	8	013319	8	013397	9	013455	9	013582	10	0192	10	030580	5	09868	7, 10

SOME ART METAL INSTALLATIONS OF HOLLOW METAL DOORS AND TRIM

CONNECTICUT

City	Installation	Architect
Hartford	Hartford National Bank & Trust Co.	
Torrington	Charlotte-Hungerford Hospital	Crow, Lewis & Wick
Waterbury	Southern New England Telephone Co.	Douglas Orr

DISTRICT OF COLUMBIA

Washington	Congressional Library	
Washington	Gallinger Hospital	A. L. Harris
Washington	National Geographic Society	A. B. Heaton
Washington	Tivoli Theatre	Thos. W. Lamb, Inc.
	Washington Loan & Trust Co.	Arthur B. Heaton

GEORGIA

Atlanta	City Hall	C. Lloyd Preacher & Co.
Atlanta	First National Bank	Pringle & Smith

ILLINOIS

Chicago	Board of Trade Building	Holabird & Root
Chicago	Commonwealth Edison Co.	Holabird & Roche
Chicago	Morrison Hotel	
Chicago	Underwriters' Laboratories, Inc.	Richard E. Schmidt, Garden & Martin
Chicago	Wacker-LaSalle Building	Holabird & Root

INDIANA

Anderson	Anderson Bank & Trust Building	Vonnegut, Bohn & Mueller
Fort Wayne	St. Joseph's Hospital	Pohlmeyer & Pohlmeyer
Hammond	First National Bank Building	Weary & Alford
Indianapolis	Selig Building	Vonnegut, Bohn & Mueller
Kokomo	Kokomo Telephone Exchange Building	
Muncie	Ball Memorial Hospital	Kibele & Garrard

MARYLAND

Baltimore	Johns Hopkins Medical & Surgical Clinics	Joseph Evans Sperry
Baltimore	Lord Baltimore Hotel	W. D. Stoddart
Baltimore	Hecht Brothers Store	
Baltimore	Municipal Building	W. H. Emory

MASSACHUSETTS

Boston	Boston City Hospital	Ritchie, Parson & Taylor
Boston	Commonwealth Atlantic National Bank	Thomas M. James Co.
Boston	Consolidated Gas Co.	Parker, Thomas & Rice
Boston	Edison Electric Illuminating Co.	Bigelow & Wadsworth
Boston	First National Bank Building	York & Sawyer
Boston	John Hancock Mutual Life Insurance Co.	Parker, Thomas & Rice
Springfield	Massachusetts Mutual Life Ins. Co.	Kirkman & Parlett
Springfield	State Building	Burton E. Geckler
Worcester	State Mutual Life Association	Parker, Thomas & Rice

MICHIGAN

City	Installation	Architect
Ann Arbor	University of Michigan	York & Sawyer
Detroit	David Stott Building	Donaldson & Meirer
Detroit	Detroit News	
Detroit	Detroit R. R. Harbor Terminal	Albert Kahn, Inc.
Detroit	Detroit Towers Building	Walter A. Ahlschlager
Detroit	Herman-Kiefer Hospital	Albert Kahn, Inc.
Grand Rapids	Michigan Bell Telephone Co.	Smith, Hinchman & Grylls

NEW JERSEY

Atlantic City	Atlantic City Electric Co.	V. B. Smith
Camden	Camden Co. Court House and Municipal Bldg.	Edwards & Green
Hackensack	Holman Building	Moores & Dunford
Jersey City	Holland Tunnel Buildings	Ole Singstedt
Newark	Essex County Hall of Records	Guilbert & Betelle

NEW YORK

Albany	Capitol Building	State Division of Architecture
Albany	Department of Health Building	Sullivan W. Jones, State Architect
Albany	Executive Mansion	State Division of Architecture
Brooklyn	Kings County Hospital	Leroy P. Ward
Buffalo	Erie County Court House	J. J. Cook
Buffalo	Federal Reserve Bank	Esenwein & Johnson
New York	Equitable Trust Co.	Trowbridge & Livingston
New York	Federal Reserve Bank	York & Sawyer
New York	R. H. Macy & Co.	Robert D. Kohn
New York	New Madison Square Garden	Thos. W. Lamb, Inc.
New York	New York County Court House	Guy Lowell
New York	No. 2 Park Avenue Building	Buchman & Kahn
New York	Plaza Hotel	Schultz & Weaver
New York	Saks Co. Building	Starrett & Van Vleck
New York	Waldorf-Astoria Hotel	Schultz & Weaver

OHIO

Cincinnati	Carew Tower	Walter W. Ahlschlager
Cincinnati	Union Central Life Building	Garber & Woodward
Cleveland	Cleveland Club	Meade & Hamilton
Cleveland	Federal Reserve Bank	Walker & Weeks
Cleveland	National Town & Country Club	George P. Post & Sons

PENNSYLVANIA

Harrisburg	Union Trust Co.	
New Kensington	Aluminum Co. of America, Research Bldg.	P. R. L. Hogner
Philadelphia	Equitable Building	A. F. Gilbert
Philadelphia	Free Library of Philadelphia	Horace Trumbauer
Philadelphia	Presbyterian Hospital	John T. Windrum
Pittsburgh	Arrott Land Building	Hunting, Davis & Dunnells
Pittsburgh	McCreery & Co.	

CANADA

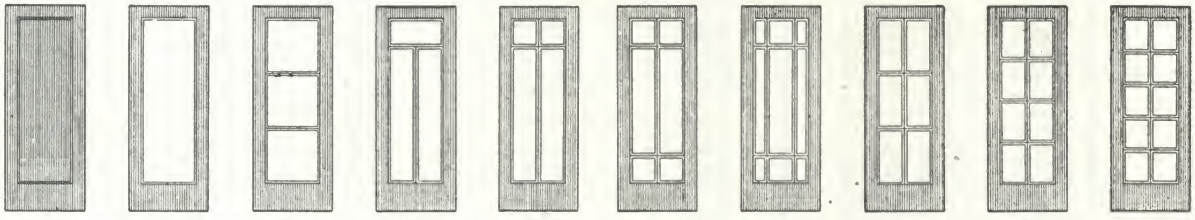
Edmonton	Canadian Bank of Commerce	York & Sawyer
Montreal	Royal Bank of Canada	York & Sawyer

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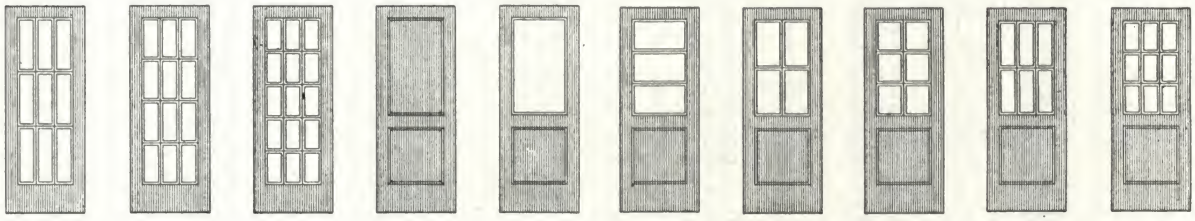
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· STYLES OF Art Metal · DOORS ·

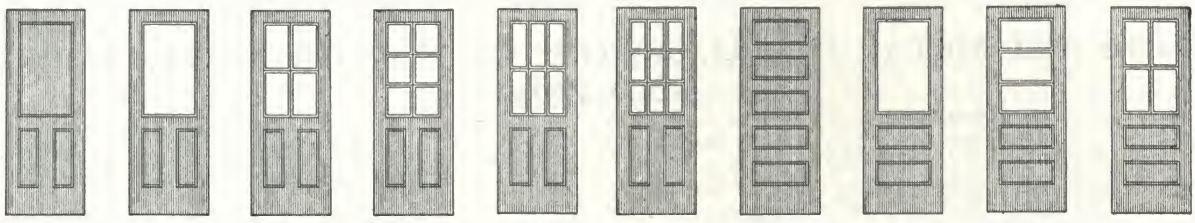
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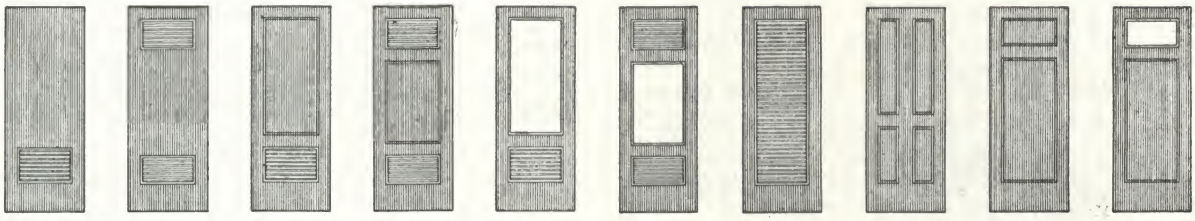
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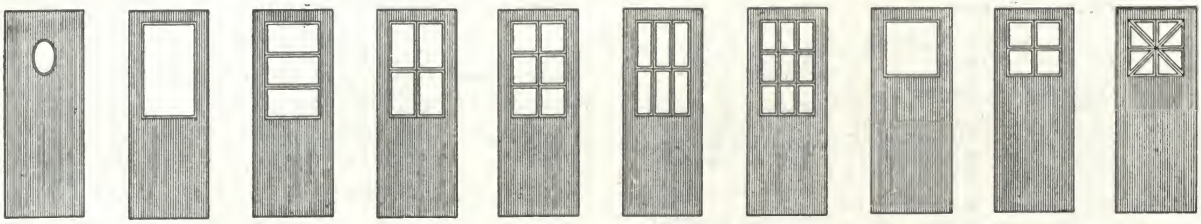
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·A31· ·A31A· ·A32· ·A32A· ·A33· ·A33A· ·A33B· ·A34· ·A35· ·A35A·



·A35B· ·A35C· ·A35D· ·A36· ·A36A· ·A23· ·A24· ·A25· ·A26· ·A26A·



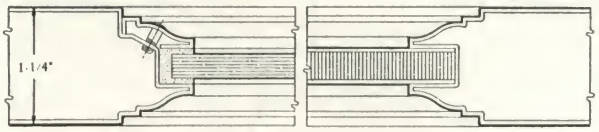
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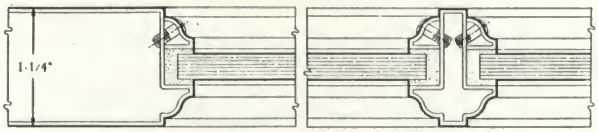
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· TYPES OF · DOORS ·

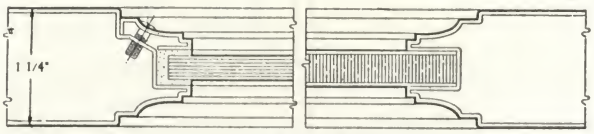
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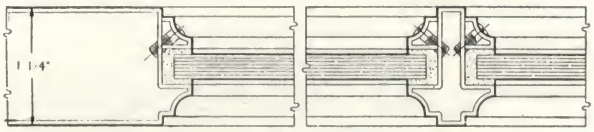
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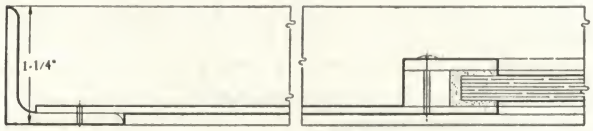
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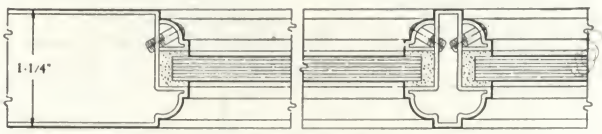
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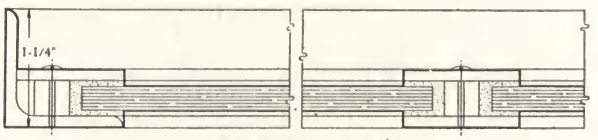
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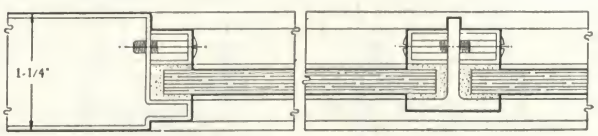
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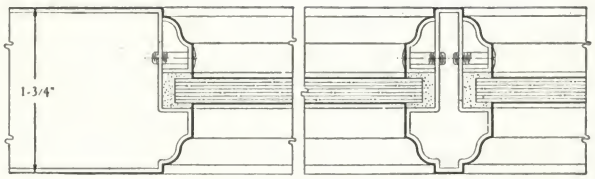
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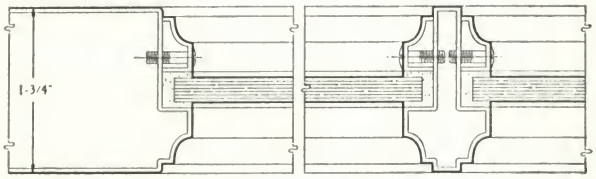
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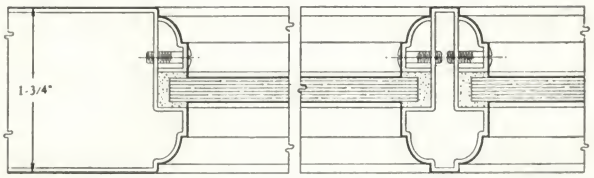
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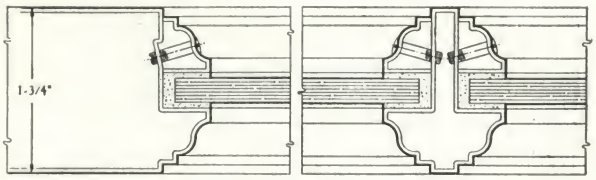
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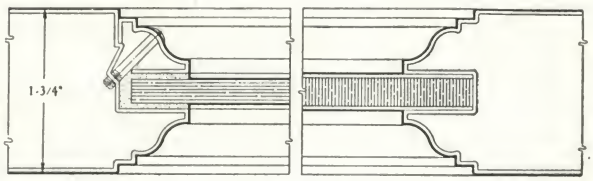
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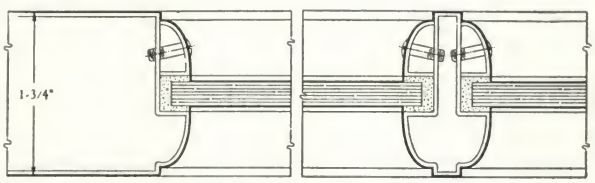
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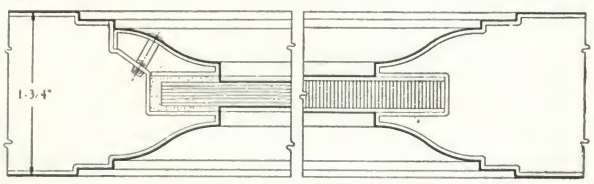
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· TYPE · 51 ·



· TYPE · 89 ·



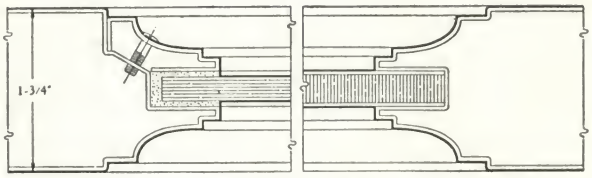
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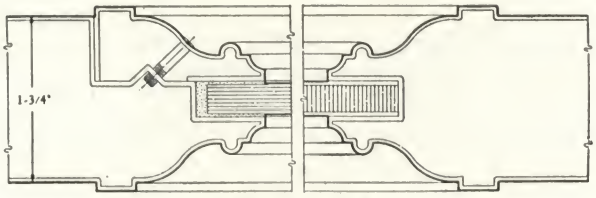
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TYPES OF DOORS

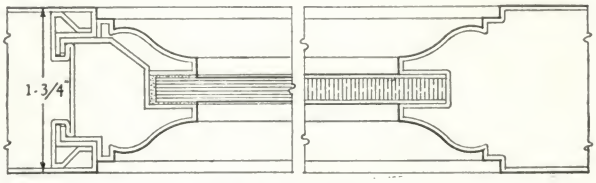
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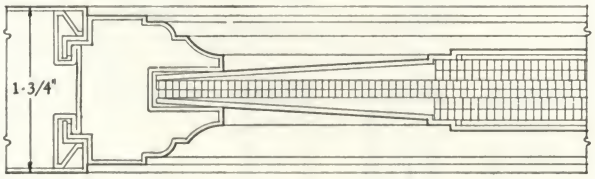
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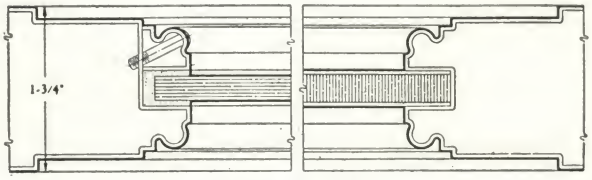
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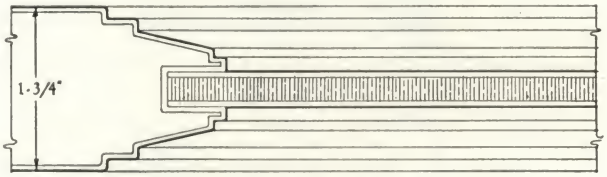
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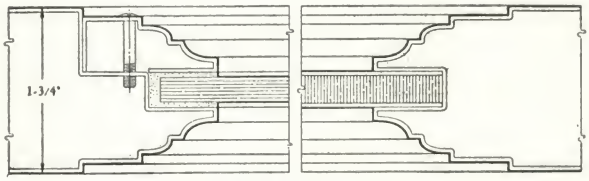
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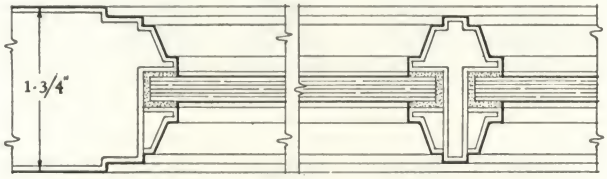
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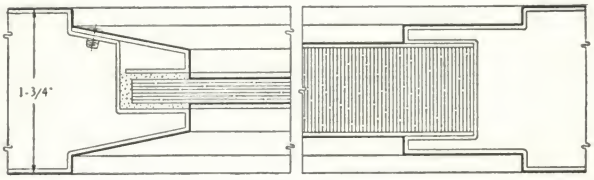
·TYPE·107·
WITH STEEL PANELS



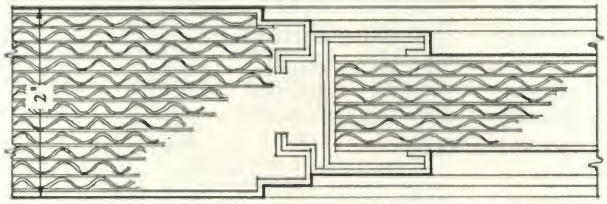
·TYPE·90·



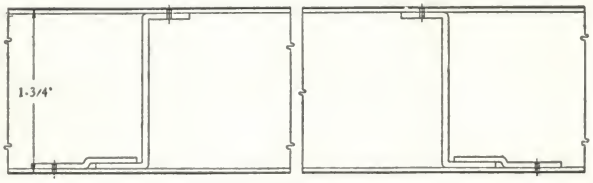
·TYPE·107·
WITH GLASS PANELS



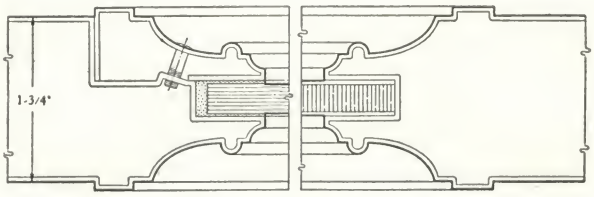
·TYPE·87·



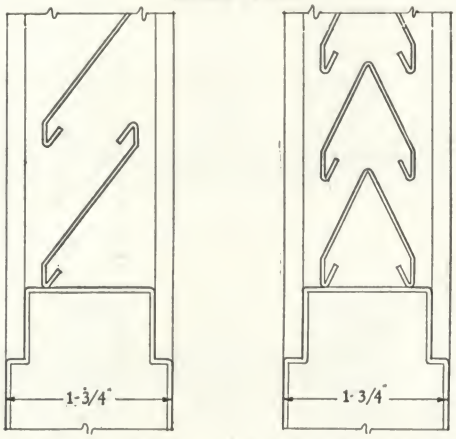
·TYPE·87·
LABELED DOOR



·TYPE·94·



·TYPE·66·



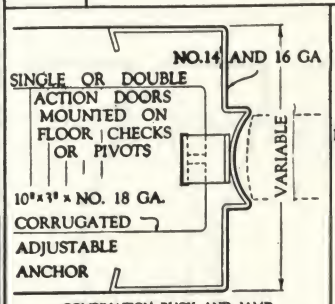
·TYPE·98· ·TYPE·104·

Continued on next page

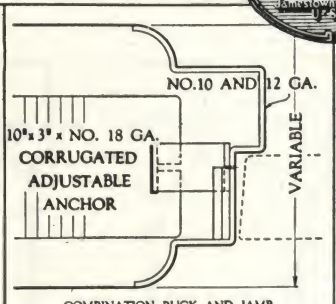
SCALE 3"-1'

DOOR FRAMES

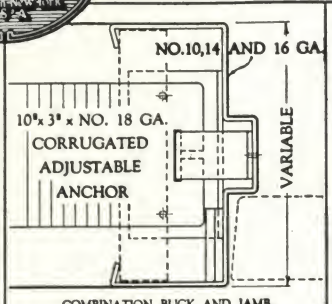
PLATE 4



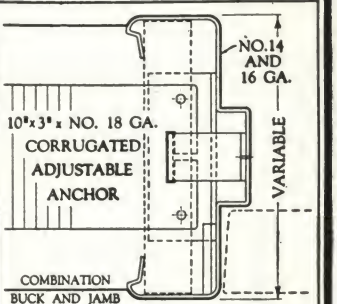
TYPE B4



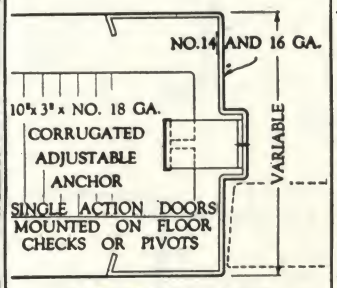
TYPE E1



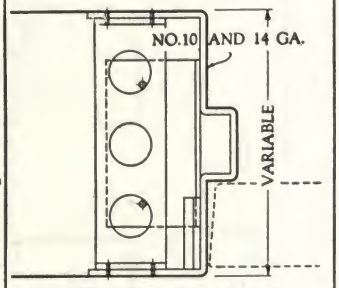
TYPE B2



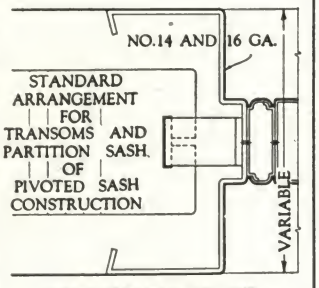
TYPE HH1



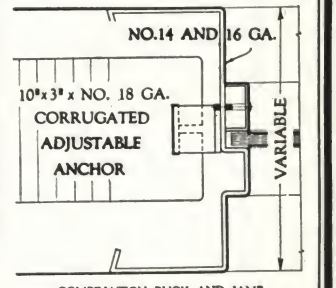
TYPE B3



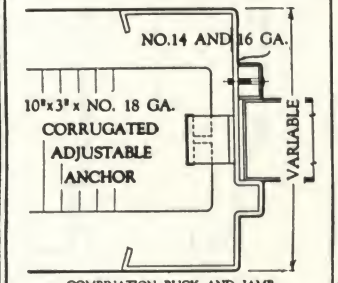
TYPE C2



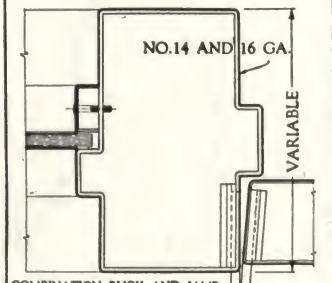
TYPE B7



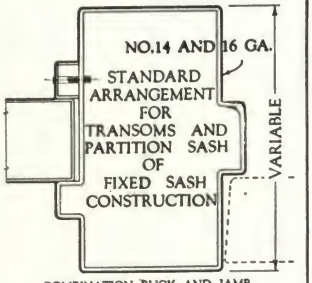
TYPE B5



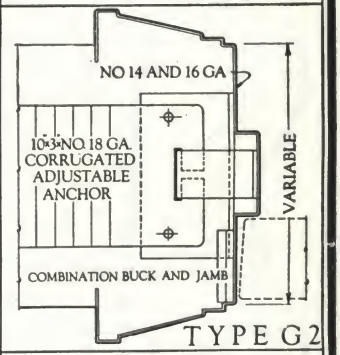
TYPE B6



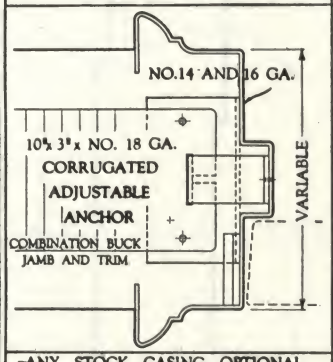
TYPE B8

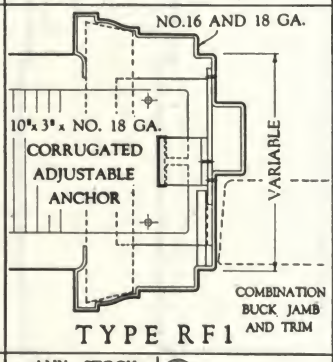


TYPE B9

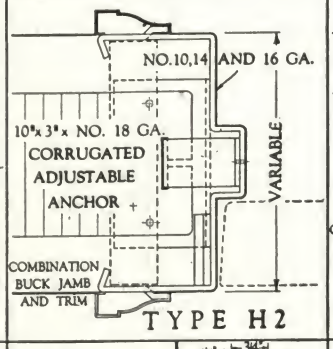


TYPE G2

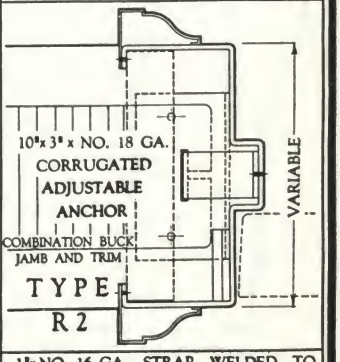




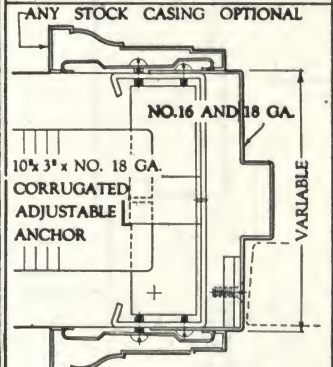
TYPE RF1



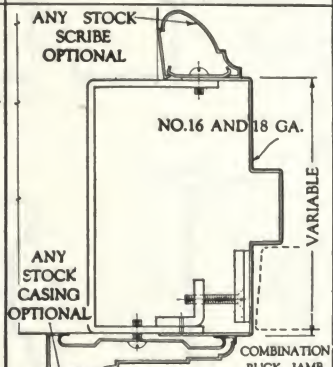
TYPE H2



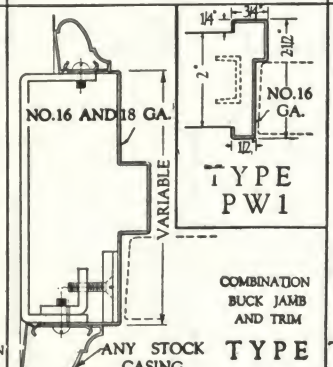
TYPE R2



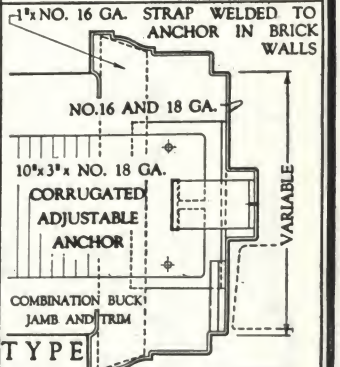
TYPE J2



TYPE L2



TYPE N2



TYPE RF2

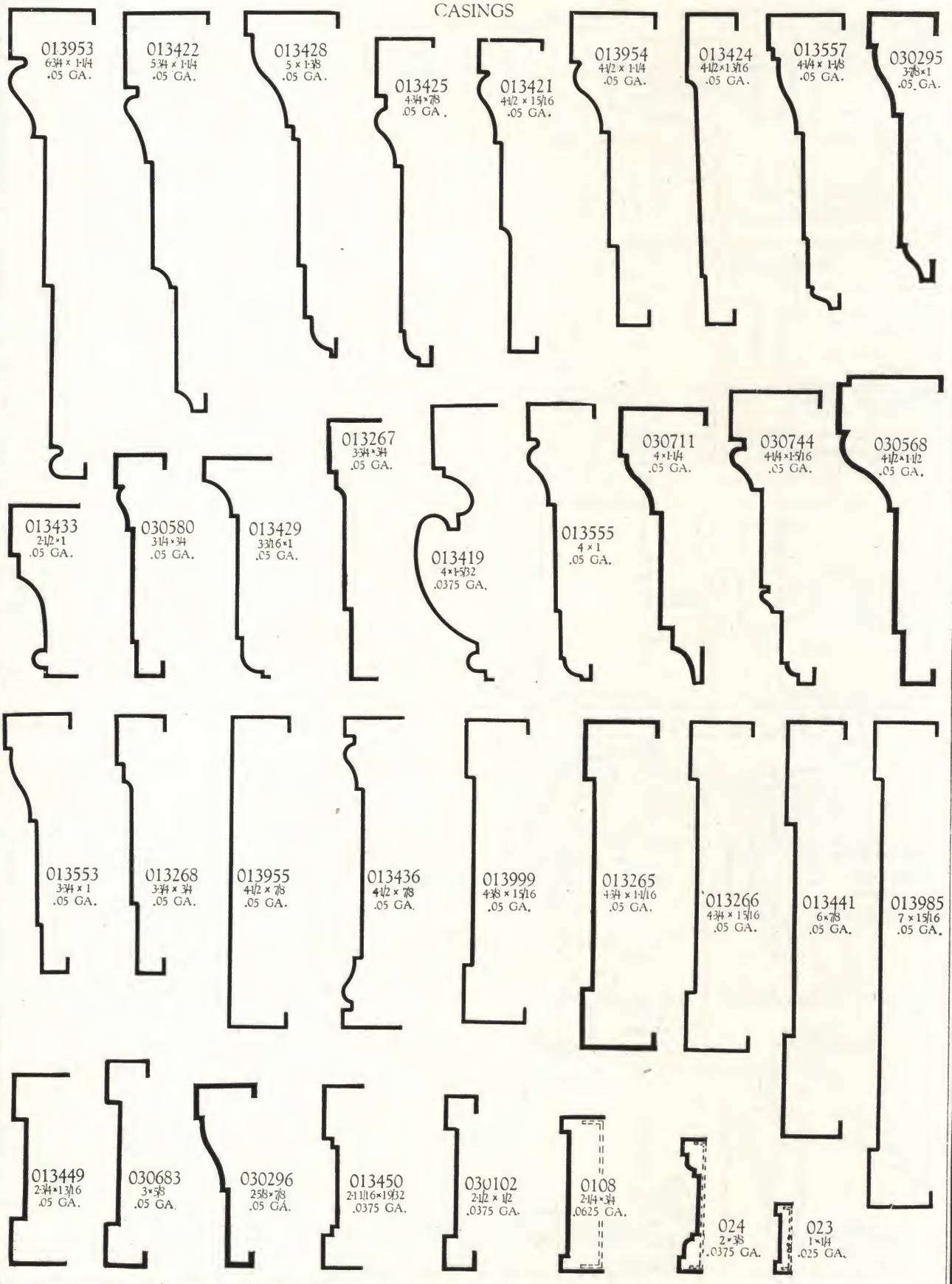
Continued on next page

SCALE 1/2 F. S.

ART METAL MOULDINGS

PLATE 5

CASINGS



Continued on next page

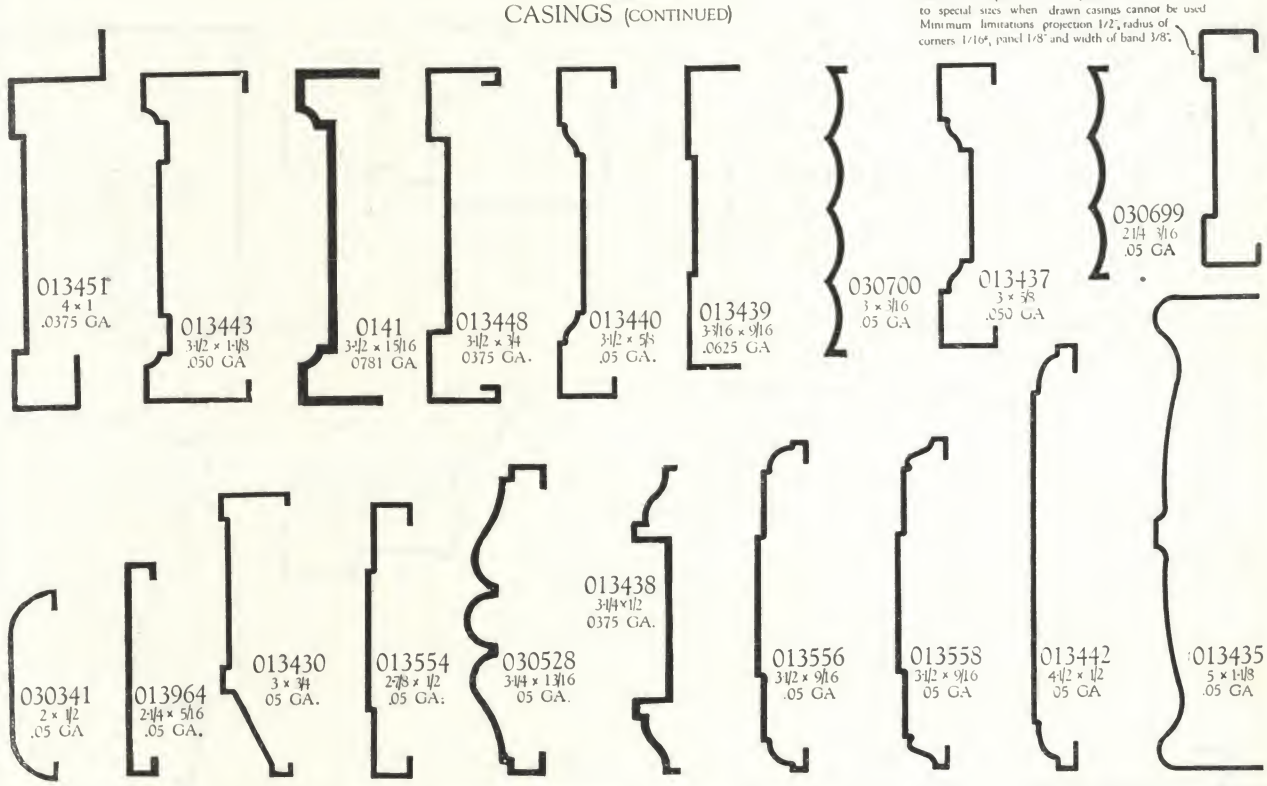
SCALE 1/2 F.S

ART METAL MOULDINGS

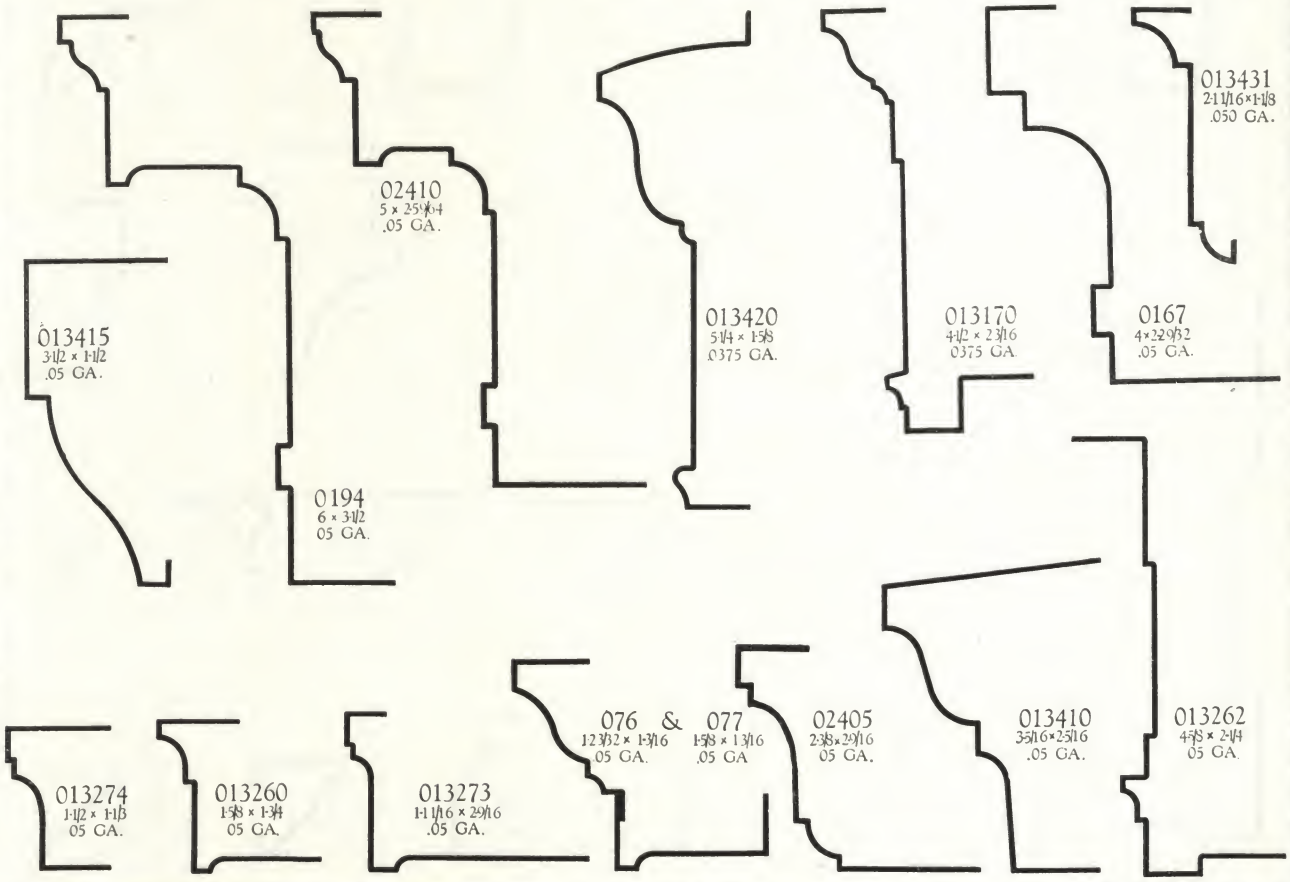
PLATE 6

CASINGS (CONTINUED)

SPECIAL
Casings of this character and with plain faces can be bent up with either square or round corners to special sizes when drawn casings cannot be used. Minimum limitations projection 1/2", radius of corners 1/16", panel 1/8" and width of band 3/8".



CORNICES



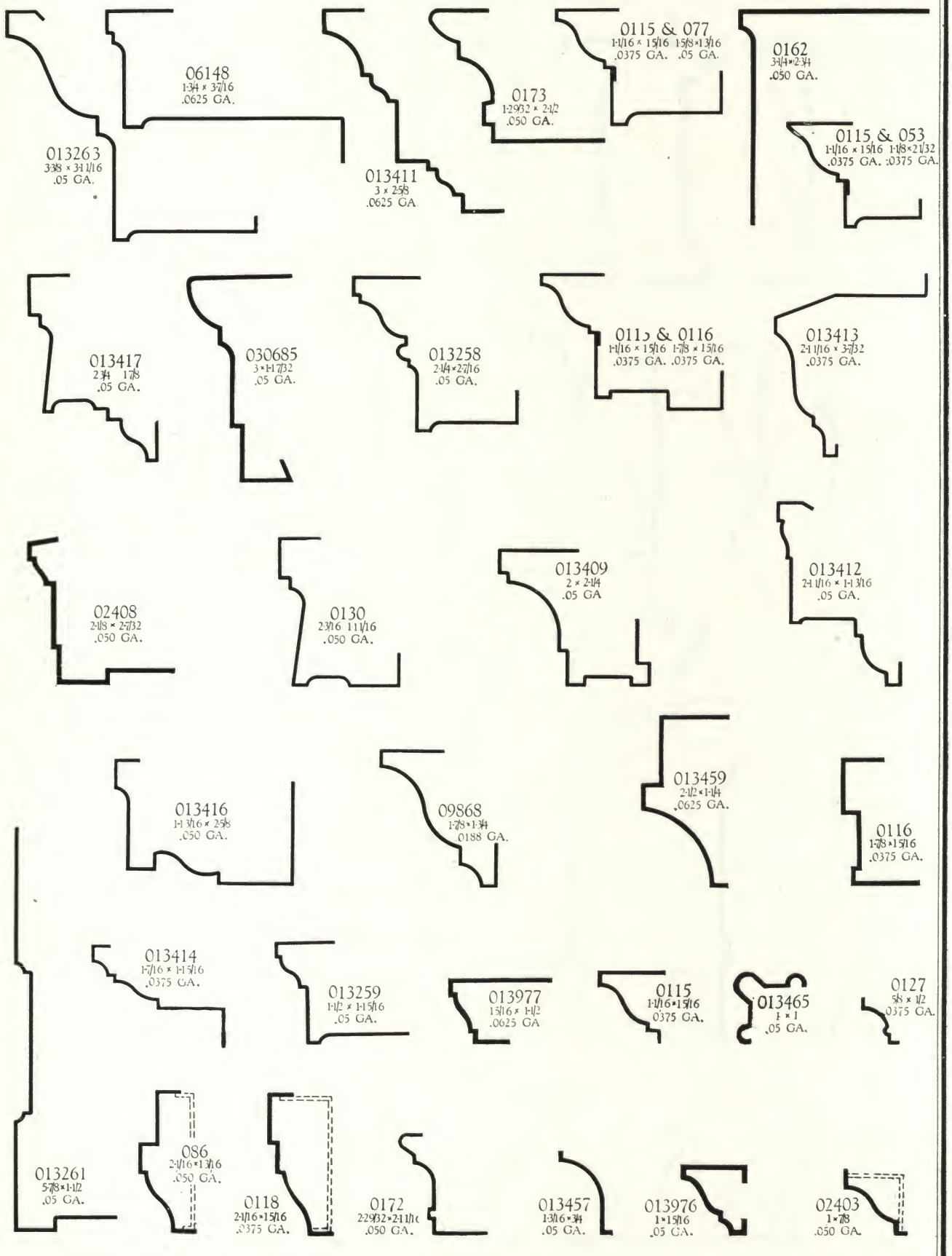
Continued on next page

SCALE 1/2 F. S.

ART METAL MOULDINGS

PLATE 7

CORNICE MOULDINGS



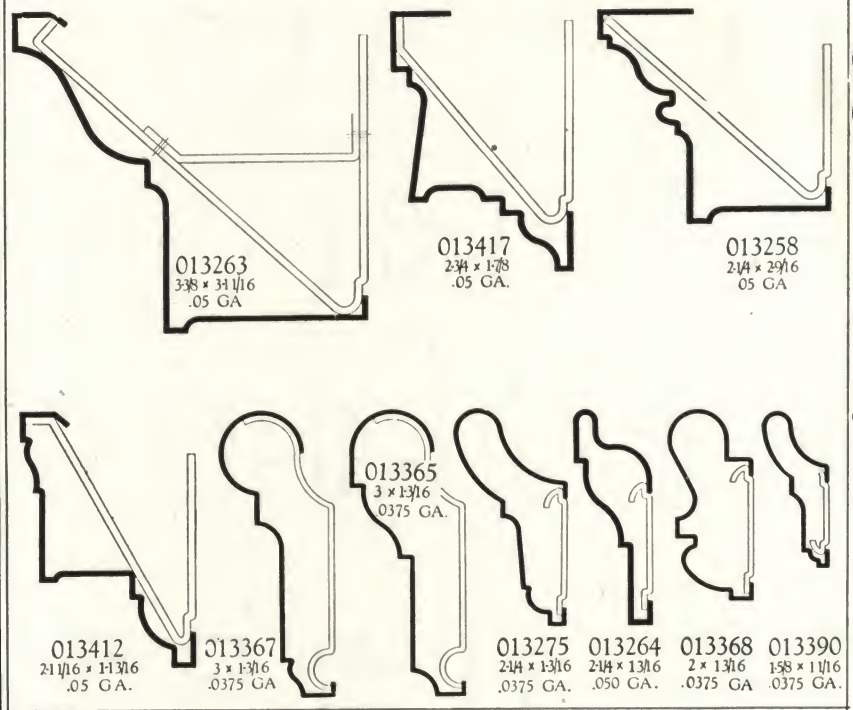
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SCALE 1/2 F. S.

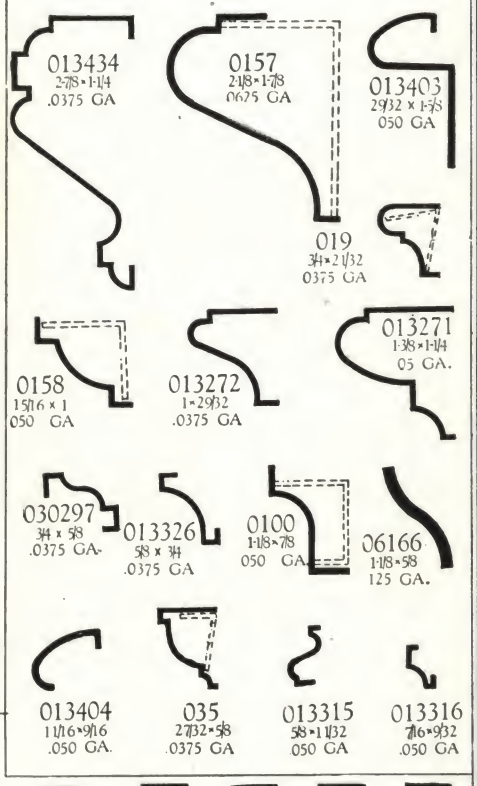
ART METAL MOULDINGS

PLATE 8

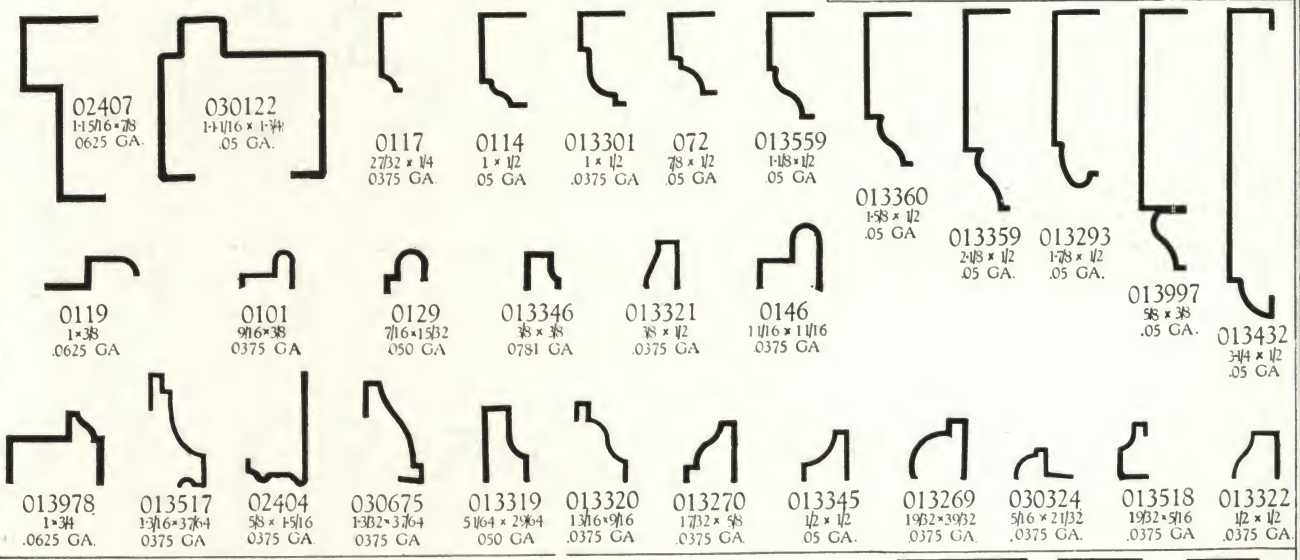
WIRE AND PICTURE MOULDINGS



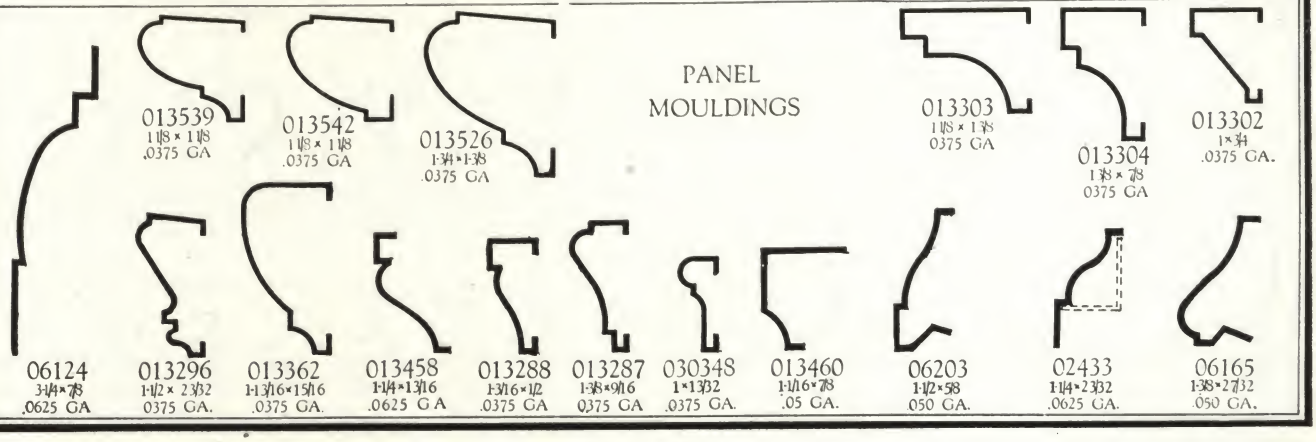
SCRIBE AND BED MOULDINGS



GLASS STOPS



PANEL MOULDINGS



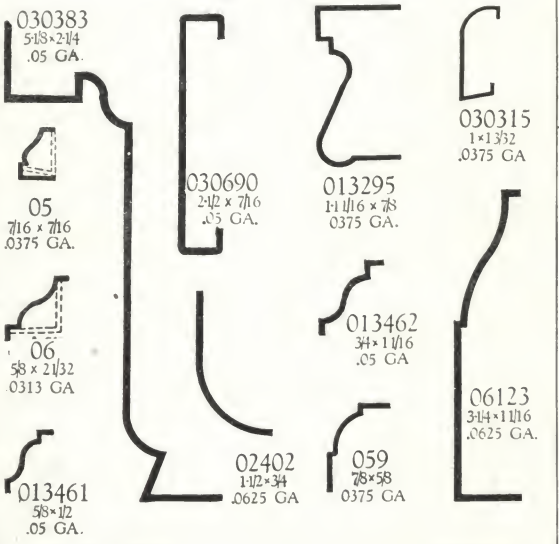
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SCALE 1/2 F.S.

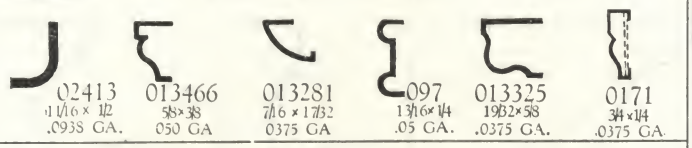
ART METAL MOULDINGS

PLATE 9

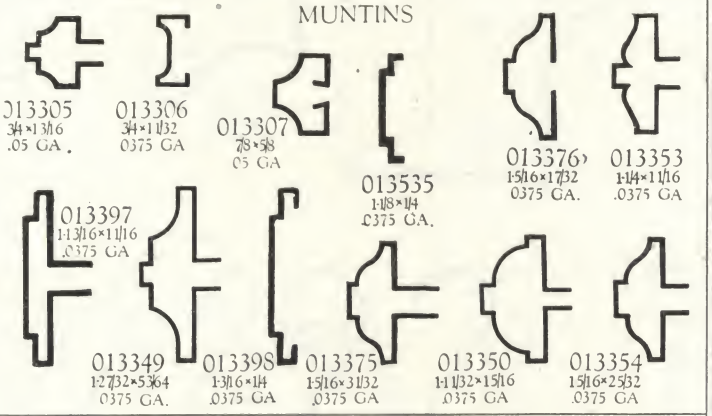
BASE MOULDINGS



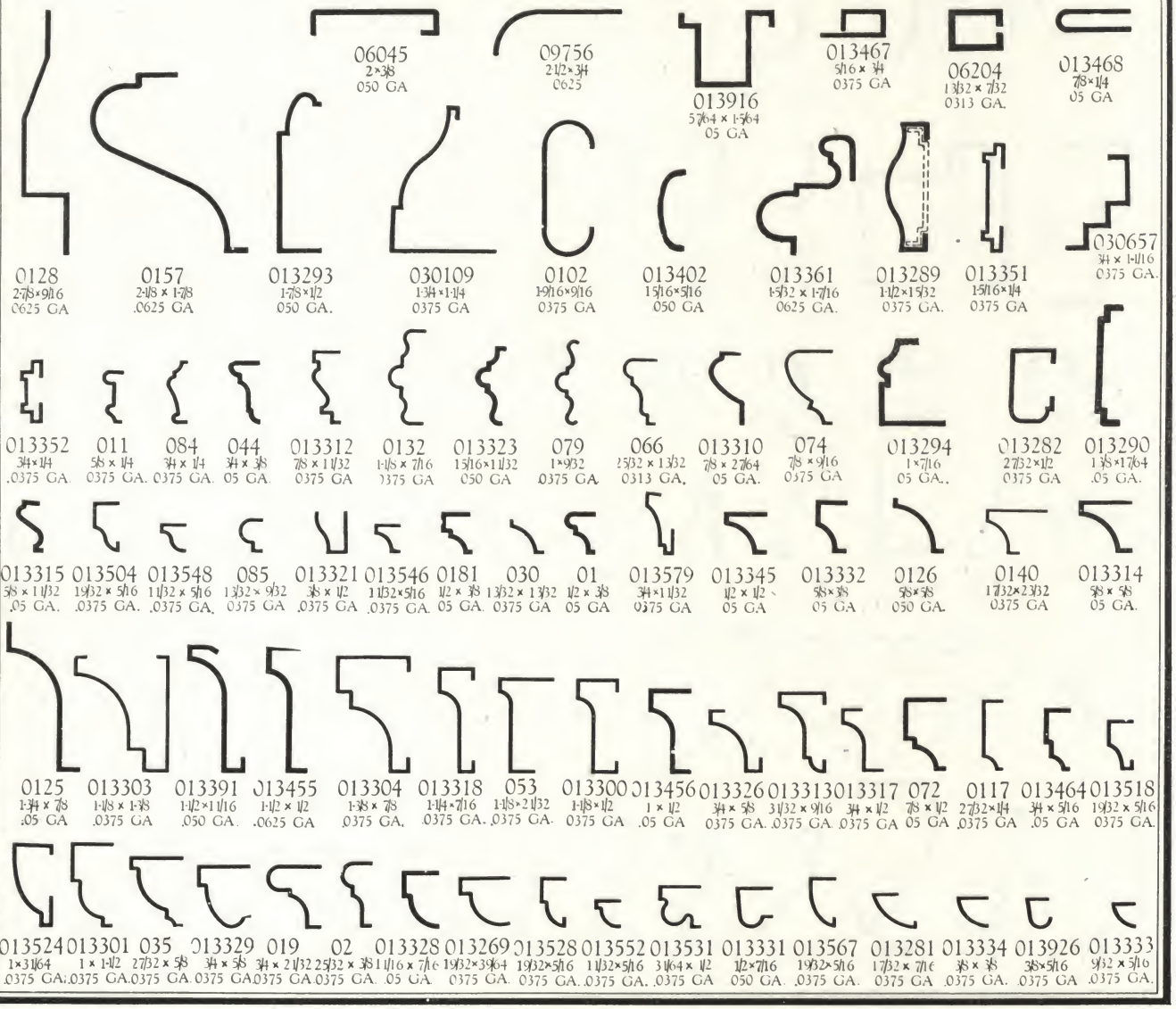
PANEL MOULDINGS (CONTINUED)



MUNTINS



MISCELLANEOUS MOULDINGS



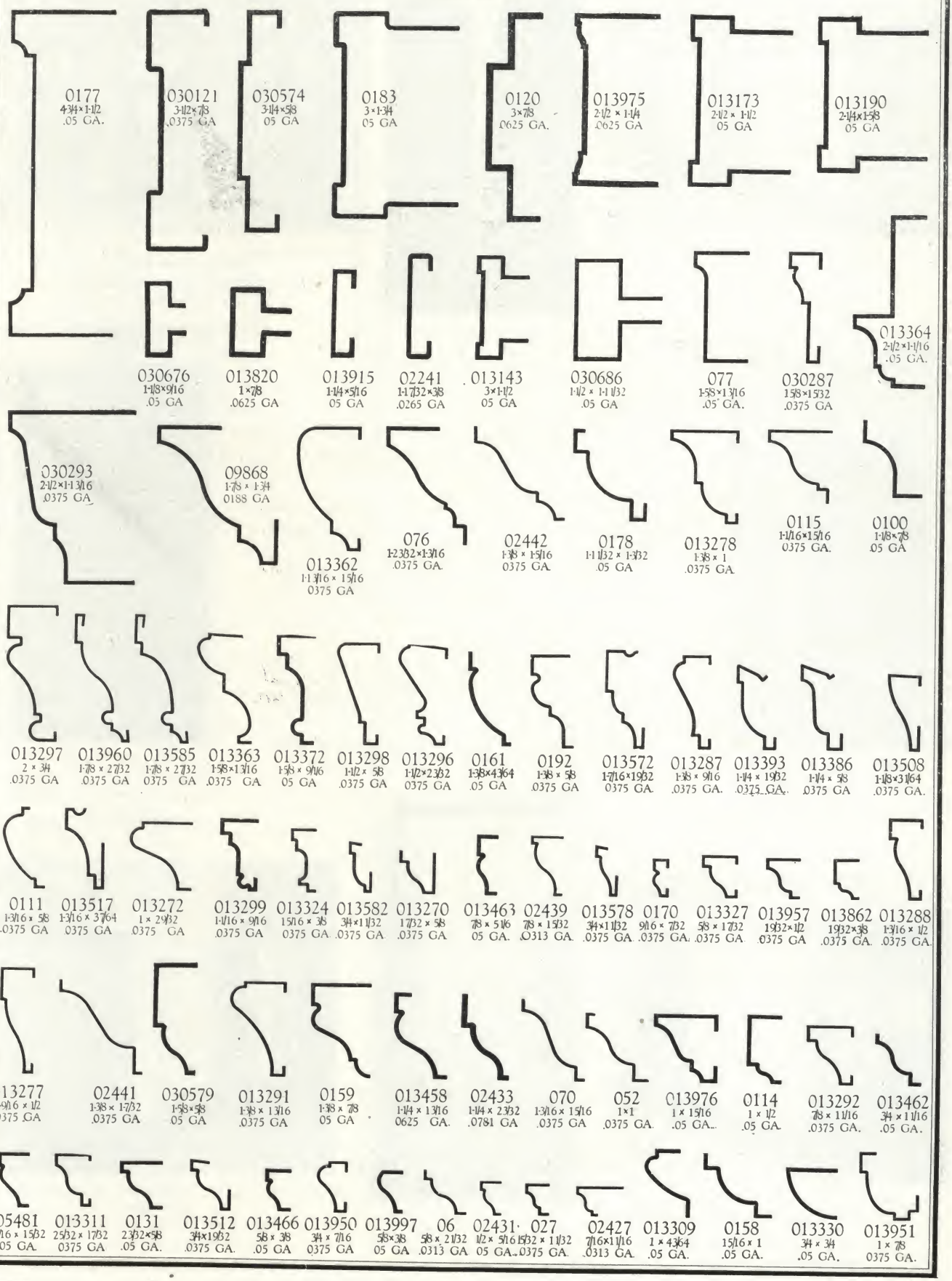
Continued on next page

SCALE 1/2" F.S.

ART METAL MOULDINGS

PLATE 10

MISCELLANEOUS MOULDINGS



Continued on next page

ELEVATOR ENCLOSURES



STEEL DOORS WITH PAINTED DECORATION
Board of Trade Building, Chicago, Ill.
HOLABIRD & ROOT, Architects



STEEL DOOR WITH NICKEL TRIM
Board of Trade Building, Chicago, Ill.
HOLABIRD & ROOT, Architects



HOLLOW METAL DOORS WITH ETCHED BRONZE PANELS
Lord Baltimore Hotel, Baltimore, Md.
W. D. STODDART, Architect



HOLLOW METAL ELEVATOR DOORS
Pittsburgher Hotel, Pittsburgh, Pa.
H. L. STEVENS CO., Architects

Elevator Enclosures

The plate illustrations on the following pages show the styles of elevator enclosures in general use and are shown with combination buck and jamb frame.

Any of these styles can be furnished in rough buck or structural buck and finished jamb with casings or scribe mouldings as required.

Art Metal elevator enclosures make proper provision for the reception of all operating appliances and safety devices.

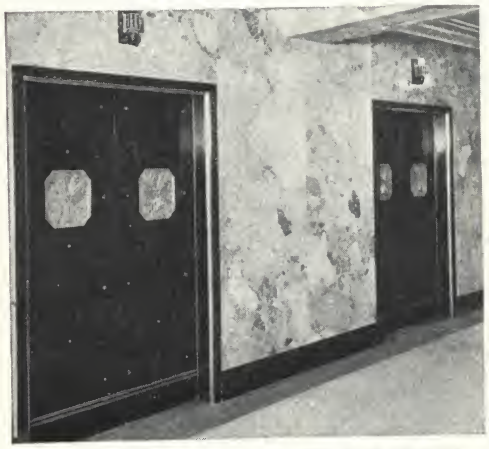
Dumbwaiter Enclosures

Dumbwaiter enclosures of any size, with frames of either combination buck and jamb or buck and finished jambs, with or without casings, can be supplied.

Unless otherwise specified, pulleys, weights and chains will be furnished with the units.



STANDARD TYPE "A-1" HOLLOW METAL DOOR
Union & Peoples National Bank, Jackson, Miss.
ALBERT KAHN, INC., Architect



FLUSH PANEL STEEL DOORS WITH NICKEL SILVER MEDALLION AND RIVET HEADS
Board of Trade Building, Chicago, Ill.
HOLABIRD & ROOT, Architects



STEEL DOOR WITH ETCHED BRONZE PANEL
Chateau Crillon, Philadelphia, Pa.
HORACE TRUMBAUER, Architect



ORNAMENTAL CAST BRONZE ELEVATOR DOORS
David Stott Building, Detroit, Mich.
DONALDSON & MEIRER, Architects

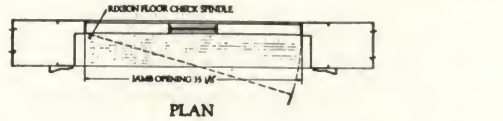
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SCALE 3/8" & 1 1/2"

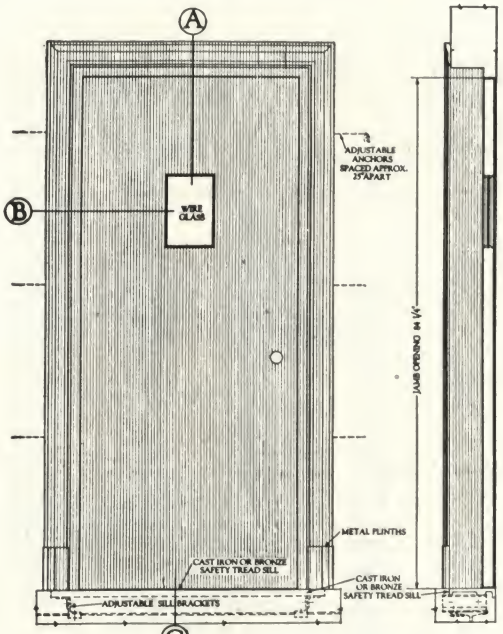
ELEVATOR ENCLOSURES

PLATE 11

AUTOMATIC (PUSH BUTTON) UNIT

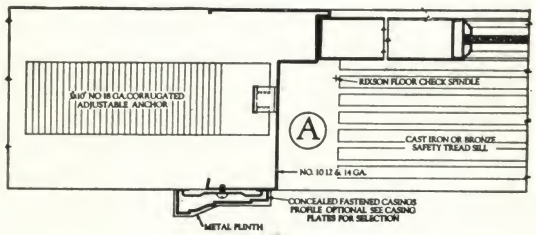


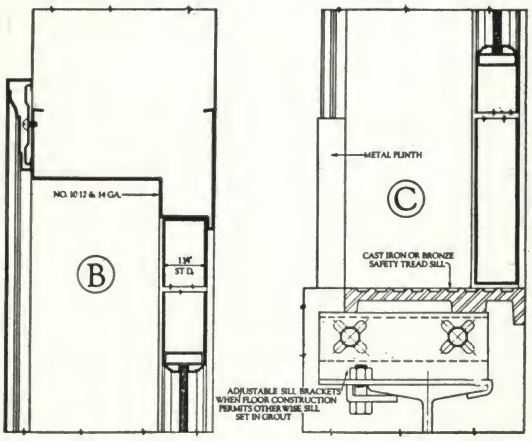
PLAN



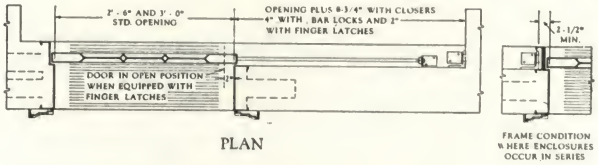
ELEVATION

VERTICAL SECTION



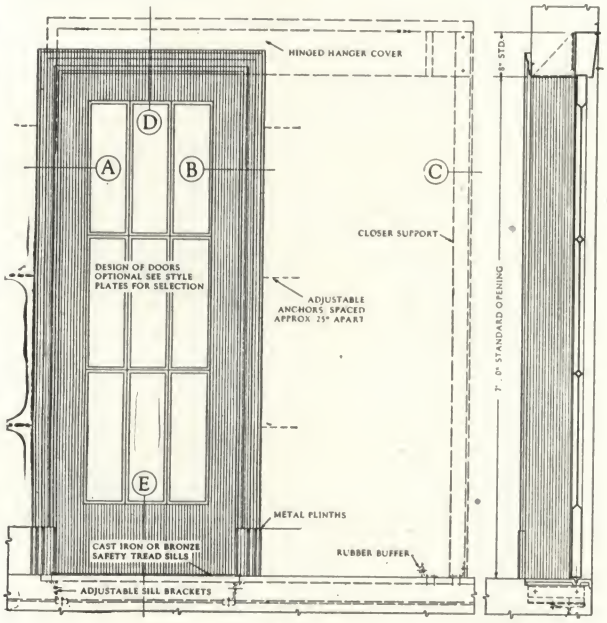


SINGLE SLIDING UNIT



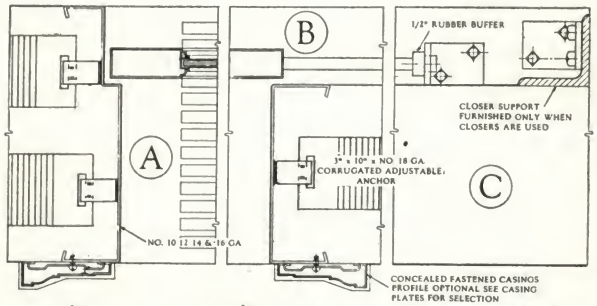
PLAN

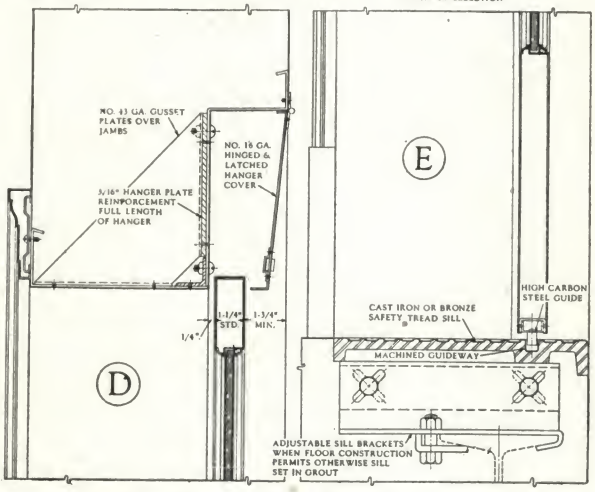
FRAME CONDITION WHERE ENCLOSURES OCCUR IN SERIES



ELEVATION

VERTICAL SECTION





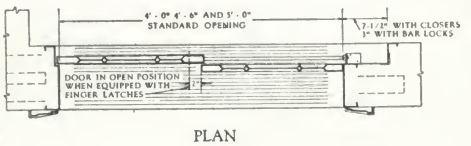
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SCALE 3/8" & 1 1/2"

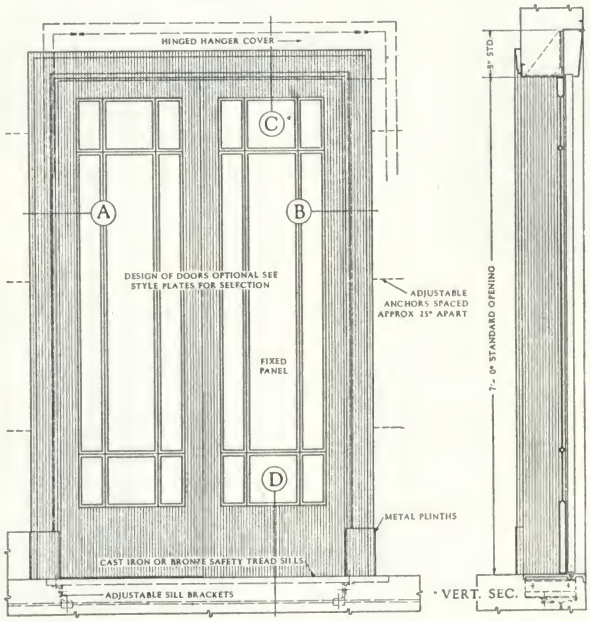
ELEVATOR ENCLOSURES

PLATE 12

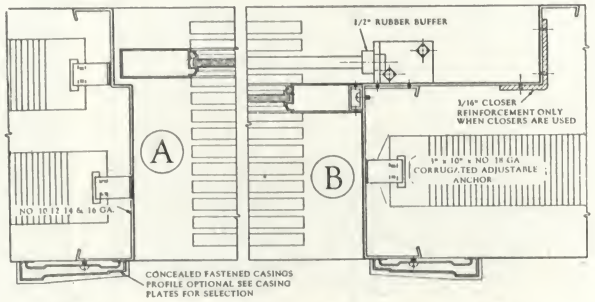
SLIDE & FIXED PANEL UNIT

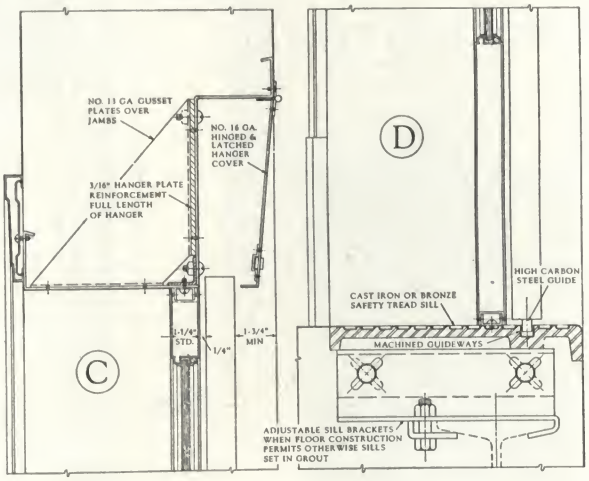


PLAN



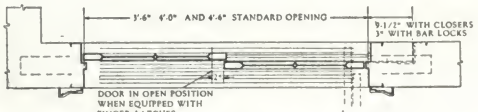
ELEVATION VERTICAL SECTION



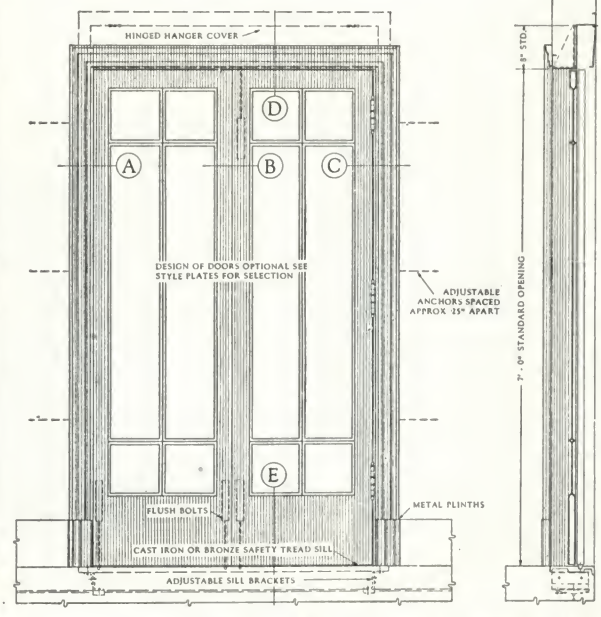


SLIDE & SWING UNIT

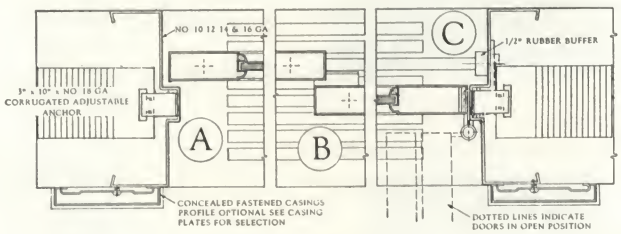
· HANGER · BAR · TYPE ·

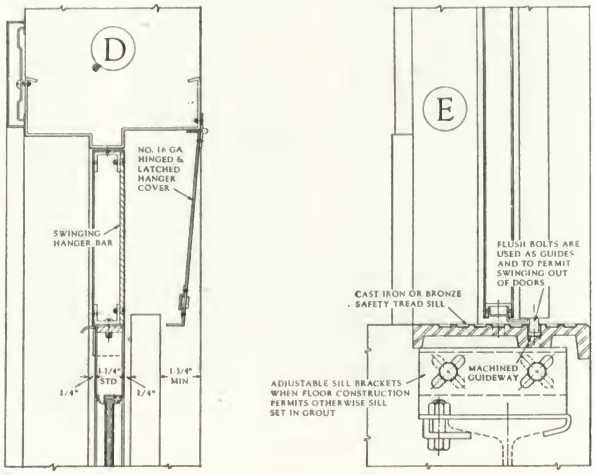


PLAN



ELEVATION VERTICAL SECTION





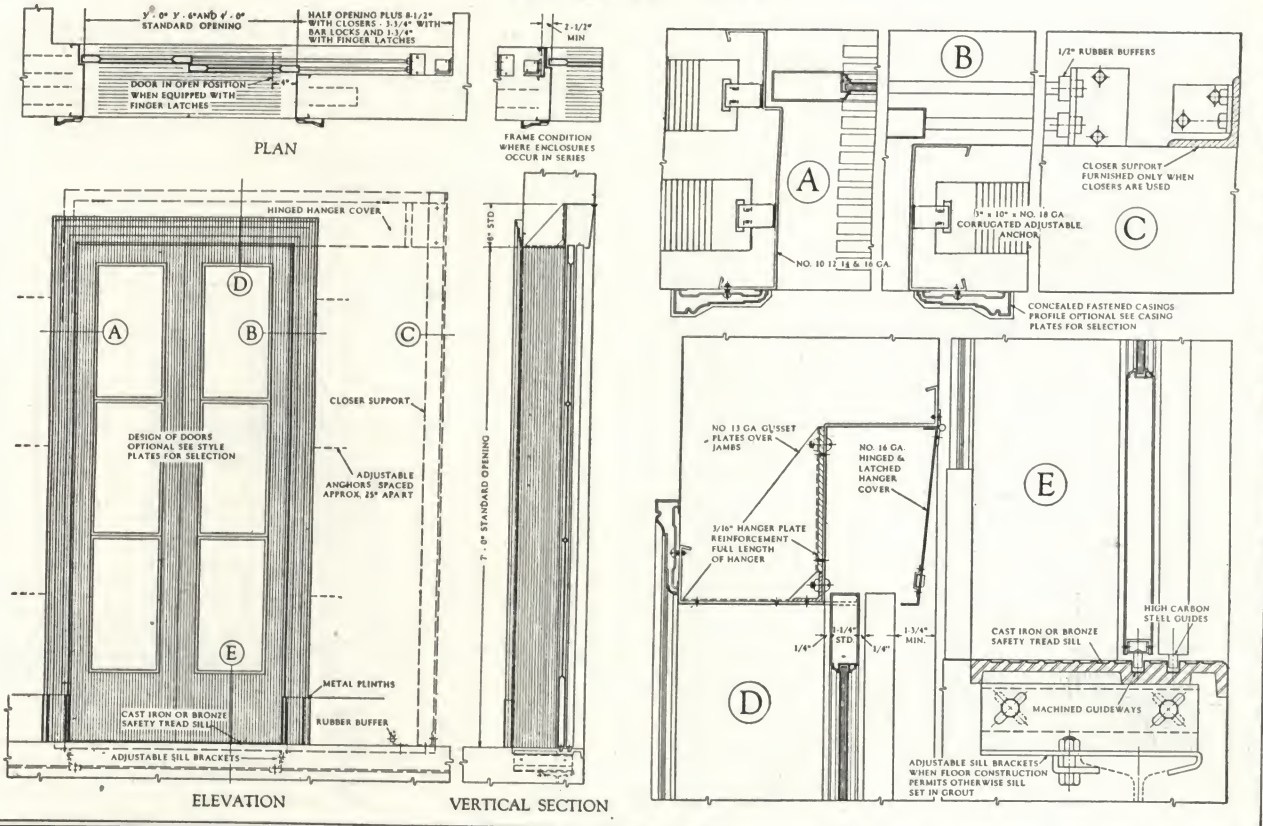
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SCALE 1/4, 3/8, 1 1/2

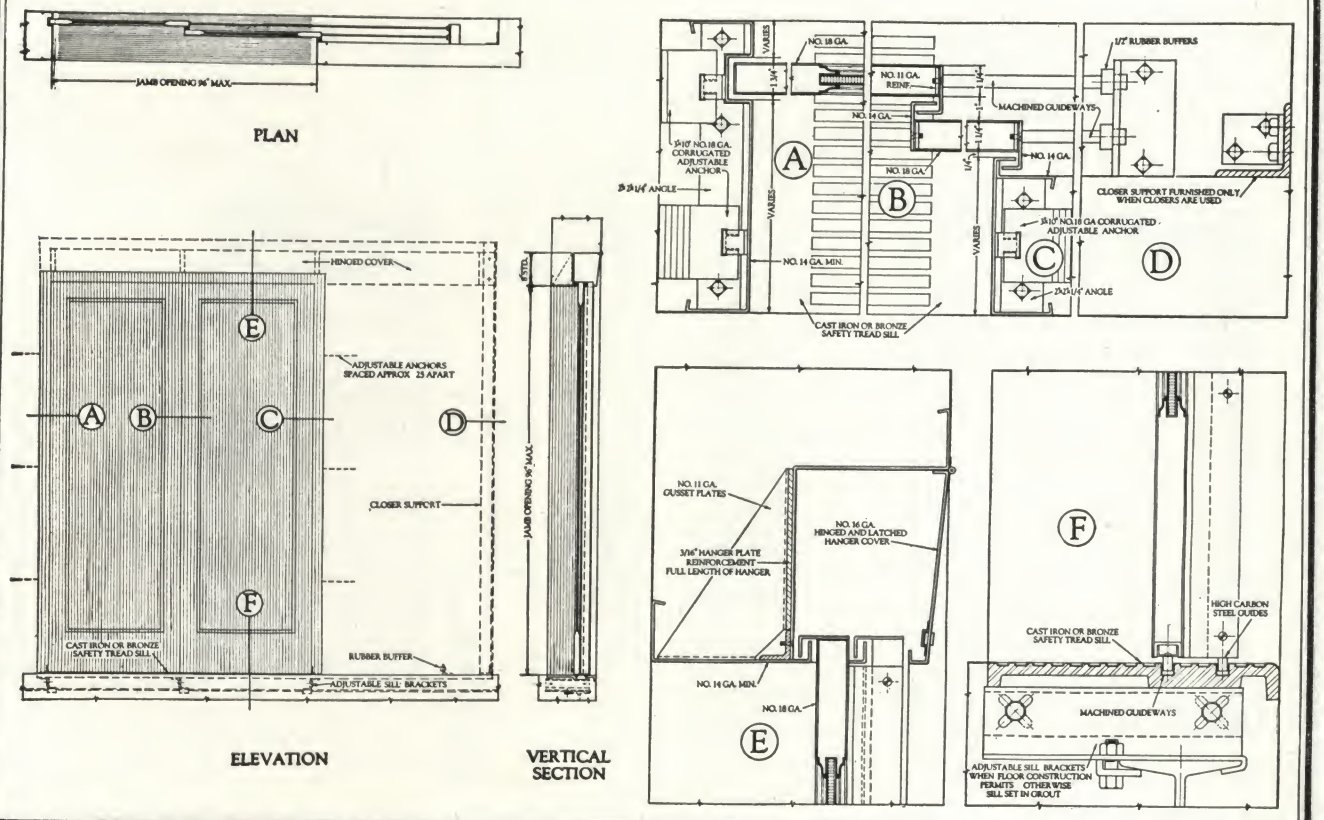
ELEVATOR ENCLOSURES

PLATE 13

TWO SPEED UNIT



TWO SPEED LABELED UNIT



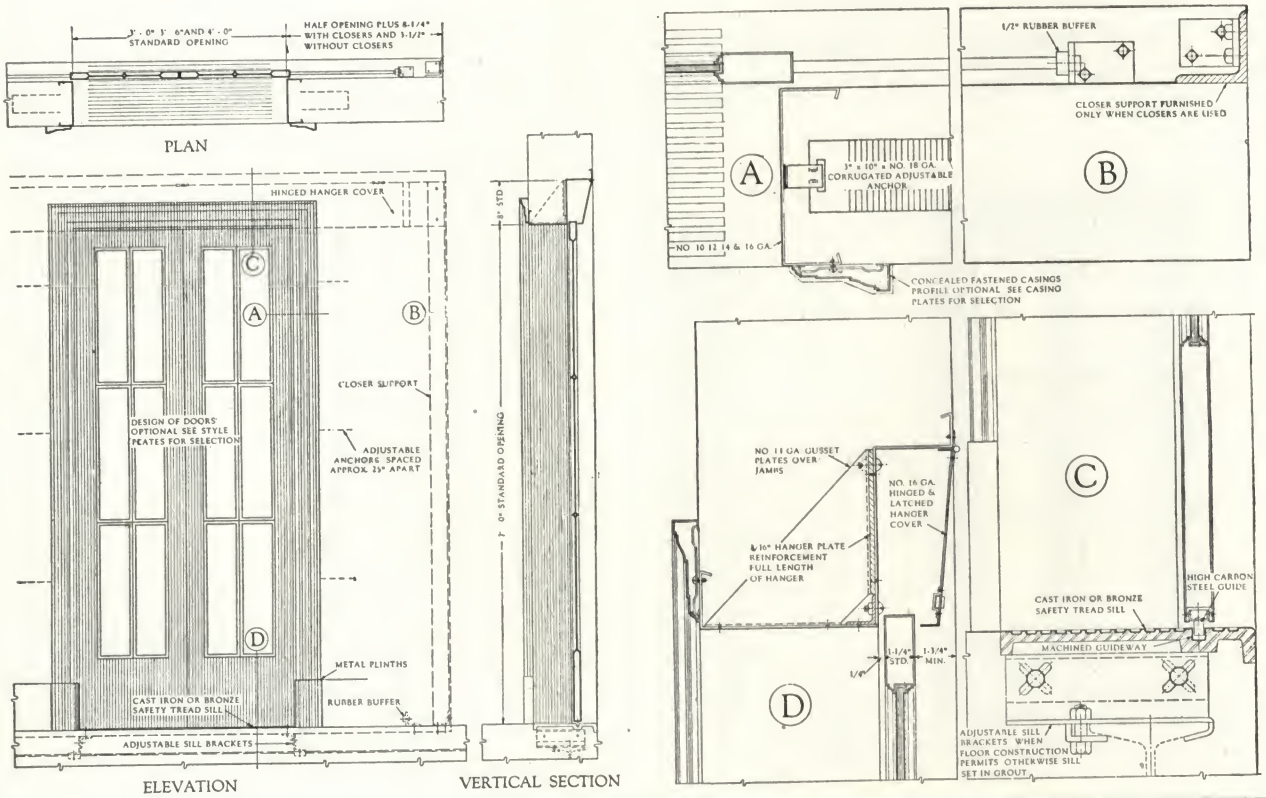
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SCALE 3/8" & 11/2"

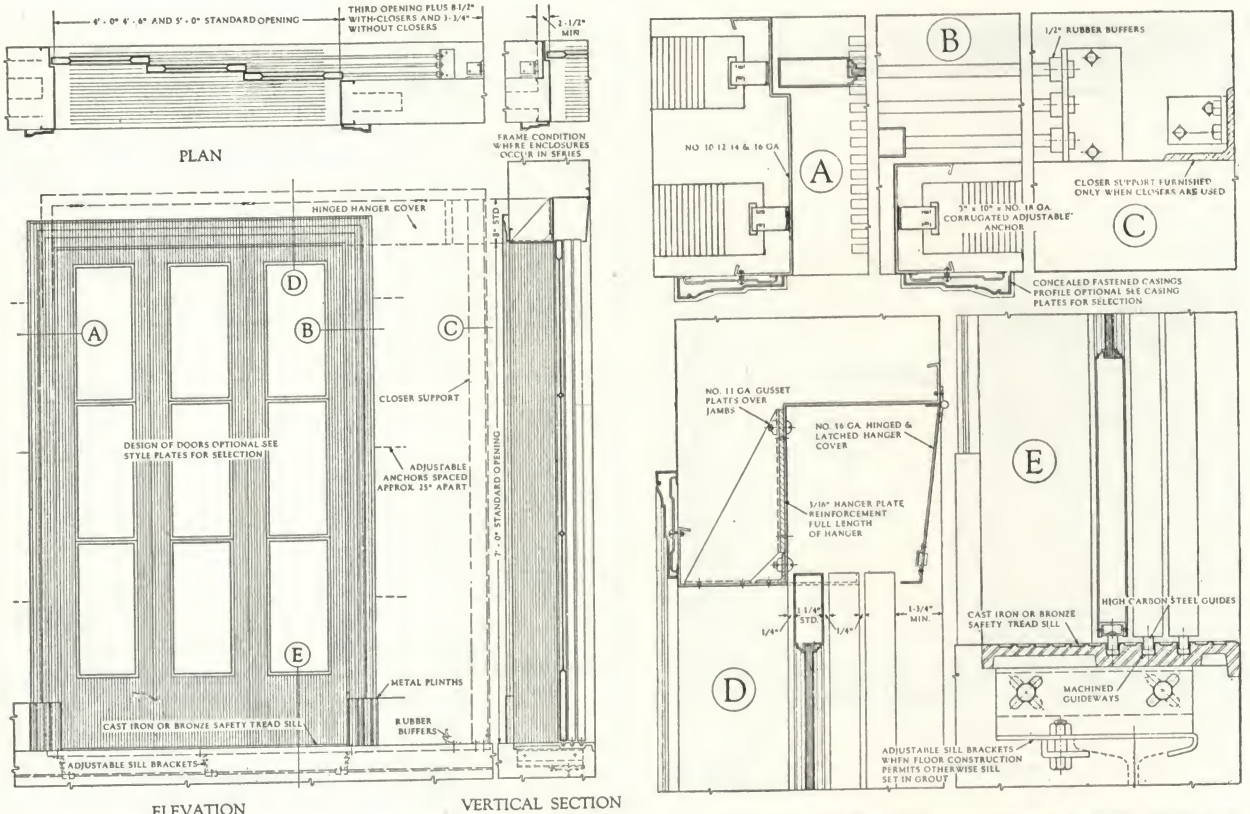
ELEVATOR ENCLOSURES

PLATE 14

CENTER OPENING UNIT



THREE SPEED UNIT



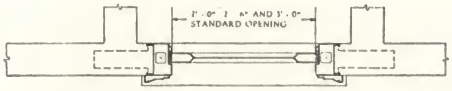
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SCALE 3/8" & 1 1/2"

DUMB-WAITER ENCLOSURES

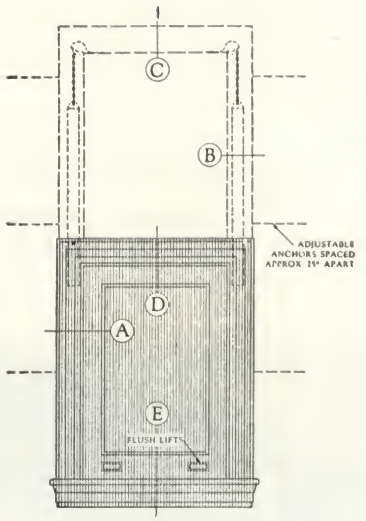
PLATE 15

SINGLE PANEL UNIT

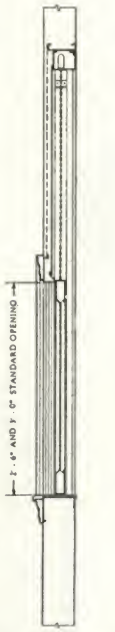


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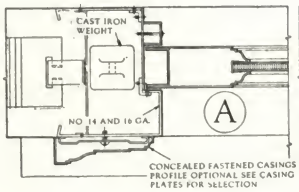


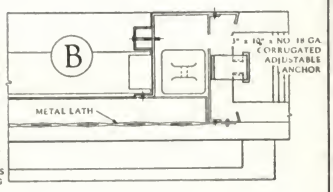


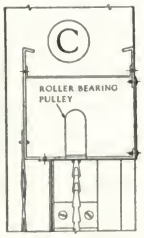
ELEVATION

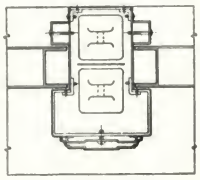


VERTICAL SECTION

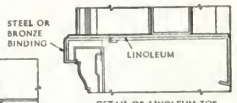




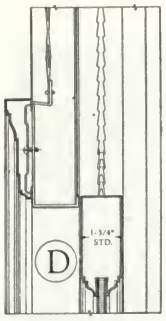


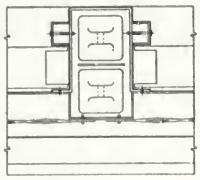


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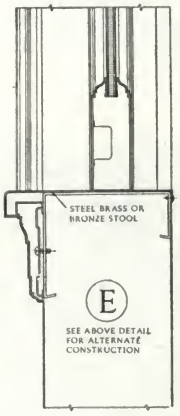


DETAIL OF LINOLEUM TOP





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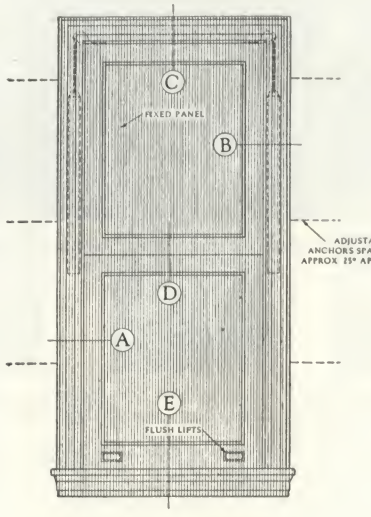


DOUBLE PANEL UNIT

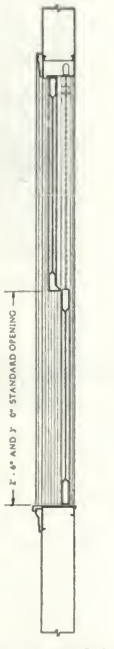


PLAN

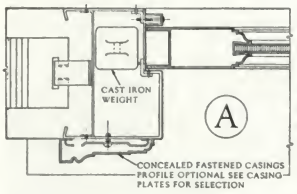


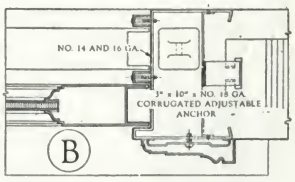


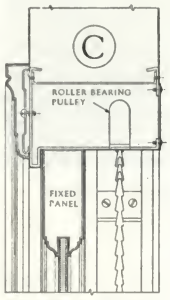
ELEVATION

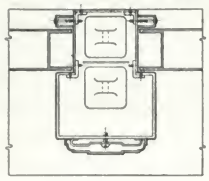


VERTICAL SECTION

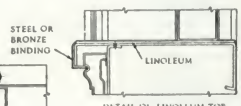




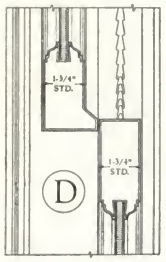


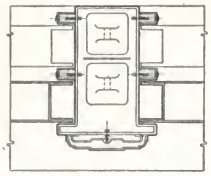


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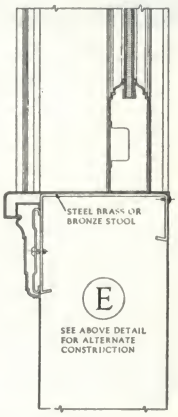


DETAIL OF LINOLEUM TOP





· MULLION · AT · SECTION · B ·



A. J. BAYER COMPANY

INCORPORATED

Hollow Metal Doors

LOS ANGELES, CALIF.

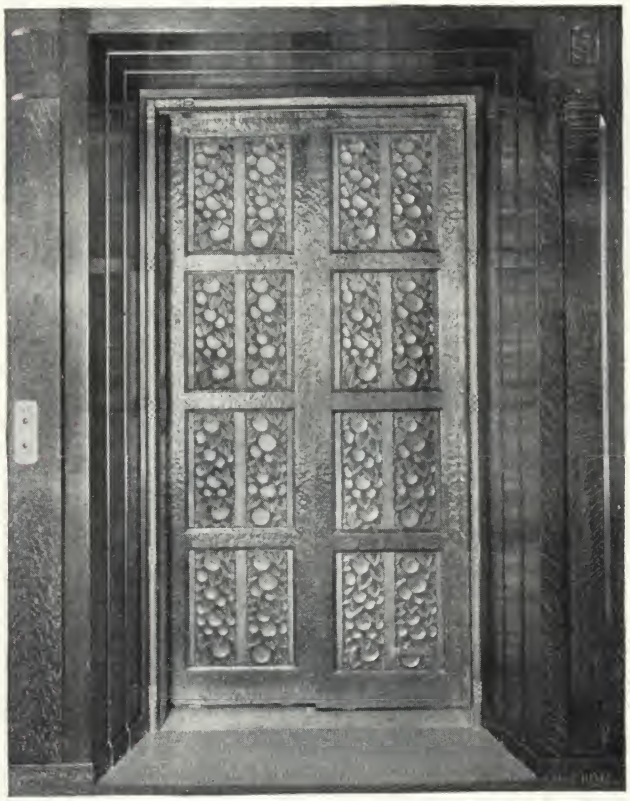
For our page on Ornamental Iron and Bronze Work, see Manufacturers' Index

Experience

This company has served the building industries since 1900 in the manufacture and installation of ornamental metal and hollow metal in monumental and commercial buildings.

Facilities

A complete manufacturing plant and foundry is maintained for the execution of work ranging from miscellaneous iron work to the highest grade of architectural bronze and iron.



Nickel Silver Elevator Enclosure, Alexander & Oviatt Building, Los Angeles, Calif.



Hollow Metal Elevator Enclosure, Pacific Mutual Building, Los Angeles, Calif.

Recent Installations

BUILDING	ARCHITECT
City Hall, Los Angeles, Calif.	Austin, Martin & Parkinson, Los Angeles, Calif.
Biltmore Hotel, Los Angeles, Calif.	Schultze & Weaver, New York, N. Y.
Forman and Clark Building, Los Angeles, Calif.	Curlett & Beelman, Los Angeles, Calif.
Jonathan Club, Los Angeles, Calif.	Schultze & Weaver, New York, N. Y.
Elks Club Building, Los Angeles, Calif.	Curlett & Beelman, Los Angeles, Calif.
Roosevelt Building, Los Angeles, Calif.	Curlett & Beelman, Los Angeles, Calif.
Bullock's, Los Angeles, Calif.	John and Donald B. Parkinson, Los Angeles, Calif.
Richfield Oil Building, Los Angeles, Calif.	Morgan, Walls & Clements, Los Angeles, Calif.

THE CINCINNATI MFG. CO.

Kalamein and Hollow Metal Doors

CINCINNATI, OHIO

Products

HOLLOW METAL and KALAMEIN DOORS and TRIM, all types and designs.

HOLLOW METAL DOORS, bearing Underwriters' Laboratories, Inc., label of approval.

Also Elevator Enclosures, Doors and Cars.

For our page on Ornamental Iron and Bronze Work, see Manufacturers' Index.

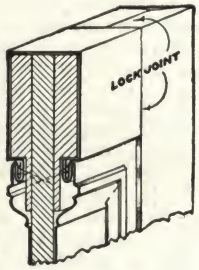
Kalamein Doors

These doors are constructed with a wood core over which sheet metal is applied. This construction will not warp or bulge, as expansion and contraction are allowed for in a special lock seam.

They can be furnished in a variety of stock designs.

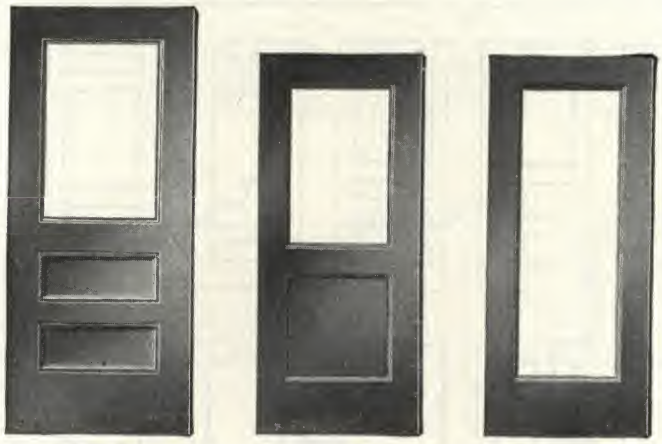
Catalogue No. 53 sent on application.

In addition to doors, kalamein trim, mouldings, muntin bars, astragals, and stop strips are manufactured by this company in either stock or special designs.



Detail of Construction for Kalamein Door

Specification Data—Wood core of thoroughly kiln dried lumber covered with No. 24 gauge armco furniture steel stretcher leveled. Mouldings to be either wood, metal covered, or special hollow steel interlocking type. Exterior doors can be furnished covered with copper or bronze. Steel doors finished in either prime coat or baked enamel plain colors or grained as desired. Kalamein trim, mouldings and muntin bars can be furnished separately from stock, covered with either steel, copper or bronze.



Style B Style E Style F

Kalamein Doors, with Glass Panels

Hollow Metal Doors

Made to architect's designs in special finishes permitting a wide range of individual expressions, or in stock patterns and standard finishes. Thoroughly insulated throughout to insure an efficient fire retardant and to prevent metallic sound. The construction obviates necessity of installing jamb during erection of walls, and permits hanging and adjusting of doors independently of frames. The Underwriters' Laboratories, Inc., have tested and approved these doors and their label is affixed to them when required.

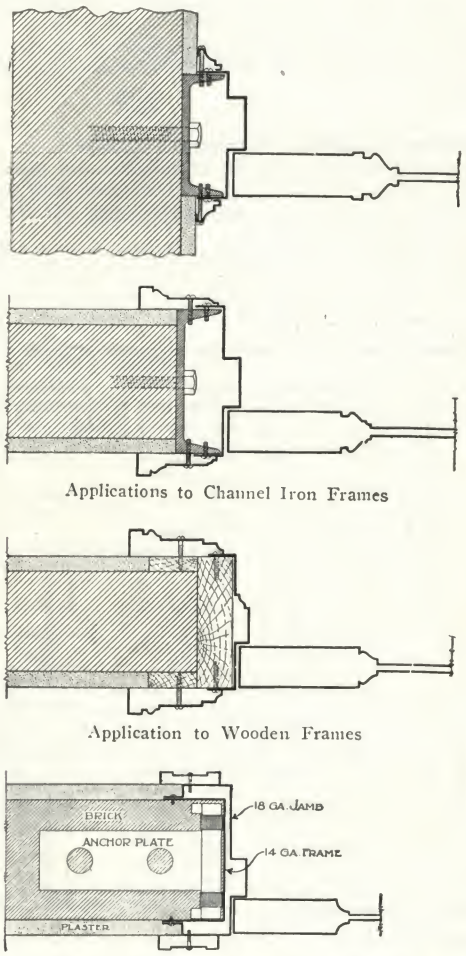
Complete information should be given when asking for estimates, as they are based on the requirements of each particular installation.

Catalogue No. 53 sent on request.



Corner Section Hollow Metal Door

Specification Data—Doors of highest grade No. 18 gauge armco open hearth steel specially treated. All surfaces true, level, and free from all imperfections. Parts interlocked and welded with invisible seams and joints. Insulate stiles, rails, and panels throughout with asbestos. Apply baked enamel finish in imitation of wood specified. Frames of No. 14 gauge steel, welded at joints to form one piece. Attach to walls by means of adjustable anchor plates. Jambs, furnished in separate pieces, fit over frames.



Applications to Channel Iron Frames

Application to Wooden Frames

Application to Cinmanco Approved Frame with Adjustable Anchor Plates

Section Through Door Jambs Showing Approved Buck Jamb and Casing Constructions for Hollow Metal Doors

COBURN TROLLEY TRACK MFG. CO.

Metal Covered Doors, Windows and Finish, Steel Bucks and Trim

HOLYOKE, MASS.

BRANCHES IN ALL PRINCIPAL CITIES

Products

METAL COVERED DOORS with photographic graining to match wood doors; STEEL BUCKS, FRAMES and TRIM.

Also Metal Covered Double Hung Windows both with and without integral weatherstripping; Bronze and Copper Entrances; Metal Covered Dumbwaiter Units of all types; Elevator Enclosures, including sills and hardware complete; Tin Clad Fire Doors and Shutters with hardware.

For Coburn Sliding Door Hardware of all types, and Folding Partitions, see Manufacturers' Index.

Facilities and Shipping

This company is prepared to handle orders of any size for all parts of the country. A large modern plant, with direct rail connection, insures the fabrication and delivery of all work promptly and in a satisfactory manner.

Metal Covered Doors and Trim

Coburn metal covered doors are furnished both labeled and unlabeled for use in office buildings, hospitals, public buildings, hotels, theaters, stores, residences, etc. These include stair, elevator, fire escape, tower, corridor and partition doors for general interior work, and entrance doors in copper, bronze, and brass.

Coburn standard doors are made with kiln dried white pine cores; rails are tenoned into stiles; panels are grooved into stiles and rails. Cores are covered with kalamein or galvanized iron, bronze, copper or brass.

For standard details and application of labeled and unlabeled doors showing mouldings and panels, see details on following page.

Underwriters' Labeled Kalamein Doors

Coburn underwriters' labeled kalamein doors when installed as specified below for the purposes indicated, will give maximum protection and procure minimum rates for the insuring of the building and its contents.

Standard Stair and Elevator Doors—Labeled for single doors up to 48 in. wide and in pairs up to 96 in. wide. Panels to be solid. Hung on angle iron frames for brick walls and channel frames for tile walls or for metal lath and plaster partitions, with strap hinges and latches or butts and lock sets. Doors to stairs should be made self-closing. Doors can not be hung on metal covered jambs.

Fire Escape and Tower Doors—Labeled for single doors up to 4 ft. wide, 10 ft. high and for pairs up to 8 ft. wide, 10 ft. high; can include glass panels not exceeding 720 sq. ft. in area. Must be hung in the same manner as stair and elevator doors.

Corridor and Partition Doors—Labeled to receive 9 sq. ft. of wire glass. Labeled up to 4 ft. wide, 10 ft. high for single doors and 8 ft. wide, 10 ft. high for pairs.

Specifications for Kalamein and Metal Covered Work

The following specifications are applied to the manufacture of all Coburn metal covered work and comply strictly with the most approved methods of construction for labeled and unlabeled doors and trim.

Cores—All woodwork used in the manufacture of doors and window frames, jambs, doors, sash and trim to be seasoned, clear, kiln dried white pine. Stiles more than 6 in. wide to be built up of strips glued together. All door and sash members to be mortised and tenoned together.

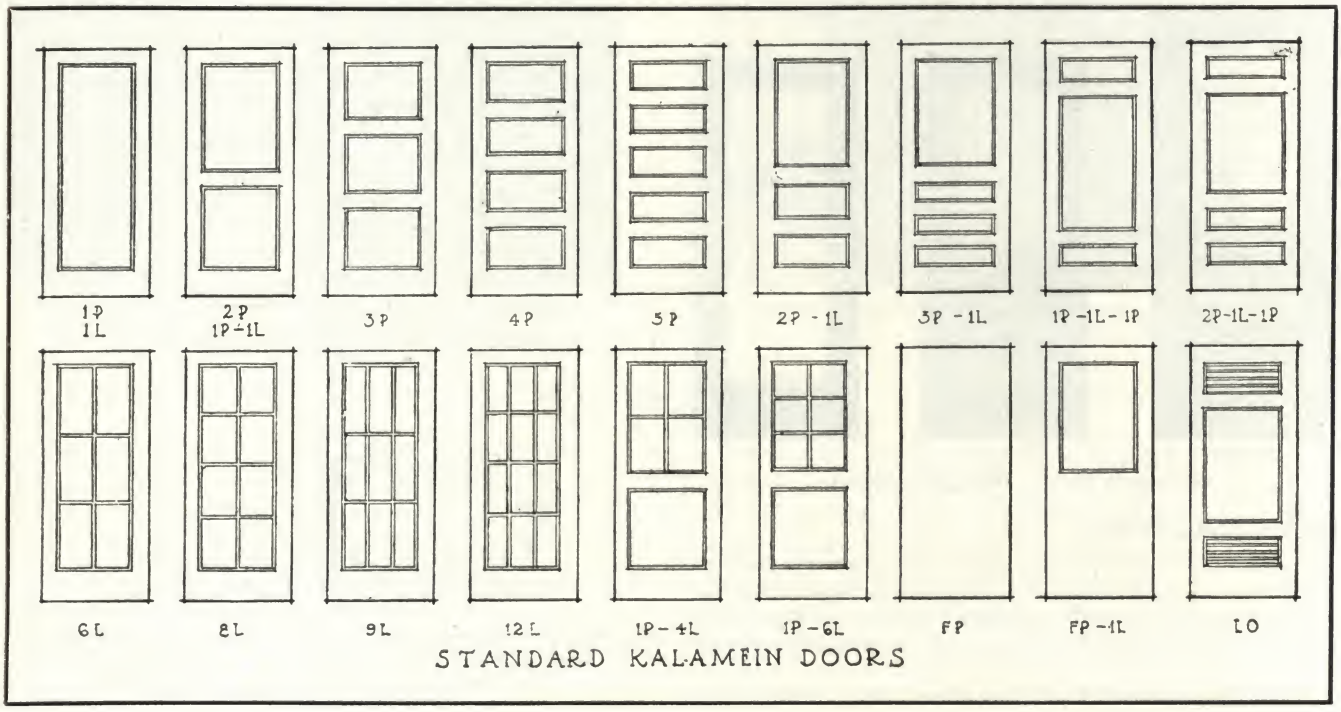
Trim—Trim for doors to be shipped knocked down and fitted in the field so that any irregularities may be taken up at the job.

Metal—All metal covering of galvanized iron, furniture steel or kalamein to be of gauges ranging from 18 to 26; copper to be from 16 to 32 oz.; bronze from gauges 16 to 24. Metal to be drawn on to wood cores through steel dies. Furniture steel or kalamein can be painted in color or grained to match any type of wood door; copper and bronze to be finished antique, statuary bronze or any suitable design as required.

Covering of Cores—***Unlabeled Doors***—The metal is to be applied directly over the cores. All metal must fit closely to the wood cores. All surfaces and edges are to be straight and true; mouldings to be as per details. Bench marks are to be avoided as much as possible and cut ends at miters are to be covered with the same metal as used on mouldings. Thickness of door is 1¾ in.

Labeled Doors—Are to be covered in the same manner as the unlabeled doors except as shown on detail on following page. Thickness of door is 1⅞ in.

All joints of metal to be locked and soldered so that no moisture can gain entrance to the cores.

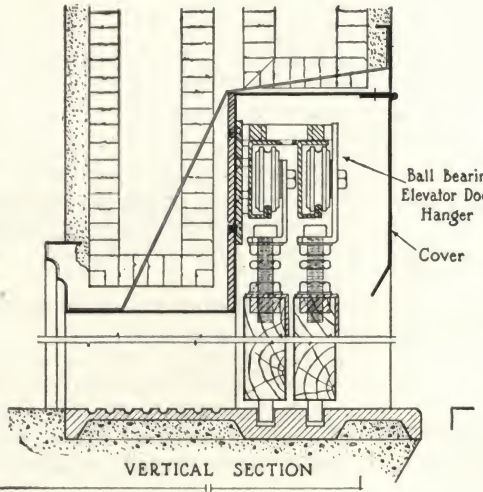


STANDARD KALAMEIN DOORS

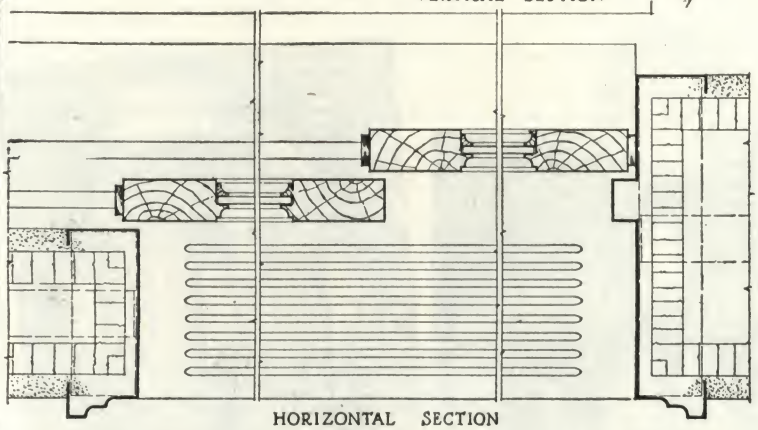
Continued on next page

DETAILS OF COBURN METAL COVERED DOORS

Coburn makes, furnishes and installs the complete opening, including, Doors, Steel Jambs, Track and hangers, Sills and Track Covers.
Details show standard material

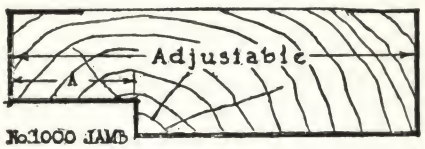


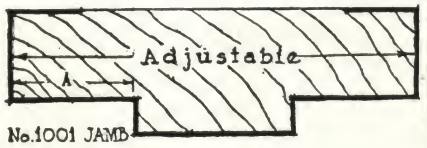
VERTICAL SECTION

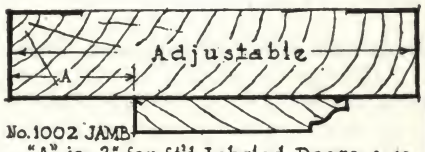


HORIZONTAL SECTION

DETAILS OF TWO SPEED GEARED KALAMEIN ELEVATOR DOORS WITH STEEL BUCKS AND TRIM

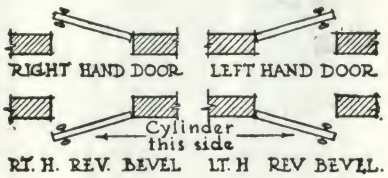






"A" is 2" for St'd Labeled Doors, & is 1⅞" for St'd Unlabeled Doors. This dimension can be varied for special heavy doors.

ONE-HALF FULL SIZE DETAILS OF STANDARD JAMBS

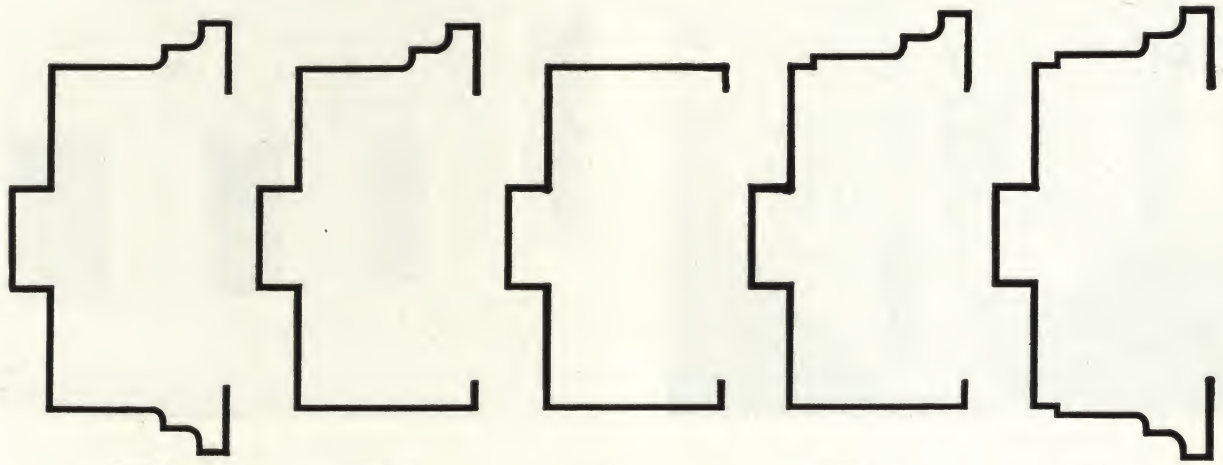


DESIGNATIONS OF DOOR-SWINGS.

COBURN COMBINATION STEEL BUCKS, FRAMES AND TRIM

The Coburn construction combines into one unit the buck, door frame and trim. These units are made of blue annealed, pickled sheets in 10, 12, 14 and 16 gauge. All miters and joints are solidly welded. Anchors are furnished as required. Rigid reinforcements are provided for the application of all hardware. Boxes in back of all reinforcing plates prevent mortar getting into the screwholes. One coat of metallic primer is applied to all frames.

Note: We can manufacture special types of hospital frames. Prices and details furnished on application.



TYPE M TYPE MP TYPE P TYPE MMP TYPE MM

DAHLSTROM METALLIC DOOR COMPANY

EXECUTIVE OFFICES AND FACTORIES
JAMESTOWN, N. Y.

BRANCH OFFICES
NEW YORK, N. Y., 475 Fifth Avenue CHICAGO, ILL., 19 So. La Salle Street DETROIT, MICH., 1331 Dime Bank Building
PACIFIC COAST PLANT: 335 East Slawson Avenue, LOS ANGELES, CALIF.
REPRESENTATIVES IN PRINCIPAL CITIES

Products

Manufacturers of METAL DOORS and TRIM and ELEVATOR ENTRANCES.

Also Conduo-Base, General Trim for office buildings, hotels, apartments, hospitals, schools, banks, theaters; Hose Cabinets and Switch Box Panels.

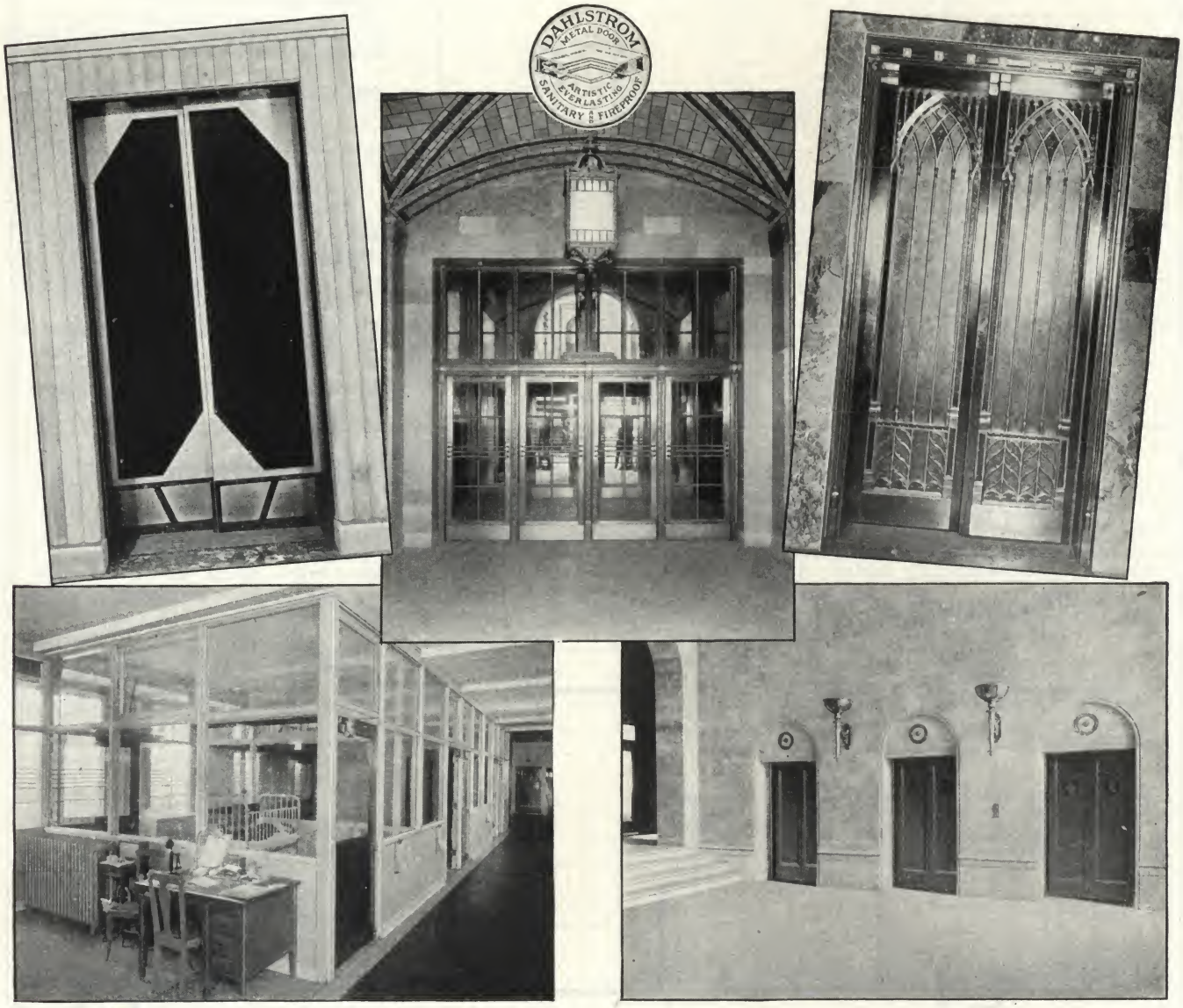
For Adjustable Steel Partitions, see Manufacturers' Index.

Dahlstrom Metal Doors and Trim

Design—Original and largest manufacturers of metal doors and trim in the world. Metal doors were originated by the founder of this Company. Twenty-five years of designing and manufacturing doors and trim to meet various conditions have given Dahlstrom products the well-earned title of "The Specified Standard."

Construction—Dahlstrom Metal Doors and Trim have during a quarter of a century proved their fire-retarding value. No portion of the product can burn.

All joints are carefully welded. Reinforcements are also welded to the construction members. The design of Dahlstrom Metal Doors makes for rigidity, stability, fire protection and elegance.



Top, Left: Elevator Entrances, Wise Shoe Store, Detroit, Mich.

Top, Right: Main Floor Elevator Entrance, Smith Young Building, San Antonio, Tex.

Bottom, Left: Borrowed Light Units, Children's Ward, Union Memorial Hospital, Baltimore, Md.

Bottom, Right: Main Floor Elevator Entrances, New Jersey State Office Building, Trenton, N. J

Top, Center: Vestibule Entrance Unit, Salmon Tower, New York, N. Y.

Continued on next page

Door frames are fabricated from Nos. 16 to 11 gauge metal according to the size of the opening and the service required.

Finish—All surfaces are thoroughly cleaned before finish is applied; all materials are carefully tested in our laboratory. Each coat of paint or enamel is carefully baked and properly treated to secure the superior finish for which Dahlstrom products are noted. The same care and attention is given all finishes, whether plain colors, stipples or reproductions of wood graining. All material for finishing is carefully tested in our laboratories.

Quality—Dahlstrom products are internationally known. Only the expert workmanship and first-class materials entering into their manufacture can sustain this reputation.

General Instructions

The preceding page gives an idea as to the great variety of door designs and door types that can be furnished. The door opening sizes and the dimensions of stiles and rails should be established in accordance with the recommendations set forth under the auspices of the Bureau of Standards of Washington, D. C. The main features of those recommendations are shown below.

Various meeting stiles, types of frames and general hardware locations are shown on the following three pages.

General information with reference to elevator entrances is also given on the following pages. For information regarding metal partitions, refer to Manufacturers' Index.

SHORT FORM SPECIFICATIONS FOR DAHLSTROM STEEL SWING DOORS

The work embraced under this heading shall be furnished strictly in accordance with the specifications herein outlined.

Materials

All steel used in the construction of the doors and trim shall be of the best grade open hearth full cold rolled, full pickled, double annealed, patent leveled sheet steel entirely free from scale and pits, of the United States standard gauges herein under the various headings.

Workmanship

All work shall be executed and finished to conform to the generally accepted standards established by the Dahlstrom Metallic Door Company of Jamestown, N. Y. The finished work in all cases shall be neat in appearance and free from defects. All surfaces shall be smooth and free from warps and buckles; all moulded members shall be clean cut, straight and true; all miters shall be well formed and in true alignment; all welded joints shall be neatly made and cleaned off flush.

Construction

All doors, rough bucks, jambs, casings, borrowed light and transom sash, base mouldings, picture mouldings, wire mouldings, metal partitions and railings shall be constructed in accordance with the standard practices established by the Dahlstrom Metallic Door Company (complete specifications furnished on request).

Finish

All preparations for finishing, all prime coating and final finishing shall be done in accordance with the standard practices of Dahlstrom Metallic Door Company (complete specifications on request).

Erection

The materials embraced in this specification shall be set in place at locations designated on the Architect's plans and to levels established by the General Contractor or Architect's superintendent. Bucks and frames shall be plumb and true to insure satisfactory operations of the doors.

Cleaning and Final Finishing

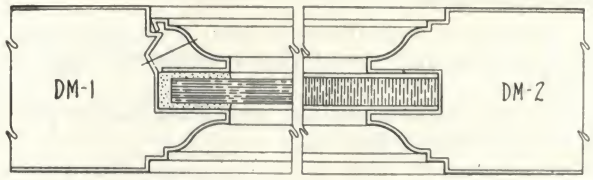
The Erection Contractor who is in charge of setting this material shall leave the finished material clean and in condition satisfactory to the Architect. The Painting Contractor shall clean and finish in a manner satisfactory to the Architect only such portions of this material as are furnished by this contractor in prime finish.

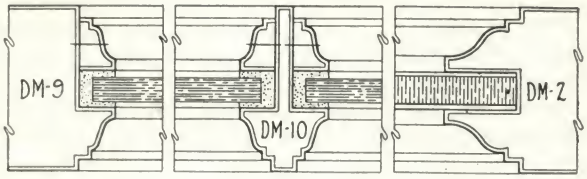
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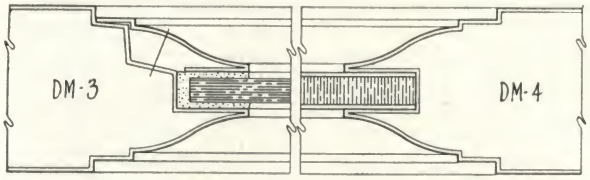


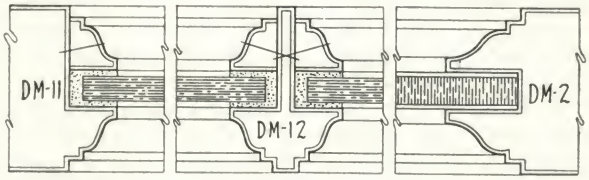
DAHLSTROM METALLIC DOOR COMPANY	STANDARD DOOR DESIGNS	PLATE NO. 1

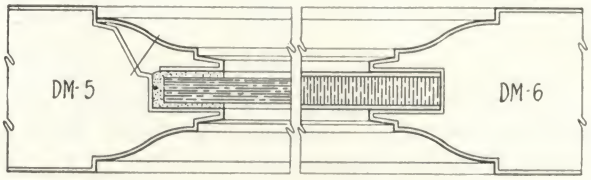
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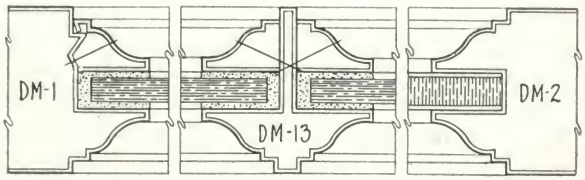


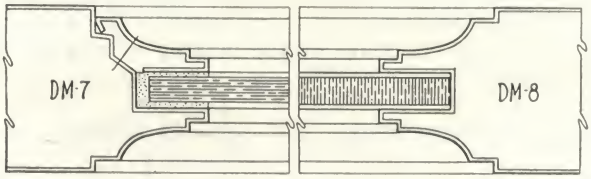


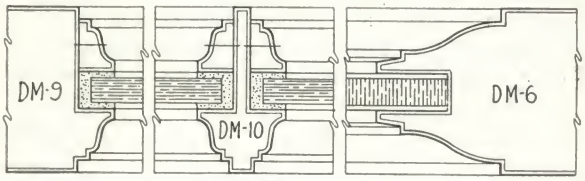


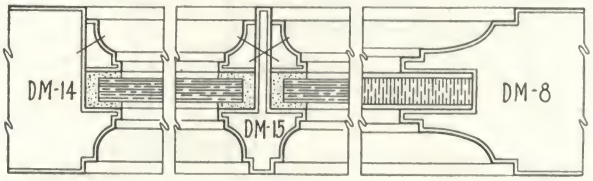


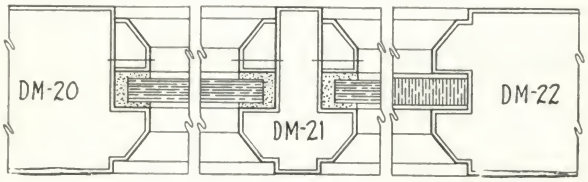


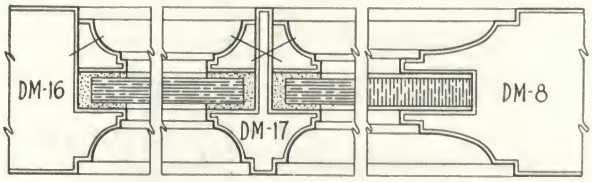


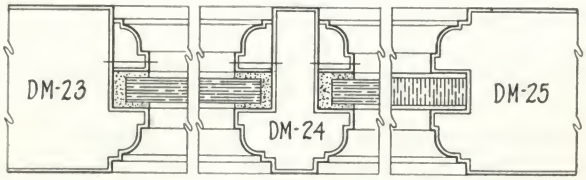


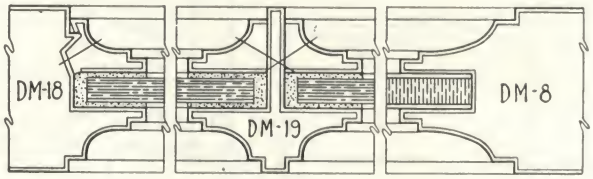


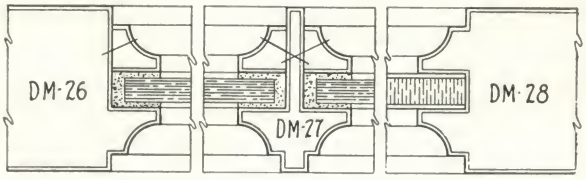


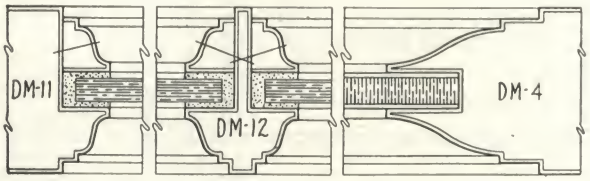












FLUSH DOOR THICKNESSES

FD-1	1¾"	FD-3	1⅛"
FD-2	1⅜"	FD-4	1"

DAHLSTROM METALLIC DOOR COMPANY	SWING DOOR TYPES	PLATE NO. 2

Continued on next page

STANDARD DOOR DESIGNS

The problem of fitting a hollow metal door into an interior or exterior opening is not such a complicated job if we analyze it carefully.

There are 60 designs of swing doors shown on second preceding page. Here will be found flush and panel doors—metal and glass panels.

On the first preceding page are shown different types of door mouldings.

There are also several widths and designs of Muntin units, so designed that they can be used separately or in combinations.

To illustrate: If a door No. 101-102-114 and 115 is used, any of the following mouldings can be applied—Mouldings DM-1, DM-3, DM-5, DM-7 if glass panels. And for metal panels use DM-2, DM-4, DM-6 and DM-8.

If door No. 109 is chosen, mouldings DM-9, DM-11, DM-14 and DM-16 can be used (if no labels are desired) and DM-10, DM-12, DM-15, and DM-17 muntins—according to width of door. If labels are desired it is necessary to use DM-1 or DM-18 for stiles and rails and DM-13 and DM-19 for muntins on account of ¾-in. glass rabbet being required.

If door No. 113 be chosen, it would perhaps be necessary to use DM-9 and DM-14 together with DM-10 and DM-15 muntin in order to obtain greater light area, using DM-2, DM-4, or DM-6 in lower panel.

The above will illustrate that one can select any one of the 60 designs of doors—with the appropriate mouldings.

Further, in combination for a door such as No. 118 one can use the following:

Lower Panel	Upper Panel	
	Stile and Rail	Muntin
DM-8	DM-14 DM-16 DM-18	DM-15 DM-17 DM-19
DM-2	DM-9 DM-11 DM-1	DM-10 DM-12 DM-13
DM-6	DM-9 DM-11 DM-1	DM-10 DM-12 DM-13
DM-4	DM-9 DM-11 DM-1	DM-10 DM-12 DM-13

Again we have DM-2, DM-4 and DM-6 as O. G. mouldings and their combinations. Also M-8 cove moulding with its combination.

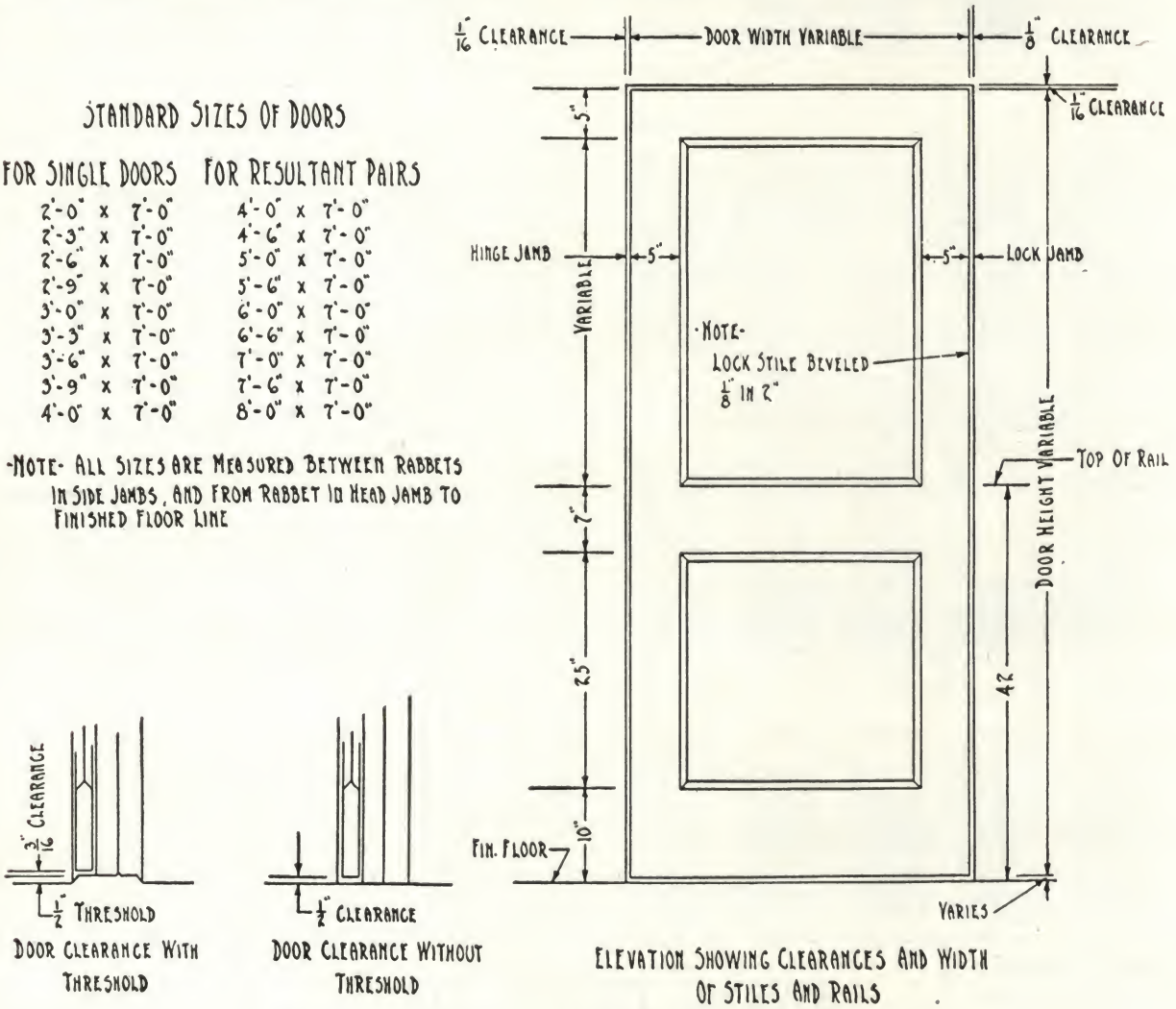
Section 7 and 7A contains many more types of stock mouldings for both interior and exterior doors.

Special profiles can be furnished at an additional expense made necessary by the making of new die and tool equipment.

STANDARD SIZES OF DOORS

FOR SINGLE DOORS	FOR RESULTANT PAIRS
2'-0" x 7'-0"	4'-0" x 7'-0"
2'-3" x 7'-0"	4'-6" x 7'-0"
2'-6" x 7'-0"	5'-0" x 7'-0"
2'-9" x 7'-0"	5'-6" x 7'-0"
3'-0" x 7'-0"	6'-0" x 7'-0"
3'-3" x 7'-0"	6'-6" x 7'-0"
3'-6" x 7'-0"	7'-0" x 7'-0"
3'-9" x 7'-0"	7'-6" x 7'-0"
4'-0" x 7'-0"	8'-0" x 7'-0"

-NOTE- ALL SIZES ARE MEASURED BETWEEN RABBETS IN SIDE JAMBS, AND FROM RABBET IN HEAD JAMB TO FINISHED FLOOR LINE



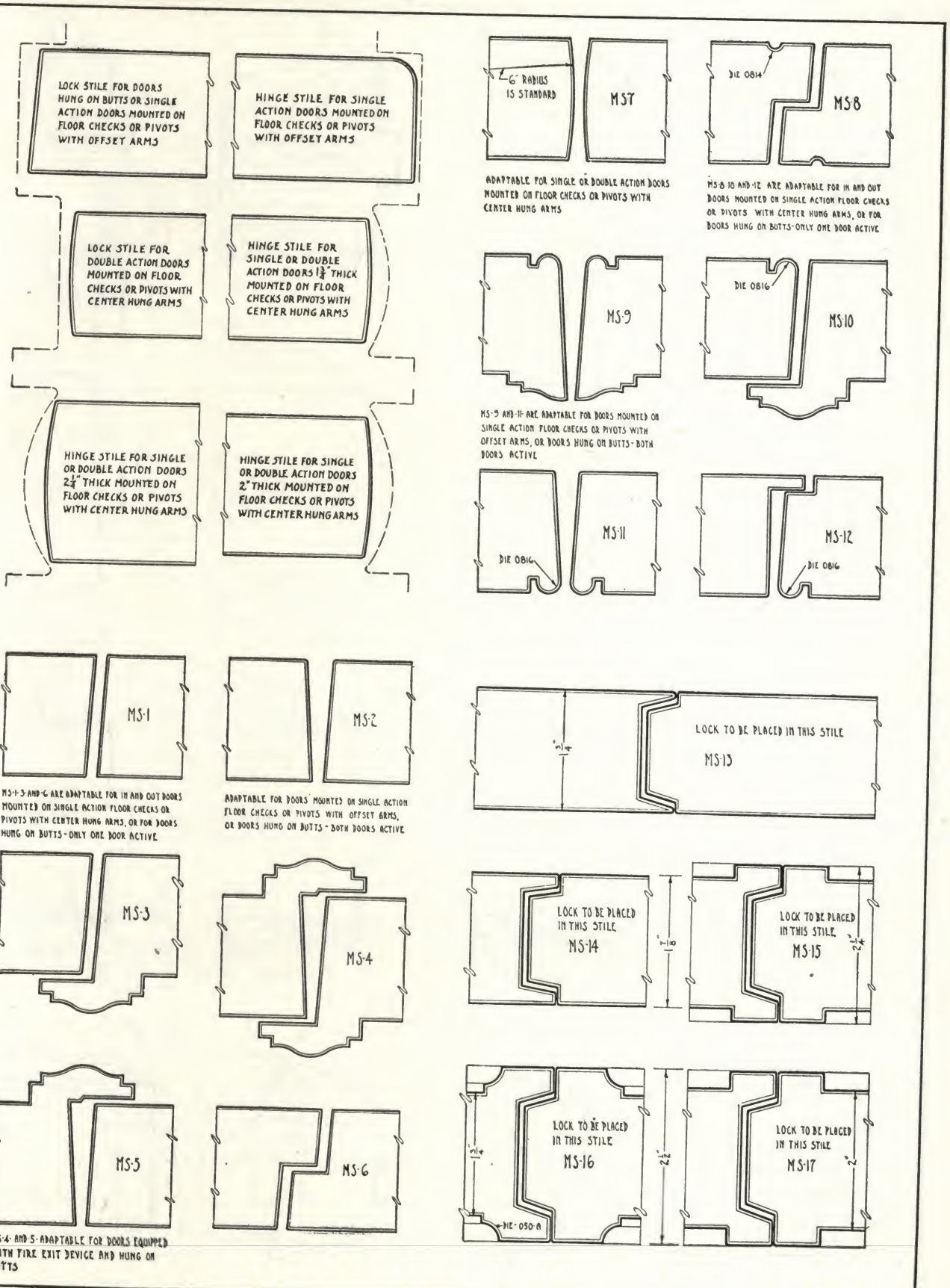
DOOR CLEARANCE WITH THRESHOLD

DOOR CLEARANCE WITHOUT THRESHOLD

ELEVATION SHOWING CLEARANCES AND WIDTH OF STILES AND RAILS

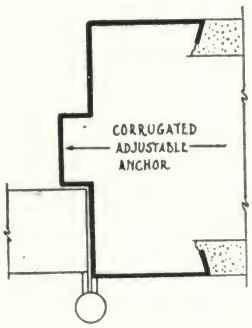
DOOR SIZES, CLEARANCES AND WIDTHS OF RAILS & STILES*

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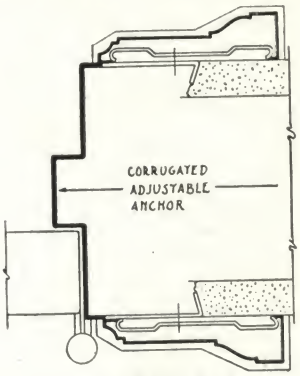


DAHLSTROM METALLIC DOOR COMPANY	DOOR STILE TREATMENTS	PLATE NO. 3

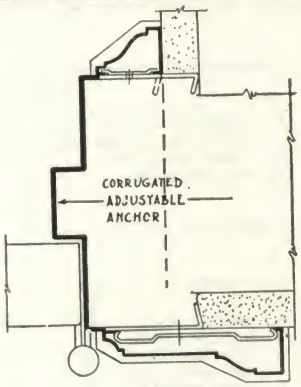
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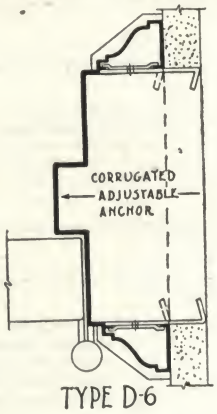
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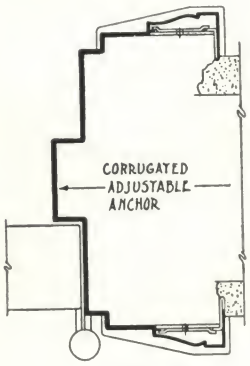
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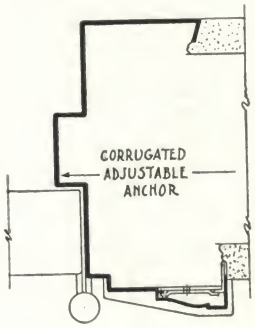
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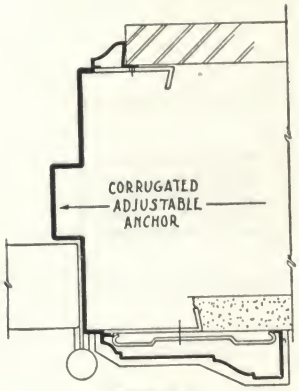
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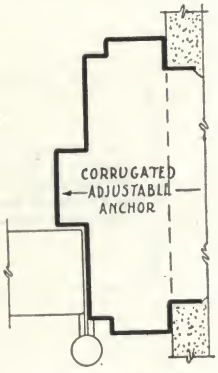
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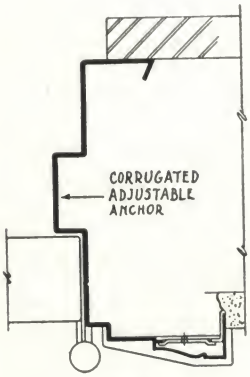
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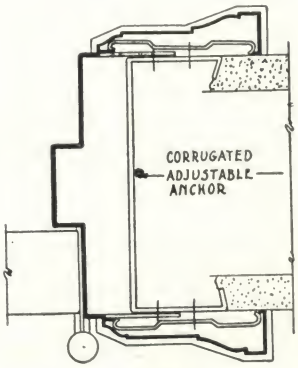
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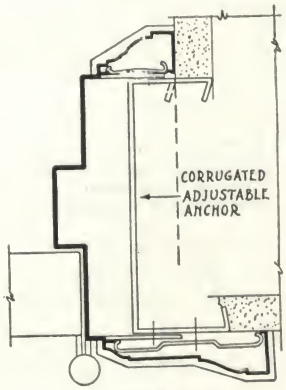
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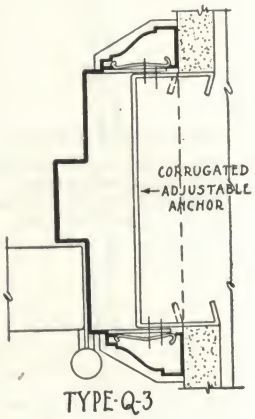
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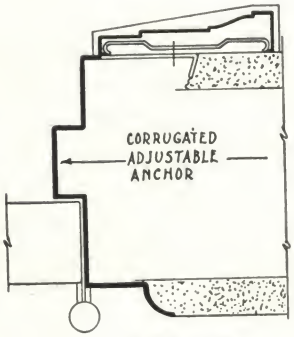
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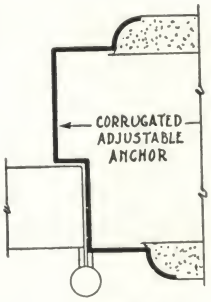
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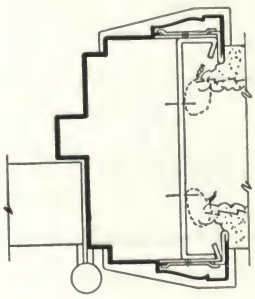
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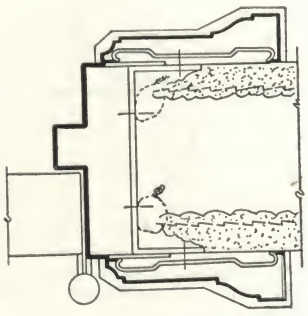
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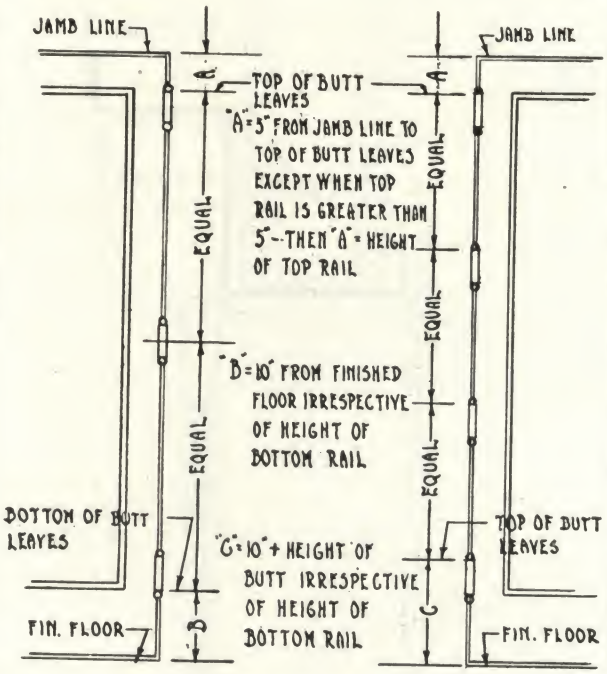
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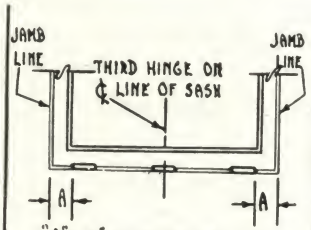
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DAHLSTROM METALLIC DOOR COMPANY	TYPICAL DOOR FRAMES	PLATE NO. 4

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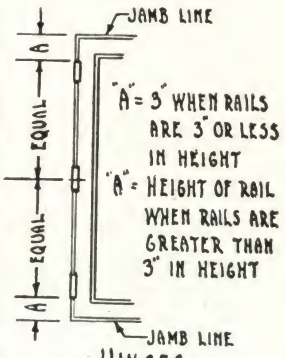


-HINGES- (DOORS)



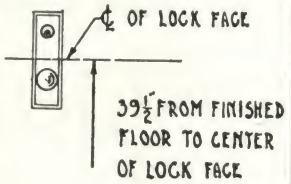
"A"=3" WHEN STILES ARE 3" OR LESS IN WIDTH.
"A"=WIDTH OF STILE WHEN STILES ARE GREATER THAN 3" IN WIDTH

- HINGES -
(SASH HINGED AT BOTTOM OR TOP)

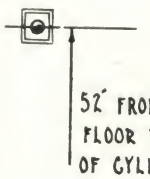


"A"=3" WHEN RAILS ARE 3" OR LESS IN HEIGHT
"A"=HEIGHT OF RAIL WHEN RAILS ARE GREATER THAN 3" IN HEIGHT

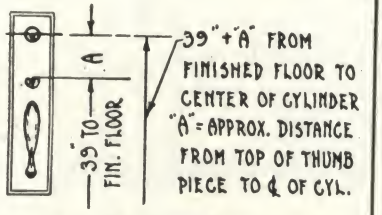
- HINGES -
(SASH HINGED AT SIDES)



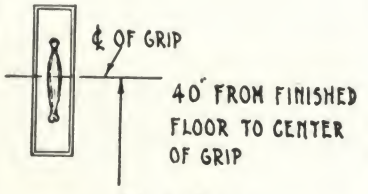
- KNOB -
(LATCH OR LOCK)



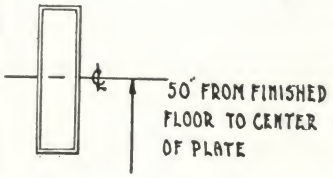
- CYLINDER -
(DEAD LOCK)



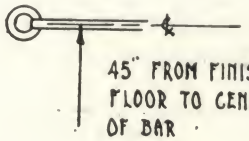
- ENTRANCE OR STORE DOOR LOCK -



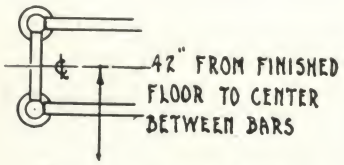
- DOOR PULL -



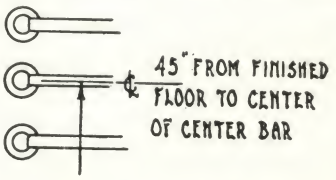
- PUSH PLATE -



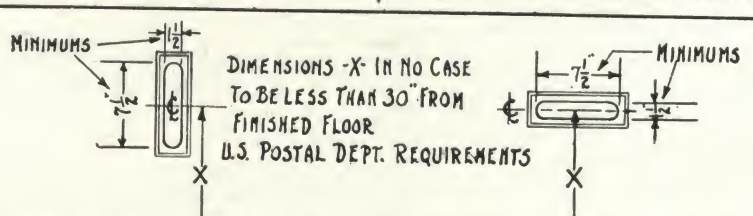
- PUSH BAR -



- PUSH & GUARD BARS -
- WITH OR WITHOUT GRAB BAR -

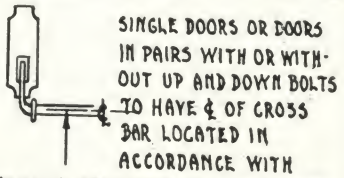


- PUSH & GUARD BARS -



VERTICAL TYPE LETTER BOX
PLACE IN HINGE STILE

HORIZONTAL TYPE LETTER BOX
PLACE IN CROSS RAIL

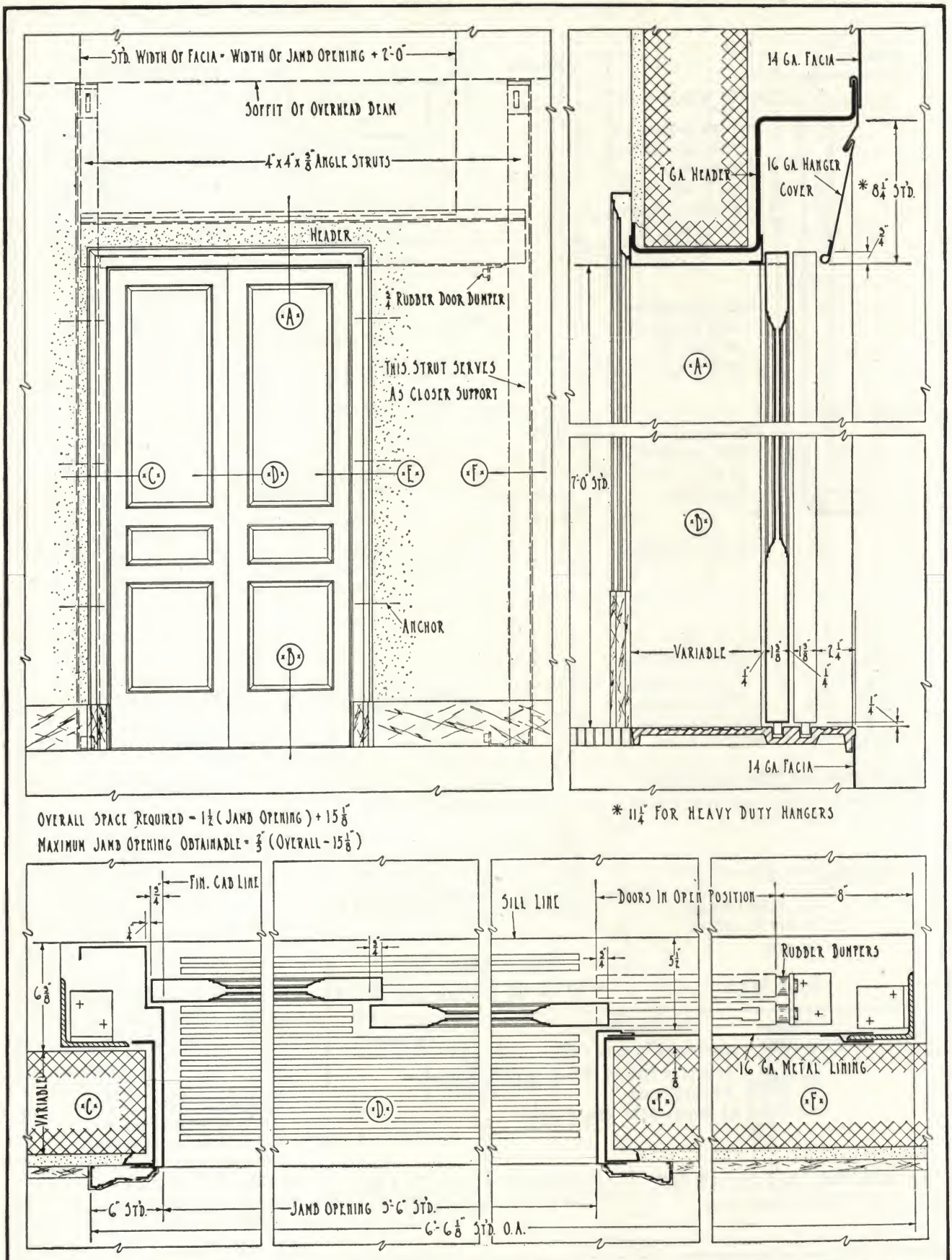


SINGLE DOORS OR DOORS IN PAIRS WITH OR WITHOUT UP AND DOWN BOLTS TO HAVE ℄ OF CROSS BAR LOCATED IN ACCORDANCE WITH HEIGHTS SPECIFIED BY EACH INDIVIDUAL EXIT DEVICE MANUFACTURER

- PANIC OR EXIT DEVICES -

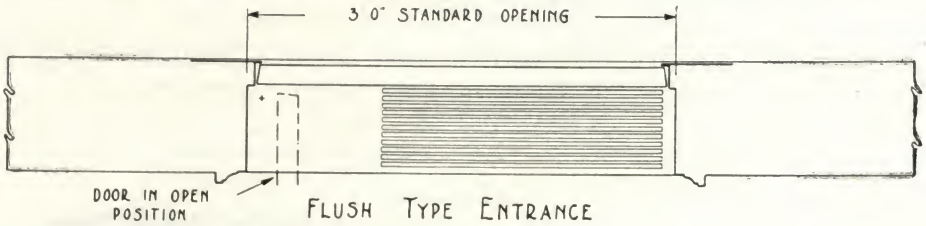
DAHLSTROM METALLIC DOOR COMPANY	STANDARD LOCATIONS OF HARDWARE	PLATE NO. 5

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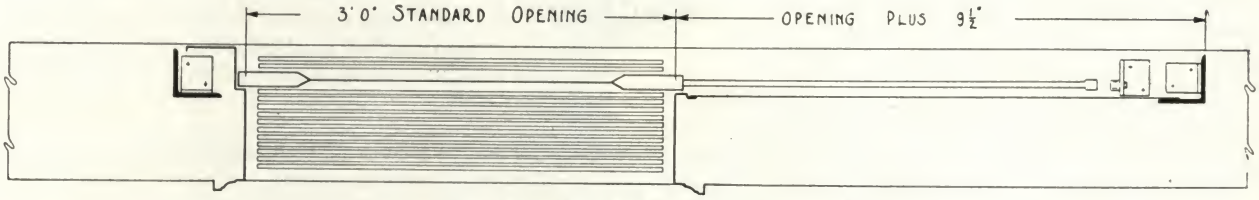


DAHLSTROM METALLIC DOOR COMPANY	Two-Speed Sliding Elevator Entrance Unit Cabinet Jambs and Rough Bucks	PLATE NO. 6

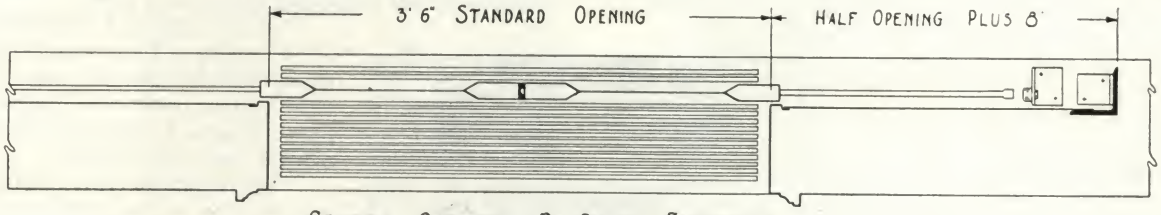
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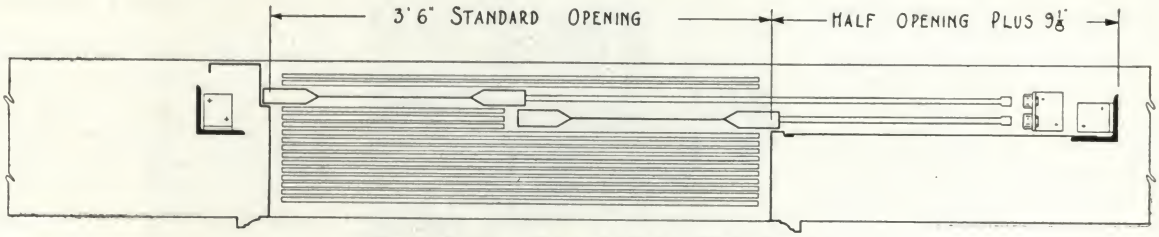
FLUSH TYPE ENTRANCE



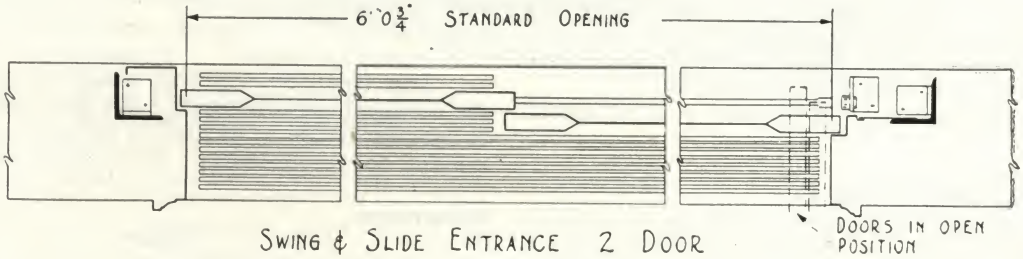
SINGLE SLIDE ENTRANCE



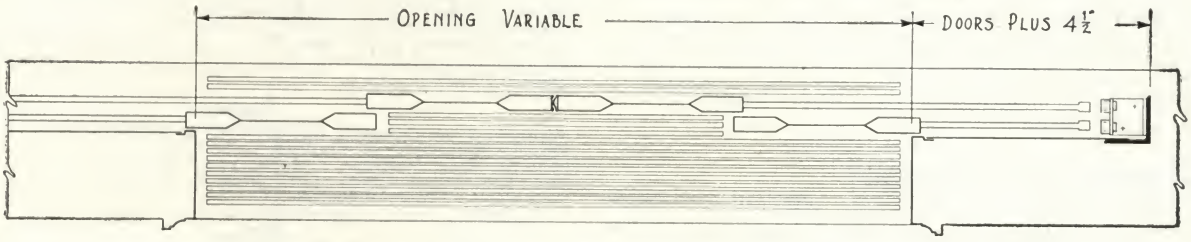
CENTER OPENING 2 DOOR ENTRANCE



TWO-DOOR TWO-SPEED ENTRANCE



SWING & SLIDE ENTRANCE 2 DOOR



FOUR DOOR CENTER OPENING TWO SPEED ENTRANCE

DAHLSTROM METALLIC DOOR COMPANY	ELEVATOR ENTRANCE TYPES	PLATE NO. 7

EMPIRE FIREPROOF DOOR CO.

EMPIRE KALAMEIN CO., INC., SUBSIDIARY

Metal Covered Doors, Windows and Trim; Shower Stall Doors

Southern Boulevard at 145th Street

NEW YORK, N. Y.

BRANCH OFFICE: 703 Leader Building, CLEVELAND, OHIO

Write to Home Office for Address of Nearest Representative

Products

METAL COVERED DOORS (Underwriters' Labeled), WINDOWS, DOOR FRAMES and TRIM, ELEVATOR FRONTS, SMOKE SCREENS; BRONZE ENTRANCES.

EMPIRE REINFORCED EXTRUDED BRONZE DOORS.

EMPIRE REINFORCED EXTRUDED ALUMINUM DOORS and SHOWER STALL DOORS.

We specialize in Bronze Work.

"Empire Commercial" Metal Covered Doors

Through years of specialization in the manufacture of metal covered work, we have evolved a product in which we take just pride—the "Empire Commercial" metal covered door, suitable for any class of fireproof work.

Details — ***Cores*** — Sound kiln dried white pine milled in one piece, sanded and finished accurately, for cores of stiles and rails.

Covering—Long terne or galvanized or furniture steel of No. 24 gauge. Drawn on through steel dies; sharp angles and arrises; tight and free from waves and buckles.

Panels—To be three-ply laminated pine meeting requirements of all city and state building departments.

Assembly—Doors are mortised and tenoned, wedged and glued or doweled. Seams soldered and scraped by our own process, producing a perfect and smooth surface. Under ordinary use seams are guaranteed not to split.

Finish—All material receives one coat of special metallic primer.



Bronze Entrance of the Architects' Building, 101 Park Avenue, New York, N. Y.

Underwriters' Labeled Doors

Paneled metal clad swinging doors may be used for openings in vertical shafts, corridor or room partitions, exterior walls, and fire escape exits when provided with special hardware.

Size when mounted singly, not exceeding 4x8 ft. In pairs, not exceeding 7x8 ft.

Doors must be hung to angle iron, channel iron or hollow metal jambs.

Empire Metal Covered Windows

Double hung or casement type windows are made in our standard design, or they will be manufactured to meet special conditions.

The construction follows, in general, the strictest standard requirements. Great care is taken to secure tight seams and joints to counteract the natural effects of exposure.

Empire Integro Window—Details are the same as described for the standard window, with the addition of special interlocking features which combine to produce all the effect of a weatherstripped window.

Empire Copper Doors

It is wise to use an "Empire Copper Door" for exterior openings as the chemical composition of copper is such that will enable it to withstand the elements far better than iron or steel.

Empire Metal Covered Smoke Screens

For enclosing stair halls, and corridors, we manufacture in any design to meet any condition.

Empire Metal Covered Elevator Fronts

Metal covered elevator fronts are being used more extensively now than ever before, because the solid core feature makes it practically the only fireproof elevator door which can be operated quietly.

The tinny metallic rattling sound so common in metal sliding doors is absent in metal covered work as the wood core acts as a sound deadener.

Empire Shower Stall Doors

We manufacture shower stall doors in bronze, nickel, benedict metal and chromium plated. The doors are made with patented adjustable "non-sag" hinge and frame. Complete details sent on request.

Empire Service

"We can duplicate in metal covered work any door that can be designed in wood."

This company is always ready to co-operate with the architectural profession. We are ready at all times to suggest details or to furnish technical information in relation to our products. Catalogues sent on request.

References

Theaters

Loew's 175th Street, New York, N. Y.
Warner Brothers' Hollywood, Broadway, New York, N Y.
Warner Brothers' Grand, Pittsburgh, Pa.
Loew's Syracuse, Syracuse, N. Y.
Shubert's Forrest, Philadelphia, Pa.
Loew's Richmond, Richmond, Va.
Keith's, Chester, N. Y.
Mark Strand, Utica, N. Y.

Banks

Northport Trust Company, Northport, L. I., N. Y.
Flushing National Bank, Flushing, L. I., N. Y.
Malverne Bank, Malverne, L. I., N. Y.
Little Neck National Bank, Little Neck, L. I., N. Y.
First National Bank, Wytheville, Va.
First National Bank, Niagara Falls, N. Y.

Schools

Julia Richman High School, New York, N. Y.
Girls' Commercial High School, Brooklyn, N. Y.
Adams School, Youngstown, Ohio
University of Wyoming, Casper, Wyo.
Jerome High School, Phoenix, Ariz.
McNeil High School, Kansas City, Mo.
Junior High School, Camden, N. J.

Office Buildings

The Architects' Building, 101 Park Avenue, New York, N. Y.
251 West 42nd Street, New York, N. Y.

Apartments

1 Beekman Place, New York, N. Y.

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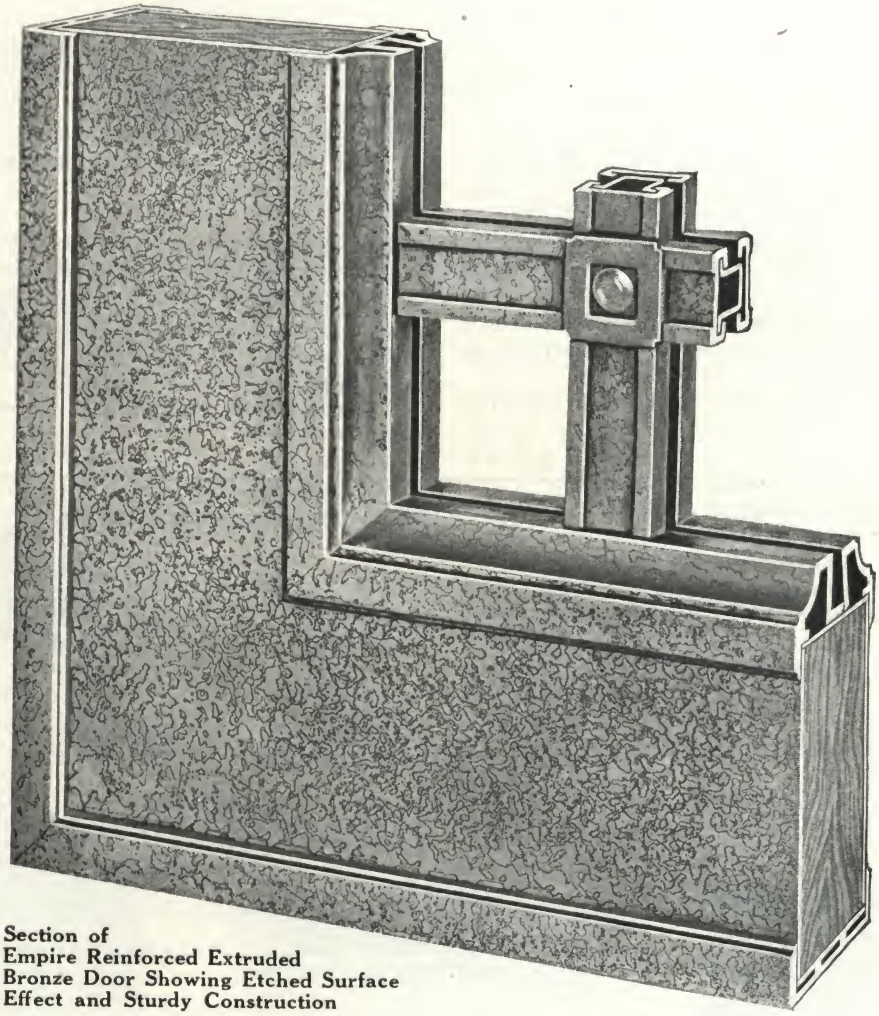
Empire Reinforced Extruded Bronze Doors and Aluminum Doors

Note: The details and specifications following apply to aluminum as well as bronze.

The door illustrated below is a product of our own factory and originated with us. It was designed for the purpose of furnishing a strong, well constructed bronze door at a nominal cost. Note from the specifications that the metal used is of sufficient thickness to make the door withstand much abuse. The finish shown below is just one of many. We have over twenty standard colors and designs which we can furnish.

The cost is surprisingly low.

We have installations of this door in all parts of the country, and will be glad to furnish any one interested with a list of the buildings. These doors are used extensively for theater and bank entrances.

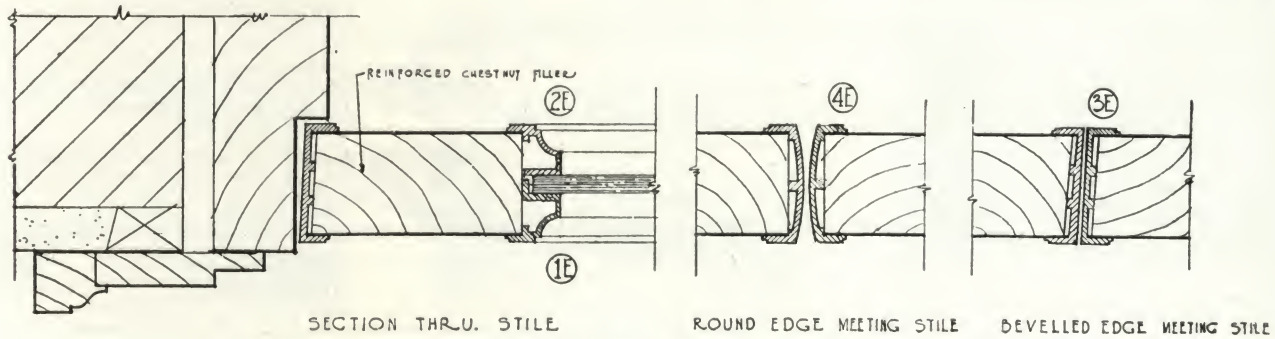


Section of Empire Reinforced Extruded Bronze Door Showing Etched Surface Effect and Sturdy Construction

Specifications—Bronze doors to be reinforced extruded bronze as manufactured by Empire Fireproof Door Co. Metal for stiles and rails No. 16 gauge bronze sheets. Panel and glass moulding extruded bronze. Edge pieces of extruded bronze channel. Edge pieces are to be used on both sides, top and bottom of doors. Edge pieces and mouldings to lap doors on both sides. Mouldings to be secured with concealed brass screws, except on removable side. Reinforced filler of kiln dried chestnut to be used as core. ⅛-in. brass plates to be countersunk over all seams and joints in the core and to be secured with countersunk brass screws. Bronze sheets to be brazed to this plate. Seams between stiles and rails to be invisible. Jambs and trim to be bronze covered (or extruded bronze as desired).

Transom sash to be constructed same as doors.

All material to be finished either natural, statuary, or etched and chased, as desired by architect. The finish is to be chosen from Empire Fireproof Door Company's color card.



Section of No. 16 Gauge Bronze Door with Extruded Bronze Mouldings

ESTABLISHED 1911

ELLISON BRONZE COMPANY, INC.

Manufacturers of Ellison Welded Bronze Doors and Welded Aluminum Doors

JAMESTOWN, N. Y.

For Representatives, see our page on Ornamental Metal Work

For our pages on Cast and Hollow Bronze Products and Louvre Ventilators, see Manufacturers' Index

Ellison Welded Bronze Door

The Ellison Welded Bronze Door is formed from No. 11 gauge extruded bronze ($\frac{3}{32}$ in. thick), dent and buckle proof. Although this material is considerably heavier than the usual hollow bronze construction, this door is light enough to swing easily at all times.

Stiles and rails are formed from extruded bronze with all visible corners and arrises made sharp by an Ellison patented process.

Stiles and rails can be made any width and can be plain, paneled or ornamented, as may be desired.

All joints where stiles meet rails are *welded,* not brazed or riveted. Welding makes a solid joint, which is absolutely invisible as done by us. The metal is actually flowed together.

We use Anaconda architectural extruded bronze shapes for plain mouldings. This means correct contours and straight, sharp and true arrises. All mouldings, with the exception of the removable glass stops, have concealed fastenings.

All ornamental mouldings or ornaments on panels, stiles and rails are in cast bronze, matching the color of the extruded bronze exactly and are attached by means of concealed fasteners.

The construction of the Ellison Welded Bronze Door is so flexible that architects are assured of having their designs correctly interpreted.

All inherent defects of the so-called hollow-bronze doors are eliminated; our method of fabrication makes a "one-piece" door of permanent rigidity.

Ellison Welded Aluminum Doors

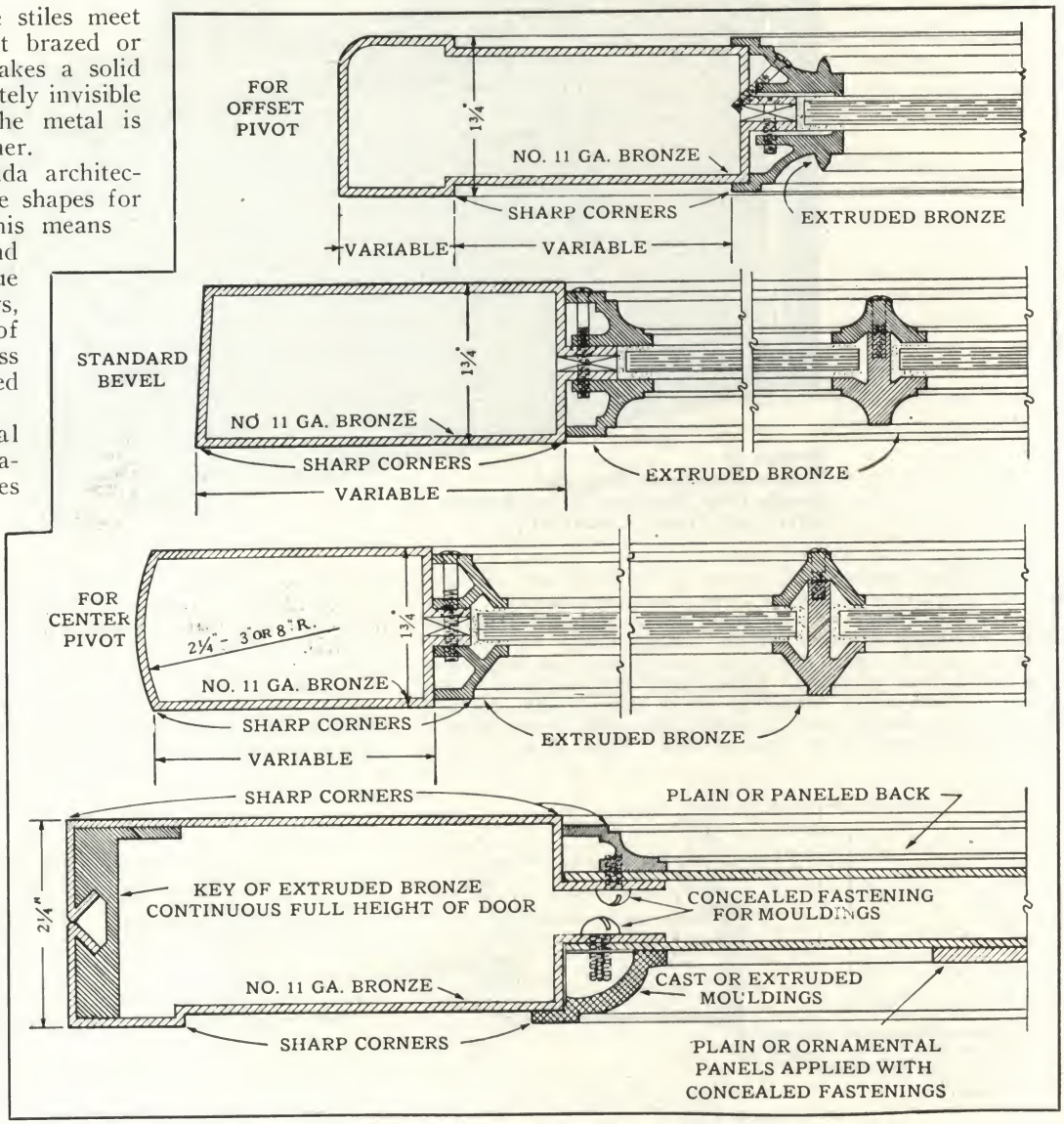
We also make doors of genuine Alcoa aluminum by this same process.

Ellison Stiffener and Aligner

We have also developed a stiffener and aligner, especially for day doors which have a strike at the top only. By the use of the Ellison Aligner, doors of this type are easily brought into alignment and remain so indefinitely.

Literature, etc.

Literature, list of installations and specifications gladly mailed on request.



Details of Ellison Welded Bronze Door Construction

EQUIPMENT & SUPPLY COMPANY, INC.

Adjustable Steel Paneldor

51 Madison Avenue
NEW YORK, N. Y.

Products

ADJUSTABLE STEEL PANELDOR for Room Ventilation in Hospitals, Schools, Apartments, State Rooms, Compartments and Public Buildings. (Patent pending.)

For "Jantzen" Towel Stands and Cabinets see Manufacturers' Index.

Description

A door construction with independently adjustable upper and lower panels to provide openings for ventilation while the door proper remains unopened.

Panel housing cavities, in line with openings, are located in the intermediate portion of the door frame. Panels are guided in operation and when closed cover openings firmly and with solid door appearance.

Concealed automatic door closer eliminates the possibility of door slamming.

Perfect Ventilation Without Draught—The adjustable feature allows the opening of either panel from 1 to 16⅝ in.

Eliminates Transom—Leaving upper panel of Adjustable Paneldor open acts as a transom, with the added feature it can be adjusted to any opening desired up to 16⅝ in.

Sneakproof—Inside mechanism holds either panel in rigid position at any size opening. Panels are automatically locked in the position desired and cannot be forced down.

Visibility—When panels are open full depth of opening, it is possible to see people passing through the corridors, yet the center of the door between panel openings acts as a screen.

Protection Against Insects — Copper screws snugly fit in recess frame completely covering opening at top and bottom of door when panels are opened.

Finishes—Grained to match any wood or any of several plain finishes. Only special steel furniture stock used, thus eliminating the refinishing for several years. All finishes are baked-on enamel rubbed to an egg-shell gloss with pumis stone and oil.

Unaffected by Climate—Adjustable Steel Paneldor are not affected by any variance in climate. They always work, no swelling, binding or cracking and are impervious to any weather conditions.

To the Architect

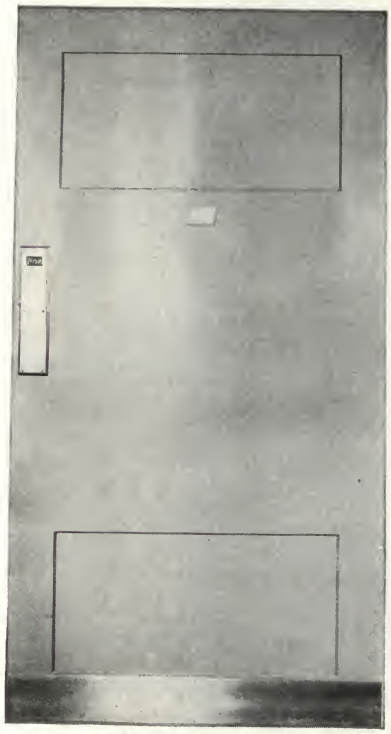
The adjustable Steel Paneldor is so designed as to leave our factory complete, ready for erection. All mechanism is concealed in the door proper, eliminating all cutting in the field for door checks and closers. To your clients it will be a great stride in modern practical door equipment.

Inspection and Detail Drawings

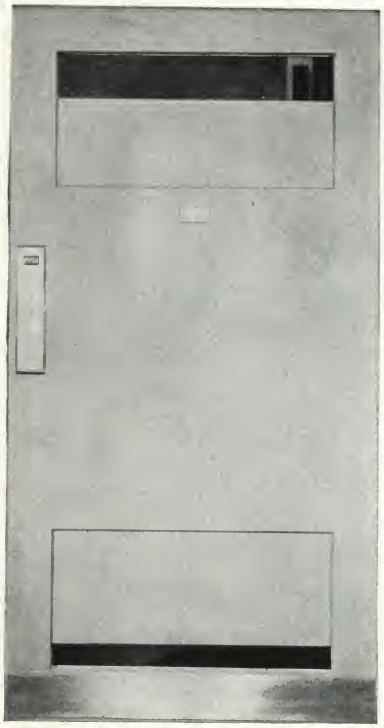
We solicit a personal call for your inspection and comments

Display Suite, 2509-51 Madison Avenue, New York, N. Y.

We will be pleased to consult with you, furnishing detail drawings and estimates for your consideration.



Adjustable Flush Door Panel in Closed Position



Adjustable Flush Door Panels in Partly Open Position



Showing Position of Panel Operating Handles (Door Closer Concealed)

E. H. FRIEDRICH COMPANY

Manufacturers of Metal Covered Doors, Windows, Partitions and Trim

HOLYOKE, MASS.

REPRESENTATIVES

ALBANY, N. Y., Haefner & Harding, 1 Columbia Place
BALTIMORE, MD., Consolidated Supply Co., 1102 No. Charles Street
BOSTON, MASS., Rubin-Burke Co., 333 Washington Street
NEW HAVEN, CONN., A. R. Kirschner Co., 30 Whitney Avenue
SCRANTON, PA., LeBar Evans & Allen, 711 Linden Street
UTICA, N. Y., American Hardwall Plaster Co.
WASHINGTON, D. C., Consolidated Supply Co., Bond Building

Products

High grade Kalamein (Metal Covered) Woodwork for fireproof and sanitary purposes, including Doors and Trim, Windows, Partitions, etc., in Kalamein, Copper, Bronze and Steel.

Also Kalamein and Tin Clad Door with Underwriters' label service.

TRADE-MARK

Facilities and Workmanship

Our factory is especially well equipped to produce any design in high grade metal covered woodwork suitable for buildings, such as banks, public office and school buildings.

This work can be executed promptly and efficiently.

High Grade Metal Covered Entrance Doors

The manufacturing of highest grade metal covered entrance doors is our specialty. They are made in copper or commercial bronze.

Finish

All bronze and copper work is properly cleaned, oxydized and oiled before it leaves the factory to prevent corrosion. Kalamein products are cleaned and painted with one coat of special metal primer.

Metal Covered Mouldings

In order to economize in designing metal covered work, a number of standard stock mouldings for panels, trim, etc., have been shown at the scale of 3 in. to the foot.

By using these mouldings the cost of special dies is saved.

Kalamein Elevator Doors

We make a specialty of metal covered elevator doors in kalamein, copper or bronze.

These are furnished in three types: swing, slide, or combination slide and swing, and in any design. Mouldings to be standard to fit our dies.

Doors can be furnished complete with hardware.

Specifications for Kalamein Doors and Smoke Screens

Where indicated on plans, doors, jambs, trim, side lights, transoms, etc., shall be kalamein.

All metal used for covering shall be "Keystone" copper steel. No. 26 gauge to be used for stiles, rails, jambs and panels, and for all sash and trim, and No. 28 for all moulding.

All cores shall be made up from clear kiln dried white pine, free from loose knots, sap and shakes.

All cores shall be milled true to form. All stiles over 6 in. wide shall be built up of small strips glued together. All door stiles and rails shall be mortised, tenoned, and glued together.

All door stiles, sash, jambs, mouldings, muntins and trim shall be drawn through steel dies. All mouldings and edges shall be clean, sharp and true to detail with metal fitting closely to wood cores.

Special care must be used in assembling to avoid bench marks as much as possible.

All joints between metal shall be filled with solder and scraped flush.

After work is assembled all metal surfaces shall be thoroughly cleaned, with oxide of iron, of grease and all foreign substances, and given one coat of special metallic primer sprayed on even and smooth.

Recent Contracts

Apostolic Sisters Orphanage, New Haven, Conn.
Albany Law School, Albany, N. Y.
Boys' Club, Bridgeport, Conn.
Baltimore Copper Smelting & Rolling Co., Baltimore, Md.
High School, Brighton, Mass.
Brehms Lane School, Baltimore, Md.
Bridgeport City Trust Co., Bridgeport, Conn.
City National Bank, Danbury, Conn.
Folger Shakespeare Library, Washington, D. C.
Franklin Academy, Malone, N. Y.
Guilford Pumping Station, Baltimore, Md.
Clinic Building and Medical and Pediatric Building, Yale University, New Haven, Conn.
Dining Hall, Holmes Library and Dormitory, Phillips Academy, Andover, Mass.
Dormitory, Smith College, Northampton, Mass.
American Tel. & Tel. Co., West Haven, Conn.
Elihu Club, New Haven, Conn.
Francis Junior High School, Washington, D. C.
General Electric Co., Pittsfield, Mass.
Gov. Clinton Hotel, Kingston, N. Y.
Highlandtown School, Baltimore, Md.
Lackawanna County Courthouse, Scranton, Pa.
Hotel Charles, Springfield, Mass.
Loyala College, Baltimore, Md.
Langdell Hall, Harvard University, Cambridge, Mass.
Morris Plan Bank, Evanston, Ind.
National Central Bank, Baltimore, Md.
Pierce School, Arlington, Mass.
Physiology Building, John Hopkins University, Baltimore, Md.
High School, Salem, Mass.
State College for Teachers, Albany, N. Y.
Y. M. C. A., Springfield, Mass.
Sacred Heart Convent, Washington, D. C.
Tioga County Hospital, Waverly, N. Y.
Tufts College, Medford, Mass.
Southern New England Telephone Co., New Haven, Conn.
United Shoe Machinery Co., Boston, Mass.

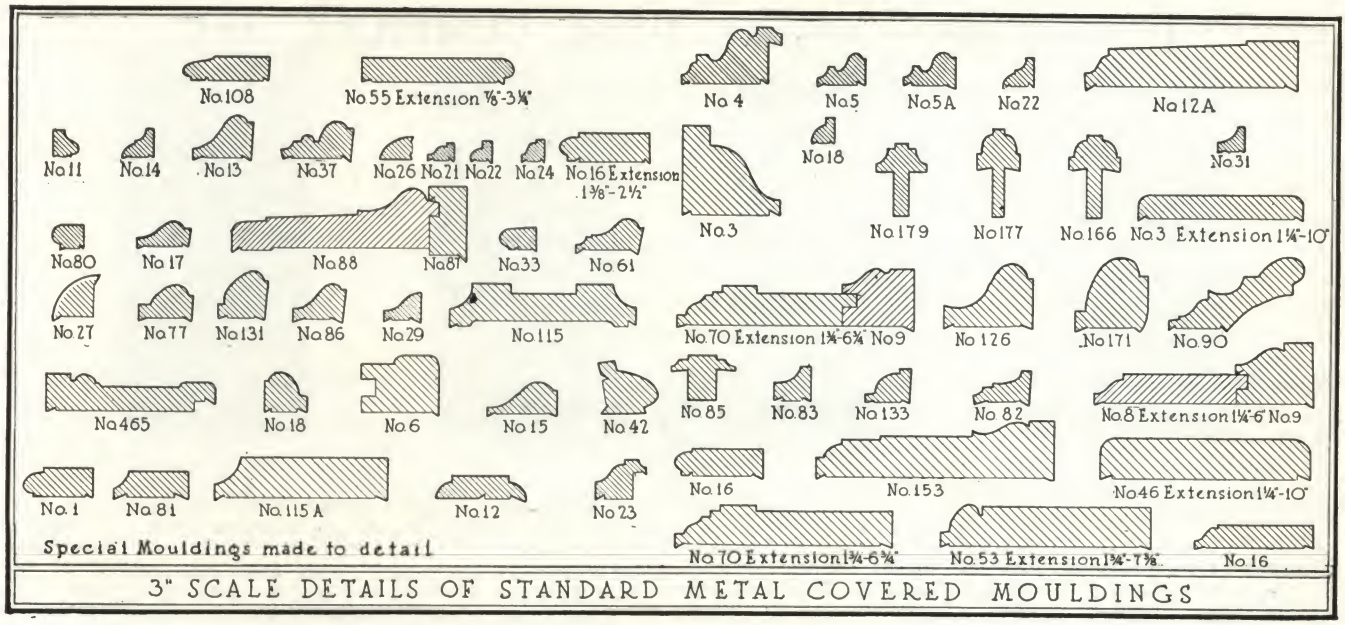


A Friedrich Metal Covered Door
Hardware applied at factory

Recent Contracts

United Illuminating Co., New Haven, Conn.
Wendell Hotel, Pittsfield, Mass.
School No. 33, Scranton, Pa.
St. Lawrence State Hospital, Ogdensburg, N. Y.
First National Bank, Amherst, Mass.
Somerville High School, Somerville, Mass.
Park City Hospital, Bridgeport, Conn.
Crocker Burbank Mfg. Co., Fitchburg, Mass.
Boston Elevated Substation, Boston, Mass.
Central Maine Power Company, Lewiston, Me.
Ann Lee Home, Albany, N. Y.
Kingston City Hall, Kingston, N. Y.
Masonic Temple, New Britain, Conn.
Waterbury Hospital, Waterbury, Conn.
Odd Fellows Temple, Springfield, Mass.
Baltimorean Apartments, Baltimore, Md.
Trinity Grace Church, Springfield, Mass.
General Industrial Bank, New Haven, Conn.
Elks Home, New Haven, Conn.
Borough Hall, Merchantville, N. J.
High School, Middletown, N. Y.
Wynnfield Theatre, Philadelphia, Pa.
Germantown Trust Co., Philadelphia, Pa.
Baltimore City College, Baltimore, Md.
John A. Nichols School, Syracuse, N. Y.
Sixth Precinct Building, Albany, N. Y.
Fourth Presbyterian Church, Washington, D. C.
First National Bank, Exeter, Pa.
Kingston Hospital, Kingston, N. Y.
Prospect Street Apartments, Stamford, Conn.
Baltimore Club, Baltimore, Md.
St. Francis College, Staten Island, N. Y.
Mercy Hospital, Springfield, Mass.
Firestone Tire & Rubber Co., Washington, D. C.
Bowdoin College, Brunswick, Me.
Walter Reed Hospital, Washington, D. C.
First National Bank, Greensboro, N. C.
Y. M. C. A., Winston-Salem, N. C.
Pollard Building, Lowell, Mass.
Masonic Temple, North Adams, Mass.
American National Bank, Camden, N. J.
Chamber of Commerce Building, Springfield, Mass.
Y. M. C. A., Oneonta, N. Y.

Continued on next page



3" SCALE DETAILS OF STANDARD METAL COVERED MOULDINGS



Connecticut Power Company Office Entrance, New London, Conn.

JAMESTOWN METAL DESK COMPANY, INC.

Hollow Metal Doors and Trim

JAMESTOWN, N. Y.

BRANCH OFFICES

NEW YORK, N. Y., 285 Madison Avenue

BOSTON, MASS., 540 Chamber of Commerce Building

REPRESENTATIVE SALES OFFICES

NEWARK, N. J., Griffith Building

PHILADELPHIA, PA., 2206 Chestnut Street

BUFFALO, N. Y., Morgan Building

REPRESENTATIVES IN PRINCIPAL CITIES

Products

HOLLOW METAL DOORS and TRIM.

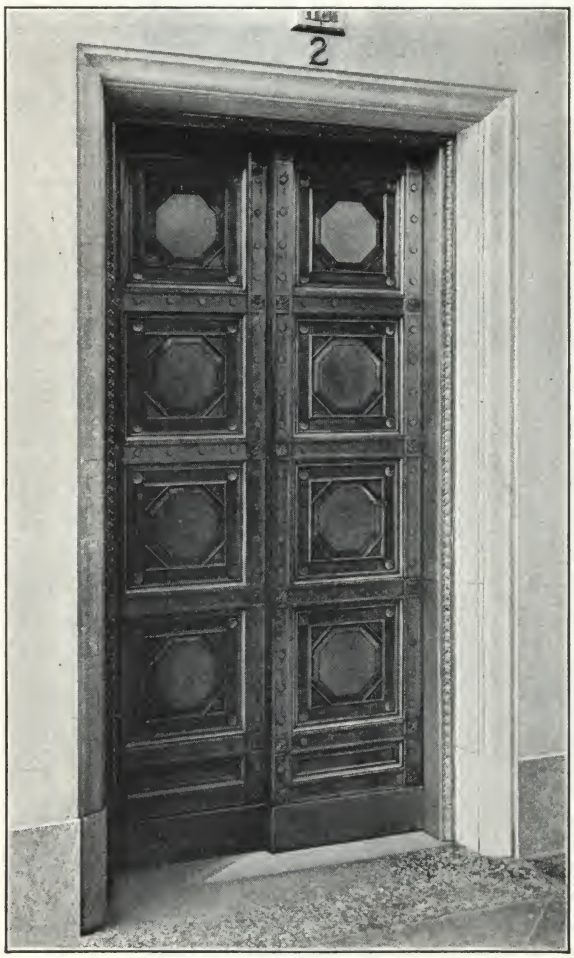
ELEVATOR ENCLOSURES.

Also Furniture, Metal Desks and Counter Work.

General Description of Hollow Metal Doors

The stiles and rails are formed from a single sheet of No. 18 gauge steel. All joints and miters are made a continuous weld with acetylene gas process. Panel mouldings electric welded to the stiles and rails, insuring perfect alignment and rigidity. Cork insulation strips are inserted in the stiles and rails to deaden the metallic ring of hollow metal. Panels are insulated with ¼-in. thick asbestos.

Frames—Reinforcing plates are placed inside, backing up all hardware. Drilling and tapping for hardware is done at factory. Combination bucks and jambs are made of No. 18, 16, 14 or 12 gauge steel as required together with sufficient masonry anchors. Corners are mitered and gas welded.



Bronze Elevator Entrances, Rand Building, Buffalo, N. Y.
F. J. and W. A. KIDD, Architects
JOHN W. COWPER CO., Contractors

Trim—Made of No. 18 gauge cold rolled steel.

Mitered corners are gas welded. Trim is secured with concealed fasteners or with special oval head screws.

Finish—All finished products are thoroughly cleaned, primed and filled, followed by required coats to produce durable finish of color desired. Each coat uniformly applied, baked and sanded, with final coat rubbed as required.

Classification of Finishes—A list of standard classification of finishes is given in the following schedule. The purpose of this list is to show the price brackets in which the various finishes occur.

Class A—All plain enamels except white and black.

Class B—Color stipples, straight grain mahogany, walnut, birch, white enamel and black.

Class C—Oak, crotch mahogany, pine, circassian walnut, gumwood, metal stipples and flat metal finishes.

Class D—Fumed oak, silver oak, hand stipples, black walnut and ebony black.

A Partial List of Installations Executed by This Company

Rand Building, Buffalo, N. Y., F. J. and W. A. Kidd, Architects; John W. Cowper Co., Contractors

Barclay-Vesey Telephone Building, New York, N. Y., McKenzie, Voorhees & Gmelin, Architects; Marc Eidlitz & Son, Inc., Contractors

Bank of New York & Trust Co., New York, N. Y., Benjamin W. Morris, Architect; Marc Eidlitz & Son, Inc., Contractors

New Jersey Bell Telephone Co. of Newark, N. J., Voorhees, Gmelin & Walker, Architects; Turner Construction Co., Contractors

Public Service Building, Boston, Mass., Harold Field Kellogg, Architect; Turner Construction Co., Contractors

Firemen's Insurance Co., Newark, N. J., John H. & Wilson Ely, Architects; Starrett Bros., Contractors

Beth Israel Hospital, Boston, Mass., Densmore, LeClear & Robbins, Architects; Holt Fairchild Co., Contractors

New York Central Station, Buffalo, N. Y., Fellheimer & Wagner, Architects; Walsh Construction Co., Contractors

City Hall Annex, Philadelphia, Pa., Philip H. Johnson, Architect; F. W. Mark Construction Co., Contractors

Irving Trust Co., 1 Wall Street, New York, N. Y., Voorhees, Gmelin & Walker, Architects; Marc Eidlitz & Son, Inc., Contractors

Western Union Building, New York, N. Y., Voorhees, Gmelin & Walker, Architects; Marc Eidlitz & Son, Inc., Contractors

Convention Hall, Philadelphia, Pa., Philip H. Johnson, Architect; McCloskey & Co. Inc., Contractors

Camden County Courthouse, Camden, N. J., Edwards & Green Inc., Architects; F. W. Mark Construction Co., Contractors

State Office Building, Albany, N. Y., Wm. E. Haugaard, State Architect, Seglin Harrison Construction Co., Contractors

Bell Telephone Building, Cincinnati, Ohio, Harry Hake and Charles Kuck, Architects

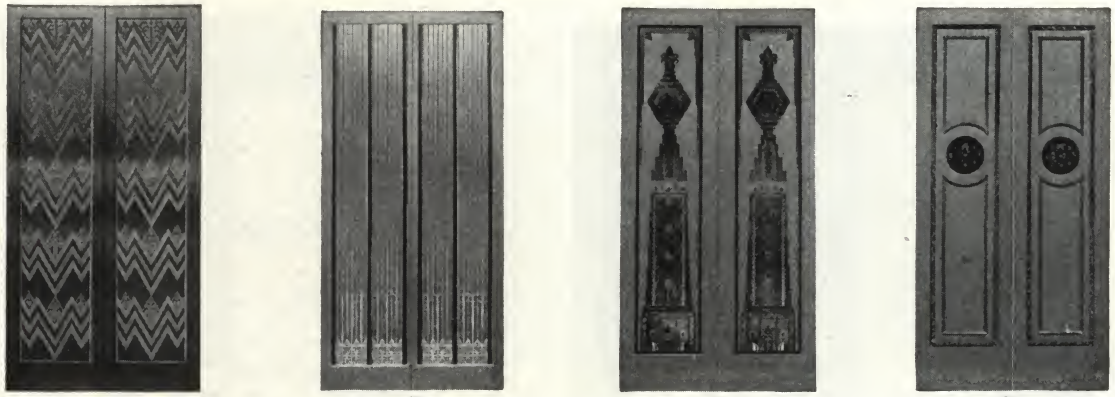
Christ Hospital, Cincinnati, Ohio, Tietig & Lee, Architects; Penker Construction Co., Contractors

Genesee Valley Trust Co., Rochester, N. Y., Voorhees, Gmelin & Walker, Architects; A. Friederich & Sons, Contractors

Medical Arts Building, Rochester, N. Y., Gordon & Kaelber, Architects; John B. Pike & Sons, Contractors

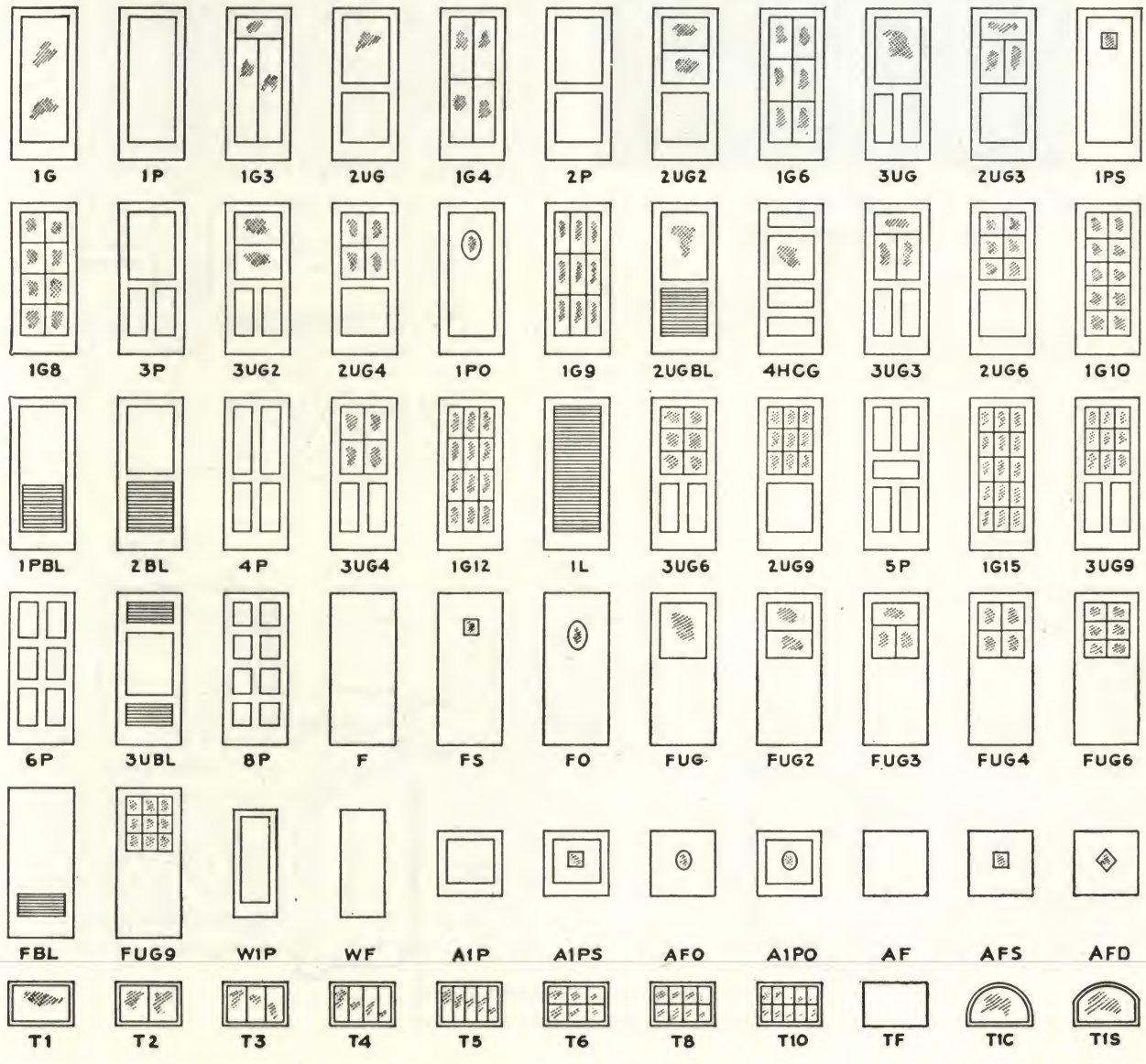
City Hall, Buffalo, N. Y., Dietel & Wade and Sullivan W. Jones, Architects; John W. Cowper Co., Contractors

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A B C D

SUGGESTED DESIGNS FOR ELEVATOR DOORS



JAMESTOWN METAL DESK COMPANY

STANDARD DESIGNS OF DOORS AND SASH

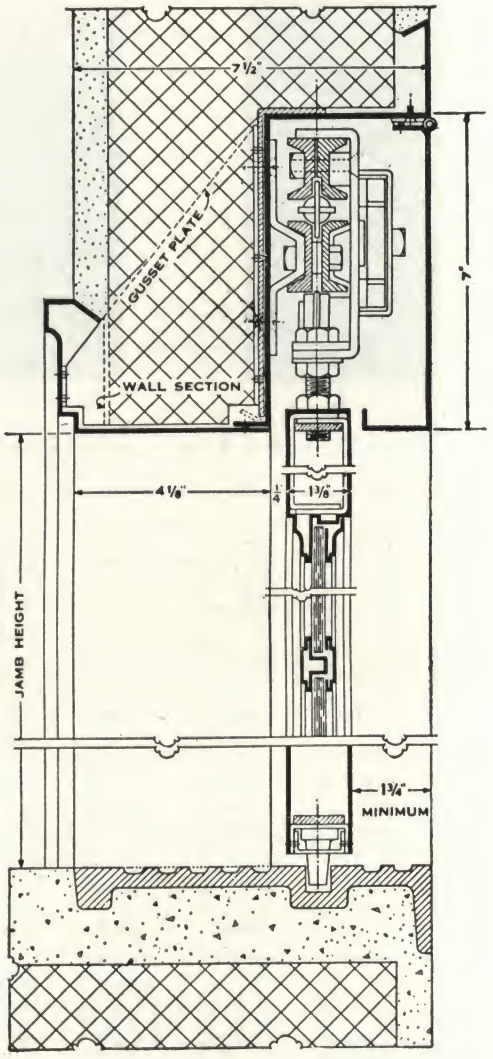
JoneSteel TRADE MARK

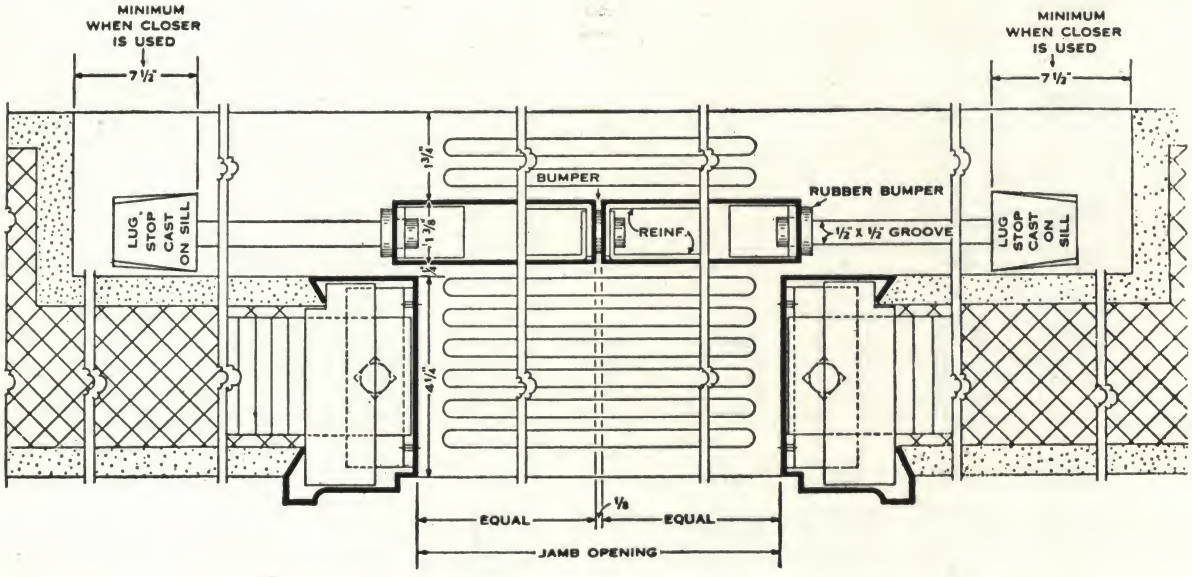
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Design D-7 Bi-parting Elevator Door Unit with Combination Buck, Jamb and Trim Frame

Any of our stock moulding can be used in the various door types, and door units finished in plain enamel or grained to match finished samples approved by architects.



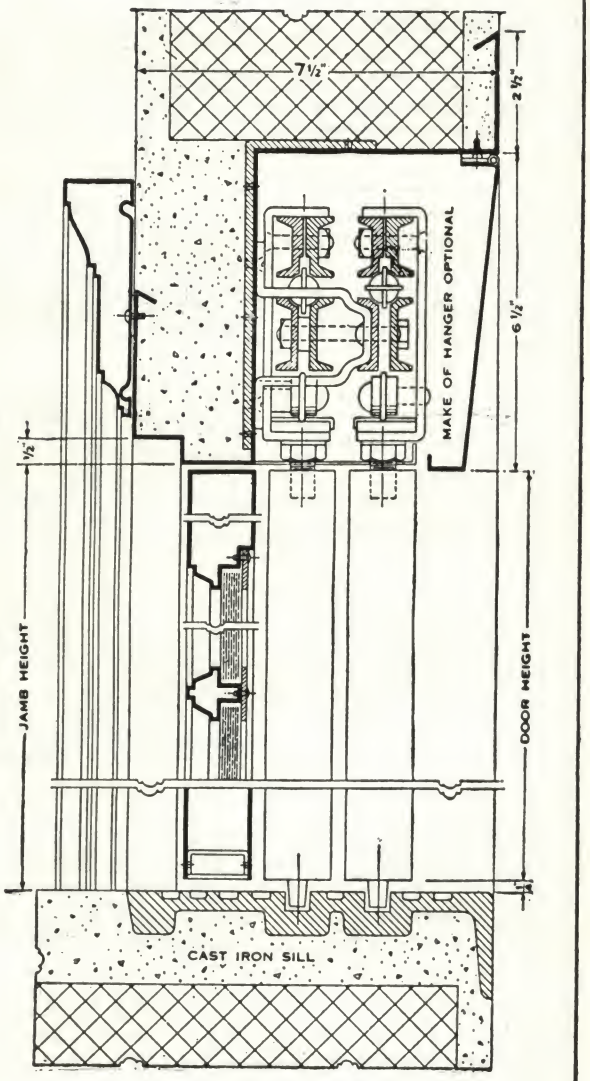


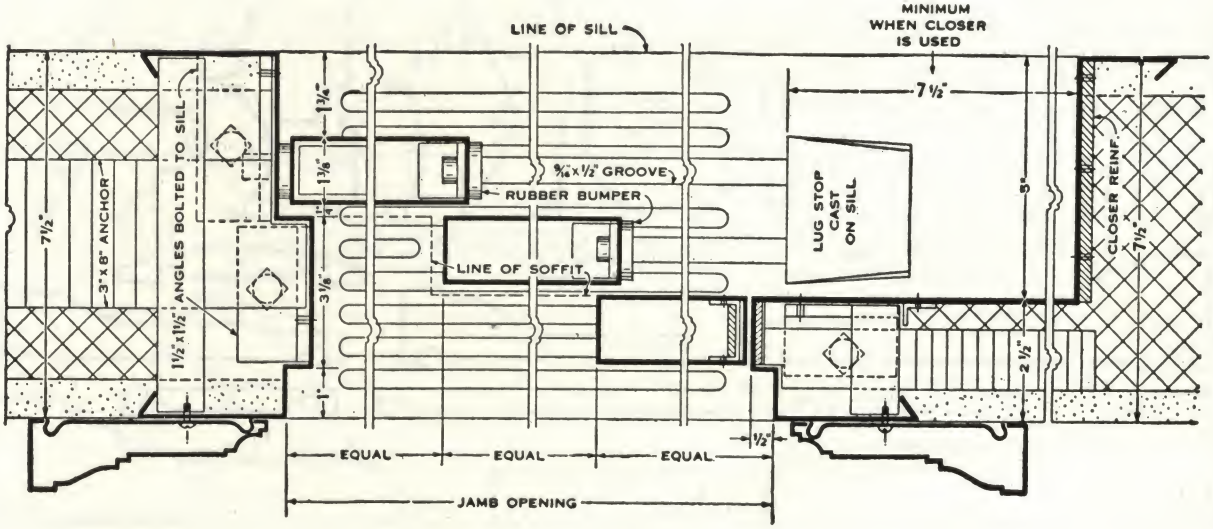
JAMESTOWN METAL DESK COMPANY	DETAILS OF HOLLOW METAL DOORS & TRIM	Jone Steel DRAWING- 1

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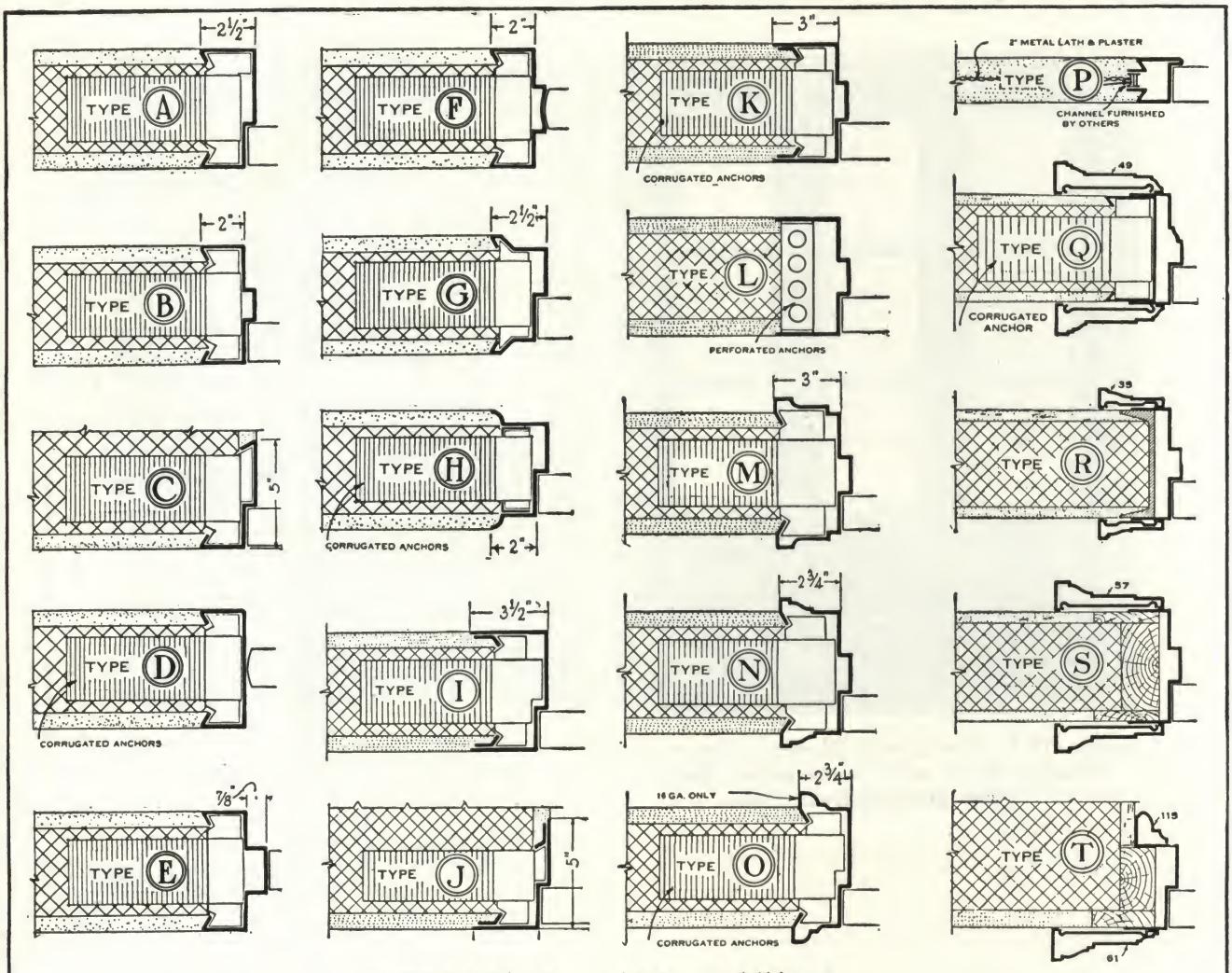
Design D-8, Two-speed Elevator Doors and Hinged Panel with Combination Buck, Jamb and Separate Trim



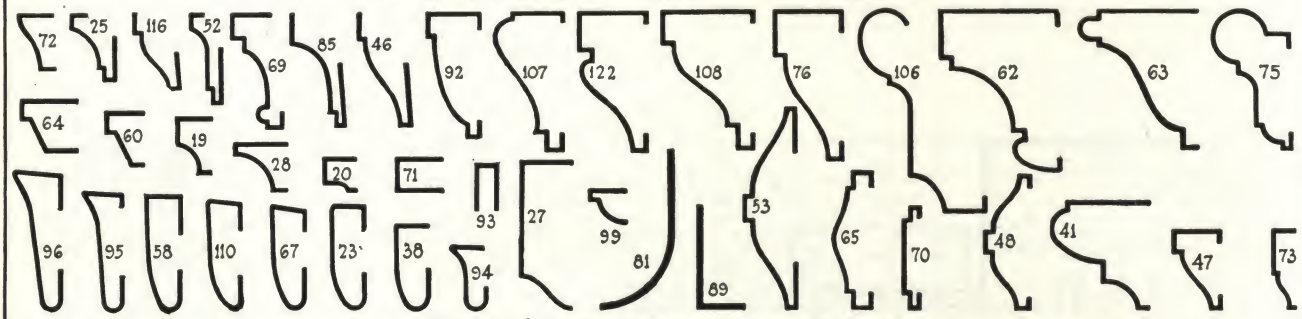


JAMESTOWN METAL DESK COMPANY	DETAILS OF HOLLOW METAL DOORS & TRIM	Jones Steel DRAWING- 2

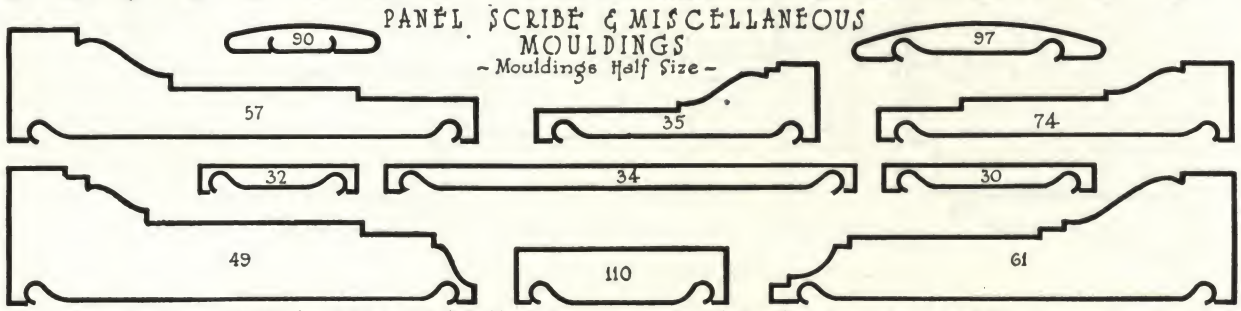
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• STANDARD JAMB DETAILS •



PANEL SCRIBE & MISCELLANEOUS MOULDINGS
~ Mouldings Half Size ~



• HALF SIZE SECTIONS OF STANDARD CASINGS •

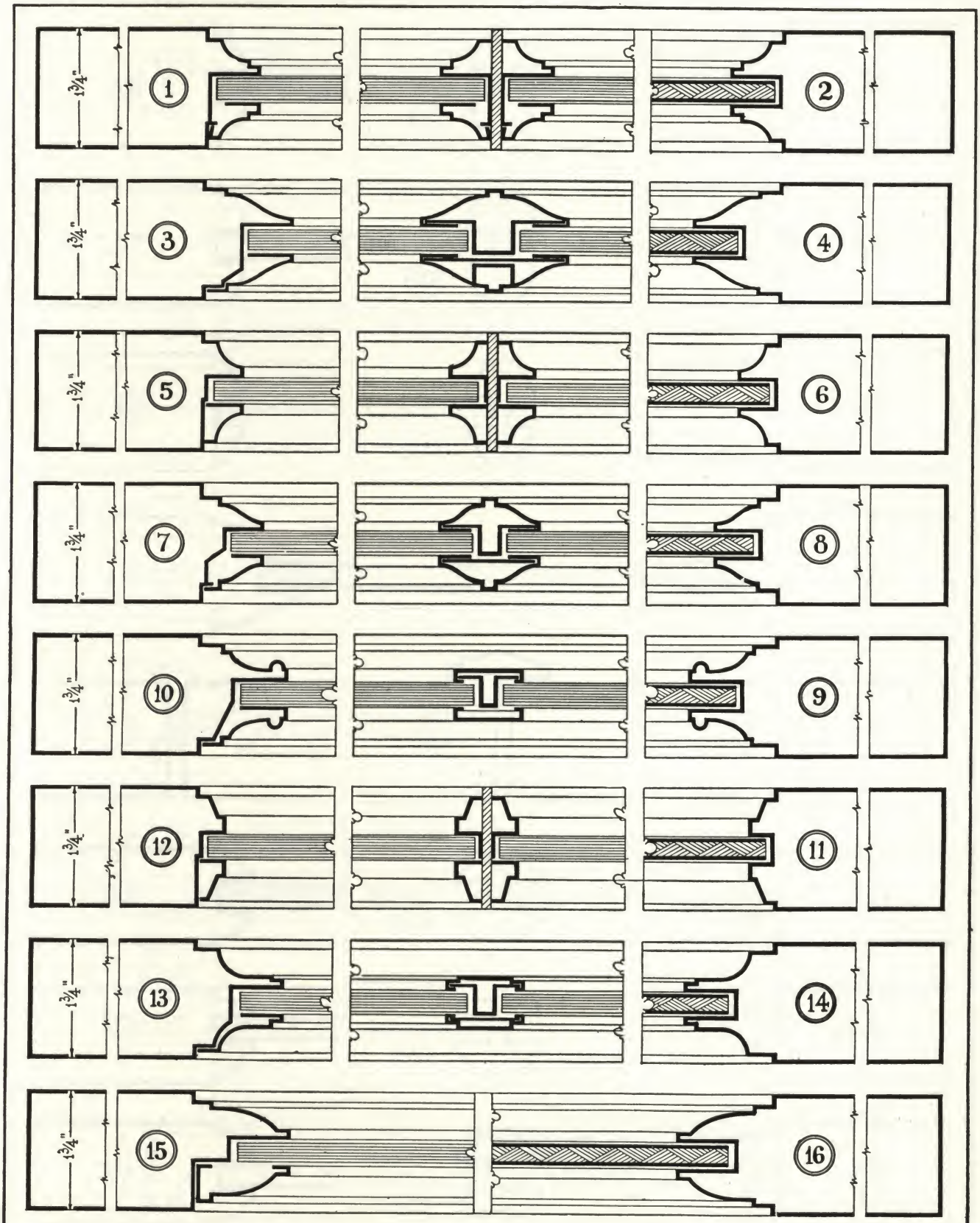
JAMESTOWN METAL DESK COMPANY

DETAILS OF HOLLOW METAL DOORS & TRIM

Jones Steel

DRAWING 3

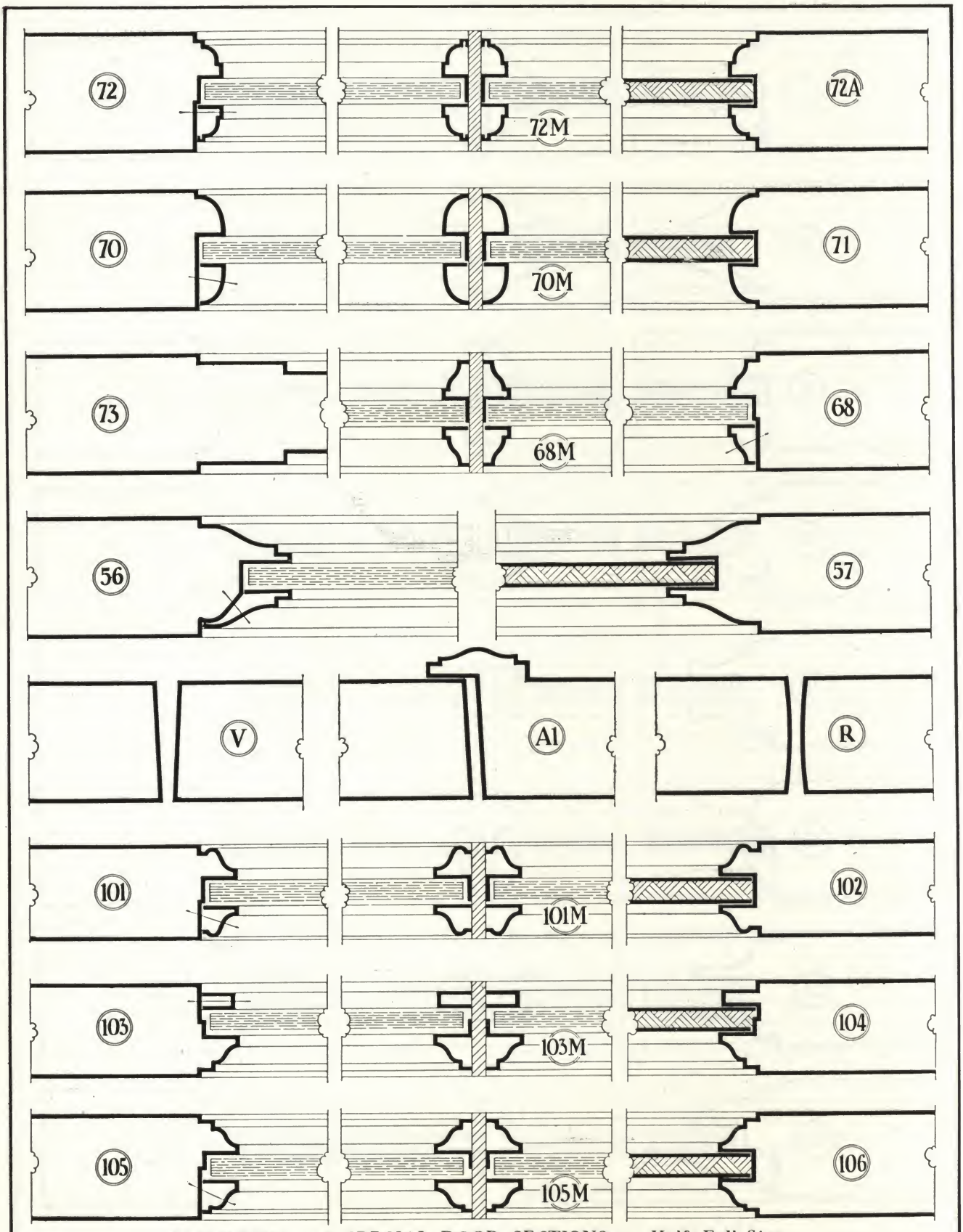
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• STANDARD DOOR SECTIONS ~ HALF FULL SIZE •

JAMESTOWN METAL DESK COMPANY	DETAILS OF HOLLOW METAL DOORS	Jones Steel JAMESTOWN METAL DESK CO. DRAWING- 4

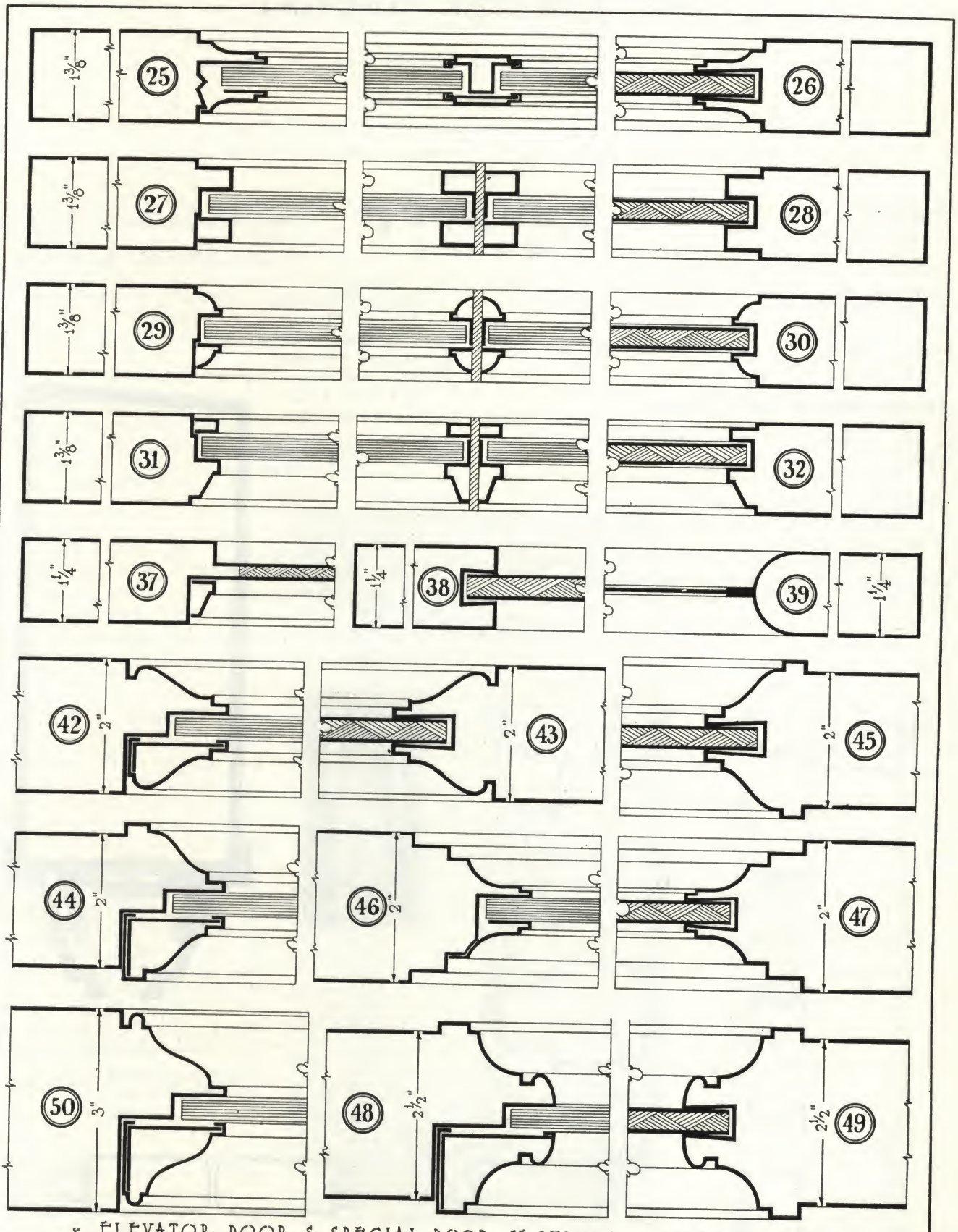
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ELEVATOR and SPECIAL DOOR SECTIONS . . . Half Full Size .

JAMESTOWN METAL DESK COMPANY	DETAILS OF HOLLOW METAL DOORS	JoneSteel TRADE MARK DRAWING 4A

Continued on next page



ELEVATOR DOOR & SPECIAL DOOR SECTIONS ~ HALF FULL SIZE

JAMESTOWN METAL DESK COMPANY

DETAILS OF HOLLOW METAL DOORS

Jones Steel JAMESTOWN METAL DESK CO.

DRAWING 5

THE KAWNEER COMPANY

AND SUBSIDIARIES

Welded Doors

NILES, MICHIGAN

For Branch Offices, refer to our pages on Kawneer Store Fronts

SEE OUR PERMANENT EXHIBIT AT THE ARCHITECTS' SAMPLE CORPORATION, NEW YORK, N. Y.

Products

WELDED BRONZE DOORS.

Also Sculptural and Architectural Castings in any practical metal, Metal Thresholds, Kick Plates, Push Plates and Grilles, Metal Architectural Mouldings, Ventilator Brackets.

For Sealair In-swinging Windows, Store Fronts made of solid bronze, aluminum alloy or copper, see Manufacturers' Index.

Kawneer Welded Bronze Doors

The rails and stiles of this door consist of heavy tubular members, the joints of which are strongly welded.

Panel mouldings are modern in character and secured in a manner to expedite glazing.

Kick plates are made flush or sunken and in flat stock or cast panels.

With necessary hardware furnished and applied the complete ensemble presents a unit appropriate for use in the finest commercial buildings.

Kawneer BRONZE DOORS

Specifications

Material—Furnished in bronze and aluminum alloy.

Gages—***Stiles and Rails***—14 gage U. S. Standard.

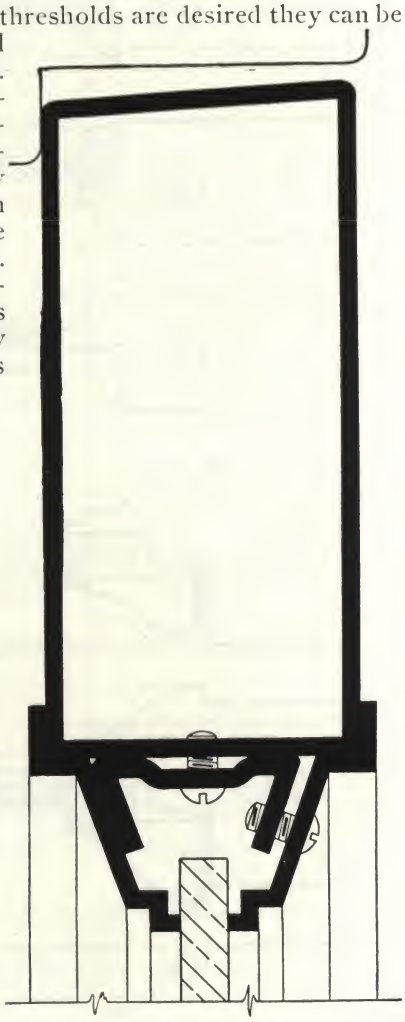
Panel Mouldings—14 gage U. S. Standard.

Jambs—13 gage U. S. Standard.

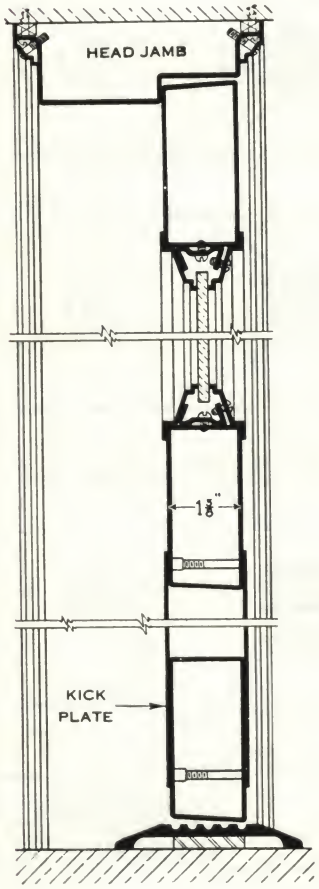
Thresholds—If thresholds are desired they can be furnished in extruded or cold rolled bronze.

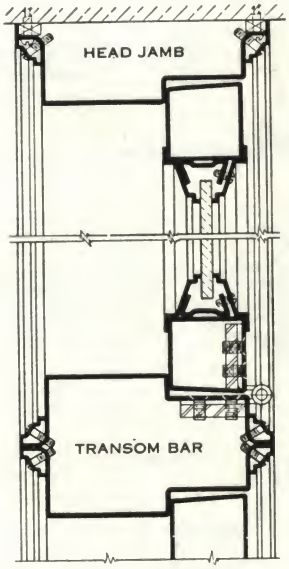
Hardware—Hardware can be furnished by THE KAWNEER COMPANY or by the customer. In either case it will be applied at the factory.

Sizes—All Kawneer Welded Doors are built to comply with architects' sizes and designs.



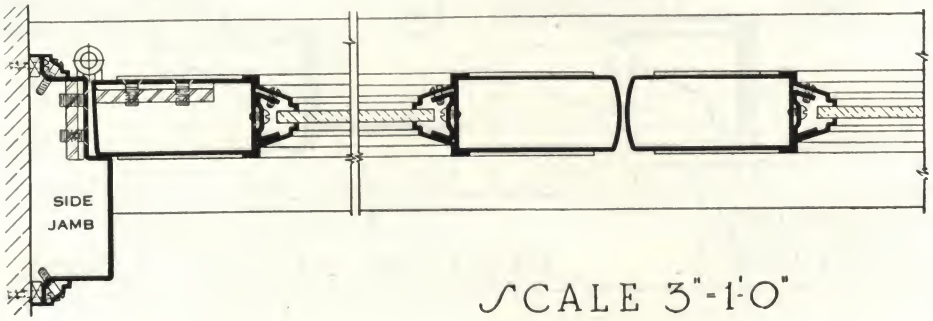
FULL SIZE DETAIL







Patents and Copyright Applied For



SCALE 3"-1'-0"

ESTABLISHED 1909

LAWTON-STEPHENS CO., INC.

Hollow Metal Doors, Drawn Metal Mouldings

427 Marcy Avenue, BROOKLYN, N. Y.

SALES AGENTS

ALBANY, N. Y., L. G. Bamer, 56 Grove Avenue
BALTIMORE, MD., Wm. E. Gambrill Co., 213 East Street
BOSTON, MASS., George Taylor & Co., 77 Summer Street
CHARLOTTE, N. C., Edwin C. Boyette, Jr.
DENVER, COLO., George P. Heinz Co., 812 Twelfth Street
DETROIT, MICH., Metallic Door & Specialty Co., 1354 Buhl Building
HARRISBURG, PA., O. L. Preble, Jr., 25 So. Third Street
HARTFORD, CONN., A. E. Greene, 191 Whiting Lane, W. Hartford
HOUSTON, TEX., Walcott & Maisey, 330 West Building
JERSEY CITY, N. J., Atlas Building Products Co., 3010 Hudson Boulevard
PHILADELPHIA, PA., R. C. Kratz, 311 Perry Building
SAN FRANCISCO, CAL., Gates-Tatterson Company, 557 Market Street
SCRANTON, PA., George F. Becker, 517 Lackawanna Avenue
UTICA, N. Y., E. C. Reusswig, 73 Genesee Street
WASHINGTON, D. C., Fred S. Gichner Iron Works, 1214 D. St., N. W.

Products

Hollow Metal Doors and Trim.
Combination Buck, Jamb and Trim.
Complete Elevator Enclosures.
Drawn Metal Mouldings.

Service

Lawton-Stephens' facilities for making complete installation of hollow metal doors, its diversified experience in this type of work and its highly trained personnel assure the maximum satisfaction to both architect and builder.

Without obligation of any kind, we will be glad to submit tentative designs and specifications, and co-operate in any way regarding methods of construction or problems where hollow metal and kindred products are contemplated.

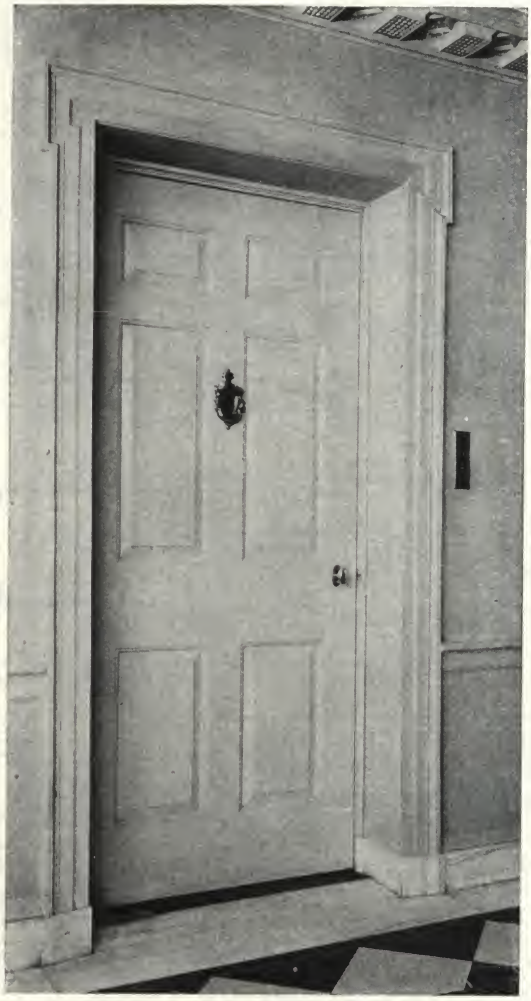
Doors

The Lawton-Stephens Co., Inc., hollow metal doors are made in any variety of styles and sizes as demanded by architects and builders—embracing solid panel, glass panel, raised panel, louver, or flush doors.

Lawton-Stephens hollow metal doors are constructed with care, and represent years of study in this field. They are adapted to meet all conditions where the best and most durable type of fireproof construction is required, such as in hotels, hospitals, apartment houses, office buildings, residences, etc.

Specifications for Standard Hollow Metal Doors—All doors to be of size and design as shown on door schedule and drawings, of Lawton-Stephens Co., Inc. manufacture, constructed throughout of open hearth, cold rolled, patent leveled furniture steel. They shall be 1¾ in. thick, 5-in. stiles and rails, except bottom rail which shall be 10 in. in height, and be welded at all points of intersection. Stiles and rails to be of No. 18 gauge steel, with suitable asbestos or cork filler; panels to comprise two sheets of No. 18 gauge steel with suitable asbestos or other filler, or to be a single sheet of No. 12 gauge patent leveled furniture steel, and mouldings to be cold drawn of No. 20 gauge steel. Mouldings to be interlocked with and into these stiles and rails and, where doors are glazed, to be provided with loose steel stops arranged to receive the glass.

Note: If underwriters' doors are required, they should be so specified—in which event, stiles and rails are lined with asbestos with Z-bar or other suitable spreader.



Hollow Metal Door and Trim, Kelvin Apartments, Forest Hills, N. Y.
Th. Engelhardt, Architect
The character of a fine Colonial wooden door can be given to a hollow steel door. Not only can the hollow metal door be made a harmonious part of the interior in any of the historic types of design, it can be made quite as satisfactory a part of the modern style interior

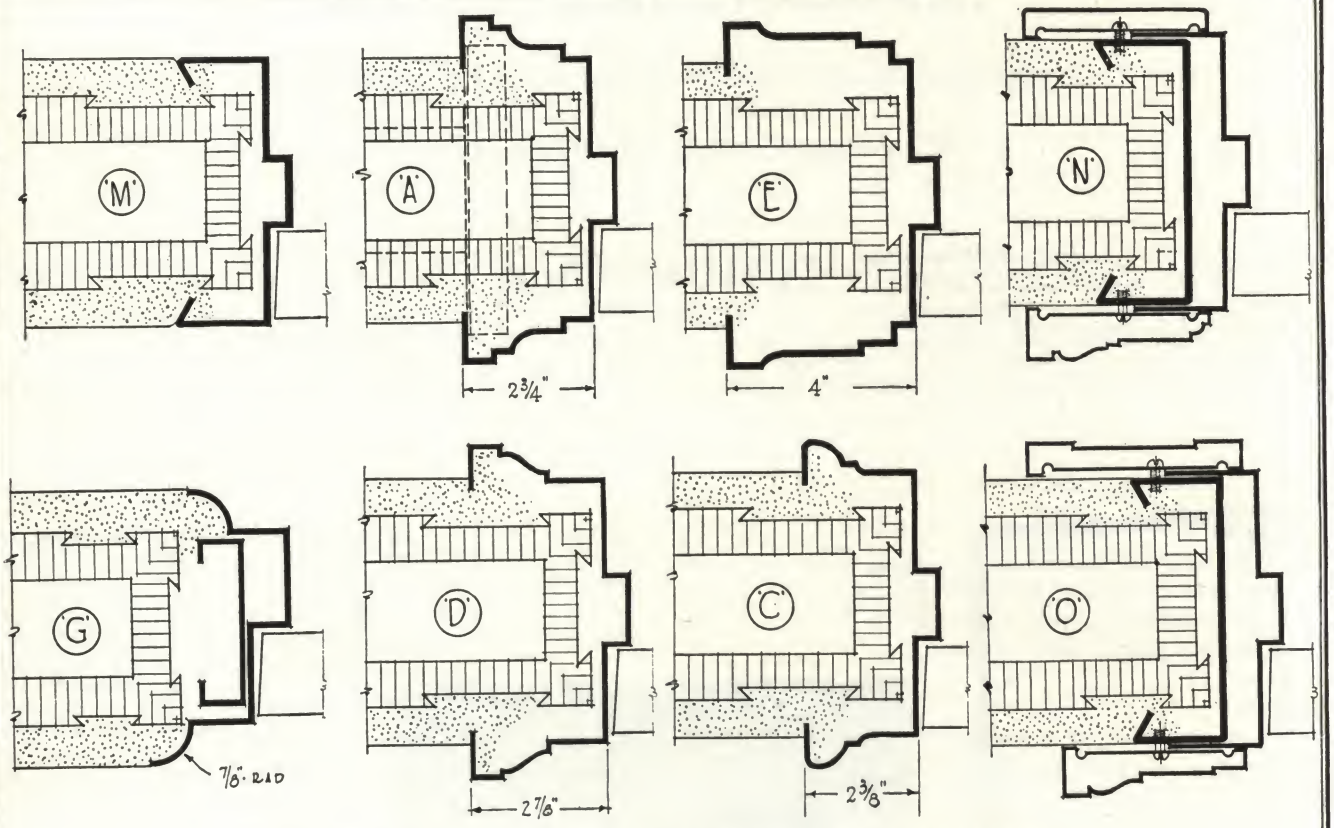
Elevator Enclosures

The Lawton-Stephens Co., Inc., is a pioneer in this field of endeavor and has completed extensive installations where the full responsibility for the elevator enclosure has been entrusted to the door manufacturer. The entire opening, including doors, bucks, jamb, sill, glass, glazing and hardware is installed as one contract, thereby doing away with divided responsibility and faulty operation.

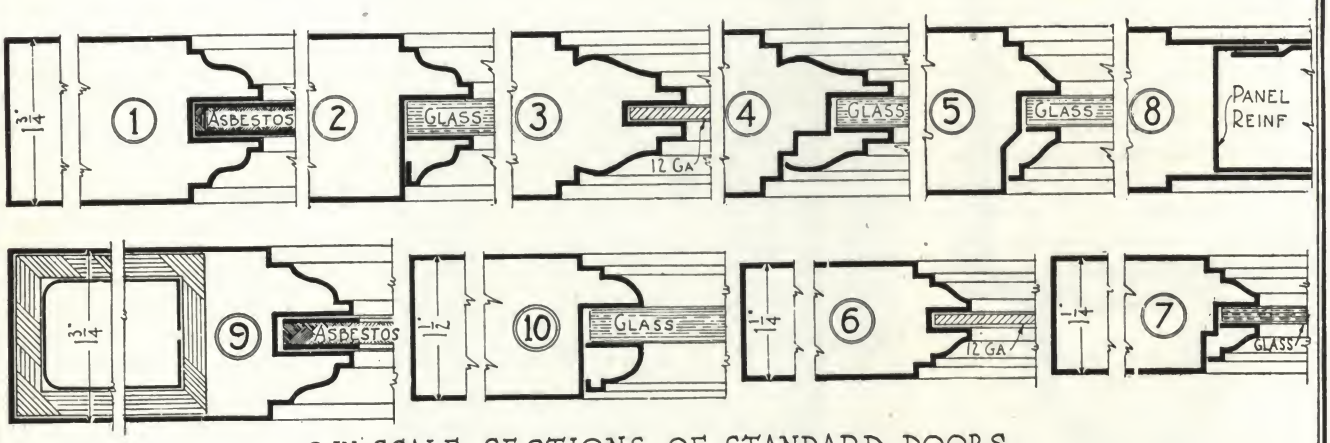
Particular attention has been given to push button installations for apartment houses and this company has developed a special standard installation for this type of enclosure.

Lawton-Stephens Co., Inc., will be pleased to forward to architects and builders complete data, including specification, photographs and sketches, on request.

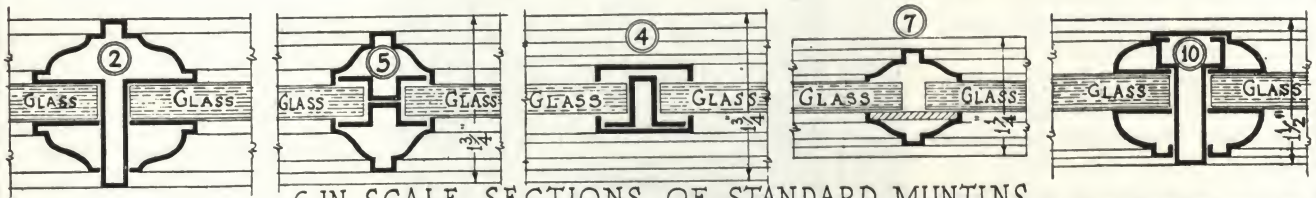
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3 IN. SCALE DETAILS OF STANDARD DOOR FRAMES



6 IN. SCALE SECTIONS OF STANDARD DOORS

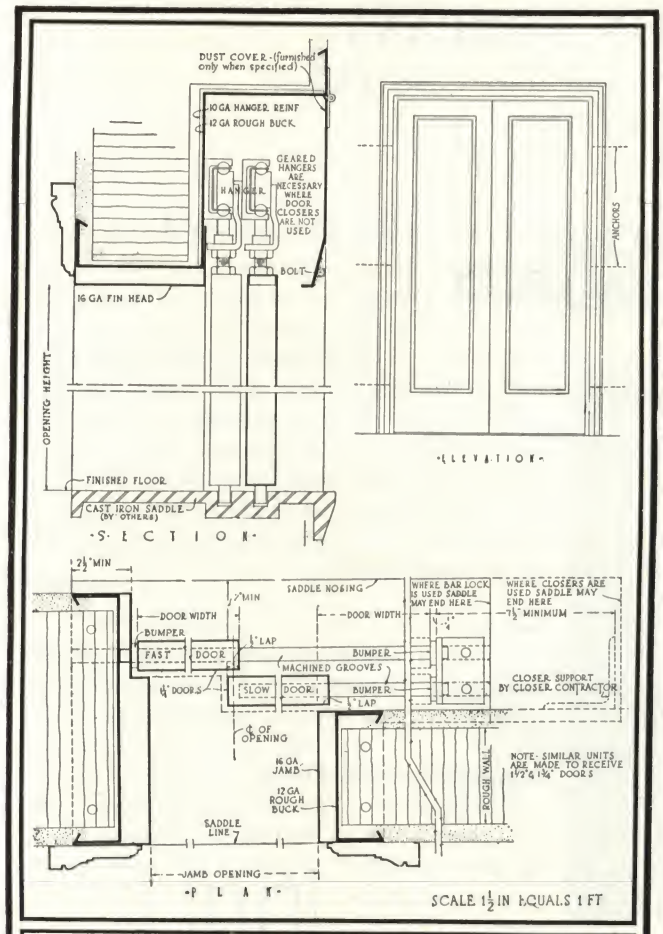


6 IN. SCALE SECTIONS OF STANDARD MUNTINS

NOTE~ Doors No. 1, 2, 3, 4 & 5 are Standard 1¾" doors. Doors No. 6 & 7 are Standard 1¼" thick doors. Door No. 8 - 1¼", 1½" or 1¾" thick and Door No. 10 - 1½" thick are Standard Hospital Doors. Door No. 9 is Standard Fire Underw. Door 1¾" thick with 20 ga. steel shell and asbestos lining in stiles, rails and panels. Door No. 1 has asbestos lined panels. Doors No. 3 and 6 have No. 12 ga. solid steel panels. Doors No. 2, 4, 5, 7 and 10 are arranged for glazing. Door No. 4 is also made to receive asbestos lined panel. Door No. 8 has ⅛" sinkage metal panels. All doors except No. 9 have cork fillers in stiles and rails. Full Size Details mailed on request.

LAWTON-STEPHENS CO., INC.	DETAILS OF HOLLOW METAL DOORS AND TRIM	DRAWING NO. 1 SCALE 3" & 6" EQUALS 1'-0"

Continued on next page



TWO-SPEED ELEVATOR DOOR UNIT

Special Hospital Type Door Construction

Lawton-Stephens Hospital Doors were specially developed for this service. They are semi-flush, carrying all the characteristics and sanitary features of the flush door but eliminate the usual flat monotonous appearance. Finish is a high class baked or grained enamel, the life of which is about 25 years.

Jambs

Jambs may be No. 12, 14, or 16 gauge integral combination buck, jamb and trim, or No. 18 gauge cabinet jambs installed with rough steel bucks. With cabinet jamb installation, trim is separate, either clipped on or screwed on, and both jamb and trim can be finished to match the door.

Finish

All surfaces are thoroughly cleaned of all grease and foreign matter before finish is applied. Each coat is then applied and baked.

This Company has an enviable reputation for the quality and durability of its finish and is prepared to furnish a large variety of enamels in plain colors, grained to match wood, or metallic finishes of various shades such as bronze, copper, verd antique or any other finish desired.

Where a prime coat finish is specified, the final coat is applied at the building by the painting contractor.

Mouldings

This Company specializes in drawn metal mouldings, made from either stock dies, or to special detail.

Our service includes a complete machineshop, to make either new dies or to keep old dies in first class condition. A large number of dies are in stock, including such shapes as panel mouldings, trim, automobile mouldings, channels, angles, and special shapes of many kinds. These may be specified in either hot or cold rolled strip steel, galvanized steel, bronze, copper, monel metal or various other metals, as desired.

Other Products

This company manufactures various types of pressed or stamped metal shapes for a large number of different purposes.

List of Representative Installations

Memorial Buildings

Horace Bushnell Memorial Hall, Hartford, Conn., Helmle, Corbett & Harrison, Architects; R. F. Jones & Company, Builders

Sterling Memorial Library, Yale University, New Haven, Conn., James Gamble Rogers, Architect; Marc Eidlitz & Son, Builders

Office Buildings

Architects Building, 101 Park Avenue, New York, N. Y., Ewing & Allen, Architects; Post & McCord, Builders

Williamsburgh Savings Bank, Brooklyn, N. Y., Halsey, McCormack & Helmer, Architects; William Kennedy Construction Co., Builders

Washington Central Trust Building, Washington, D. C., Coolidge, Shepley, Bulfinch & Abbott, Architects; James Stewart & Co., Builders

U. G. I. Fidelity Building, Philadelphia, Pa., U. G. I. Contracting Company, Builders

Hospital Buildings

Columbia-Presbyterian Medical Center, New York, N. Y., James Gamble Rogers, Architect; Marc Eidlitz & Son, Builders

Somerset Hospital, Somerville, N. J., Crow, Lewis & Wick, Architects; John Lowry, Inc., Builders

Riverside Hospital, New York, N. Y., H. C. Pelton, Allen & Collens, Assoc. Architects; Marc Eidlitz & Son, Builders

Germantown Hospital, Philadelphia, Pa., Arthur H. Brockie, Architect; Irwin & Leighton, Builders

Medical & Pediatric Laboratory, Yale University, New Haven, H. C. Pelton, Architect; Sperry & Treat, Builders

Municipal Buildings

Brooklyn Municipal Building, Brooklyn, N. Y., McKenzie, Voorhees & Gmelin, Architects; Cauldwell-Wingate Co., Builders

South Office Building No. 2, Harrisburg, Pa., Gehron & Ross, Architects; Nelson-Pedley Construction Co., Builders

Magistrates Court House, New York, N. Y., George M. McCabe, Architect; James McWilliams, Inc., Builders

Telephone Buildings

Newark Telephone Building, Newark, N. J., Voorhees, Gmelin & Walker, Architects; Turner Construction Co., Builders

Southern New England Telephone Building, Stamford, Conn., R. W. Foote, Architect; H. Wales Lines Company, Builders

Chesapeake & Potomac Telephone Exchange, Parkersburg, W. Va., McKenzie, Voorhees & Gmelin, Architects; Engstrom & Co., Builders

New York Telephone Company, West 18th Street Exchange, New York, N. Y., Voorhees, Gmelin & Walker, Architects; Tide Water Building Co., Builders

Industrial Buildings

National Biscuit Company, New York, N. Y., Louis Wirsching, Architect; John Lowry, Inc., Builder

Ward Baking Company, Pittsburgh, Pa., C. B. Comstock, Architect; W. F. Trimble & Sons, Builders

Otis Elevator Company Building, Yonkers, N. Y., W. O. Moyer, Architect; Turner Construction Company, Builders

Educational Institutions

Yale Law Building, New Haven, Conn., James Gamble Rogers, Architect; Sperry & Treat, Builders

Brooklyn Law School, Brooklyn, N. Y., Goodhue Associates, Architects; Thos. O'Reilly & Son, Builders

Seward Park High School, New York, N. Y., Walter C. Martin, Architect; Psaty & Fuhrman, Builders

Hall of Civil Rights, Lafayette College, Easton, Pa., Warren & Wetmore, Architects; James Stewart & Company, Builders

Residences

Ogden Reed Residence, New York, N. Y., Lafayette Goldstone, Architect; G. Richard Davis, Inc., Builders

Kirkman Residence, New York, N. Y., Ernest Flagg, Architect; Downey Associates, Builders

Chauncey M. Depew Residence, New York, N. Y., James Stewart & Company, Builders

Dodge Residence, New York, N. Y., Clinton & Russell, Architects; L. M. Neckermann & Company, Builders

Clubs

Lawyers' Club, New York, N. Y., Cass Gilbert, Architect; James Stewart & Co., Builders

The Hangar Club, New York, N. Y., Cross & Cross, Architects; William Crawford, Builder

Panhellenic Institute, New York, N. Y., John Mead Howells, Architect; Hegeman-Harris Company, Builders

Foreign Installations

Bermudian Hotel, Bermuda, Warren & Wetmore, Architects; James Stewart & Co., Builders

Rio de Janeiro Tramway, Light & Power Co., Argentine, Dwight P. Robinson Company, Architects and Builders

THE R. C. MAHON COMPANY

Manufacturers of Kalamein and Tin Clad Doors

DETROIT, MICH.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

MAHON KALAMEIN and TIN CLAD DOORS; TRANSOMS, JAMBS, TRIM and MOULDING SECTIONS.

For Mahon Permanent Steel Floor Forms, Steel Roof Deck, Rolling Steel Doors and Cast Iron Roof Sumps, see page numbers in Manufacturers' Index.

Mahon Kalamein Doors

Underwriters' Labeled Doors—Mahon Underwriters' Labeled Kalamein Doors are manufactured from the finest selected kiln-dried pine, covered with 24-gauge sheet steel.

All joints are welded, making a sturdy, fire safe, fine appearing door.

Standard Kalamein Doors—Mahon Standard Kalamein Doors embody the same high quality materials and fine workmanship as Mahon Underwriters' Labeled Doors. These doors are manufactured for use in locations where quality fire doors are desirable when labeled doors are not specified.



Mahon Type 1 Kalamein Door

Standard Types and Sizes—Mahon Underwriters' Labeled and Standard Kalamein Doors are available in 12 distinctive designs in 16 standard sizes. These doors, with their sharp, clearly defined lines, are masterpieces of fine workmanship—fit companions for the finest materials that can go into any building.

Service

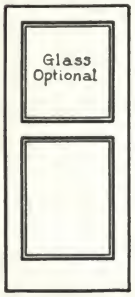
Mahon designers are available and will co-operate on special conditions where standard size doors cannot be used.

Mahon Tin Clad Doors

THE R. C. MAHON COMPANY also manufactures tin clad doors (Underwriters' labeled) to meet every requirement.

STANDARD SIZES—MAHON KALAMEIN DOORS

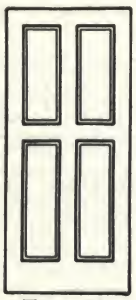
2'6"x6' 6"	2'8"x6' 6"	2'10"x6' 6"	3'0"x6' 6"
2'6"x6' 8"	2'8"x6' 8"	2'10"x6' 8"	3'0"x6' 8"
2'6"x6'10"	2'8"x6'10"	2'10"x6'10"	3'0"x6'10"
2'6"x7' 0"	2'8"x7' 0"	2'10"x7' 0"	3'0"x7' 0"



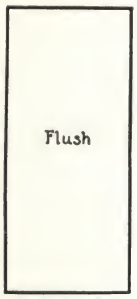
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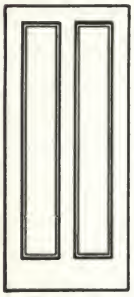
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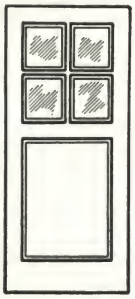
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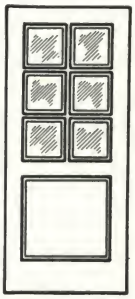
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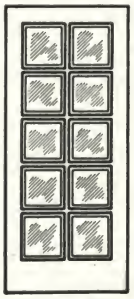
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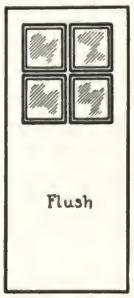
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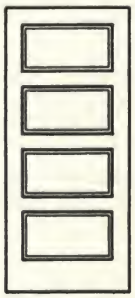
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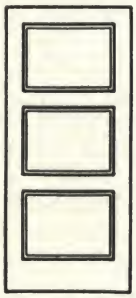
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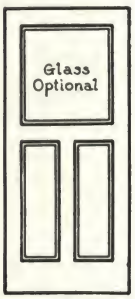
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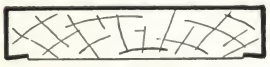
Type 9



Type 10

Standard Fireproofed Jambs, Trim and Moulding

Transoms, jambs and many attractively designed trim and moulding sections, manufactured from the same high quality materials and fireproofed in the same manner as Mahon Kalamein Doors, are carried in stock for immediate delivery.

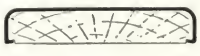


No. 101

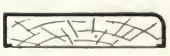
Standard 5½-in. Jamb



No. 200



No. 201



No. 203



Nos. 204 and 206



No. 205

Standard Trim Sections



No. 100



No. 101



No. 102

Standard Stop Sections



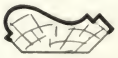
No. 300



No. 301



No. 305



No. 307



Nos. 309 and 308



No. 310



No. 311

Standard Moulding Sections

J. L. MAYER COMPANY

Hollow Metal Swing Doors and Trim, Elevator Enclosures, Elevator Cabs and Gates

TELEPHONE 6-4025

Post Office Box 935
DES MOINES, IOWA

QUALITY MAYCO BUILT

Products

HOLLOW METAL PASSENGER ELEVATOR ENCLOSURES.
KALAMEIN PASSENGER ELEVATOR ENCLOSURES.
INDUSTRIAL STEEL FREIGHT ELEVATOR DOORS.
ELEVATOR CABS.
ELEVATOR CAB GATES.



Corner Section MAYCO Door

HOLLOW METAL SWING DOORS AND TRIM.
KALAMEIN SWING DOORS AND TRIM.
COMBINATION BUCK JAMB AND TRIM FRAMES.
CUSTOM-BUILT PARTITIONS.
INDUSTRIAL STEEL DOORS.

The Architect

The architect will find the original designs and construction of Mayco custom-built products so flexible that same may be used to carry out his most exacting individual ideas.

This flexibility of design and construction, using the highest grade of copper-bearing, furniture stock steel, stainless steel, aluminum or other alloys of a gauge to insure perfect rigidity, fabricates a unit that only quality, materials and workmanship can create.

Finish, which is of major importance, furnished to meet any requirements.

Grained finishes in the standard nine-coat process of baking enamels, hand grained to match all domestic and rare woods, rich inlays, panels, etc.

Solid colors, stippled, verdi antique or the most delicate shades of bronze in seven-coat lacquer, final coat rubbed to an eggshell gloss.

Our Engineering Department is composed of men trained in architectural designing and will assist you in construction or details.

As we specialize in custom-built design and construction we ask that you deal direct or through our representatives. Your requests will receive prompt attention.

The Elevator Manufacturer

We offer the elevator manufacturer a most progressive line of elevator enclosures. Enclosures in the highest quality, custom-built designs to architects' specifications, furnished either f.o.b. or installed. Our completely assembled Mayco units which are furnished in six designs and fourteen opening sizes can be shipped direct with your equipment and installed by your workmen.

Our line of Mayco cabs are custom-built to your requirements, design and price range, to carry out your individual ideas and complete your line of equipment.

Enclosures and cabs designed to incorporate your interlocks, electrical contacts, control switches, gang switches, closers, etc. We will be glad to assist your Engineering Department in securing equipment.

The Contractor

Particular attention has been given to the design and construction of our products with the object of assisting the contractor in the field. All units are fabricated as completely as possible; combination bucks so designed that they can be quickly and economically placed; doors properly fitted and the actual hardware applied if desired. These labor saving items, with prompt delivery, will assist in completing your projects.

METAL CLAD DOORS, INC.

685 Concord Avenue, CAMBRIDGE, MASS.

Products

METCLA METAL COVERED DOORS, FRAMES, TRIM, ENTRANCES and WINDOWS; TIN CLAD FIRE DOORS and SHUTTERS.

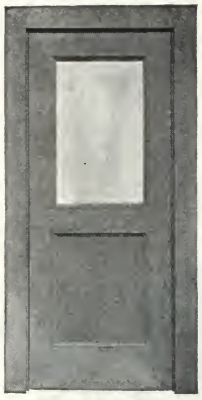
Kalamein and Tinclad Doors are furnished either with or without Underwriters' label.

Metcla Metal Covered Doors, Frames and Trim

Made by drawing sheet metal through steel dies over a wood core of white pine. This process practically welds the metal covering to its core, eliminates buckles and brings out all moulding members in clear relief.

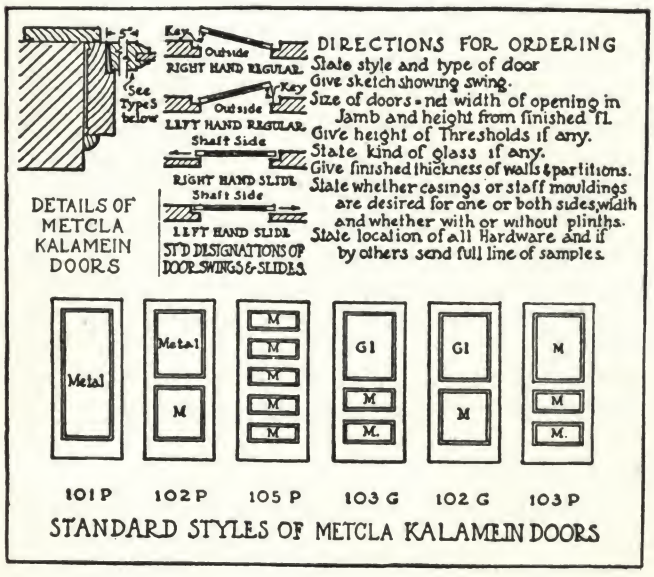
Made in kalamein iron, galvanized steel, copper or low brass; in sections, tongued, grooved and pinned together, and finished with a priming coat of paint. Glass is not furnished by us.

Standard styles in kalamein iron are illustrated below. Special styles and sizes will be furnished on short notice.



No. 102G Metcla Metal Covered Door

Metcla metal covered doors, frames and trim are approved by leading architects and engineers, and have been used under the most severe conditions. In specifying Metcla doors, frames and trim the architect is assured of the utmost in quality, workmanship and durability, upheld by continuous service and a high reputation for materials and workmanship.



Metcla Metal Covered Windows

The outstanding qualities of Metcla windows are their simple construction, ease of operation, fire retarding qualities, and the unusually high standard maintained in regard to the materials used in their construction.

They combine safety, economy, durability and weatherproofness.

Made for all classes of buildings in all required types and sizes, either from our own or architects' details and to conform with special requirements.

Furnished glazed or unglazed, with or without hardware, as required.

Metcla Metal Covered Entrances of Copper, Bronze or Kalamein

Metcla entrances are made in accordance with the architect's details to meet every requirement. They are a striking feature of many prominent public and private buildings and have all the advantages and the appearance of cast metal doors, without their extreme weight or cost.



Mill Entrance
Metcla Copper Kalamein

Metcla Kalamein Elevator Fronts

Metcla kalamein elevator fronts are specified for durability, ease of operation and appearance, where sheet steel doors are not desired, or where hollow metal doors would be too expensive.

Tin Clad Doors and Shutters

These are made in any style and size, and are furnished with or without hardware f.o.b. Boston or installed with or without Underwriters' labels.



Storage Warehouse Equipment
Tin Clad Doors, Iron Frames, Special Hardware

METAL DOOR & TRIM CO.

SUCCESSORS TO J. C. McFARLAND COMPANY

LA PORTE, IND.

BRANCH OFFICES

NEW YORK, N. Y., 205 E. 42nd Street — CHICAGO, ILL., 1458 Builders Building

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

SWING DOOR UNITS.
ELEVATOR ENCLOSURES.
Also Dumbwaiter Enclosures; Mouldings; Interchangeable Partitions; Louvres and Grilles; Sills and Weatherstrips.

La Porte
METAL DOORS

Facilities

A plant covering more than 6½ acres, designed and built solely for the manufacture of hollow metal products. Equipped throughout with the most modern machinery and equipment.

Recent Installations

Recent outstanding installations include: Empire State (now under construction), Chrysler, Lincoln, Daily News, Chanin and New York Central buildings, all in New York; Civic Opera building, Chicago; Pennsylvania building, Philadelphia; and Bus Terminal building, Kansas City. La Porte hollow metal materials are used nationally in the leading buildings.

Materials and Workmanship

Materials and workmanship are the best of their respective kinds. Steel is of the highest grade commercial furniture stock of U. S. standard gauge.

Catalogue and Service

We have prepared a comprehensive catalogue giving essential information needed to detail and specify hollow metal doors and trim to meet almost any situation. Elevator door operating hardware, together with fire underwriters' requirements, have also been fully covered. We will be glad to send you a copy.

A competent Engineering Staff is at all times available for advisory service.

HOLLOW STEEL SWING DOOR UNITS

Doors and Sash (Metal Panel Type)—Panels are constructed of two 18 gauge steel plates separated by heat retarding filler. Panel mouldings, cold drawn to profile, are fitted to panels, mitered and welded at corners, forming a continuous frame around panels.

Stiles and rails are formed of 18 gauge steel and continuously interlocked to panel mouldings. Stiles are fitted to rails, reinforced and welded at joints. Stiffener channels extending full width are welded inside the doors at top and bottom.

Compressed cork is provided in stiles and rails of doors to eliminate metallic sound.

Doors and Sash (Flush Type)—Doors and sash are constructed of two 18 gauge steel plates locked together with special interlocking members welded to plates. Members are spaced not more than 6 in. apart and extend full height of doors and sash.

Continuous reinforcements and stiffener channels are welded inside the doors and sash at top and bottom, and in both sides.

Compressed cork is placed in doors to eliminate metallic sound.

Doors and Sash (Glass Panel Type)—Glass panels are held in place by removable mouldings which are secured to stationary mouldings with oval head machine screws. Mouldings are cold drawn to profile and are made into frames with corners mitered and welded. Stiles and rails are interlocked to stationary mouldings as described under "Metal Panel Type."

When doors are "Flush Type," stationary mouldings are interlocked to plates in a similar manner.

Muntins are constructed of cold drawn interlocking shapes fitted and welded to panel mouldings.

Where mirrors occur, 18 gauge steel plates are provided for backing up.

Stall Doors—Stiles and rails are formed of 20 gauge steel and continuously interlocked to 16 or 18 gauge steel panels. Stiles are fitted to rails and welded at joints.

Astragals—Astragals are of cold drawn interlocking shapes welded to door stiles.

Grilles—Grilles are of 14 gauge perforated steel secured in doors in the same manner as metal or glass panels. When grilles are desired in bottom rails they are usually formed as a part of the rail.

Louvres (Stationary Type)—Louvres, constructed of specially formed 18 gauge steel members, are secured in doors in a substantial manner.

Ventadoors, Panelouvres and Servidors—Doors are prepared to receive these products which are usually furnished under separate contract.

Ventadoors and Panelouvres are ordinarily delivered to our factory completely finished, and installed in the doors by us.

Servidors are usually delivered direct to the building and installed in the doors by Servidor contractor.

Frames (Rough Buck and Cabinet Jamb Type)—Bucks are formed of 12 or 14 gauge steel, welded at corners, provided with anchors for securing to walls and clip angles at bottom for fastening to floor.

When bucks are shipped knocked down, side members are provided with tenons for securing to heads.

Jambs, formed of 16 or 18 gauge steel, are secured to steel bucks by machine screws, and to wood bucks, which are usually furnished and erected under separate contract, by wood screws.

Stationary doors and sash, or glass panels, are retained by removable cold drawn moulding or channel frames, secured to jambs by oval head machine screws.

Frames (Combination Buck and Jamb Type)—Frames are formed of 12, 14 or 16 gauge steel, mitered or coped and welded at corners. Anchors are provided for securing frames to walls and clip angles at bottom for fastening to floor.

Glass panels, or stationary doors and sash, are held in place by removable cold drawn moulding or channel frames, secured to frames by oval head machine screws.

Frames (Combination Buck, Jamb and Trim—Rolled Type)—Frames are cold rolled of 16 gauge steel. The jamb portions of side members are coped and tenoned to heads, while casing portions are mitered and acetylene welded.

Frames are provided with wire anchors for securing to walls and clip angles at bottom for fastening to floor. Special anchoring arrangement is provided for frames in plaster, wood stud or Simplex partitions.

Glass panels are retained by removable cold drawn channels, coped at corners, and secured to frames by oval head machine screws.

Transom Bars and Mullions (Rough Buck and Cabinet Jamb Type)—Bucks are formed of 12 or 14 gauge steel, welded to frames or secured by concealed clip angles and screws as conditions warrant.

Jambs are formed of 16 or 18 gauge steel, secured to steel bucks by machine screws, or to wood bucks, which are usually furnished and erected under separate contract, by wood screws.

Transom Bars and Mullions (Combination Buck and Jamb Type)—Transom bars and mullions are formed of 12, 14, 16 or 18 gauge steel, welded to frames or secured by concealed clip angles and screws as conditions warrant.

Continued on next page

Weatherstrips—Exterior openings are made weathertight at sides and heads by felt, rubber or spring bronze weatherstripping, and at the bottom by bronze interlocking shapes or specially formed steel strips.

Casings—Casings are of 18 gauge cold drawn shapes with corners mitered, welded, and secured to frames by concealed fastenings or oval head machine screws.

Scribe Mouldings—Mouldings are cold drawn of 18 gauge steel, mitered or coped at corners, and secured to frames by oval head machine screws.

Plinths—Plinths are formed of 18 gauge steel, secured to frames by concealed fastenings or oval head machine screws.

Hardware and Reinforcements—Hardware must be to template and is ordinarily supplied under separate contract.

All work is mortised, reinforced, drilled and tapped at the factory to receive hardware, except that frames are usually drilled and tapped for surface hardware at the building by the contractor erecting the doors.

Combination type frames are provided with cover boxes in back of hardware cutouts.

Fire Underwriters' Labels—Our products have been listed by the Fire Underwriters' Laboratories for Class A, B, C, D and E situations.

HOLLOW STEEL ELEVATOR ENCLOSURES

Doors (Metal Panel Type)—Panels are constructed of two 18 gauge steel plates separated by heat-retarding filler. Panel mouldings—cold drawn to profile—are fitted to panels, mitered and welded at corners, forming a continuous frame around panels.

Stiles and rails are cold rolled of 12 gauge steel and continuously interlocked to panel mouldings. Stiles are fitted to rails and welded at joints. Stiffener channels extending full width are welded inside the doors at the bottom.

Continuous rubber bumpers, secured in place by neat cold drawn mouldings, are provided for center-parting doors. For all other types, rubber bumpers are fastened to frames and sills.

Two cast iron guides are attached to the bottom of each sliding door. Flush bolts are used as guides when doors are combination slide and swing.

Doors (Flush Type)—Doors are constructed of two 18 gauge steel plates locked together with special interlocking members welded to plates. These members are spaced not more than 6 in. apart and extend full height of doors. Continuous reinforcements and stiffener channels are welded inside the doors at top and bottom, and in both sides. Compressed cork is placed in doors to eliminate metallic sound.

Continuous rubber bumpers, secured in place by neat cold drawn mouldings, are provided for center-parting doors. For all other types, rubber bumpers are fastened to frames and sills.

Two cast iron guides are attached to the bottom of each sliding door. Flush bolts are used as guides when doors are combination slide and swing.

Doors (Glass Panel Type)—Glass panels are held in place by removable mouldings which are secured to stationary mouldings with oval head machine screws. Mouldings are cold drawn to profile and are made into frames with corners mitered and welded. Stiles and rails are interlocked to stationary mouldings as described under "Metal Panel Type."

When doors are "Flush Type," stationary mouldings are interlocked to plates in a similar manner.

Muntins are constructed of cold drawn interlocking shapes, fitted and welded to panel mouldings.

Where mirrors occur, 18 gauge steel plates are provided for backing up.

Stationary Panels—Panels are constructed as previously described for doors, with the exception that no provisions are made for hardware or guides. Panels are secured to frames at the head and side with machine screws, and held in place at the bottom by channels fastened to sills.

Glass—Glass, which is usually furnished by us, is set in rubber inserts and putty and held in place by removable moulding frames.

Mirrors are set in the same manner, with the exception that they are backed up with felt.

Hanger Housings—Hanger housings are formed of two 12 gauge steel plates spot-welded together and firmly fastened to angle supports at both ends with machine bolts and nuts.

Angle Supports—Hanger housings are supported independent of the walls by two structural steel angles extending from sill to either steel or concrete beam overhead and securely fastened in place. One of these angles is located to act as a closer support when closers or pneumatic operators are used.

Hanger Covers—Hanger covers are formed of 16 or 18 gauge steel and attached to hanger housings by concealed method. Ready access to hangers is permitted without removing covers.

Frames (Combination Buck, Jamb and Trim Type)—Frames are formed of 16 gauge steel mitered and welded at corners. They are securely fastened to hanger housings with machine screws and to the sills with clip angles and cap screws. Where required, a suitable number of rubber bumpers is provided.

Frames (Combination Buck and Jamb Type)—Frames are formed of 12, 14 or 16 gauge steel, either mitered or coped and welded at corners. They are securely fastened to hanger housings with machine screws and to the sills with clip angles and cap screws. Where required, a suitable number of rubber bumpers is provided.

Sills—Sills are either close grain gray iron or bronze castings with non-slip surfaces, securely anchored to either structural steel or concrete. The grooves for door guides are machined. Bumper angles, secured to sills with cap screws, are provided where required.

Facias—Facias are formed of either 14 or 16 gauge steel, substantially reinforced where necessary, and securely fastened in place.

Casings—Casings are cold drawn of 18 gauge steel, mitered and welded at corners, and secured to frames by concealed fastenings or oval head machine screws.

Scribe Mouldings—Mouldings are cold drawn of 18 gauge steel either mitered or coped at corners, and secured to frames by oval head machine screws.

Plinths—Plinths are formed of 18 gauge steel and secured to frames by concealed fastenings or oval head machine screws.

Hardware and Reinforcements—Hardware must be to template and is usually included in our contract.

All work is mortised where required, reinforced, drilled and tapped at the factory to receive hardware, except that drilling and tapping for bar locks, pneumatic operators, door closers, rack and pawl devices, interlocks and striker plates are done at the building.

Frames for combination slide and swing type doors are provided with cover boxes in back of all hardware cutouts.

FINISH

Prime Finish (Doors and Sash)—Before assembling, metal panels are painted on the inside. After assembling, all oil, dirt and rust are removed.

Doors and sash are thoroughly coated on the inside and outside with rust resisting paint by a dip process, and then baked. Exposed surfaces are filled where required, each coat baked and sanded. Priming coat of paint is then applied and baked.

Prime Finish (All Other Work)—After assembling, all oil, dirt and rust are removed. Exposed surfaces are filled where required, each coat baked and sanded. Priming coat of paint is then applied to all surfaces, both inside and outside, and baked.

Plain Enamel Finish—Prime coat is thoroughly sanded, after which three coats of enamel of a color as selected are applied to all exposed surfaces. Each coat is baked and rubbed, the final coat being rubbed to an eggshell gloss.

Grained Finish—Prime coat is thoroughly sanded, after which all exposed surfaces are hand grained to match sample selected, and then baked. Two coats of finishing varnish are then applied, each coat baked and rubbed, the final coat being rubbed to an eggshell gloss.

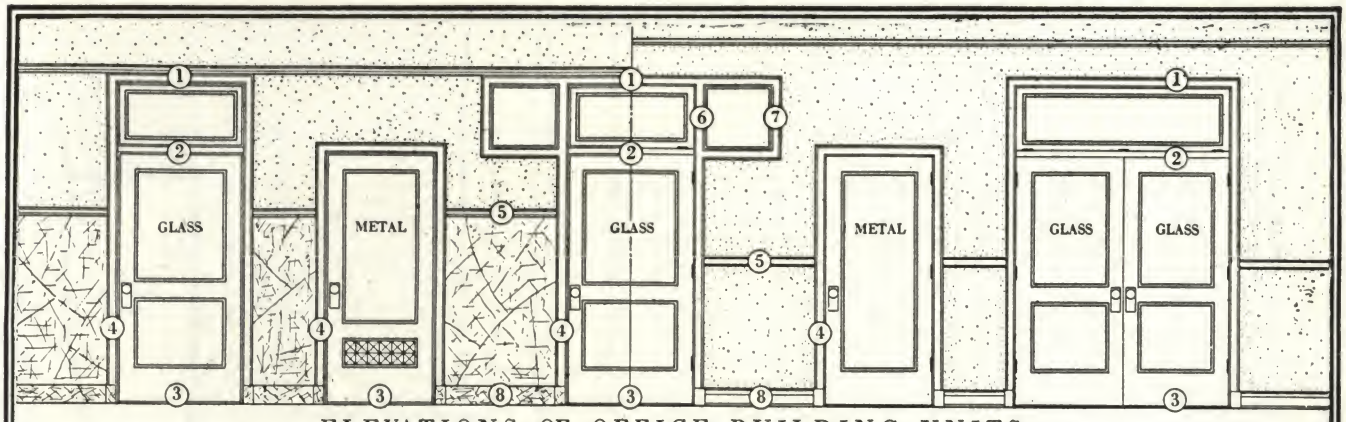
CRATING AND ERECTION

Crating—The finished products are substantially crated to guard against damage in transit.

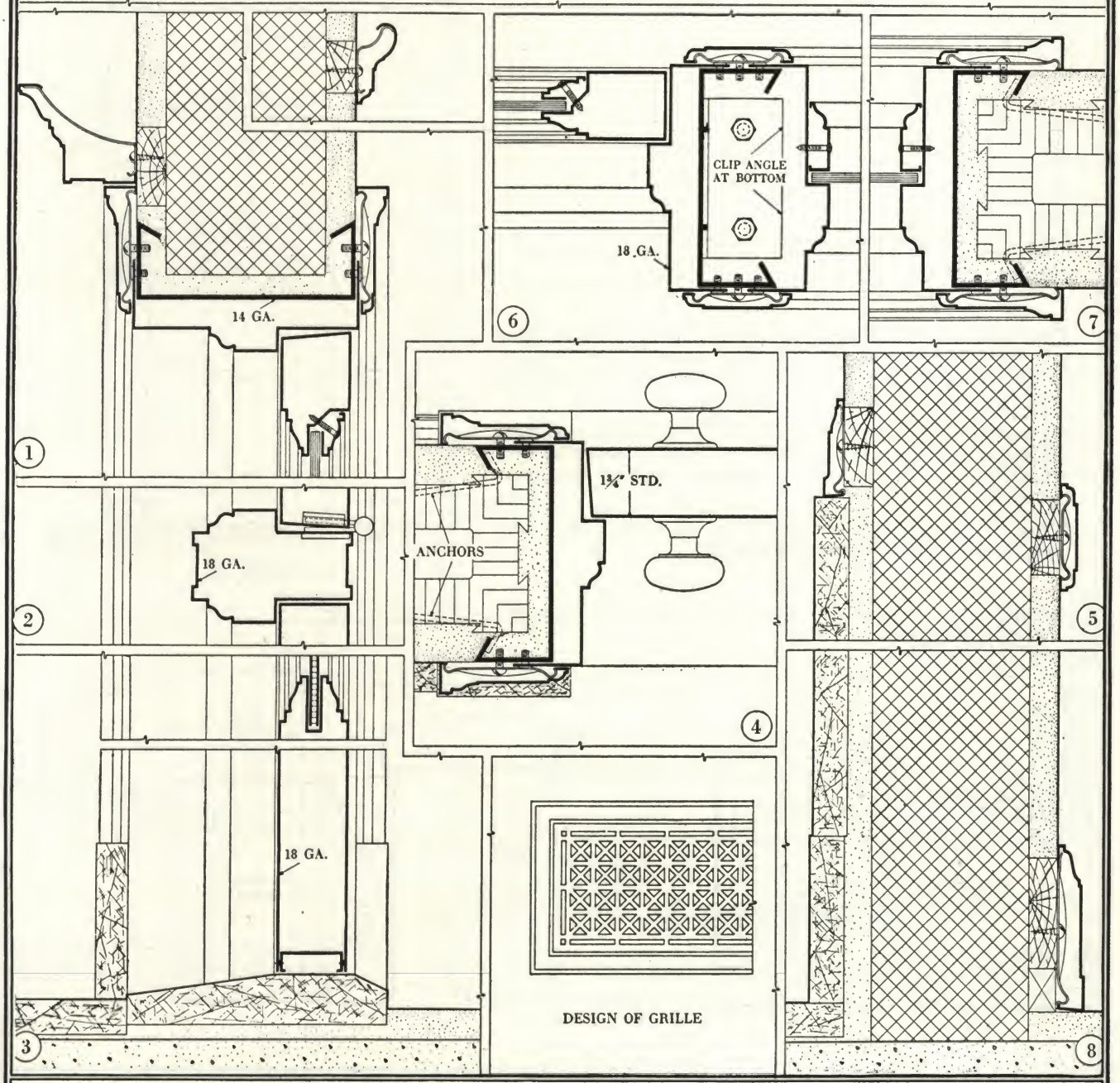
Combination type frames, when finished in baked enamel, are protected by oiled paper, and crated individually. Crating is not removed until after walls have been plastered.

Erection—All work is erected plumb and true by skilled mechanics. Rough bucks, frames, etc., are set and braced in position before partitions are built. The doors, cabinet jambs, casings, etc., are erected after plastering has been completed and the floors are broom clean.

Continued on next page

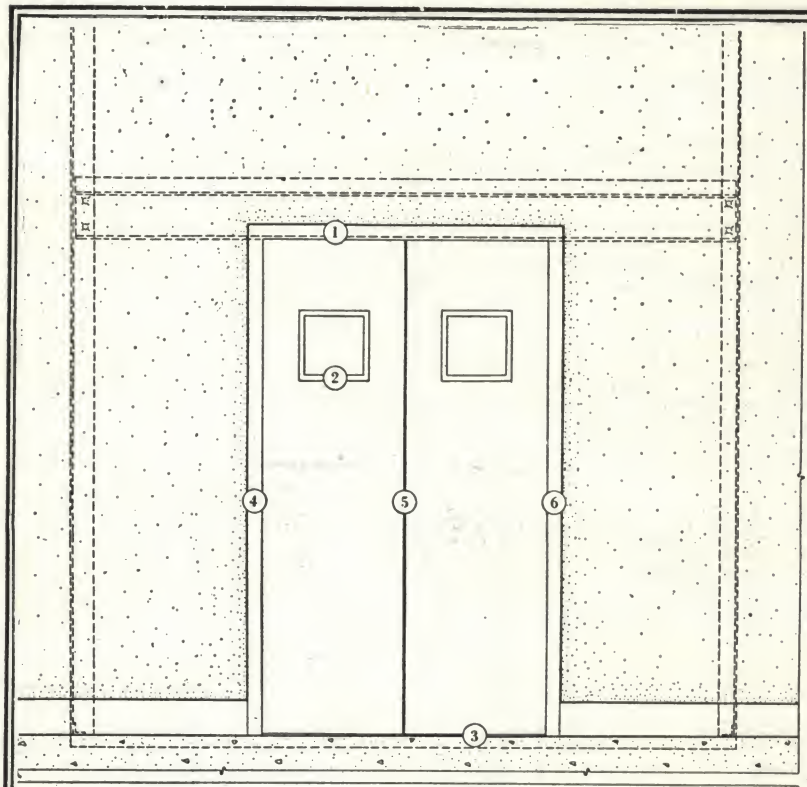


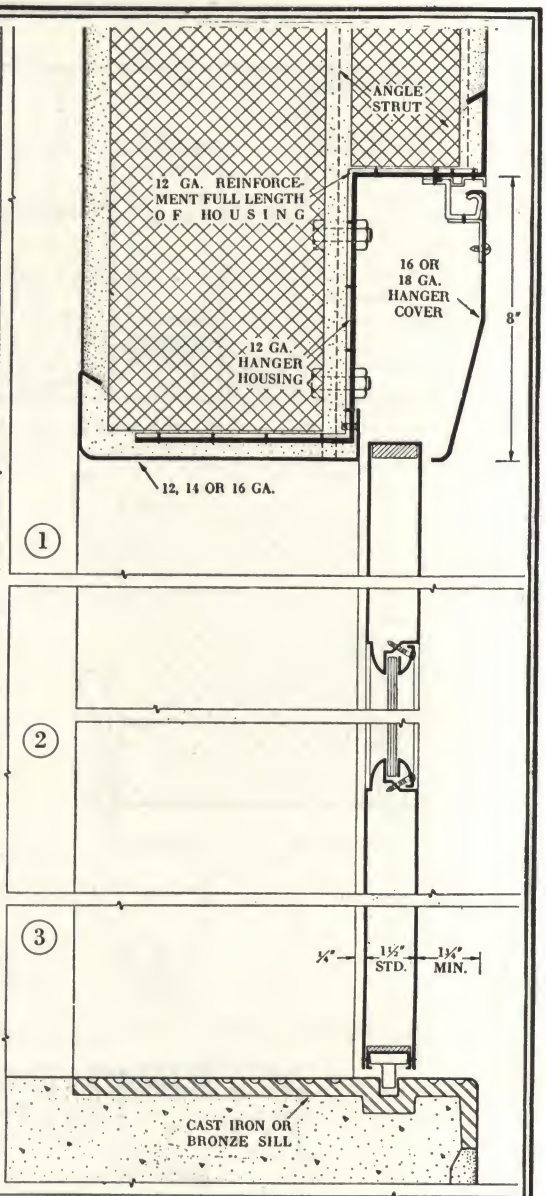
ELEVATIONS OF OFFICE BUILDING UNITS



OFFICE BUILDING UNITS
(Rough Buck and Cabinet Jamb Type Frame)
SCALE 3 IN.=1 FT.

Continued on next page

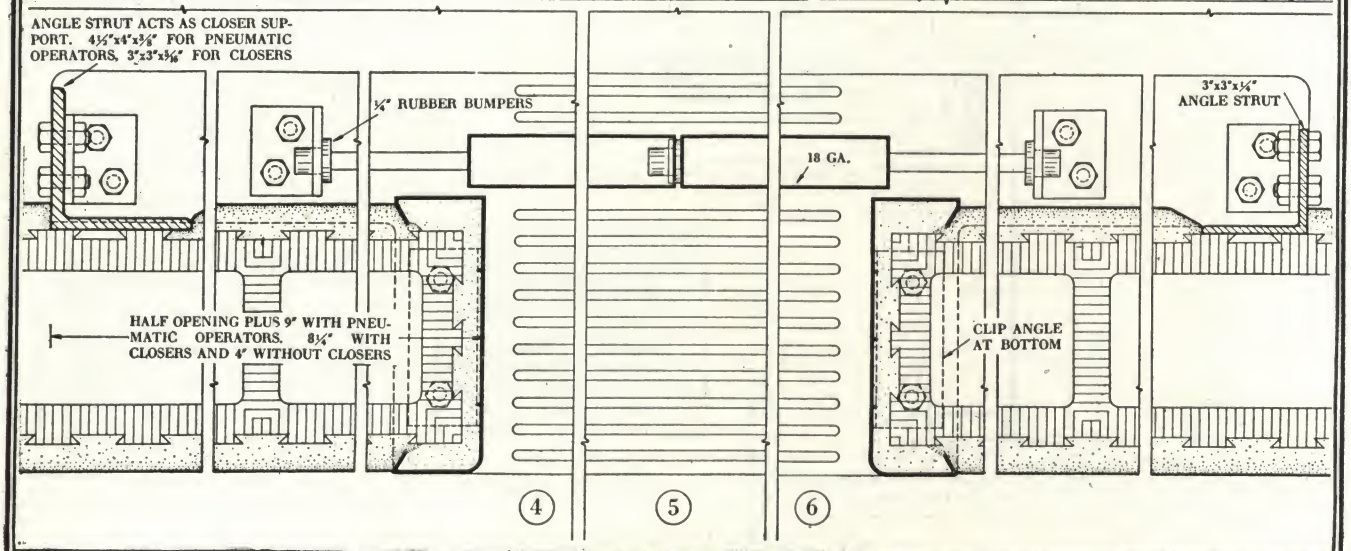




SOME makes of pneumatic operators require greater clearance than shown. Heavy duty sheave type hangers require not less than 11″ headroom. When bar locks are used, hanger covers must be made straight.

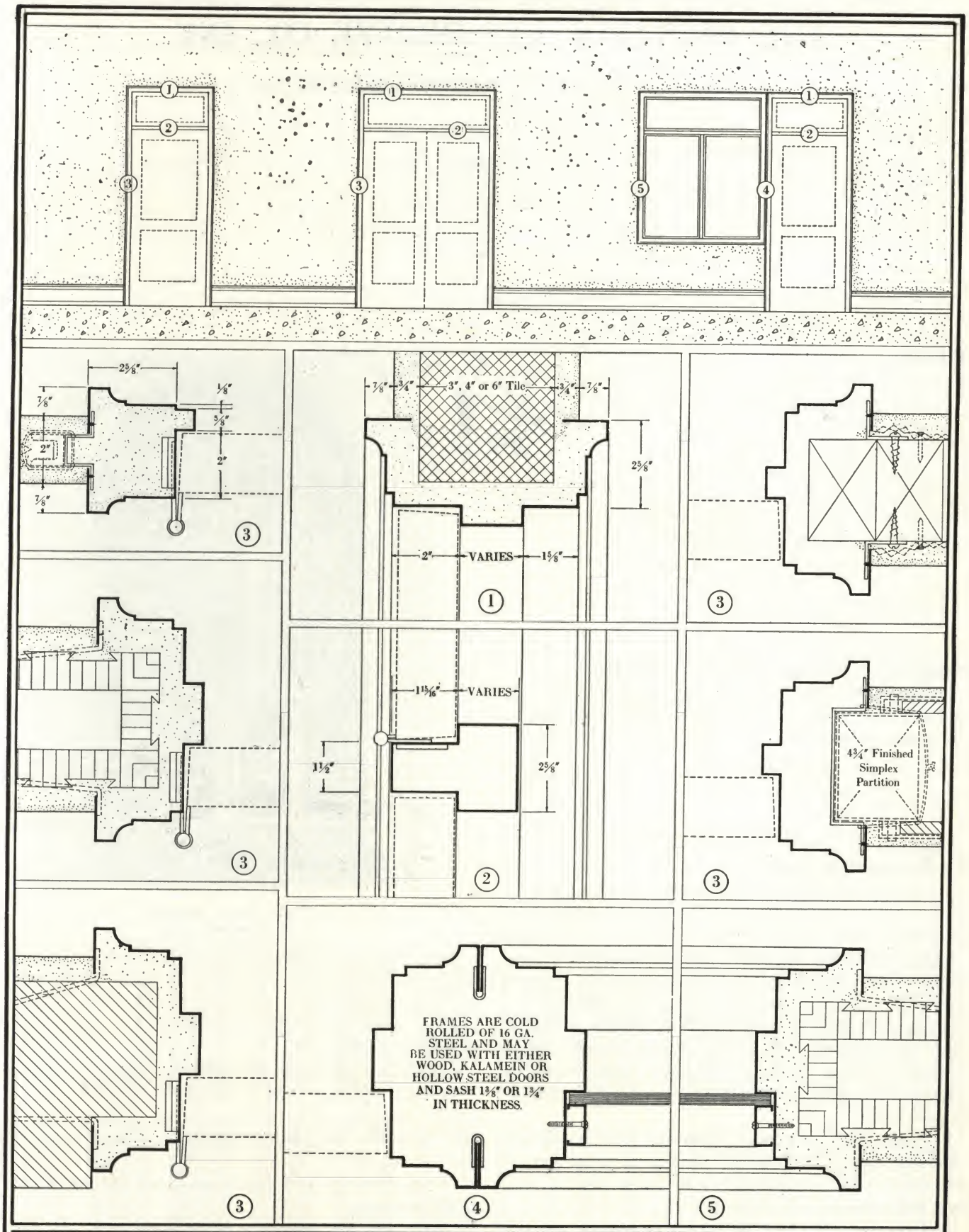
When sufficient space is not available to permit mounting the pneumatic operators or closers in back of doors as here detailed, these devices can be placed between the doors and cab.

When overhead pneumatic operators are used, write us for detail drawing showing condition at head.



CENTER PARTING UNIT
(Combination Buck and Jamb Type Frame)
SCALE $\frac{3}{16}$ IN. = .1 FT.

Continued on next page



COMBINATION BUCK, JAMB AND TRIM FRAMES
(Rolled Type)
SCALE 3 IN. = 1 FT.

THE MICHAELS ART BRONZE CO., INC.

Manufacturers of Cast and Welded Doors

235-241 Court Avenue
COVINGTON, KY.

FACTORY: 230-240 Scott Boulevard, COVINGTON, KY.
(Three minutes from the heart of Cincinnati, Ohio)

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

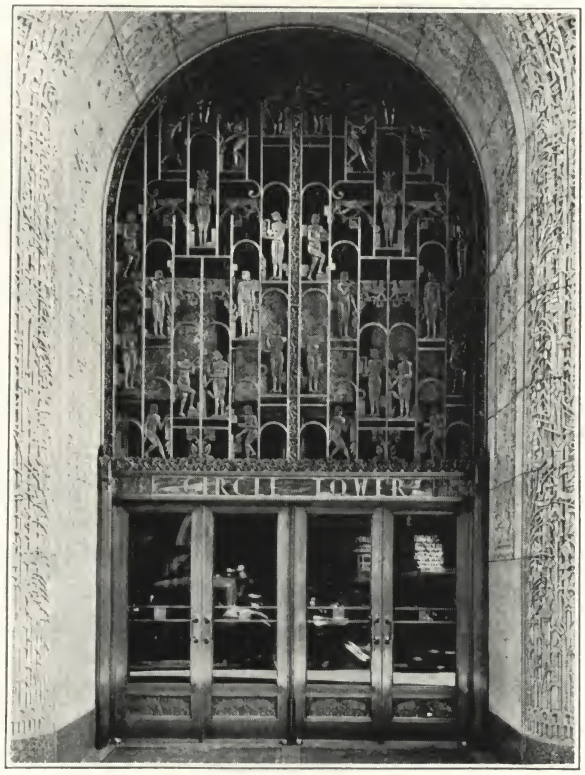


CASEMENT DOORS.
CAST DOORS of all types.
ELEVATOR DOORS.
WELDED BRONZE DOORS.
WELDED EXTRUDED DOORS.

For our pages on Bronze Casement Windows; Ornamental Iron and Bronze; and Store Front Construction, see Manufacturers' Index.

Originators of Welded Doors (Cork Filled)

Our bronze doors will pass the most critical inspection. You will find no sagging, no winding, no waves, no seams, no joints.



Circle Tower Building, Indianapolis, Ind.
RUSH & HUNTER, Architects
Doors *welded* by Michaels

Facilities and Experience

Our plant of over 150,000 sq. ft. of floor space, modernly equipped and especially adapted for designing modeling and manufacturing distinctive metal work, includes complete estimating, engineering and drafting departments, modeling studio, pattern shop, bronze foundry, fitting, assembling and finishing departments, chasing and engraving departments, polishing, buffing and electroplating department, baking enamel ovens, extensive machine shop, wrought iron and wire mesh departments, electric laboratories and acid etching department.

Large stock of bronze, brass and iron mouldings, channels, angles and sheets on hand at all times and on account of our central location, we can secure the very best deliveries on mill shipments.

Our organization of skilled craftsmen was selected individually for their architectural and mechanical ability to do artistic and exacting workmanship.

Service

Architects are invited to write for full size details of various Michaels' doors. Estimates cheerfully furnished, catalogues sent upon request. Architect's details faithfully executed. Complete engineering and drafting service.

Shop drawings and details submitted for approval on all contracts.

Architects are offered, without extra cost, any of our numerous ornamental stock patterns (designs that correspond with any type of architecture).

THE MOESCHL-EDWARDS CORRUGATING CO., INC.

Manufacturers of Kalamein and Tin Clad Doors

CINCINNATI, OHIO

Products

"Mecco" Kalamein and Tin Clad Doors; Jambs, Trim, Transoms and Moulding Sections.

For "Mecco" Rolling Steel Doors, see Manufacturers' Index.

TRADE-MARK

Facilities

A long established firm with a modern plant and ample facilities to execute orders of any size, for high grade metal covered woodwork in steel, copper or bronze. Also hollow metal frames, kalamein trim and moulding.

Labeled Products

Kalamein doors are Underwriters' labeled for all except Class "A" openings. Frames to be labeled must be hollow metal. Mecco labeled doors and frames will give you the best possible rating obtainable. A circular giving complete details will be mailed upon request.

Specifications for Underwriters' Labeled Kalamein Doors

Where specified or marked "Kalamein Doors" same shall be metal covered with wood cores and labeled by the National Board of Underwriters and all to be as manufactured by The Moeschl-Edwards Corrugating Co., Inc., of Cincinnati, Ohio.

The cores shall be built of non-resinous wood assembled with mortise and tenon joints. Panels to be ¼-in. thick formed of asbestos mill board and two thicknesses of 24 gauge galvanized steel. Covering for rails and styles shall be not less than 24 gauge galvanized steel so applied as to fit the cores snugly and edges of covering to be riveted through the panels, all in neat and workmanlike manner.

Where styles and rails meet, they shall be joined by a lock joint. Panel molds are to be of wood core, drawn metal construction with members sharp and true. Glass molds to be of drawn hollow metal, joined as approved by the Underwriters. Doors shall receive one prime coat of paint at the factory.

STOCK DOORS—STANDARD SIZES ALWAYS IN STOCK

All Dimensions in Ft. and In.

Type E	Type B	Type C
2–6x6–0; 2–6x6–6 2–8x6–8; 3–0x7–0	..... 2–8x6–8; 3–0x7–0	..... 2–8x6–8; 3–0x7–0

Construction and Materials

"Mecco" Kalamein products are manufactured of only high grade materials throughout. Construction used is that proven by time and experience to be the best for every condition. Wood work is kiln dried and only stretcher leveled sheets of proper gauges are used.

Specifications for Commercial Non-labeled Kalamein Doors

Where specified or marked "Kalamein Doors" same shall be metal covered with wood cores, as manufactured by The Moeschl-Edwards Corrugating Co., Inc., of Cincinnati, Ohio.

Cores shall be of non-resinous wood with mortise and tenon joints, thoroughly glued and nailed.

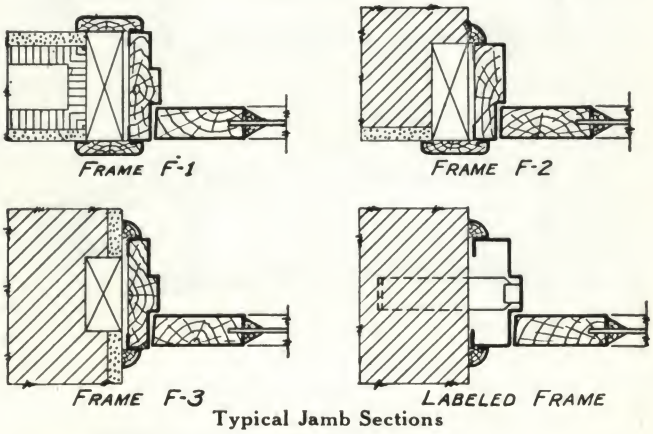
Covering shall not be less than No. 25 gauge stretcher leveled kalamein iron for interior doors and No. 24 gauge galvanized steel for exterior doors, so applied as to fit the cores snugly, in the most approved and workmanlike manner.

Panel and glass mould must have wood cores with metal covering drawn tightly on by means of steel dies. All members must be sharp and true; no pressed moulds will be permitted.

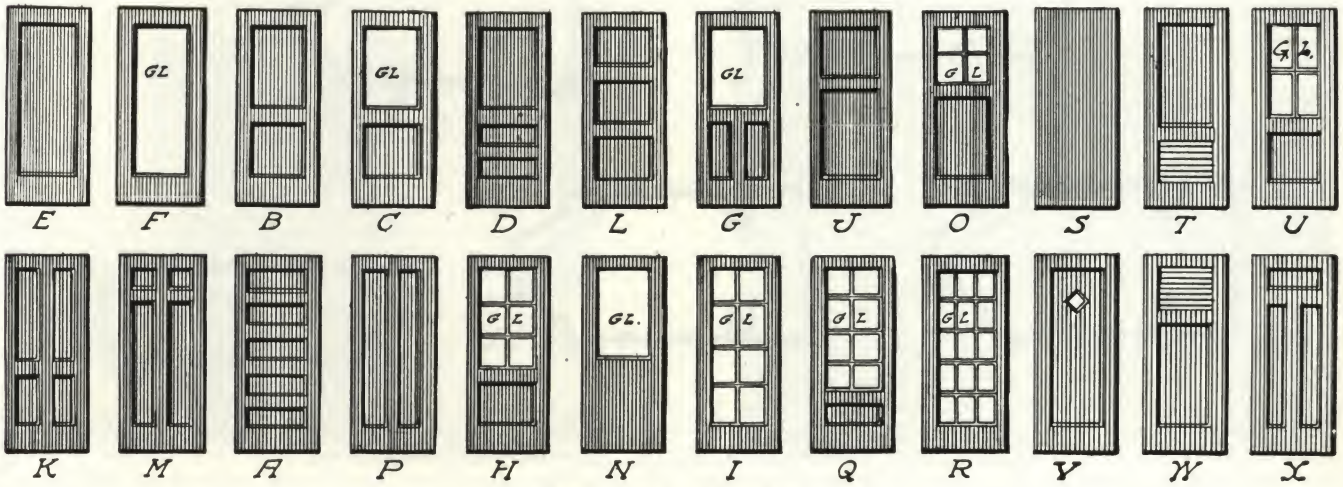
Doors must receive one prime coat of paint at the factory.

Frames, casing and staff moulds for these doors, where required, are also to be wood core, metal covered of equal workmanship.

Hardware is furnished by others, but must be mortised for by the door manufacturer at the factory.



Typical Jamb Sections



Suggestions for Paneling

THE NEWMAN MANUFACTURING CO.

FOUNDED 1882

Bronze, Aluminum, Monel and Nickel Doors, Frames, Trim and Enclosures

MAIN OFFICE AND PLANT

CINCINNATI, OHIO

BRANCHES: CHICAGO AND NEW YORK
SALES OFFICES IN 84 CITIES

Products

SOLID CAST DOORS and FRAMES.

KALAMEIN DOORS, TRIM, PARTITIONS and ELEVATOR ENCLOSURES.

HOLLOW DOORS, TRIM, PARTITIONS and ELEVATOR ENCLOSURES.

EXTRUDED DOORS and ENTRANCES.

Also makers of Door Bars, Pulls, Push and Pull Plates, Kick Plates, Thresholds and Sills, of Brass, Bronze, Aluminum, etc.

Note: We do not make steel doors.

For our pages on Ornamental Brass and Bronze Work, Windows (double-hung and casement types), Storefronts, Grilles, see Manufacturers' Index.

For Iron Work and Lighting Fixtures, see our Midwest Metal Art Division in Manufacturers' Index.

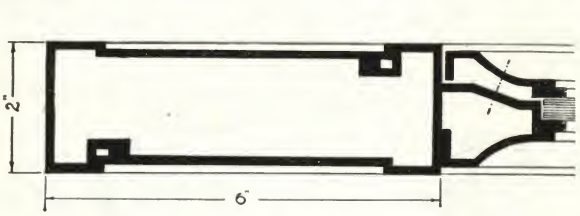
Facilities

Plant contains 226,000 sq. ft. of space, is devoted exclusively to ornamental metal work, and employs 450 craftsmen. Door Department second to none, and we are prepared to execute contracts for all varieties of doors and entrances, as listed above.

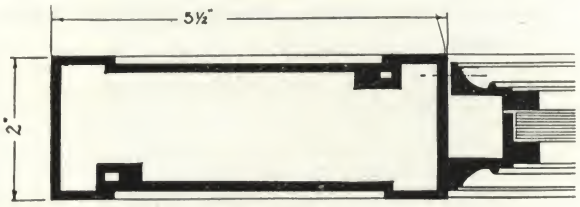
Construction

Newman Bronze Doors are of the construction termed standard, except that the materials in some instances are extra heavy. All cast bronze work is regulation U. S. Government Standard, moulded in French sand, bound and baked.

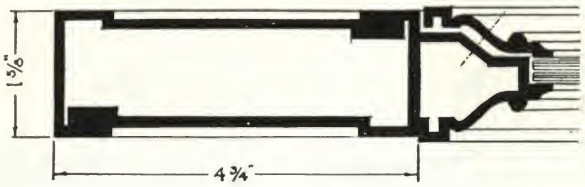
Please write for complete specifications, giving opening sizes if you wish suggestions and estimates of cost. If desired, we will gladly design special doors and entrances, *or send full size blueprints of the sections shown herein, and also details of bronze jambs.*



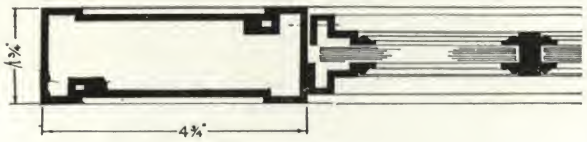
No. 10. 6x2 in.



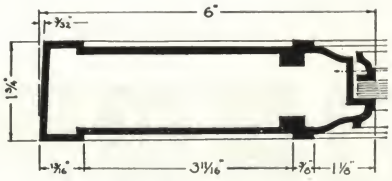
No. 11. 5½x2 in.



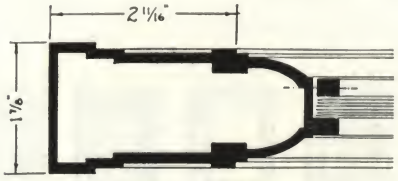
No. 12. 4¾x1⅝ in.



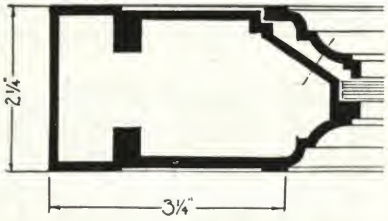
No. 13. 4¾x1¾ in.



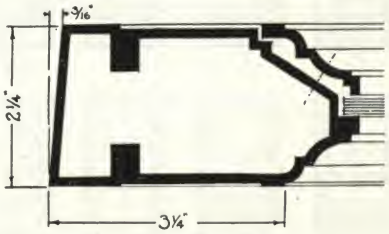
No. 14. 6x1¾ in.



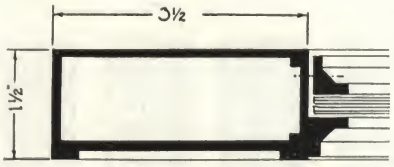
No. 21. 2 1/16x1⅛ in.



No. 16. 3¼x2¼ in.



No. 17. 3¼x2¼ in.



No. 18. 3½x1½ in.

DETAILS OF NEWMAN EXTRUDED BRONZE DOOR SECTIONS
(Other details on 4th page following)

Continued on next page



Museum of Art, Baltimore, Md.
JOHN RUSSELL POPE, Architect



First Camden Trust Co., Camden, N. J.
SIMON & SIMON, Architects



Columbia National Bank, Washington, D. C.
APPLETON P. CLARK, JR., Architect



Telephone Building, Bridgeport, Conn.
R. W. FOOTE, Architect



Fountain Square Building, Cincinnati, Ohio
HARRY HAKE, Architect



Mesa County Courthouse, Grand Junction, Colo.
EUGENE G. GROVES, Architect



Calcasieu National Bank, Lake Charles, La.
FAVROT & LIVAUDAIS, Architects



Willoughby Tower, Chicago, Ill.
S. N. CROWEN & ASSOCIATES, Architects

Continued on next page



Jackson Trust Co., Jersey City, N. J.
Wm. Neumann, Architect



First National Bank, Boise, Ida.
Tourtelotte & Hummel, Architects



Woolworth Building, Chicago, Ill.
Walter W. Ahlschlager, Architect



Industrial Bank, Detroit, Mich.
Louis Kamper, Inc., Architect



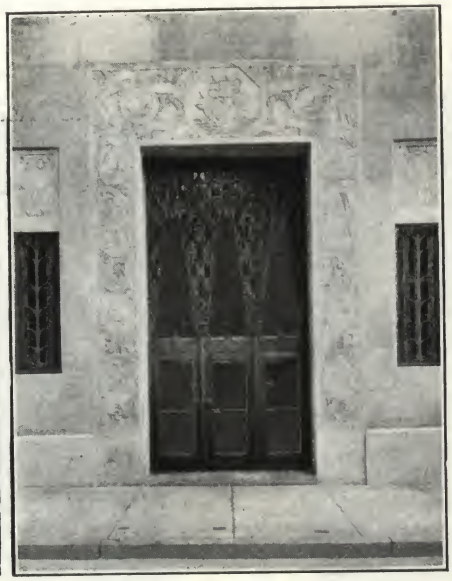
Federal Reserve Bank, Oklahoma City, Okla.
Graham, Anderson, Probst & White, Architects



Commercial Loan & Trust Co., San Antonio, Tex.
Phelps & Dewees, Architects



Liberal Savings & Loan Building, Cincinnati, Ohio
Rendigs, Panzer & Martin, Architects

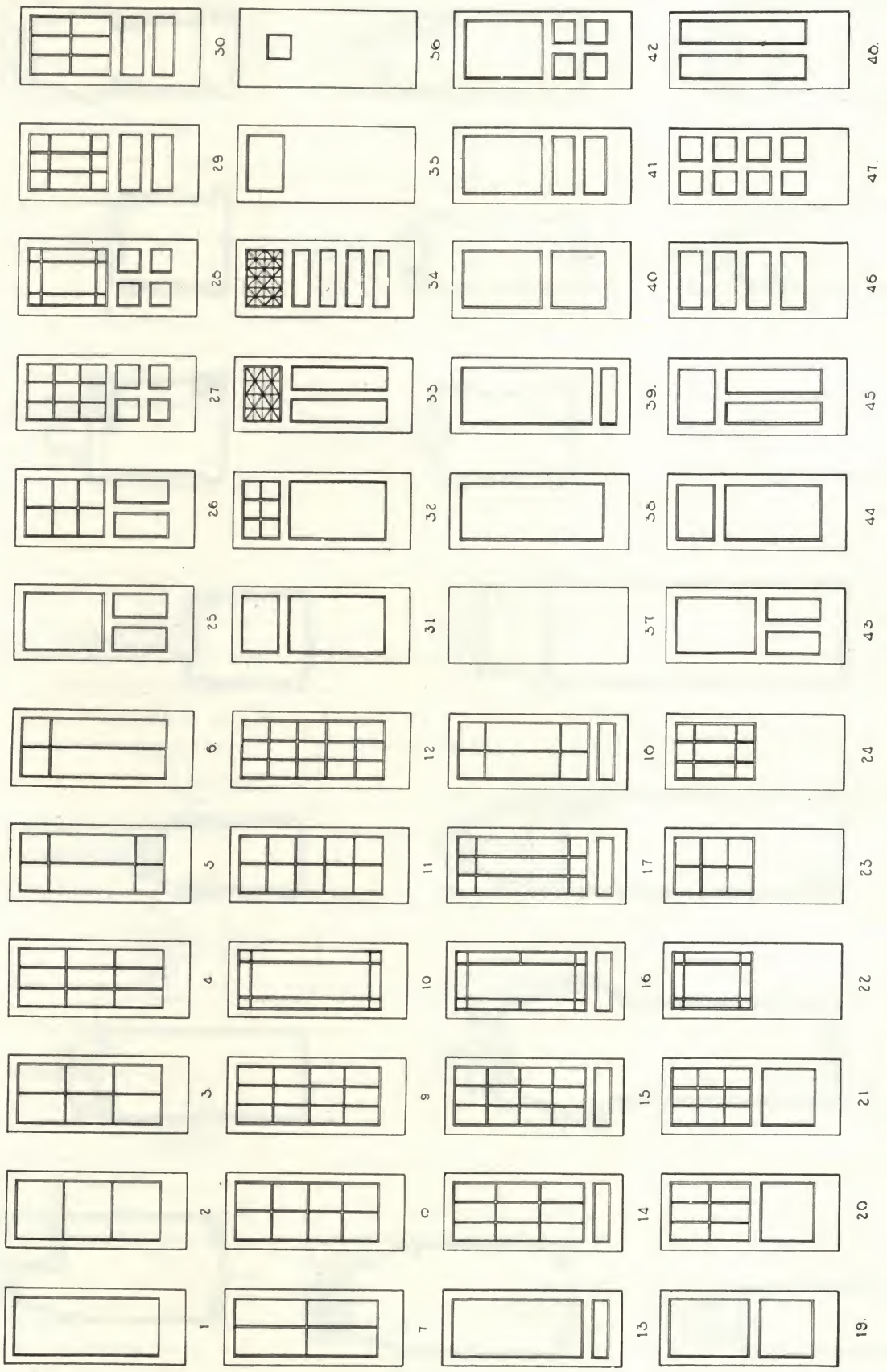


Navy Central Y. M. C. A., Philadelphia, Pa.
Louis E. Jallade, Architect



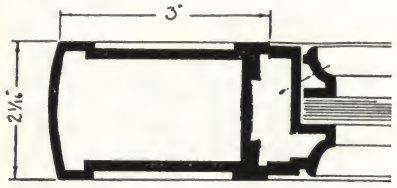
Immaculate Conception Church, New Orleans, La.
Wogand & Bernard, Architects

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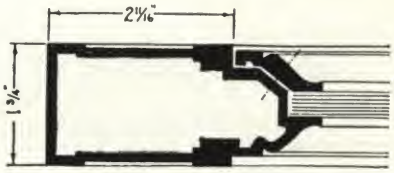


NEWMAN STANDARD STYLES OF HOLLOW AND EXTRUDED BRONZE DOORS

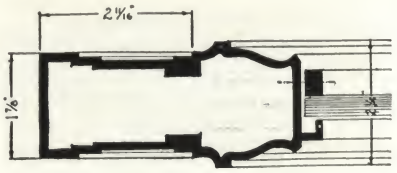
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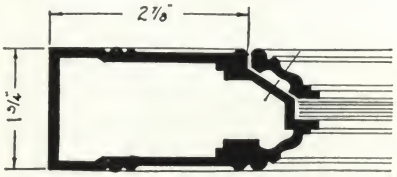
No. 19. 3x2 1/16 in.



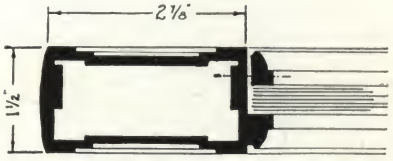
No. 20. 2 11/16 x 1 3/4 in.



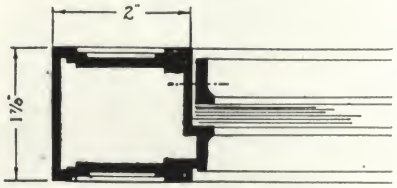
No. 15. 2 11/16 x 1 7/8 in.



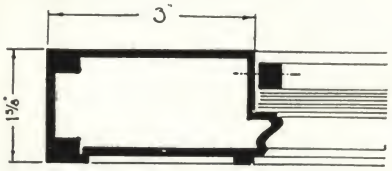
No. 22. 2 1/8 x 1 3/4 in.



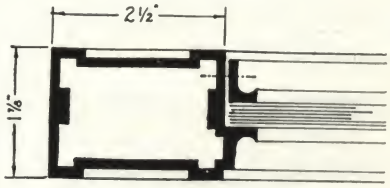
No. 23. 2 1/8 x 1 1/2 in.



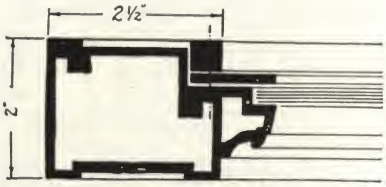
No. 28. 2x1 7/8 in.



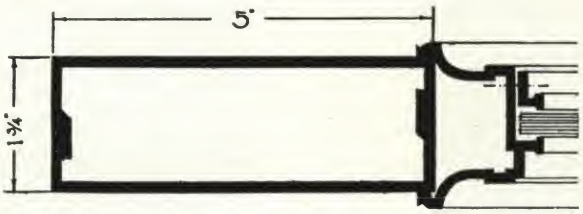
No. 24. 3x1 5/8 in.



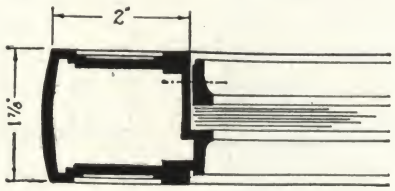
No. 26. 2 1/2 x 1 7/8 in.



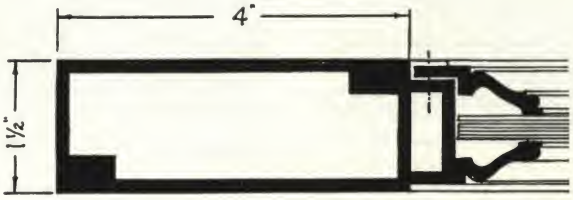
No. 25. 2 1/2 x 2 in.



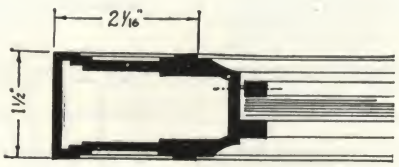
No. 31. 5x1 3/4 in.



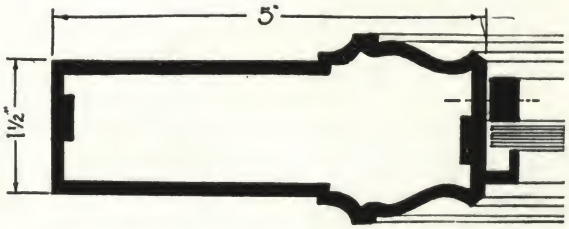
No. 27. 2x1 7/8 in.



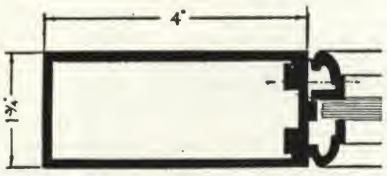
No. 33. 4x1 1/2 in.



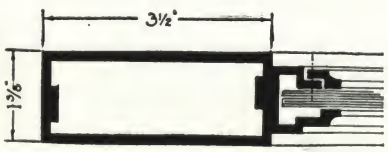
No. 29. 2 1/16 x 1 1/2 in.



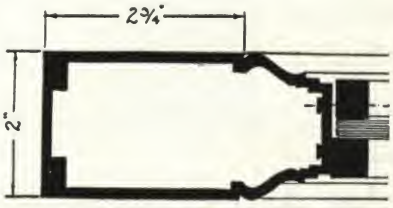
No. 35. 5x1 1/2 in.



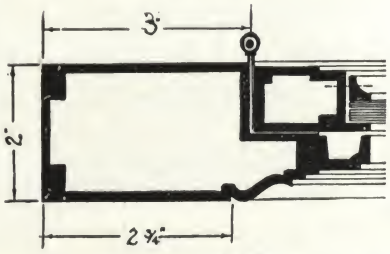
No. 32. 4x1 3/4 in.



No. 34. 3 1/2 x 1 3/8 in.



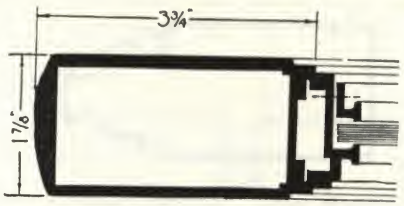
No. 37. 2 3/4 x 2 in.



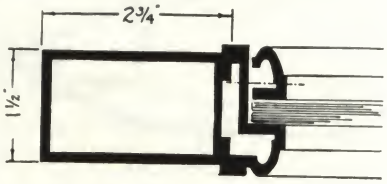
No. 36. 3x2x2 3/4 in.

DETAILS OF NEWMAN EXTRUDED BRONZE DOOR SECTIONS

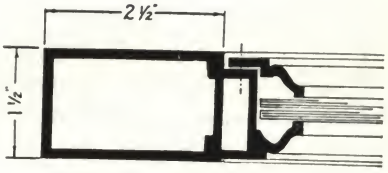
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No. 38. 3¾x1⅞ in.

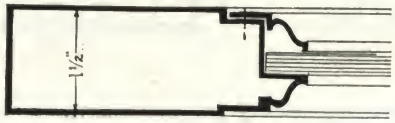


No. 39. 2¾x1½ in.

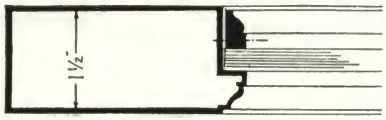


No. 40. 2½x1½ in.

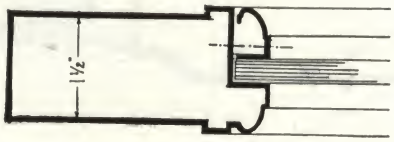
DETAILS OF NEWMAN EXTRUDED BRONZE DOOR SECTIONS



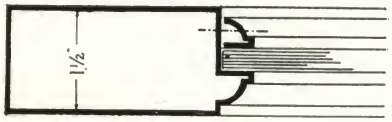
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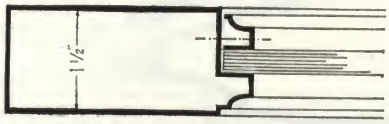
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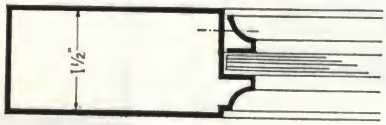
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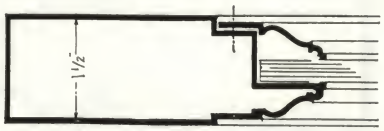
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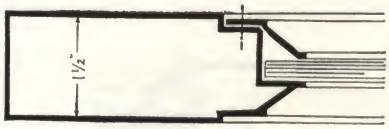
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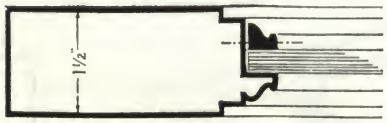
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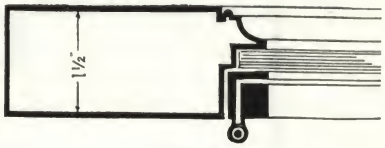
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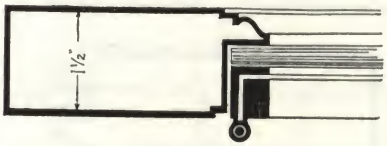
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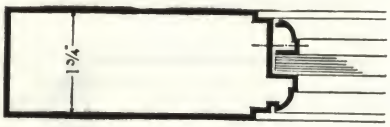
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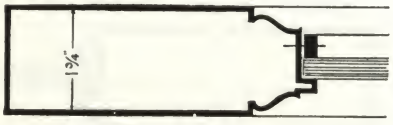
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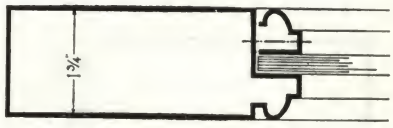
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No. 55



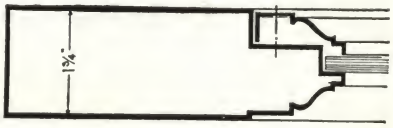
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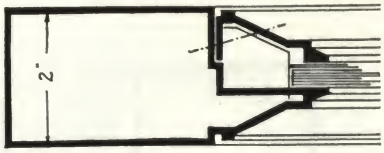
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DETAILS OF NEWMAN DRAWN HOLLOW BRONZE DOOR SECTIONS

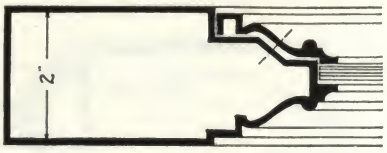
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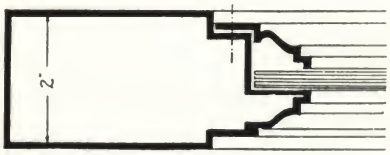
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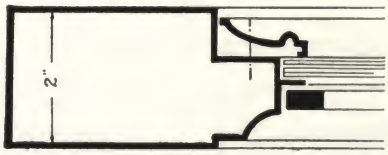
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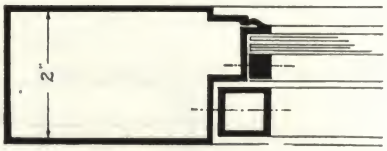
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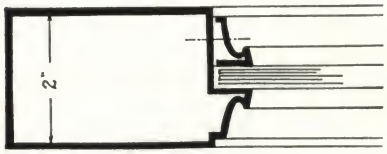
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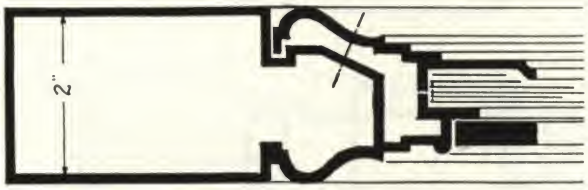
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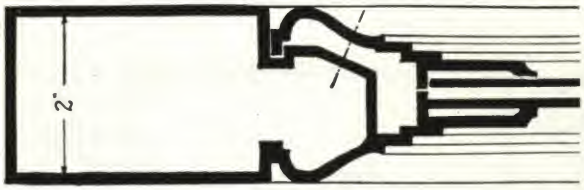
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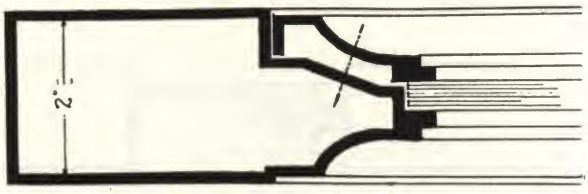
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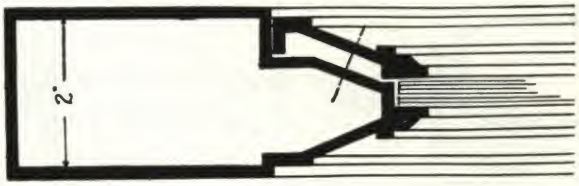
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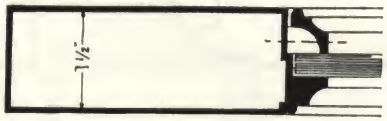
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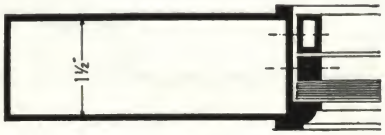
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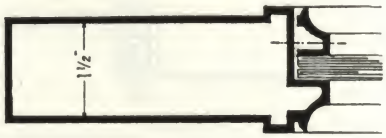
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No. 72



No. 73



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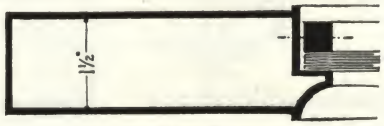
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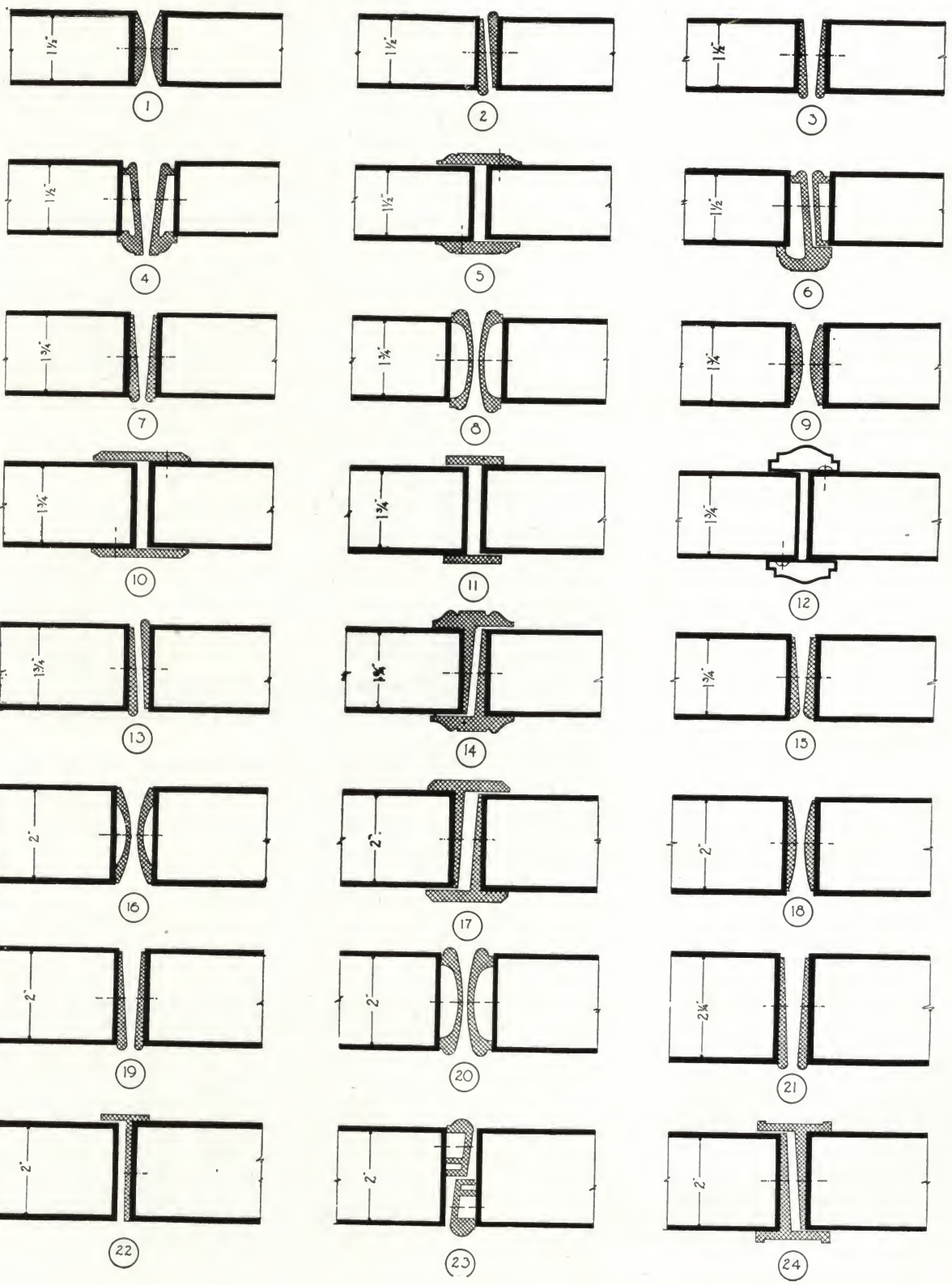
No. 78



No. 79

DETAILS OF NEWMAN DRAWN HOLLOW BRONZE DOOR SECTIONS

Continued on next page



NEWMAN STOCK DESIGN MEETING STILES FOR BRONZE DOORS

Full size details will be sent upon request

NEW YORK KALAMEIN CO.

Manufacturers of Metal Covered Wood Work

800 Humboldt Street, BROOKLYN, N. Y.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

DRAWN METAL COVERED WOOD DOORS, WINDOWS, ELEVATOR FRONTS, PARTITIONS and TRIM in Steel, Copper and Bronze.

NEW YORK KALAMEIN COMPANY

TRADE-MARK

Sound Construction

In the manufacture of our products we follow old established methods, which have been found through long use to be the most satisfactory. Doors are of mortise and tenon construction. No dowels or corrugated fasteners are used. No parts are covered by hand, the doors are strictly a machine made product.

All parts of doors, windows and trim are separately kalameined before assembly. This not only produces the highest class of work, but places us in a position to render a very wide service to users of all classes of metal covered woodwork.

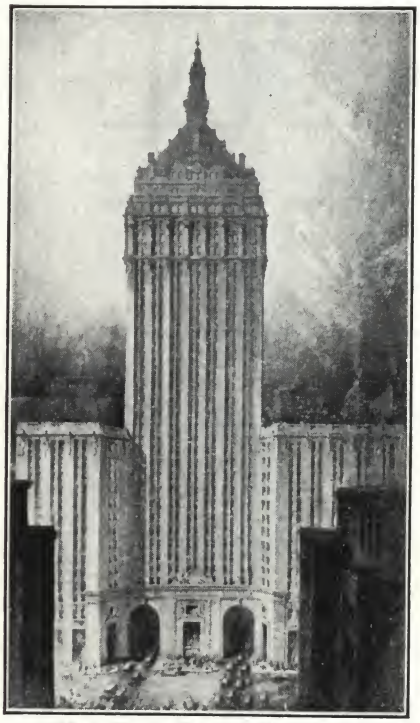
Specification Data for Standard Metal Covered Doors

Cores, Stiles and Rails—Wood used in cores, stiles and rails is sound, kiln dried white pine, milled solid, and free from large and loose knots and sap.

Covering—All parts are covered with No. 24 gauge furniture steel, No. 24 gauge terne plate or No. 26 gauge galvanized iron by die process before assembly.

If doors are to be covered with copper, 16 oz. is recommended; if bronze is used, 20 gauge is recommended.

Panels—Panels are built up as in veneer process, under pressure of 2 sheets of metal, cemented on to approved board.



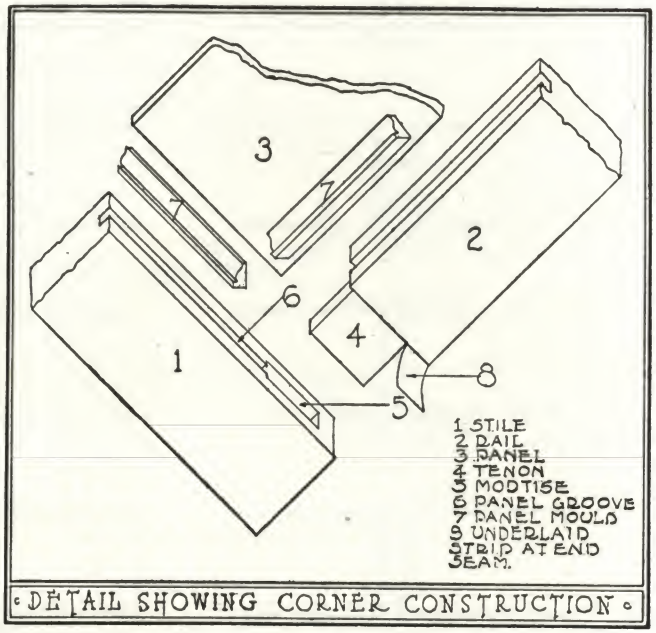
New York Central Building
WARREN & WETMORE, Architects
JAMES STEWART & CO., INC., Contractors
N. Y. Kalamein Doors used throughout

Assembly—Stiles are mortised and rails blind tenoned. Panel is inset into stiles and rails. Surface seams are soldered and scraped smooth. The top and bottom edge seams have underlaid strips of metal making the joints practically waterproof.

Painting—All material is given a priming coat of paint before leaving the factory.

Metal Covered Windows

Metal covered windows of double hung or casement type can be furnished in our own standard designs, or we will build them to specifications. Other types of windows will be manufactured to meet special conditions. All windows are of sturdy construction. Special care is taken to have the joints and seams tight to withstand the action of the weather.



DETAIL SHOWING CORNER CONSTRUCTION

Service

We are prepared to design special metal covered woodwork to fit openings with unusual contours. Upon receipt of drawings or sketches we shall be glad to submit for approval designs for filling any shape or size window opening.

Some Recent Installations

New York Central Office Building, New York, N. Y.; James Stewart & Co., Inc., Contractors; Warren & Wetmore, Architects

Vincent Astor Residence, New York, N. Y., Saxton-Gerard Co., Inc., Contractors; Mott B. Schmidt, Architect

Apartment House, 79 E. 79th Street, New York, N. Y., James Stewart & Co., Inc., Contractors; Electus Litchfield, Architect

Edison Substation, West 72nd Street, New York, N. Y., Saxton-Gerard Co., Inc., Contractors; W. Whitehill, Architect

Edison Substation West 124th Street, New York, N. Y., Ken-Well Contracting Co., Contractors; W. Whitehill, Architect

Hillsboro High School, Tampa, Fla., J. L. Crouse, Contractor; Francis J. Kennard & Son, Architect

Westbury Theater, Westbury, L. I., N. Y., A. B. Whitney Co., Contractors; D. P. Hall, Architect

Brooklyn Preparatory School, Brooklyn, N. Y., John Kennedy & Co., Contractors; McKenna & Irving, Architects

Coal Loading Towers, New York Edison & New York Steam Cos., New York, N. Y., Maine Electric Co., Contractors

U. S. Veterans' Hospital, Bedford, Mass., Murch Bros. Construction Co., Contractors

Clark Office Building, Philadelphia, Pa., Day & Zimmerman, Contractors; Zantzinger, Borie & Medary, Architects

Greenpoint Avenue Bridge, Brooklyn, N. Y., P. T. Cox Contracting Co., Contractors

Hartford National Bank, Hartford, Conn., Stone & Webster, Contractors; Dennison & Hirons, Architects

Radio Corporation of America Building, Riverhead, L. I., N. Y., Skinner & Cook, Contractors; Clinton McKenzie, Architect

ESTABLISHED 1888

W. F. OVERLY & SONS

Overly Metal Covered Doors

GREENSBURG, PA.

Products

LABELED and NON-LABELED METAL COVERED DOORS.

Also manufacturers of Special Architectural Sheet Metal Products, including Cornices, Roof Ventilators, Gutters and Conductors.

For Goodwin Automatic Stage Ventilator, Skylights and Marquees, see Manufacturers' Index.

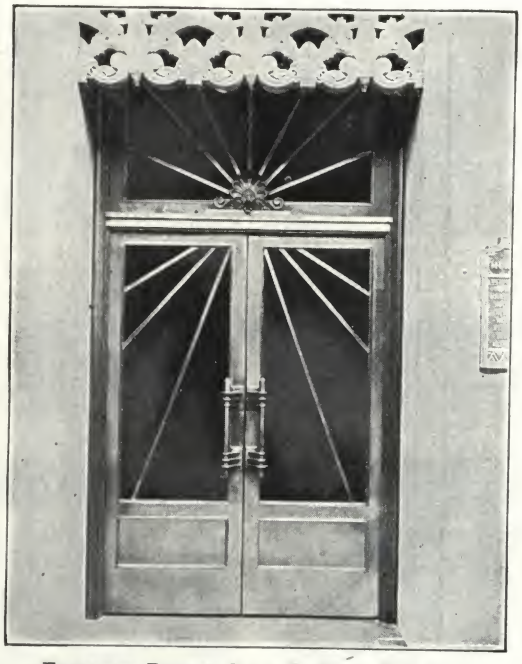
In addition to the standard type, Overly Doors are supplied in a variety of styles and sizes. Special designs and construction may be covered with various metals as desired, brass, bronze, aluminum, monel metal, Everdur metal, etc., and furnished with rolled extruded or cast mouldings.

Overly Metal Covered Doors

An unusually high standard is maintained in the manufacture of Overly Metal Covered Doors. They are specified by leading architects and approved by prominent engineers and builders.

Facilities

The plant of W. F. OVERLY & SONS is fully equipped with modern machinery and devices to meet the most exacting requirements combined with quantity production. The men employed are craftsmen in the field of metal door production, men accustomed to executing the highest grade of metal work.



Entrance Doors, John E. Born Building, Pittsburgh, Pa.

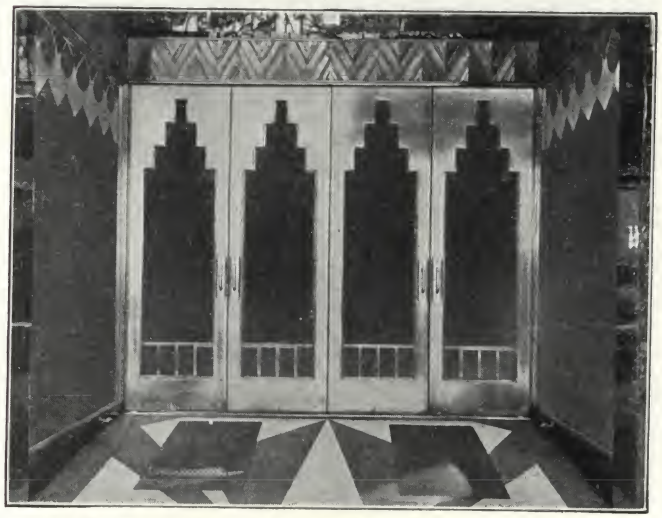
General Construction

The wood core is of thoroughly seasoned kiln dried white pine, straight and true and free from loose or unsound knots, shakes or other imperfections.

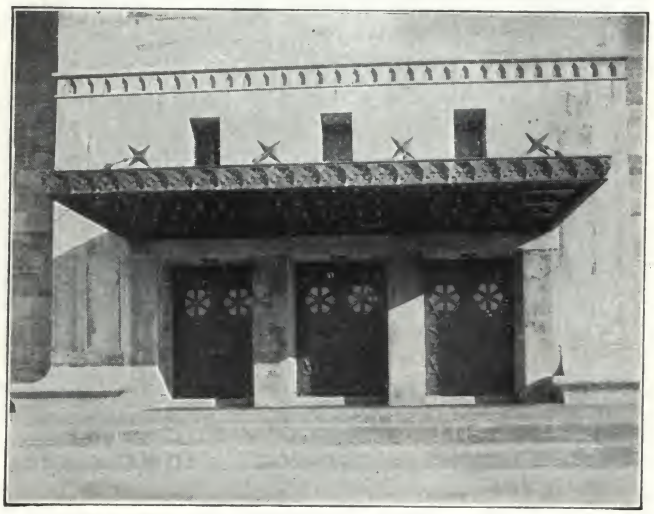
The metal is die formed to insure uniformity and made to encase each member of the door. The method of assembling assures adhering closely to the wood core. Metal is free from waves, buckles, mars or other imperfections.

Overly Service

Our Engineering Service is at your disposal to help in solving any problems involving metal covered materials. Write, telling us about the problem, and we will promptly co-operate with you.



Entrance Doors, Mason Store, Pittsburgh, Pa.



Main Doors, Zembo Temple, Harrisburg, Pa.

Continued on next page

STANDARD SPECIFICATIONS FOR OVERLY KALAMEIN DOORS, FRAMES AND TRIM

Under this heading furnish all kalamein work and pressed steel frames as shown on drawings or door schedule.

All material shall be made in accordance with U. S. Department of Commerce, Bureau of Standards, "Simplified Practice Recommendations R83-28."

Wood Core

All kalamein doors, frames and trim shall have thoroughly seasoned kiln dried white pine wood cores. Each member shall be made independently and completely covered with metal as hereinafter specified. All members shall be straight and true, machined all over and free from loose or unsound knots, shakes or other imperfections.

Panels shall be of ¼ in. thick and either
(a) 3-ply laminated fir (for non-labeled)
(b) Composition asbestos board (for labeled)
and covered with metal as hereinafter specified, glued under pressure with suitable compound to assure permanent adhesion.

Metal Covering

Shall be formed from:

Optional
(a) No. (state gauge) (No. 24 gauge for labeled)
(b) Galvanized tight coated steel
(c) Long terne tin
(d) Furniture stock steel
(e) (State weight) oz. copper (16 oz. for non-labeled) (20 oz. for labeled)

Overly doors of special design and construction may be covered with various metals as desired, bronze, brass, aluminum, monel metal, everdur metal, etc., and furnished with rolled extruded or cast mouldings.

Metal shall be die formed to insure uniformity and made to completely encase each member of the door and with projecting flanges to provide means of attaching panels and to provide bearing for glass. Metal stile covering at top and bottom shall be double lock seamed on itself and to the metal covering for top and bottom rails. Metal covered panels shall be electrically spot welded to flanges of metal coverings of stiles and rails with spots not over 8-in. centers.

Mouldings shall be of rolled type, 18 gauge, die mitered and acetylene welded at corners to form unit for each panel and secured with 1¾-in. oval head wood screws. Glass muntins when used shall be of same material as moulding with all intersections welded into a complete unit with moulding frame. Muntins in labeled doors shall be of solid section steel per Underwriters' standard requirement.

Doors shall be assembled in a manner to allow for unequal expansion and contraction of wood and metal.

Face joints shall be soldered and sanded smooth so as to be imperceptible after painting.

Kalamein transoms, side lights and sash (cannot be labeled) shall be made similar to doors in material and construction.

Casings, staff moulds, back bands, etc., shall be drawn through steel dies and made with wood cores and metal coverings as specified for doors. Shall be of manufacturer's stock profiles as selected.

Kalamein frames, transom bars and mullions (cannot be labeled; use pressed steel for labeled) shall have wood cores and metal coverings as specified for doors.

All material shall be finished at the factory with:

Optional
(a) Grey metallic primer
(b) Solid color lacquer
(c) Grained to match (state wood)
(d) As per manufacturer's sample approved

Copper covered material shall be finished:

Optional
(a) Natural
(b) Cleaned and lacquered
(c) Oxidized per sample approved

This contractor shall make provision for all mortise hardware, templates and schedule of which shall be furnished him by the hardware contractor.

Underwriters' Labels

Optional
(a) All doors
(b) All doors and frames

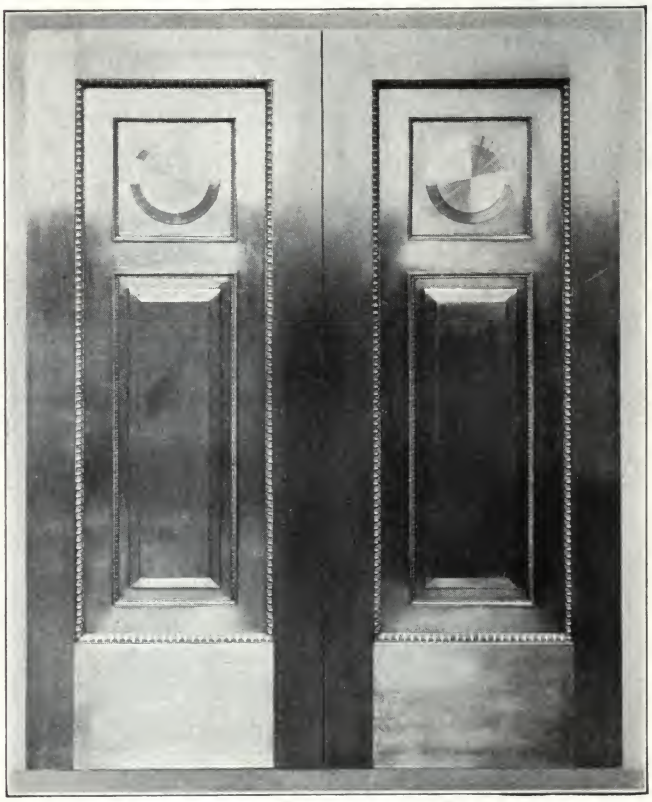
Shall bear the label of the Underwriters' Laboratories incurring the lowest rate of insurance for opening in question.

All material under this heading shall be as manufactured by W. F. Overly & Sons, Greensburg, Pa.

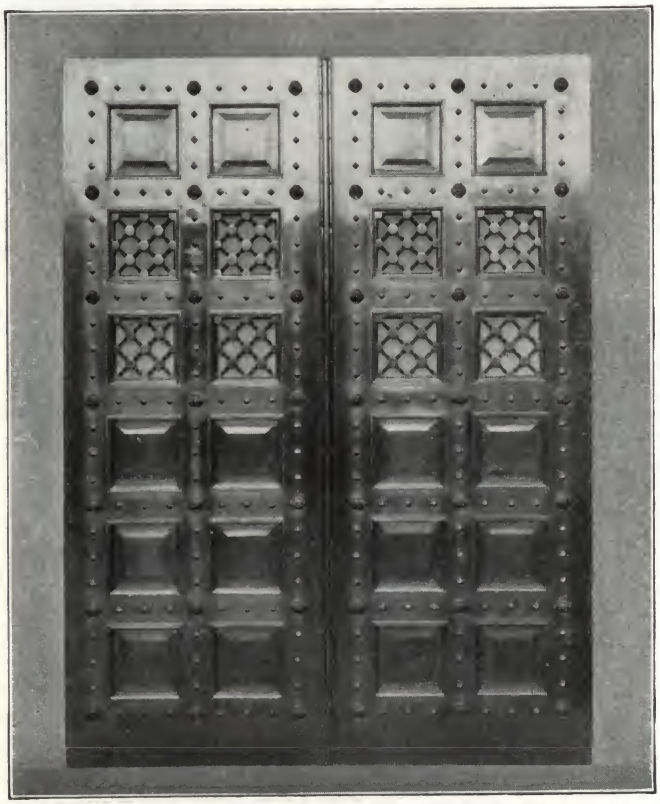
CONDENSED SPECIFICATIONS FOR KALAMEIN DOORS, FRAMES AND TRIM

Under this heading furnish all kalamein work and hollow steel frames as shown on drawings or door schedule.

All material shall be made in accordance with U. S. Department of Commerce, Bureau of Standards, "Simplified Practice Recommendations R83-28" and in accordance with standard specifications covering this material as published by W. F. Overly & Sons, Greensburg, Pa.



Overly Doors, Masonic Temple, Plainfield, N. J.



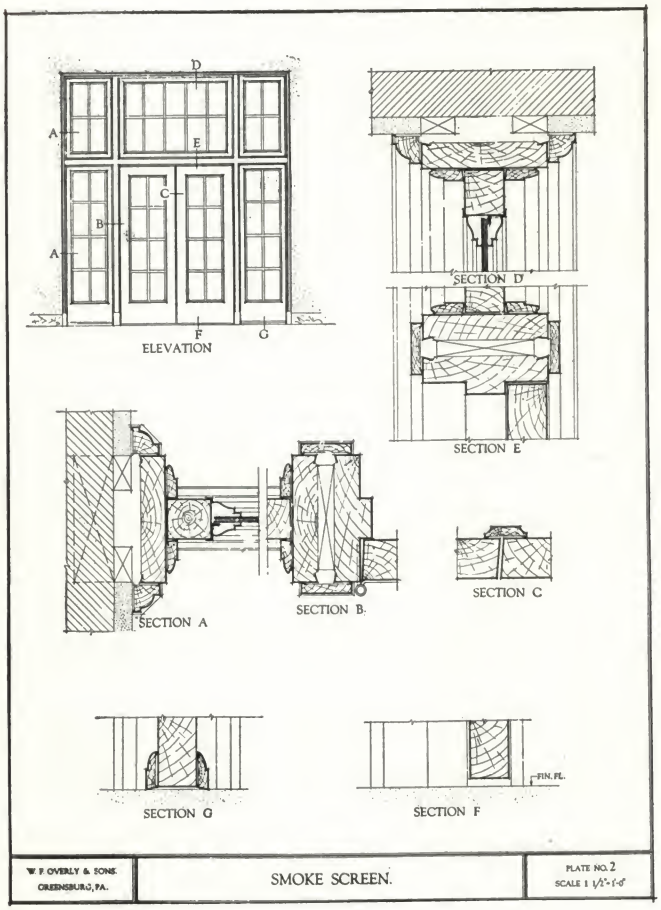
Overly Doors, Park Mansions Apartments, Pittsburgh, Pa.

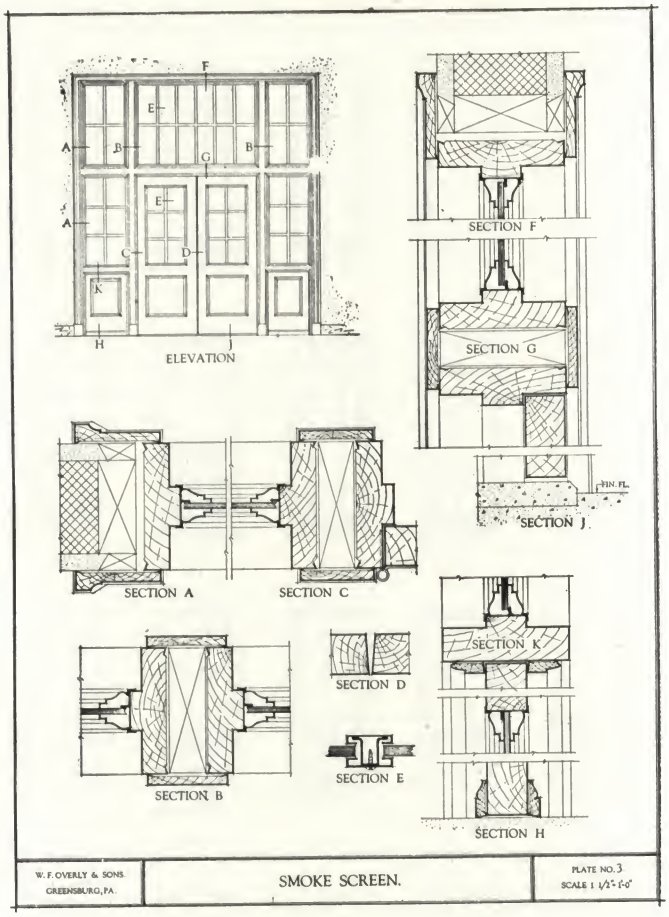
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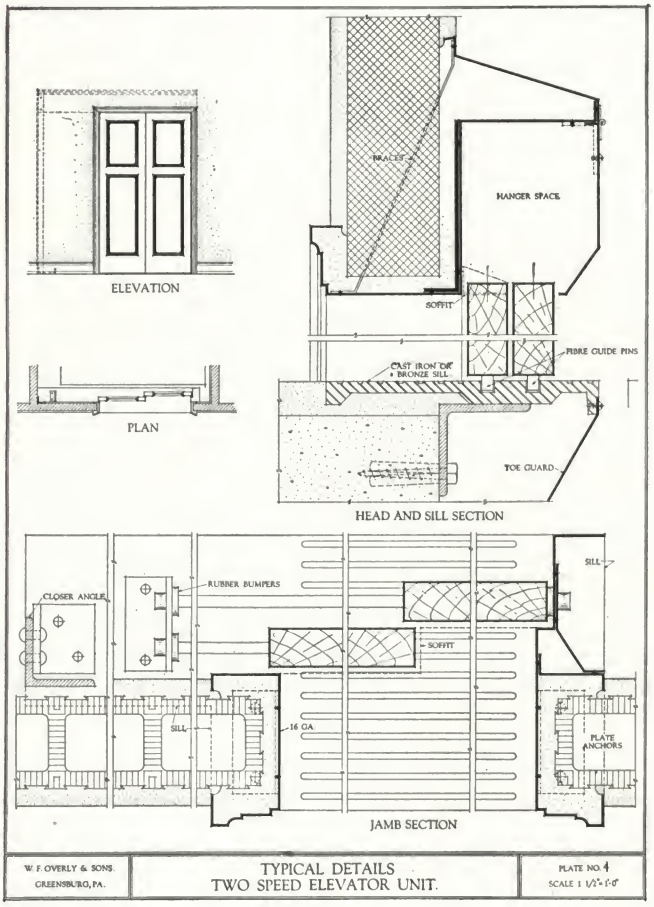


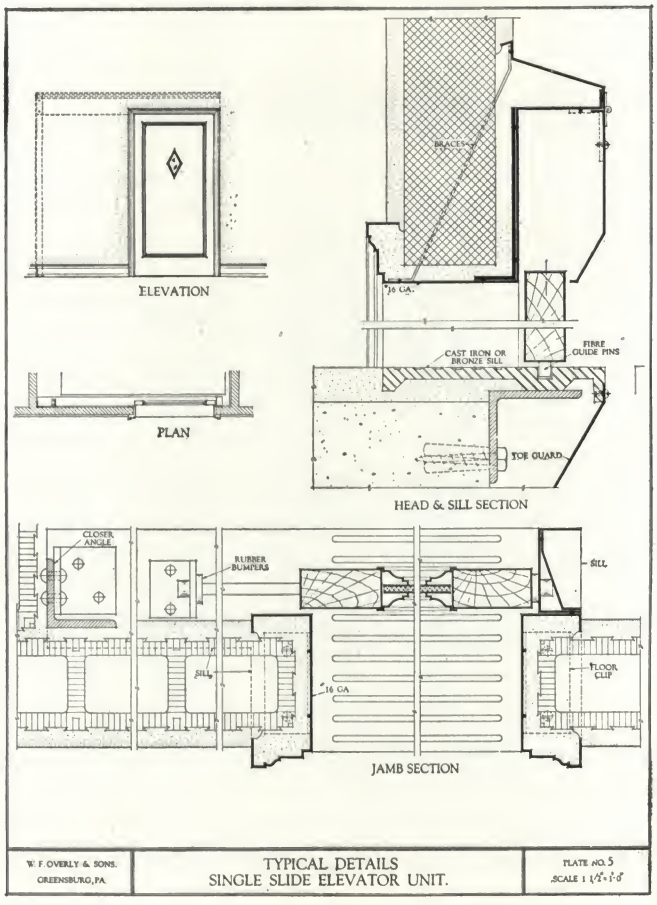
W. F. OVERLY & SONS. GREENSBURG, PA.	DOOR DESIGNS.	PLATE NO. 1. SCALE 3/1 6"=1'-0"

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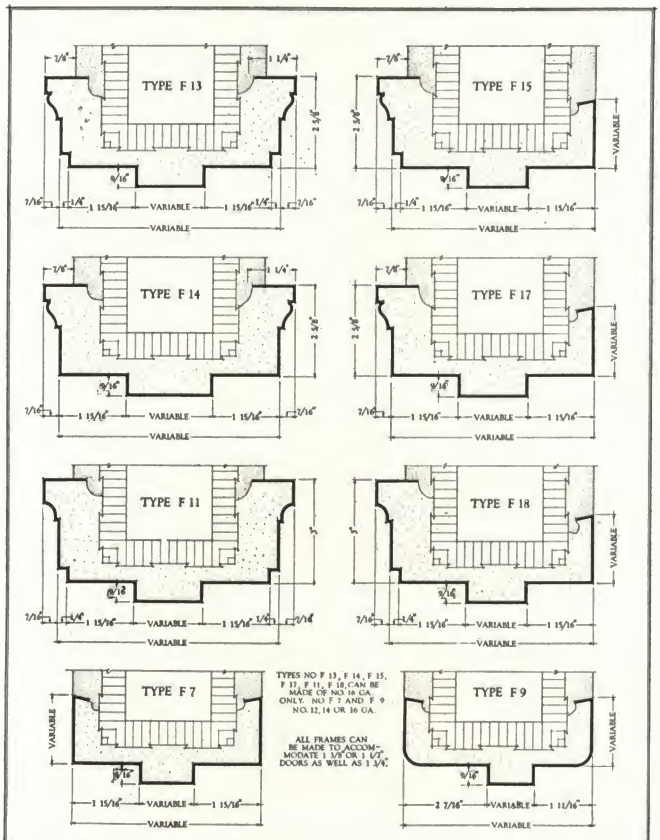




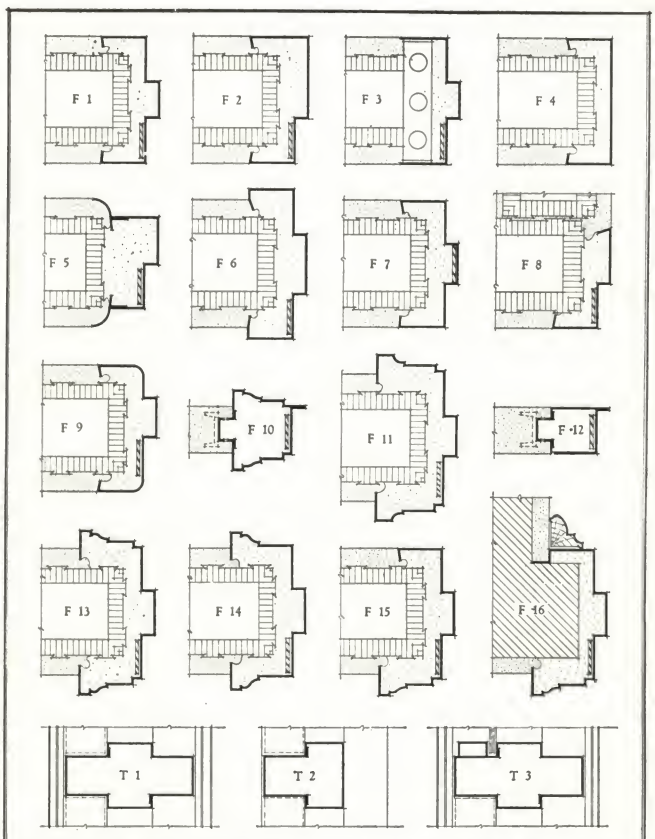




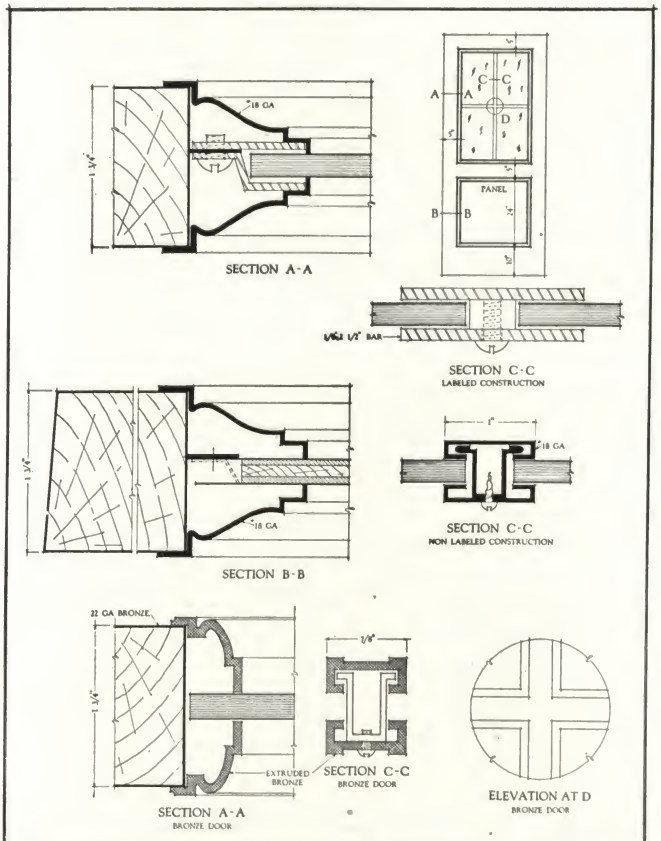
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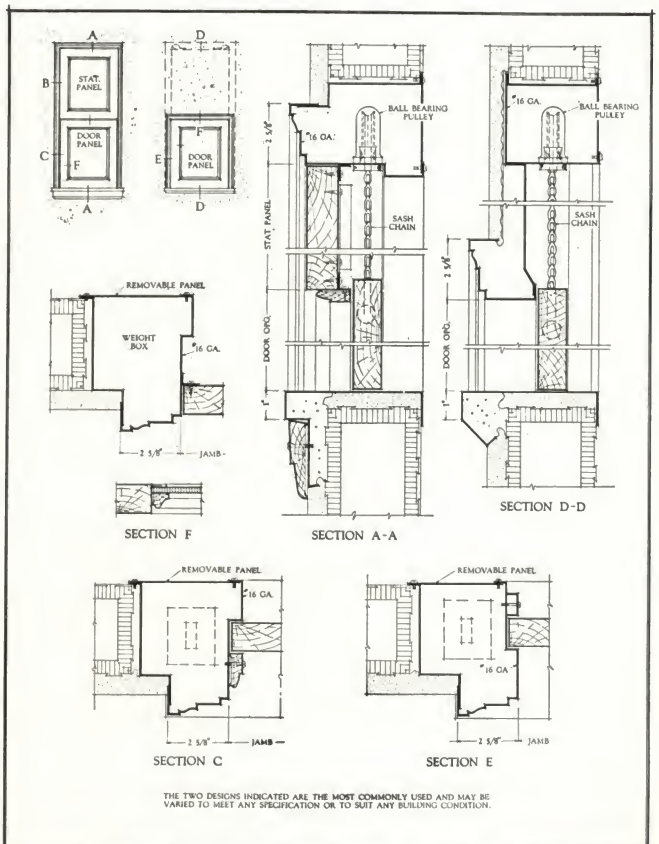
W. F. OVERLY & SONS. GREENSBURG, PA. | STANDARD FRAMES. | PLATE NO. 6 SCALE 3/1 6"=1 INCH



W. F. OVERLY & SONS. GREENSBURG, PA. | COMBINATION STEEL FRAMES. | PLATE NO. 7 SCALE 1 1/2"=1'-0"

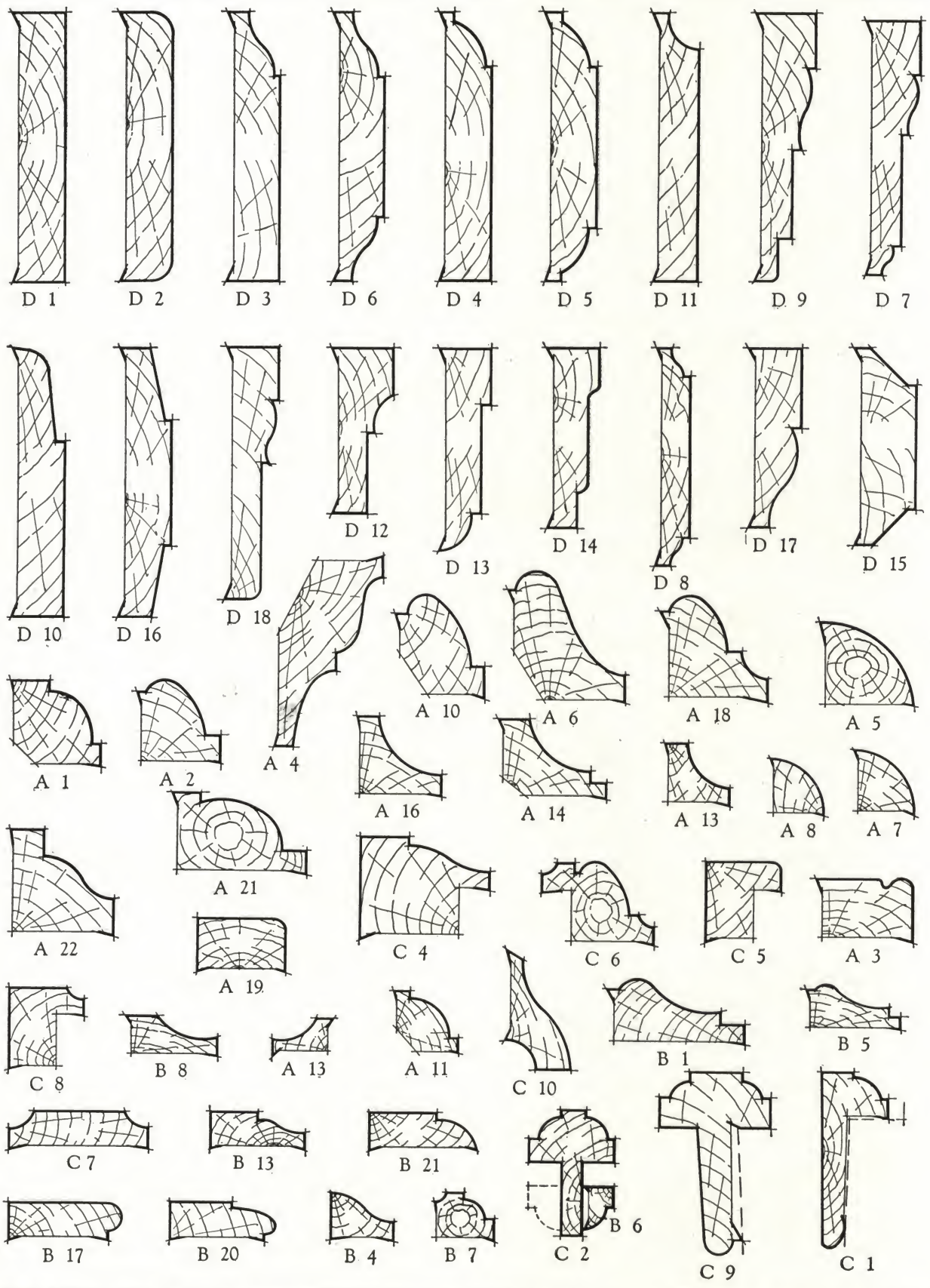


W. F. OVERLY & SONS. GREENSBURG, PA. | DOOR CONSTRUCTION DETAILS. | PLATE NO. 8 SCALE 6"=1'-0"



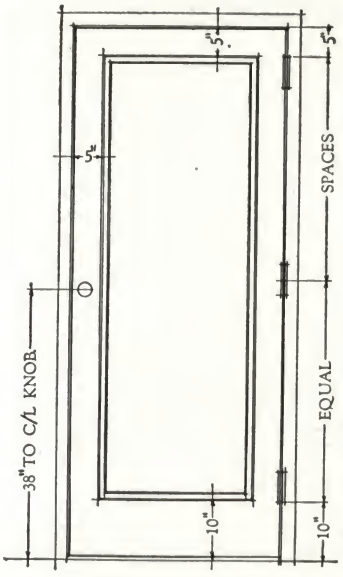
W. F. OVERLY & SONS GREENSBURG, PA. | DUMBWAITER DETAILS. | PLATE NO. 9 SCALE 1 1/2"=1'-0"

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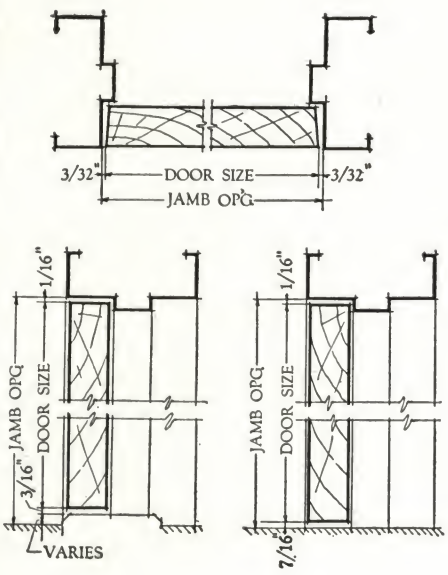


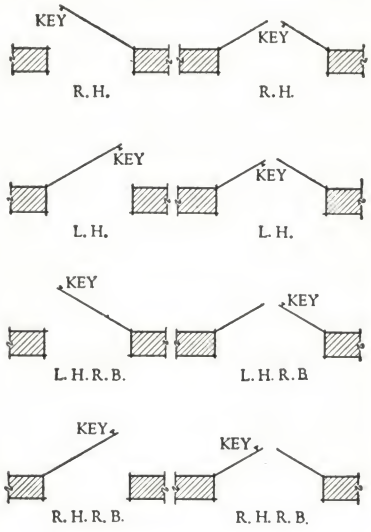
W F OVERLY & SONS GREENSBURG, PA	STANDARD MOULDINGS.	PLATE NO. 10 SCALE 6" = 1'-0"

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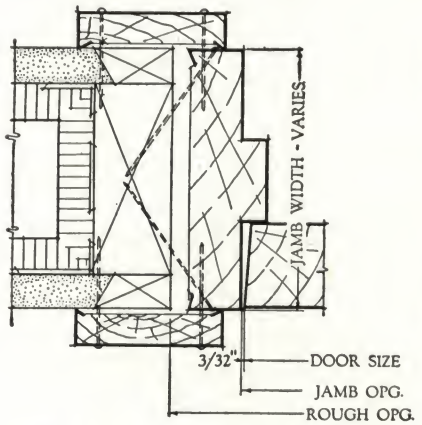


TYPICAL DOOR

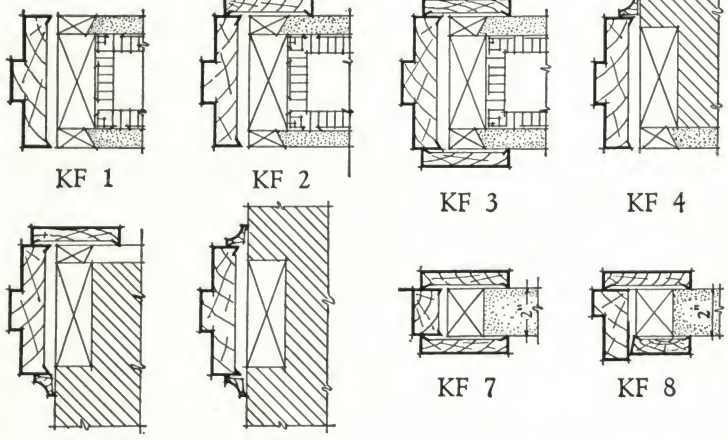




SWING DIAGRAM



TYPICAL KALAMEIN FRAME



LIST OF INSTALLATIONS AND THEIR ARCHITECTS

Gulf Refining Co. Bldgs., Pittsburgh, Pa., E. B. Lee
Junior High School, Parkersburg, W. Va., Warne, Tucker, Silling & Hutchinson
Franklin-Levering Carey Hall, Purdue University, Lafayette, Ind., Walter Scholer
Wesley Hospital, Oklahoma City, Okla., Edward L. Gahl
Polk State Hospital, Polk, Pa., Louis Stevens
Smith Opera House, Geneva, N. Y., Victor A. Rigaumont
Dulaney Bldg., Fort Worth, Tex., W. G. Clarkson Co.
Chemistry Bldg., Indiana University, Bloomington, Ind., R. F. Daggett
Falk Clinic, University of Pittsburgh, Pittsburgh, Pa., E. P. Mellon & W. I. Smith
Connelley Trade School, Pittsburgh, Pa., E. B. Lee
McCann Store and Garage Bldg., Pittsburgh, Pa., B. H. Prack
Presbyterian Hospital, Philadelphia, Pa., J. T. Windrim
King Edward Apartments, Pittsburgh, Pa., H. G. Hodgkins
Firestone Tire & Rubber Co., Pittsburgh, Pa., Lockwood & Greene
Grant Central Office Bldg., Bell Telephone Co., Pittsburgh, Pa., J. T. Windrim
Central National Bank, Richmond, Va., John Eberson
Bell Telephone Bldg., Wilkes Barre., Pa., J. T. Windrim
Farm Show Bldg., Harrisburg, Pa., Hersch & Schollar
East End Junior High School, York, Pa., Robert A. Stair
Michigan Soldiers' Home, Grand Rapids, Mich., H. L. Mead
Lakeside Hospital Group, Cleveland, Ohio, Coolidge, Shepley, Bulfinch & Abbot
Improvement of the Poor, Bldg. No. 2, Pittsburgh, Pa., E. P. Mellon
Hotel Harrisburger, Pa., Lawrie & Green
Garfinkle Store, Washington, D. C., Starrett & Van Vleck
State Normal School, Montgomery, Ala., Warren, Knight & Davis
1530 North State Parkway Apartment, Chicago, Ill., Granger & Bollenbacher
Zembo Temple, Harrisburg, Pa., Charles Howard Lloyd
Main Bldg., State College, Pa., Charles Z. Klauder
Office Bldg., 17th and Sansom Streets, Philadelphia, Pa., Arthur W. Hall
Central Bldg., Wichita, Kan., Ed. Forsblom
Moreland Courts Addition, Cleveland, Ohio, Philip Lindsey Small
Wauseon Hospital and Nurses' Residence, Wauseon, Ohio, H. C. Pelton and J. R. Gamble
Harris Theater, Butler, Pa., John Everson
Chevrolet Parts Depot, Pittsburgh, Pa., Albert Kahn, Inc.
Mansfield State Teachers' College, Mansfield, Pa., Eric Fisher Wood & Co.
Curtis-Caproni Corp., Baltimore, Md., Frederic R. Harris
Ludy Hotel, Atlantic City, N. J., V. B. Smith
Poppin Realty Bldg., Muskegon, Mich., Robinson & Campau
S. W. Bell Telephone Bldg., Norman, Okla., J. R. Timlin
Craig Theatre, New York, N. Y., R. E. Hall & Co.
Commerce Bldg., City College of New York, New York, N. Y., Thompson, Holmes & Converse
Women's Athletic Club, Chicago, Ill., Philip B. Mayer
E. W. Clark Bldg., Philadelphia, Pa., Day & Zimmermann Engr. & Const. Co.
Keystone Club, Pittsburgh, Pa., Janssen & Cocken
High School, Wilkinsburg, Pa., Thomas H. Scott
Nurses' Home, Frankford Hospital, Philadelphia, Pa., Walter T. Smedley
Curtis Hall, Drexel Institute, Philadelphia, Pa., Simon & Simon
Circle Theater, Philadelphia, Pa., Hoffman & Henon Co.
Y. M. C. A., Huntington, Ind., R. W. Stevens
Commercial Exchange Bldg., Oklahoma City, Okla., Hawk & Parr
Caldwell County Courthouse, Lenoit, N. C., Martin C. Hampton
Masonic Temple, Plainfield, N. J., F. B. & A. Ware
Masonic Temple, Hastings, Neb., Keefer & Jones
S. W. Bell Telephone Bldg., Kansas City, Mo., Hoit, Price & Barnes
Mahaska County Hospital, Oskaloosa, Iowa, George Martin

W. F. OVERLY & SONS. GREENSBURG, PA.	STANDARD CLEARANCES. - SWING DIAGRAM. TYPICAL KALAMEIN FRAMES. - INSTALATIONS.	PLATE NO. 11. SCALE 1 1/2" = 1'-0"

THE PHILIPP MANUFACTURING COMPANY

Manufacturers of Kalamein Doors, Sliding Door Hardware and Hardware Specialties

EASTHAMPTON, MASS.

Member of the National Fireproof Door Manufacturers' Association

Products

METAL COVERED KALAMEIN DOORS, WINDOWS, DOOR FRAMES, TRIM, UNDERWRITERS' LABELED KALAMEIN DOORS; SMOKE SCREENS; ELEVATOR FRONTS; DUMBWAITER DOORS; BRONZE and COPPER KALAMEIN DOORS.

Metal Covered Doors

Wood cores are made of No. 1 sound, kiln dried white pine, free from loose or large knots, dry rot, sap or shake. Machine sized to accurate dimensions.

Stiles and rails mortised and tenoned, are glued with waterproof glue, doweled and wedged, grooved to receive panels.

Metal covering for stiles, rails and panels is 26 gauge galvanized or kalamein, 16 to 32 oz. copper, 20 gauge bronze. Floor mouldings and trim, 26 gauge kalamein, 14 oz. copper or 24 gauge bronze.

Panels are composition board with metal glued to surfaces with waterproof glue, under pressure.

Special care is taken in assembling to avoid bench marks as much as possible.

All joints between metal filled with solder and scraped smooth. All material has shop coat of special metal primer.

Underwriters' Labeled Kalamein Door

Our Underwriters' labeled kalamein doors are built to requirements of National Board of Fire Underwriters and bear their labels. Single doors not to exceed 4x8 ft., pairs not to exceed 8x8 ft. These must be hung in channel, angle or hollow metal frames. We recommend consulting your local requirements to obtain minimum rates on building and contents.

Hardware

We are in position to fit for all mortised hardware on receipt of hardware schedule and samples.

Metal Covered Windows

Double hung or casement type windows are made in our standard design. All metal drawn on core to give neat and serviceable window.

Kalamein Elevator Fronts

Combined slide and swing, two-speed and three-speed, and standard swing elevator doors are serviceable and noiseless and are extensively used.

Kalamein Smoke Screens

We manufacture kalamein covered smoke screens of all types and for all conditions. Note one of our standard construction on next page.

Bronze and Copper Kalamein Doors

We also manufacture a high grade line of bronze and copper kalamein doors, etc., for entrances in banks, theaters, public buildings, etc.

Service

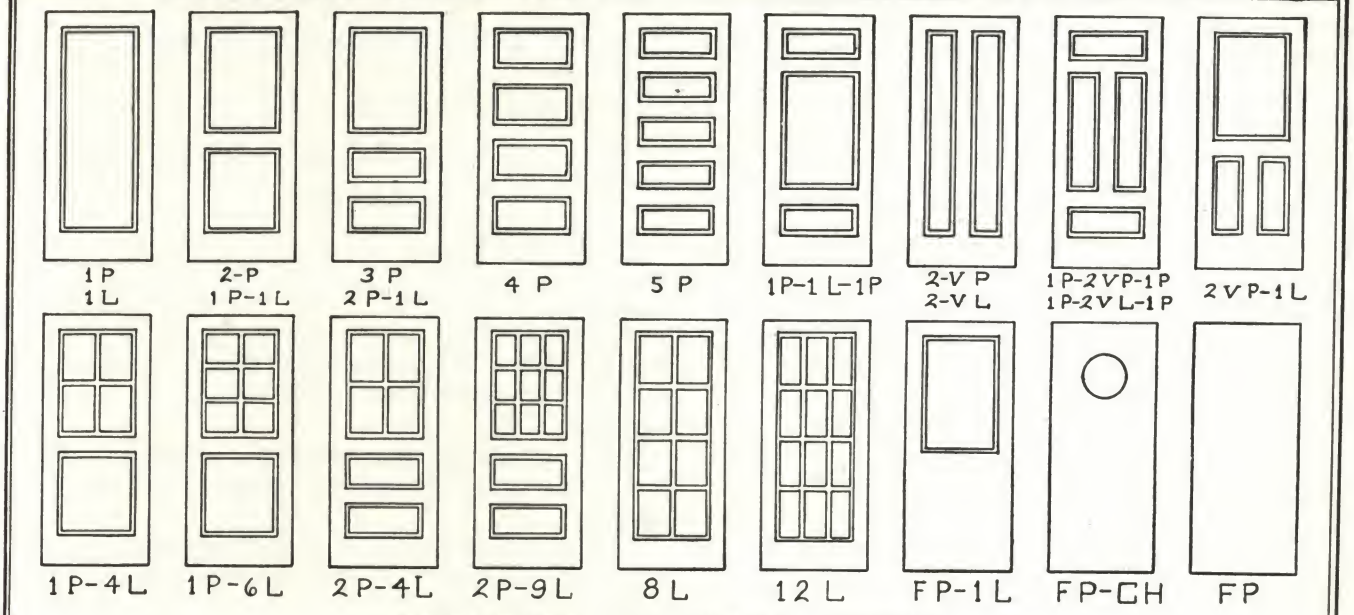
Estimates will be furnished from the architect's plans and specifications. Suggestions and shop drawings will be furnished whenever desired. We solicit your inquiries.

Blue Prints of Mouldings and Casings—We have a series of blue prints of our various stock designs of panel mouldings, stop mouldings, and casings which we will be glad to mail upon request.

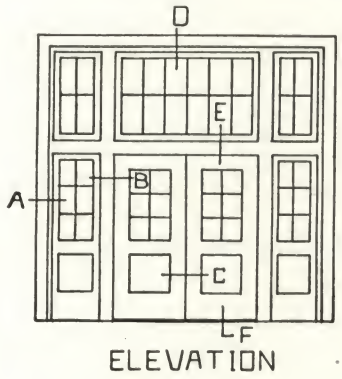
References

Gardner High School, Gardner, Mass.
Maple Street School, Easthampton, Mass.
Sacred Heart School, Springfield, Mass.
Annunciation School, Florence, Mass.
Leonard Memorial Hospital, Natick, Mass.
Ward 4 School, Revere, Mass.
Female Infirmary, Northampton, Mass.
Granite Street School, Worcester, Mass.
Nelson Place School, Worcester, Mass.
Mary Hunt Home, Nashua, N. H.
Nurses' Home, Bristol, Conn.
Jefferson School, Meriden, Conn.
Trumbull Grade School, Meriden, Conn.
River Street School, Red Bank, N. J.
Cosmopolitan Club, Atlantic City, N. J.
Bala Cynwyd Theater, Bala, Pa.
First Presbyterian Church, Pottsville, Pa.
Theater, Bryn Mawr, Pa.
Clevenden Apartments, Philadelphia, Pa.
Newark Hospital, Rochester, N. Y.
St. Ann's Home for Aged, Rochester, N. Y.
Public School No. 15, Rochester, N. Y.
Empire Theater, Birmingham, Ala.
Ritz Theater, Birmingham, Ala.
School No. 20, Scranton, Pa.
West Side Theater, Scranton, Pa.
Harris Theater, Tarentum, Pa.
McFarland Junior High School, Washington, D. C.
St. Joseph's Home, Washington, D. C.
Washington City Orphan Asylum, Washington, D. C.
Semmes Garage, Washington, D. C.
Hillside School, Hillside, N. J.
East High School, Youngstown, Ohio
Washington School, Niles, Ohio
Cedar Lee Theater, Cleveland, Ohio
Stark School, Canton, Ohio
St. Andrews Church, Cleveland, Ohio
Telephone Building, Ashtabula, Ohio

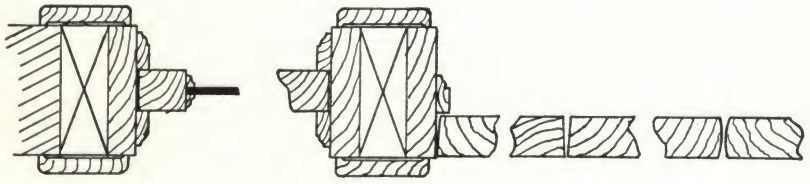
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STANDARD KALAMEIN DOORS

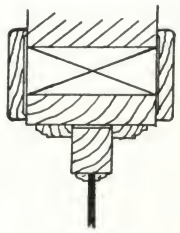


ELEVATION

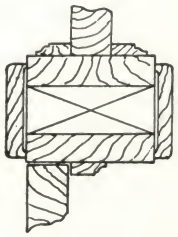


SECTION - A SECTION - B SECTION - C

STANDARD SMOKE SCREEN



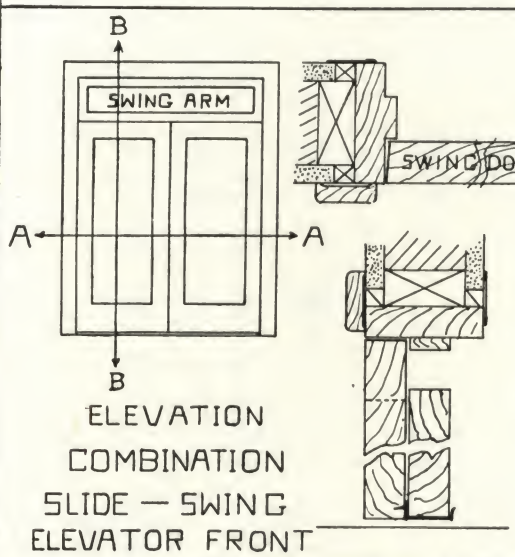
SECTION - D



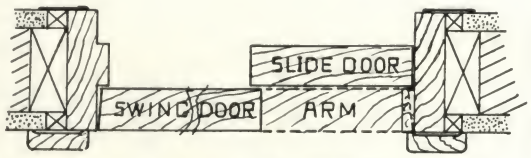
SECTION - E



SECTION - F



ELEVATION
COMBINATION
SLIDE — SWING
ELEVATOR FRONT



SECTION - AA

SECTION - BB

THE PHILIPP MFG. CO.-DWG-1	STANDARD KALAMEIN DETAILS FROM THE PHILIPP MFG. CO.	SCALE - 1½" = 1'-0" MARCH-'27

RELIANCE BRONZE & STEEL CORPORATION

Manufacturers of Fire Retardant Products and Ornamental Bronze

MAIN SALES OFFICE

Calyer and West Streets, BROOKLYN, N. Y.

FACTORIES

No. 1—BROOKLYN, N. Y., Dobbin and Baxter Streets and Norman Avenue
No. 2—LONG ISLAND CITY, N. Y., Review Avenue, Young and Gilbert Streets
No. 3—COLLEGE POINT, L. I., N. Y., 2nd Avenue and 14th Road
No. 4—HOBOKEN, N. J., 539 14th Street

REPRESENTED IN ALL PRINCIPAL CITIES

For List of Representatives, see Our Other Section

Products

HOLLOW STEEL DOORS, JAMBS, TRIM, ELEVATOR FRONTS and DUMBWAITER FRONTS.

COMBINATION STEEL BUCKS.

WELDED FURNITURE STEEL COVERED DOORS.

METAL COVERED DOORS, JAMBS, TRIM and WINDOWS in Kalamein, Copper, Bronze, Aluminum and Stainless Steel.

PLATE WAREHOUSE DOORS.

For Architectural and Ornamental Bronze, Aluminum and Nickel Silver Products, see Manufacturers' Index.

Facilities

Large and most modern equipped plants devoted to the manufacture of architectural bronze, hollow steel and metal covered fireproof products.

Service

Our offices maintain competent engineers whose services are free to architects, engineers and builders.

Quality

Reliance products are internationally known. Only expert workmanship and first-class materials are used in their manufacture.

SPECIFICATIONS AND SPECIFICATIONAL DATA COVERING THE VARIOUS RELIANCE PRODUCTS

Specifications for Hollow Steel Material

Steel—All steel to be first grade patent leveled furniture stock. Doors and sash to be of No. 18 gauge U. S. Standard .050-in. thickness. Trim mouldings of No. 18 gauge for large members; No. 20 gauge for door mouldings. All mouldings to be rolled or drawn with sharp, clean arrises to exact size and design. Flush doors to be made from No. 16 gauge leveled sheets.

Panels—Filled panels to be built up with ¼-in. fire resisting core, covered each side with patent leveled sheets of steel. No. 18 gauge for doors with panel over 30 in. wide and No. 20 gauge for panels under 30 in. wide. Elevator doors and toilet stall doors finishing 1¼ in. in thickness can be made with No. 12 gauge patent level sheet panels with no composition core.

Fabrication—All stiles and rails to be formed to exact detail, straight and true. All connections between stiles and rails to be welded, so that stiles and rails are as one piece. All mould to be mitered and welded clean and true.

Fitting for Hardware—All doors to be cut at factory to fit standard template butts and locks. All drilling and tapping for butts, locks and bolts to be done at the factory in accordance with template hardware furnished by the hardware contractor. All surface hardware, such as door checks, transom rods (which are not made to template) are to be drilled and tapped for the field by the contractor who erects the doors or sash.

All butts, locks and lock trim are to be applied to the doors at the factory.

Reinforcing—All butts are to have ⅛-in. plate reinforcements thoroughly welded to the door stiles. Locks are to have No. 12 gauge plates to receive lock fronts. Stiles are to be reinforced to receive lock trim with No. 16 gauge plates welded to inside of stiles.

All top rails are to be reinforced on both sides to receive door checks. Other miscellaneous hardware that is furnished is to be reinforced as required.

Miscellaneous—Where exposed screws are used for attaching glass moulds, or other removable mouldings, they are to be of oval head type neatly countersunk.

Finish—Material to be thoroughly cleaned, primed and filled, followed by subsequent coats required to produce a durable finish of colors selected. Each coat shall be uniformly applied, baked and sanded with final coat rubbed to an egg-shell gloss.

Note: Following finishes are standard; grouped according to class.

STANDARD FINISHES OF RELIANCE HOLLOW STEEL DOORS, CABINET JAMBS AND TRIM

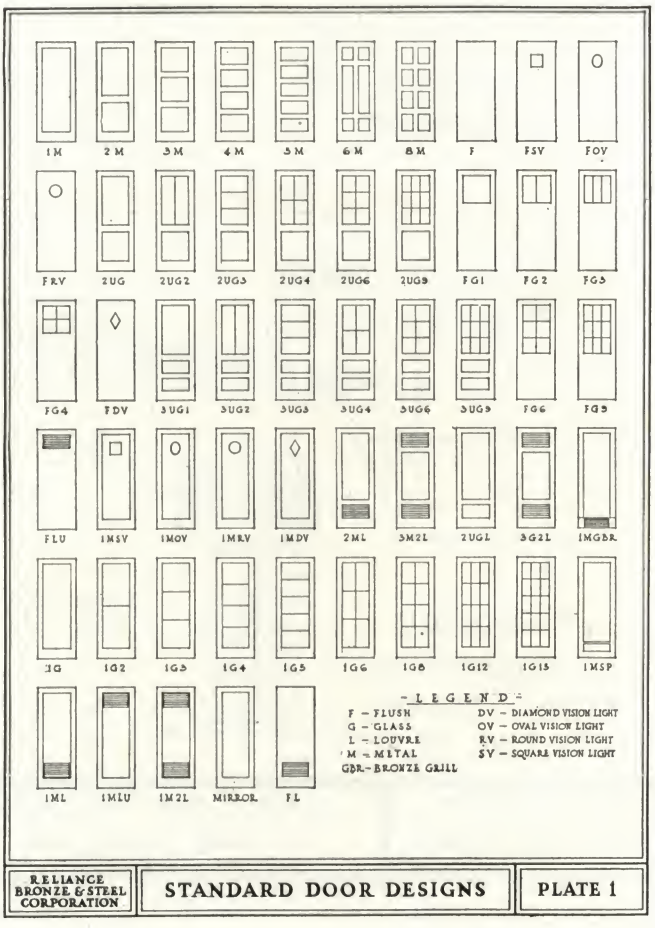
Class	Finish
A	All plain enamels, excluding white and black.
B	Color stipples, straight grained mahogany, walnut, birch, white enamel and black.
C	Oak, Crotch Mahogany, Pine, Circassian Walnut, Gum Wood, Metal Finishes and Flat Metal Finishes.
D	Fumed Oak, Silver Oak, Hand Stipples, Black Walnut and Ebony Black.
E	Special finishes as may be required.

Fire Underwriters' Requirements—See separate paragraph on third page following.

Finishing—All kalamein or galvanized iron material receive a priming coat of paint in our shop before delivery.

If finish painting is desired, finish may be solid or grained in colors as selected, in air dried enamel finish.

Bronze and copper work receive an oxidized finish of color as selected.



Continued on next page

Specifications for Combination Steel Bucks

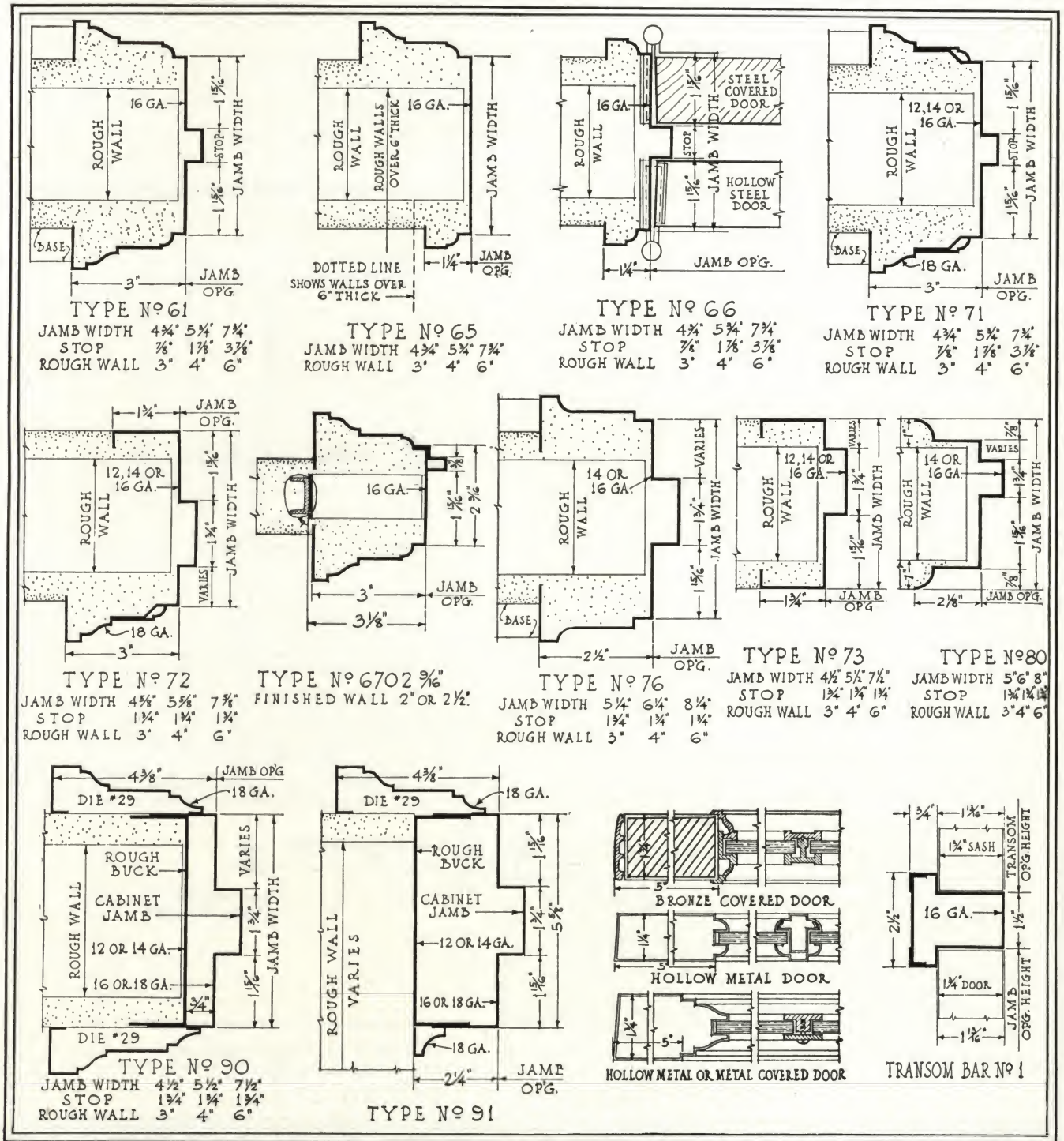
Frames to be made of furniture steel of not lighter than No. 16 gauge U. S. Standard with all miters and joints to be welded and made smooth. Reinforcement for application of necessary hardware to be electrically welded and of proper size to insure rigid construction. Wire wall anchors to be provided which are installed by mason at intervals to insure rigidity. Each frame to be provided with spreaders at bottom for parallel alignment. Templates for all hardware to be furnished in reasonable time prior to the manufacture of these frames.

All frames to receive one shop-coat of the best metallic primer and applied in a first-class workmanlike manner to insure a complete covering on all surfaces, inside and outside.

Specificational Data on Welded Furniture Steel Covered Doors

The cores of all doors are made from sound, dry seasoned and kiln dried white pine. This serves the double purpose of a sound deadener and a heat retardant when door is subjected to fire. The metal covering enclosing these cores is so fabricated and welded that air is excluded from the cores, making burning slow, so that doors will withstand the National Board of Fire Underwriters' test, where the door must withstand heat up to 1800° F. for one hour.

The metal covering is of patent leveled steel sheets which have been covered with a rust preventive coating known as dull coat galvanized. This is impervious to moisture and prevents all danger of rust. The gauge used is No. 22 and



RELIANCE BRONZE & STEEL CORPORATION	STANDARD DETAILS OF DOORS & FRAMES	PLATE 2

Continued on next page

24 U. S. Standard (.031 and .025-in. thickness), respectively. The mouldings used are of No. 20 U. S. gauge (.0375-in. thickness) hollow steel—drawn to correct design with sharp true arrises.

All doors are fabricated with the joints between stiles and rails interlocked or welded, making the metal covering of the door practically one piece. This insures effective fire retardation. All surfaces are made flush and smooth without the use of plastic filler, the joints being filled with solder which is smoothed off in the finishing processes.

Doors can be furnished with Underwriters' labels, and are particularly suitable for the protection of vertical shaft openings and other interior fireproof openings. Due to their suitability for the application of any type of hardware they can be easily installed by a good carpenter.

For the information of architects, in specifying doors of these types which bear labels, doors bearing Underwriters' labels for vertical shafts must be of solid panel types, no glass being allowed.

Labeled fire escape doors may have glass openings, the lights of glass not to exceed 720 sq. in.

Labeled corridor and partition doors may have glass openings not exceeding 1296 sq. in.

Specifications for Metal Covered Doors, Jambs, Trim and Windows

Metal Covering—All wood forming parts of doors, jambs, and trim to be covered with metal as follows:

Kalamein Iron Covered—Doors and jambs, Nos. 22 to 26 gauge and trim No. 26 gauge.

Furniture Steel Covered—Doors, Nos. 22 to 24 gauge, jambs 20 to 24 gauge, and trim No. 26 gauge.

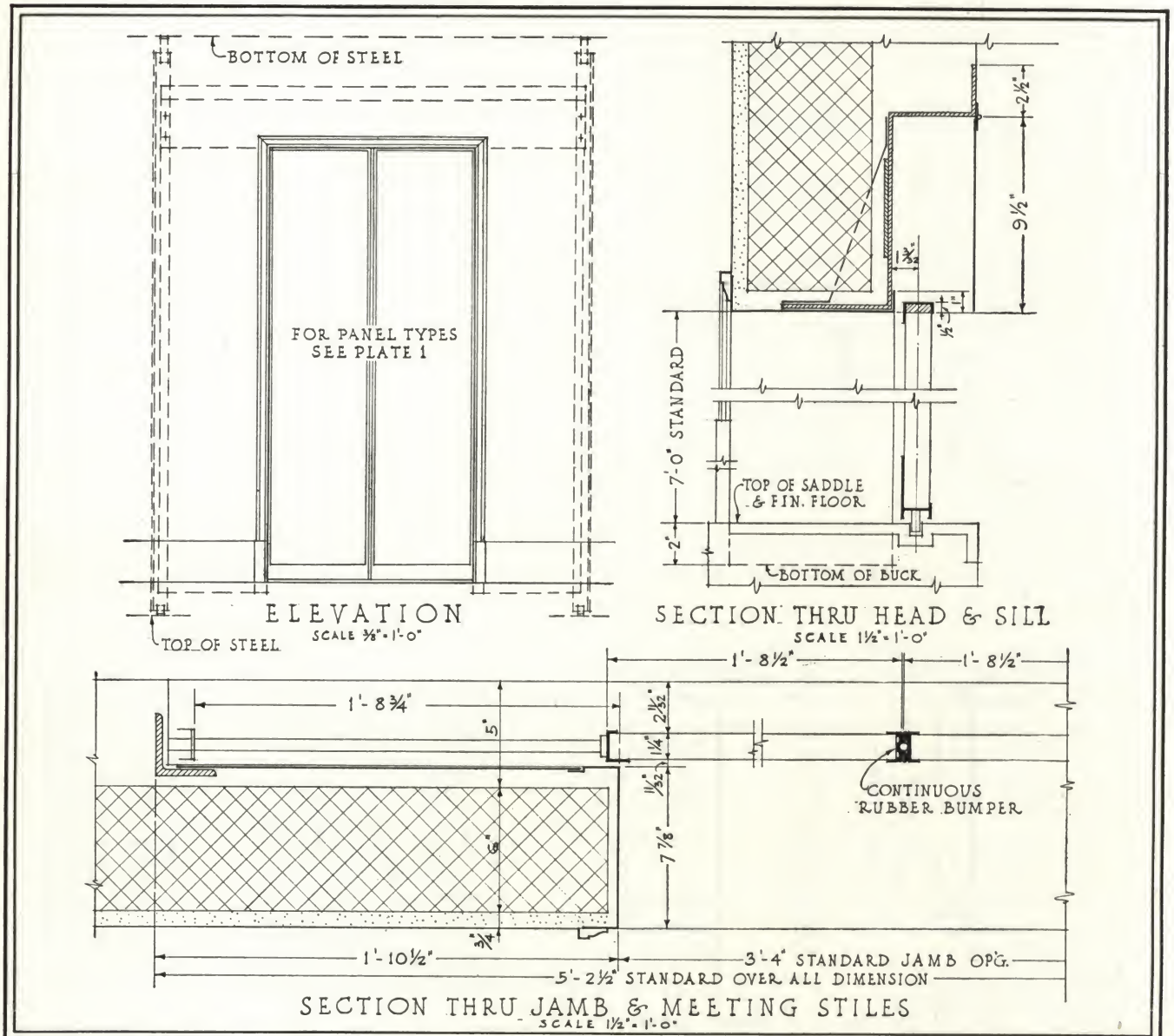
Copper Covered—Doors and jambs, 16 to 32 oz.; mouldings and trim, 14 or 16 oz.

Bronze Covered—Doors and jambs, 14 to 20 gauge; mouldings and trim, No. 23 gauge.

Cores—All wood in doors, jambs and trim shall be clear white pine and shall be thoroughly seasoned, dried and free from shakes, sap, loose or large knots, or any defects impairing strength or durability. Doors to be made, 1⅛, 1¼, 1⅜, 1$\frac{13}{16}$, 2¼ in., or heavier, if required. If doors are either 1$\frac{13}{16}$ or 2¼ in. thick, stiles, top and cross rails are to be 5 in. wide and bottom rail is to be 10 in. high.

Jambs to be made 1⅜ or 1¾ in. thick, by width shown on drawings, if rabbeted; or ⅞ or 1⅛ in. with loose stop applied.

Trim moulded or plain as shown.



RELIANCE BRONZE & STEEL CORPORATION	STANDARD DETAILS OF ELEVATOR ENTRANCE WITH BI-PARTING DOORS	PLATE 3

Continued on next page

Hollow Steel Elevator Fronts

The following description covers Reliance Standard Elevator Enclosures in Steel:

Doors—All Reliance doors are assembled from stiles and rails formed of suitable gauge stock and provided with rolled in panel mouldings. Doors are properly reinforced for the application of track and hangers, door closers or bar locks. They are insulated with compressed cork to prevent metallic sound, the joints are closely fitted, reinforced, electrically welded and dressed to produce invisible connections. Solid panels are of double plate construction, insulated with ¼ in. fire resisting material. Glass panels are secured in position by cold rolled removable moulded frames accurately fitted, welded and secured to doors by special oval head screws. Muntins are constructed of cold rolled shapes, closely fitted and welded to stationary glass frame. All doors are provided with standard close fitting guides insuring smooth and quiet operation.

Frames—Frames are formed of either No. 12, 14 or 16 gauge steel as specified, and provided with necessary anchors and knee angles for attaching to either steel or saddles. All trim corners are mitered and continuously acetylene welded. Frames are supplied with hangers and covers where specified. Ceiling extensions and closers supports are furnished when specified and are fabricated of heavy structural shapes, including necessary knee angles to provide for suitable fastening to saddles or steel as may be specified.

Trims—Reliance trims are of cold rolled shapes with corners accurately mitered, acetylene welded and dressed, procuring invisible joints and are secured to frames by either concealed fastenings or oval head special screws. Also can be furnished welded to frame at factory forming integral combination unit. Plinths when required are formed and secured to frames by concealed fastenings.

Shaft Linings and Facias—Shaft linings and facias, when specified, are furnished in suitable gauges and are properly reinforced to eliminate vibration.

Saddles—Saddles are of materials as specified, and in all cases are provided with machined grooves, necessary reinforcings web so same can be secured to building construction by adjustable angle brackets or granited in cement as building conditions warrant.

Finish—Material is thoroughly cleaned, primed and filled, followed by subsequent coats as required to produce a durable finish of colors selected.

Note: We also manufacture elevator enclosures in Bronze, Aluminum and Nickel Silver. See Manufacturers' Index.

Specifications for Plate Warehouse Doors

The contractor shall provide and install, where shown on the drawings, non-automatic swing type steel Underwriters' labeled doors to all storerooms, similar to those manufactured by the RELIANCE BRONZE & STEEL CORPORATION, Brooklyn, N. Y.

General—The doors shall be non-automatic swing type, equipped with triple latch, all mounted and attached to No. 12 US Standard gauge steel frame.

Frame—Shall be made of No. 12 US Standard gauge furniture steel, free from scale and formed with a 2-in. flange or trim on room side and 3-in. on corridor side, with edges of trim returned to receive finished plaster walls. All miters shall be welded by the oxy-acetylene process. Frames shall extend 2 in. below finished floor (frames shall set on finished floor).

Mullions—Provide 6-in. mullions between doors to receive dividing partition. These shall be constructed as indicated by the detailed drawing.

Anchors—Strap iron anchors shall be attached to the jambs of each frame placed 12 in. above floor and below head and 24 in. apart. Frame shall be slotted to permit adjustment of anchors.

Note: Where frames extend 2 in. below finished floor the following clause should be included in specification.

Sills—Provide channel shaped sills properly welded to frames.

Doors—Shall be made of No. 14 US Standard gauge steel. The edges shall be folded over 1½ in., enveloping one leg of a Z-shaped reinforcing frame in the fold, with miters welded. The Z-shaped frame and horizontal stiffening members shall be made of No. 12 US Standard gauge steel welded at all joints, with an additional reinforcement of No. 12 US Standard gauge steel knee angles 1½x1½ in. welded to both members. Horizontal members shall be spaced not to exceed 2½ ft. apart.

The finished size of doors shall be 3 ft. 7 in. x 8 ft. 6 in.

Hardware—Hinges shall be strap type with pintles attached to frame. Latches shall be 3-point type made of bar stock with coil spring with handle control both sides of door. Catches for triple latches shall be applied to frame.

Assembly and Installation—Each door and frame shall be shipped separately, all equipped with hardware. Each frame shall be installed as a unit, and door hung to frame.

Painting—The frame and door shall receive a thorough coat of special black fire resisting paint applied at the factory.

Underwriters' Label and Trade-mark—All doors shall bear Underwriters' Laboratories, Inc. label, also the manufacturer's trade-mark or name.

Fire Underwriters' Requirements—Applying to Hollow Steel, Furniture Steel and Copper Covered Doors and Combination Steel Bucks

Class "A," Units in Division Walls Between Separate Buildings or Sections of Buildings. (This applies to Hollow Steel Doors only)—

Limitations: swinging type; single doors for openings not exceeding 4x7 ft., and doors in pairs not exceeding 5x7 ft., all steel with approved hardware.

Class "B," Units in Enclosures to Vertical Communications Through Buildings—

Limitations: swinging type; single doors for openings not exceeding 4x10 ft., and doors in pairs not exceeding 8x10 ft., all steel with approved hardware.

Class "C," Units in Corridor and Room Partitions—

Limitations: swinging type; single doors for openings not exceeding 4x10 ft., and doors in pairs not exceeding 8x10 ft., with or without panels of standard wire glass. Exposed area of individual lights not exceeding 399 sq. in.

Class "D," Units in Exterior Walls Subject to Severe Fire Exposure—

Limitations: swinging type; single doors for openings not exceeding 4x10 ft., and doors in pairs not exceeding 8x10 ft.

Class "E," Fire Escape Units Subject to Moderate Fire Exposure—

Limitations: swinging type; single doors for openings not exceeding 4x10 ft.; single doors in pairs not exceeding 5x10 ft. With or without panels of wired glass. Exposed area of individual lights not to exceed 399 sq. in.

PARTIAL LIST OF RECENT INSTALLATIONS

LOCATION	ARCHITECT
1 Cedar St., New York, N. Y.	Clinton & Russell
South, Wall and Pine Sts., New York, N. Y.	Ely Jacques Kahn
270 Broadway, New York, N. Y.	E. H. Faile & Co.
International Tel. & Tel. Bldg., New York, N. Y.	Lewis S. Weeks
80 Broad St., New York, N. Y.	Sloane & Robertson
29 Broadway, New York, N. Y.	Sloane & Robertson
400 Madison Ave., New York, N. Y.	H. Craig Severance
Hotel Pierre, New York, N. Y.	Schultze & Weaver
City Bank-Farmers Trust Bldg., New York, N. Y.	Cross & Cross
D. A. R. Building, Washington, D. C.	J. Russell Pope
Public Ledger Bldg., Philadelphia, Pa.	Horace Trumbauer
Fire Association Bldg., Philadelphia, Pa.	E. J. Matthewson
Manger Hotel, North Station, Boston, Mass.	Funk & Wilcox
North Station Office Bldg., Boston, Mass.	S. Scott Joy
Nurses' Home, Baltimore, Md.	Palmer & Landin
Jersey City Hospital, Jersey City, N. J.	John T. Rowland
Eastman Kodak Works, Rochester, N. Y.	Eastman Kodak Co.
Standard Oil Bldg., Albany, N. Y.	Shreve, Lamb & Harmon
State Tower Bldg., Syracuse, N. Y.	Thompson & Churchill
Medical Arts Bldg., Atlanta, Ga.	G. Lloyd Preacher
Cincinnati Enquirer, Cincinnati, Ohio	Lockwood, Greene & Co.
American Insurance Union, Cleveland, Ohio	C. Howard Crane
Mayflower Hotel, Washington, D. C.	Warren & Wetmore
Civil Courthouse, St. Louis, Mo.	Beresford Asso.

LOCATION	ARCHITECT
Nix Professional Bldg., San Antonio, Tex.	H. T. Phelps
Penny Warehouse, St. Louis, Mo.	Robt. E. Lyons
Hotel New Yorker, New York, N. Y.	Sugarman & Berger
Goldman-Sachs Bldg., New York, N. Y.	A. F. Gilbert
Sterling Memorial Library, New Haven, Conn.	J. G. Rogers
Institute of Human Relations, New Haven, Conn.	Grosvenor & Atterbury
First National Bank, Albany, N. Y.	Halsey, McCormack & Helmer
Majestic Apartments, New York, N. Y.	H. L. Glynn
Abraham & Straus Department Store, Brooklyn, N. Y.	Starrett & Van Vleck
Princess Hotel, Pembroke, Bermuda	Clinton Mackenzie
Tilden Garden Apts., Washington, D. C.	M. & R. B. Warren
Telephone Building, Binghamton, N. Y.	Voorhees, Gmelin & Walker
Astor Apartments, East 86th St., New York, N. Y.	Chas. A. Platt
Convention Hall, Atlantic City, N. J.	Lockwood, Greene & Co.
Columbia-Presbyterian Hospital:	
Hospital Bldg.	James Gamble Rogers
Surgeon's and Physician's Bldg.	James Gamble Rogers
Out Patients' Pavilion	James Gamble Rogers
Private Patients' Pavilion	James Gamble Rogers
Nurses' Home	H. C. Pelton
Babies' Hospital	H. C. Pelton
Psychiatric Pavilion	H. C. Pelton

THE RIESTER & THESMACHER COMPANY

Hollow Metal Doors and Trim

1514-1526 West 25th Street
CLEVELAND, OHIO

Products

HOLLOW METAL DOORS, PARTITIONS, ELEVATOR FRONTS, COMBINATION BUCKS and JAMBS, METAL BASE and PICTURE MOULD.

For Steel Stairs, see List of Manufacturers.

Construction

The R & T hollow metal door with its interlocking joint construction has been developed through nearly twenty years in the door business. Doors are constructed of first grade No. 18 gauge furniture steel, full pickled, full cold rolled, re-annealed, patent leveled, re-squared and oiled. Jambs and casings are of same gauge material. Bucks or frames are fabricated from No. 10 to 14 gauge material in accordance with size of opening and service required. All joints in construction are electric process welded, practically making the door one continuous piece of metal. Proper reinforcements are welded within the door to take care of all hardware requirements and the entire design makes for rigidity, stability, fire protection and neat appearance. These doors can be fitted to either the cabinet jamb design or combination buck and jamb. R & T hollow metal doors, having no combustible material within the door, are fire retarding and fully meet the requirements of the National Board of Fire Underwriters and bear their label, when specified.

Finish

Before assembly, all parts are paint dipped in order to protect the interior of the door. Before final finish, all surfaces are thoroughly cleaned to remove grease or oil.

Each coat of paint or enamel is carefully baked and properly treated to secure the highest possible finish. Doors are finished in prime coat, plain color enamels, stipples and wood graining reproductions.

Hardware

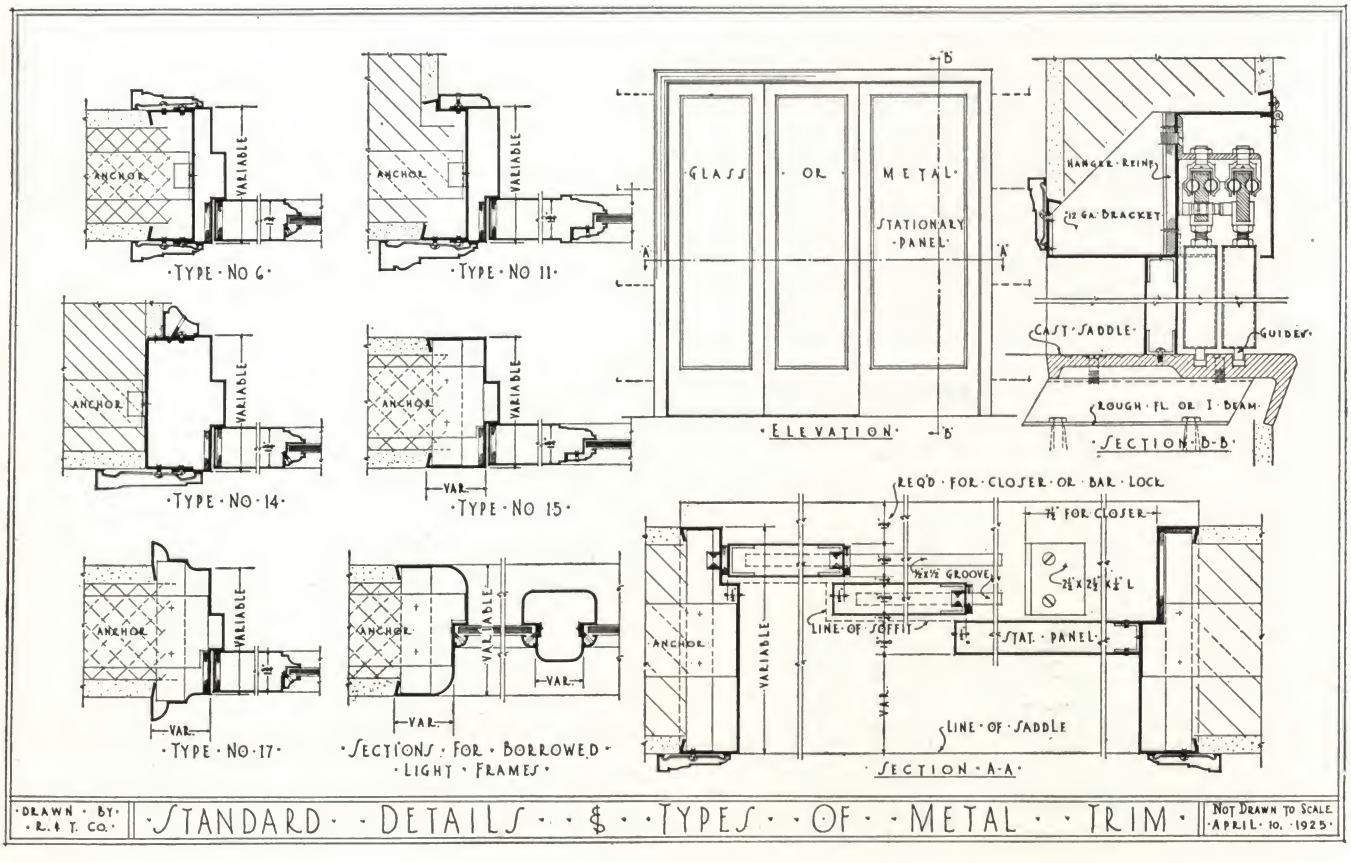
Hardware, as selected and furnished by the owner, is applied at the factory, and we have a good selection of templates of standardized hardware which facilitates delivery and avoids undue delay.

Upon request we are glad to furnish typical details and stock mouldings in order to assist in designing metal trim.

References

A few buildings of varied types in which we have recently made installations of metal doors and trim:

Cleveland Public Auditorium, Cleveland, Ohio
Women's Hospital, Detroit, Mich.
Cleveland City Hospital Group, Cleveland, Ohio
Weymouth Power Station, Boston, Mass.
Cuyahoga County Jail and Criminal Courts Building, Cleveland, Ohio



SYKES METAL PRODUCTS CO.

Manufacturers and Fabricators of Metal Doors and Frames, Drawn Steel Mouldings, and Sheet Metal Products

TELEPHONE
WENTWORTH 6100

GENERAL OFFICES
6036 South State Street, CHICAGO, ILL.
FACTORY: LOGANSPORT, IND.
AGENCIES IN PRINCIPAL CITIES

Doors

The SYKES METAL PRODUCTS CO. Hollow Metal Doors are made in a variety of styles and sizes, with panels and mouldings to conform to architectural design.

Material—No. 18 gauge stiles and rails, No. 20 gauge panels, all full cold rolled, pickled, patent leveled furniture steel. Mouldings are of No. 18 or 20 gauge cold rolled steel.

Construction—Doors are constructed to conform with simplified practice recommendation R 82-28, Department of Commerce, Bureau of Standards, and in accordance with the approved methods of Underwriters' Laboratories, Inc. They are properly reinforced and mortised for hardware at factory. All members locked and welded, giving great strength and stability.

Painting—All doors are given a shop coat. We have all facilities for applying baked enamel finish to match any samples submitted, either grained, antique, copper or bronze, plain color, etc., either gloss or rubbed to an eggshell finish, as may be specified. All finishing is done by experts.

Combination Steel Door Bucks, Jambs and Trim

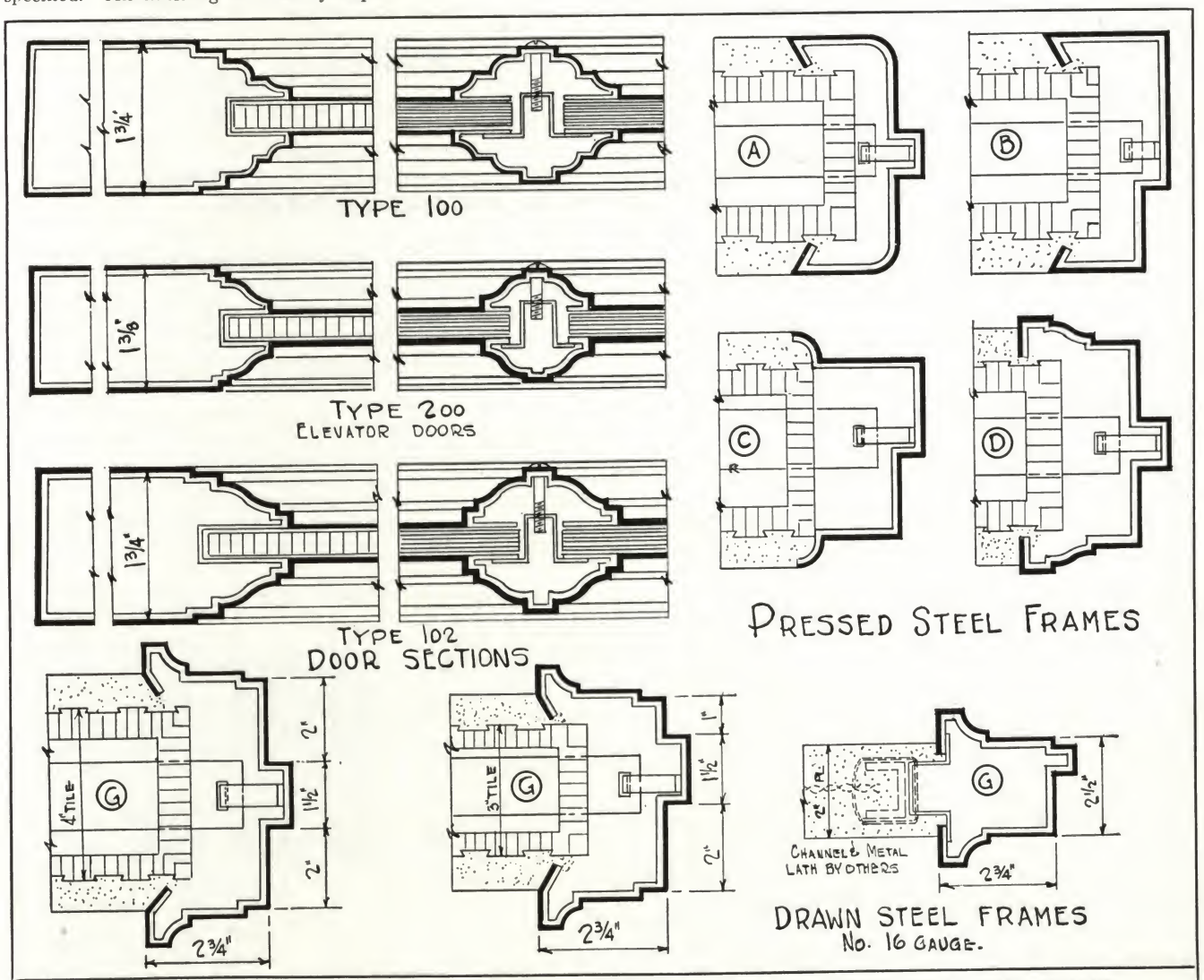
Our facilities for the manufacture of Combination Steel Frames permit us to fabricate any style, size or shape required in gauges ranging from No. 10 to No. 18, for any class of building desired. We especially recommend our types "A," "B" and "C" for hospital buildings, and types "D" and "G" for hotels or school buildings.

All Frames are neatly made, with brakes sharp and true, mitres welded, reinforced, tapped and drilled for the application of hardware according to templates furnished.

Fixed, adjustable anchors and floor clips are furnished, insuring a positive bond between wall and floor construction, eliminating plaster cracks when properly erected.

All concealed and exposed surfaces of frames are given a prime coat of rust-resisting paint at the factory prior to shipment.

The illustrations given below represent a few of the frames which we are prepared to furnish.



A FEW TYPICAL SECTIONS OF SYKES HOLLOW METAL DOORS, PRESSED STEEL AND DRAWN STEEL FRAMES

SYRACUSE FIRE DOOR CORPORATION

INC.

Manufacturers of Metal Covered Doors and Trim and Tin Clad Fire Doors

900 Canal Street

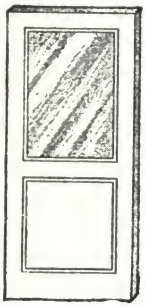
SYRACUSE, N. Y.

Products

UNDERWRITERS' LABELED and NON-LABELED KALAMEIN DOORS, covered with copper, bronze, or kalamein steel, long terne or galvanized; UNDERWRITERS' LABELED TIN CLAD FIRE DOORS and FIRE DOOR HARDWARE.

Also manufacturers of Metal Covered Frames, Trim, Mouldings, etc.; Metal Covered Window Units, Dumbwaiter Units, Elevator Fronts, Smoke Screens, Partitions, Channel and Angle Iron Frames; Hollow Metal Jambs, Bucks, etc.

Syracuse Kalamein Doors



These doors are made in a variety of standard designs for use in office buildings, public buildings, schools, theaters, stores, hospitals, etc.

The wood used in the cores is thoroughly seasoned and air dried before going through the factory. Panels are carefully built up and covered with metal, both sides glued, and placed under heavy pressure to insure good contact and eliminate any buckling. Mouldings are drawn true and accurately mitered. All joints are welded and scraped to smooth surface.

Standard thicknesses for metal covered doors are either 1¾ or 2¼ in.

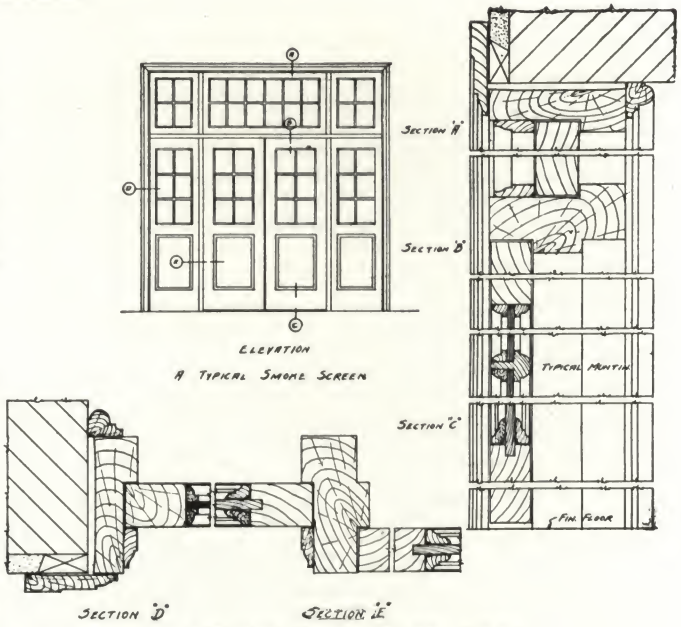
Unless otherwise advised, our doors, etc., are given one shop coat of special metallic primer.

Whenever practical, the metal covering on our kalamein jambs, casings, mouldings, etc., is carefully drawn on the wood cores through steel dies.

Labeled Kalamein Doors

We specialize in labeled kalamein doors.

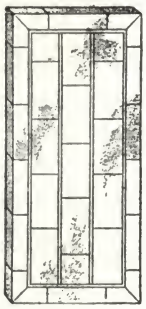
All doors shown below can be labeled excepting doors marked "B," "W" and "X."



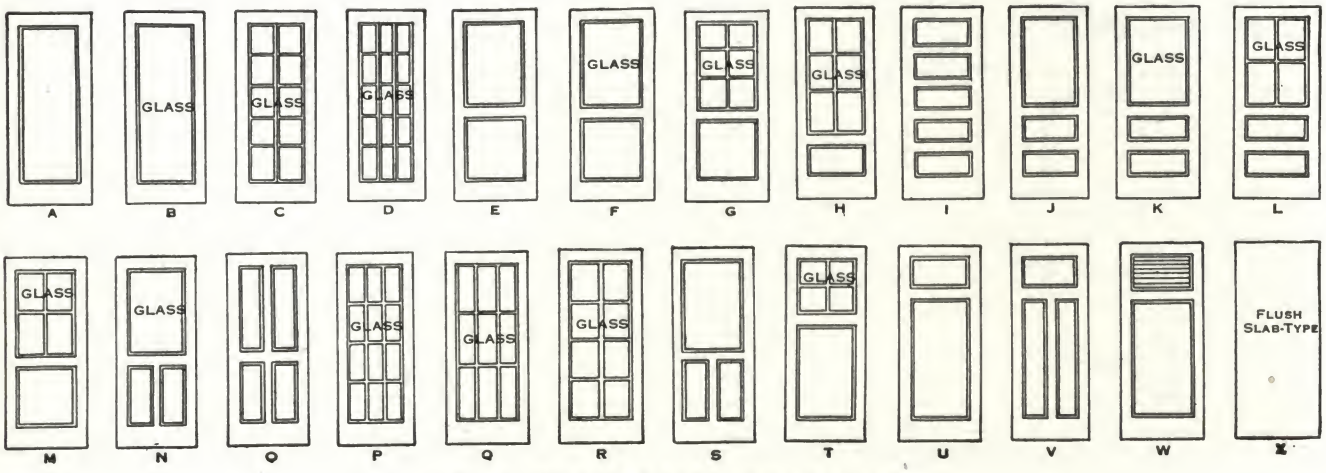
A Typical Smoke Screen Detail

Tin Clad Fire Doors and Shutters

All types of labeled and unlabeled, two-ply and three-ply tin clad fire doors and shutters to fill conditions imposed by insurance and building requirements. First class materials, careful workmanship developed by many years of experience and the most modern and efficient machinery serve to make these fireproof units of most approved design.



Doors and hardware bearing the label of the National Board of Fire Underwriters' are inspected by their representative at our shop. This is an additional warranty of their worth as fire retardants.



Syracuse Standard Kalamein Doors and Units

THORP FIRE PROOF DOOR CO.

1600-1610 Central Avenue
MINNEAPOLIS, MINN.

Products

THORP METAL COVERED DOORS, FRAMES and TRIM.
THORP SMOKE SCREENS.
THORP No. 14 GAUGE TUBULAR ELEVATOR DOORS.
THORP BRONZE and COPPER COVERED ENTRANCES.
THORP HOLLOW METAL FRAMES.

Facilities

All products are made in our new plant which is equipped with the most modern machinery made to suit our individual requirements and fully capable of handling any size order.

Details

Full size and scale details are submitted by our Drafting Department for architects' checking and approval. The requisite number of copies is furnished the general contractor.

Construction and Materials

Thorp Kalamein Doors are made on the basis of the Underwriters' requirements of 3-ply built-up pine core, heavily lined with asbestos and thoroughly nailed with cement-coated nails. All mortises in the core are made and reinforced for hardware at this point.

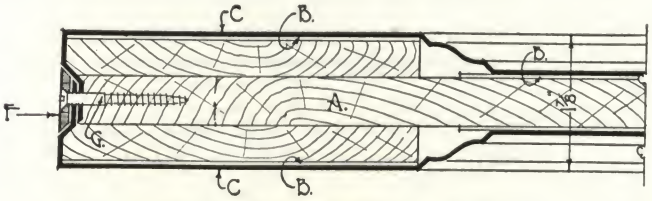
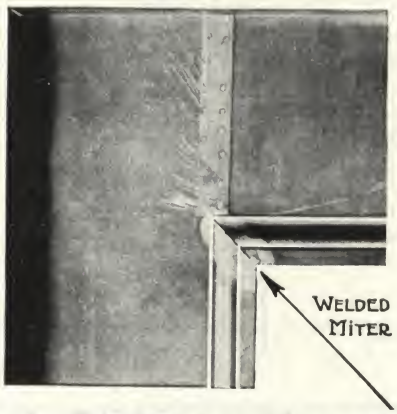


Fig. 1. Section Through Door
A—Wood core. B—Asbestos paper lining. C—Steel sheet. F—Beveled edge band. G—2-in. wood screw

Metal—The steel covering used is No. 1 furniture steel with 24 gauge for stile and rails, and 20 gauge for panels. If desired, 20 gauge may be specified for stiles and rails as well. The panel mouldings are an integral part of the stiles and rails and formed with them, and are not a separate nailed-in mould.



Back of sheet showing the reinforcement at the butt joint of the stiles and rail, and the welded miter joint of the moulding.

Fig. 2. This System of Welding Avoids All Possibility of Breakage and Looseness



Face of the sheet ready for the polishing.

Welding—All stiles, rails, panels, and panel moulds are electrically welded into one sheet. The two sheets thus formed are lapped on all four edges, formed into a groove and held in place by a steel band. No dependence is placed on mortise and tenon joints or (lag) screws to hold the doors together. No solder is used at all, since the door is welded throughout.

Mouldings—We have a large number of dies for both solid panel and glass panel moulding. Since it is more economical to use standard dies, we make our quotations on this basis unless specifically stated otherwise.

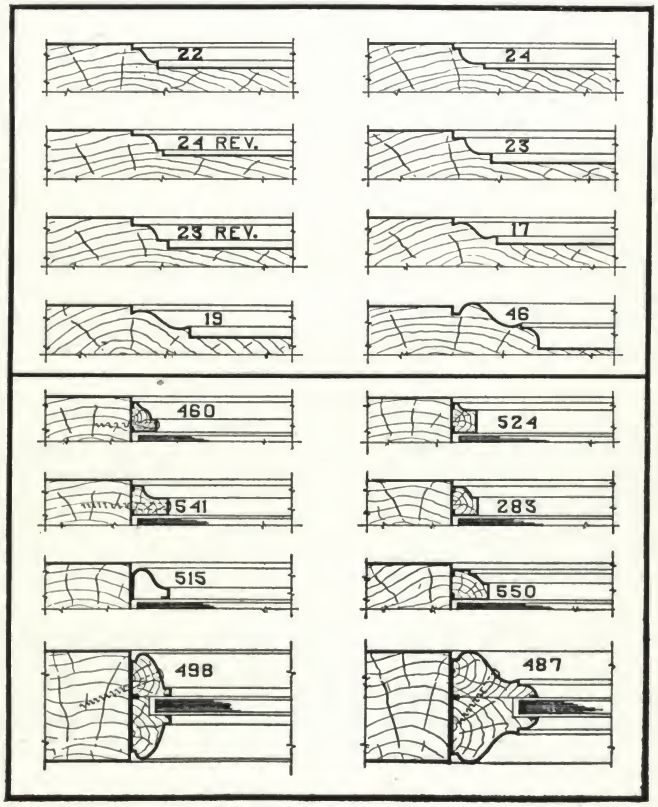


Fig. 3. A Few of Our Many Styles of Casings and Mouldings for Divided Light Panels

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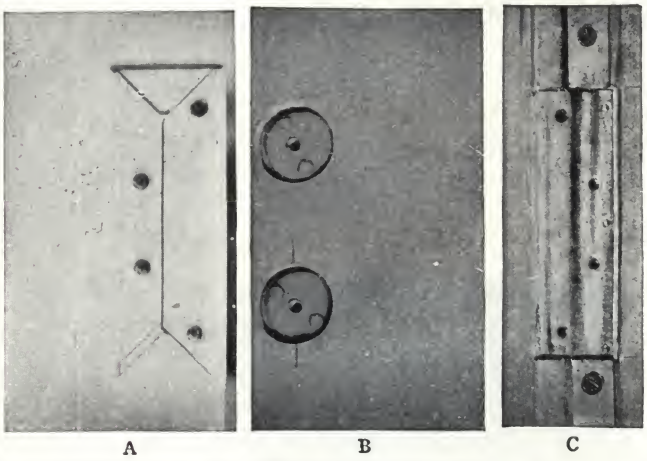


Fig. 4. Details of Hardware Reinforcement

A and B—Photographic section of the jamb at the butt seat, showing the sinkage of the washer nut on the back of the jamb.

C—Section of the back edge of a door showing butt sinkage

These methods are typical of the great care exercised by this organization that all details shall be as strong as possible to resist the action of hard usage and fire. Note that the metal is formed in under the butts

Hardware—All hardware, except checks, is fitted at the factory, provided it is delivered to us with all charges prepaid. In making the mortise seat for the hinge, the metal is not cut away, but formed into the mortise to protect the wood core on both the door and frame. The hinge jambs are suitably reinforced at all hinges to carry the door without any sagging. Necessary reinforcements are placed in the door.

Munt Bars—Our Munt Bar construction is the strongest possible, and the smallest. It consists of 1/8-in. steel bar of door thickness to which the mouldings are machine screwed. When hollow mouldings are used, they are made up in framed, welded units for each glass light opening.

Finish—All grained or enameled finishes are baked and are of the very best seven-coat type. We follow the architect's requirements for each individual order. Unless specifically stated otherwise, all work is primed. Copper-plated finish is electro-copper on steel and may be finished in the various shades of statutary copper. This is practical only for interior use.

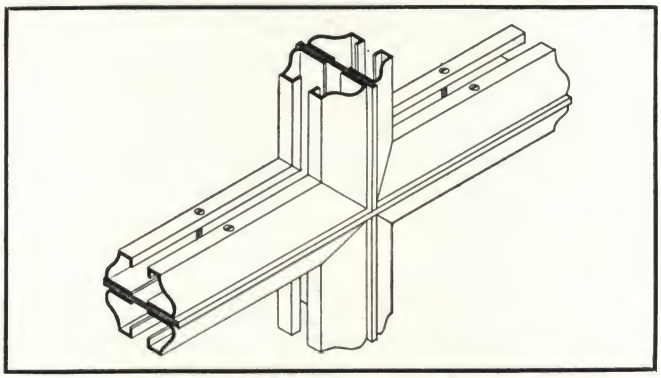


Fig. 6. The Thorp Method of Munt Bar Reinforcement
Insures complete and lasting rigidity in all divided light panels

Hollow Frames

Our frames are adaptable to any type of building or partition construction. They are either 16 or 14 gauge welded joints fully reinforced and fitted for hardware.

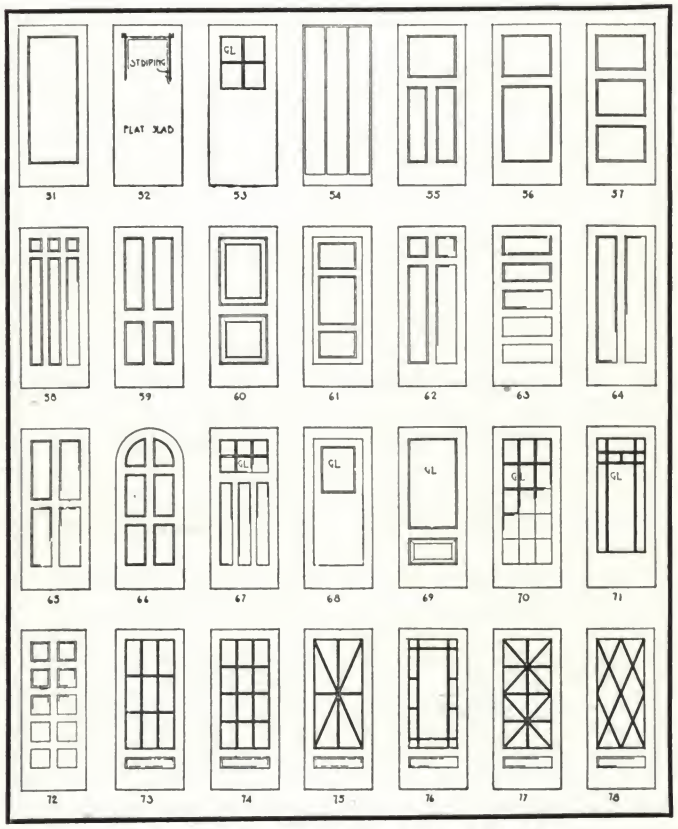


Fig. 5. Some of Thorp Special Panel Layouts

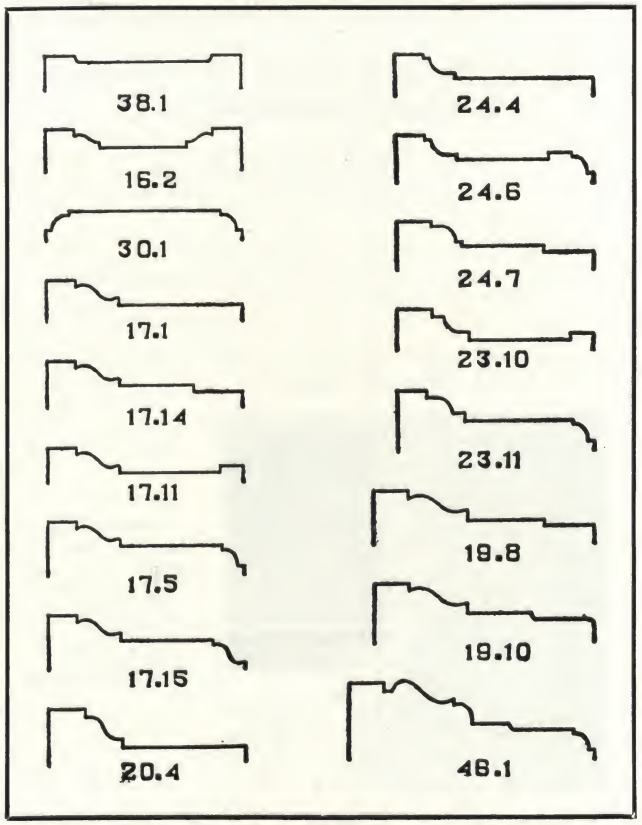


Fig. 7. These Are a Few of the Many Styles of Hollow Trim Architects May Specify

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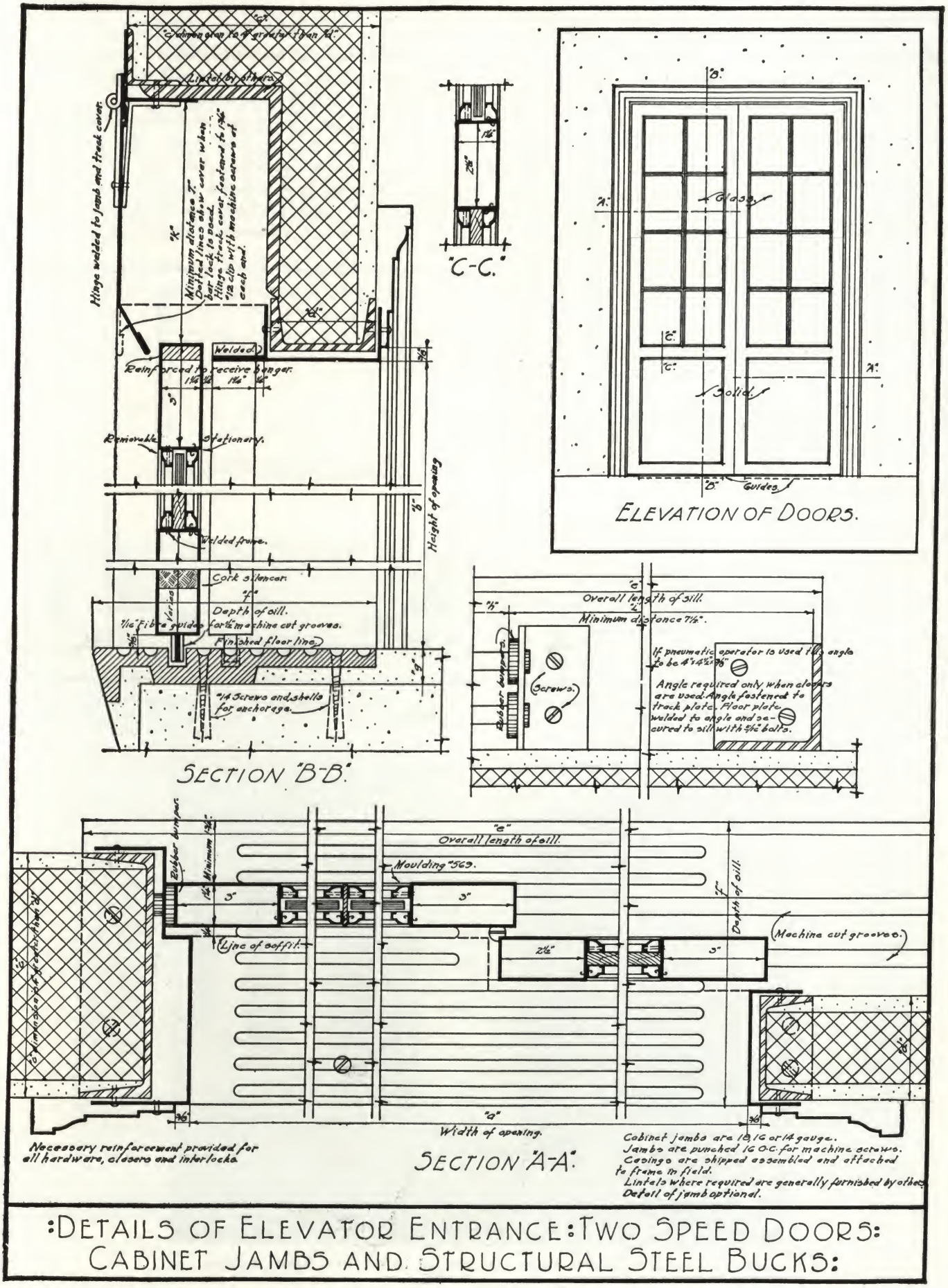


Fig. 8. Typical Detail Sheet of a Thorp Elevator Opening Installation—Note Methods of Construction

Continued on next page

Elevator Openings

These may be of metal covered or tubular steel construction. Tubular doors are 14 gauge drawn steel tubes with all mitres and joints welded. Glass mouldings are in welded frame units. This simplifies glass setting. The Thorp guide is the width of the bottom rail, preventing shaft drafts and light strikes.

The guide is lined both sides with a special grade of hard fibre, obviating metal-to-metal contact, adding to quietness and ease of operation.

We furnish the welded type of hollow metal frame and track cover or cabinet jamb type. Sills and hardware complete are also provided if desired. Sills should be machine grooved or of a similar construction. Elevator openings are finished in baked enamel in any desired wood grain or color. Otherwise it is factory primed.

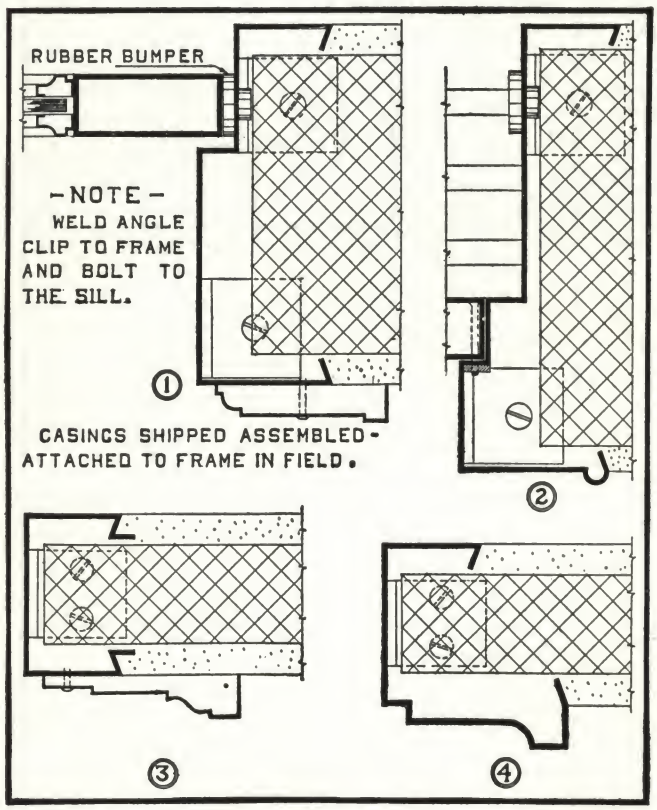


Fig. 9. Four Typical Thorp Elevator Opening Casings

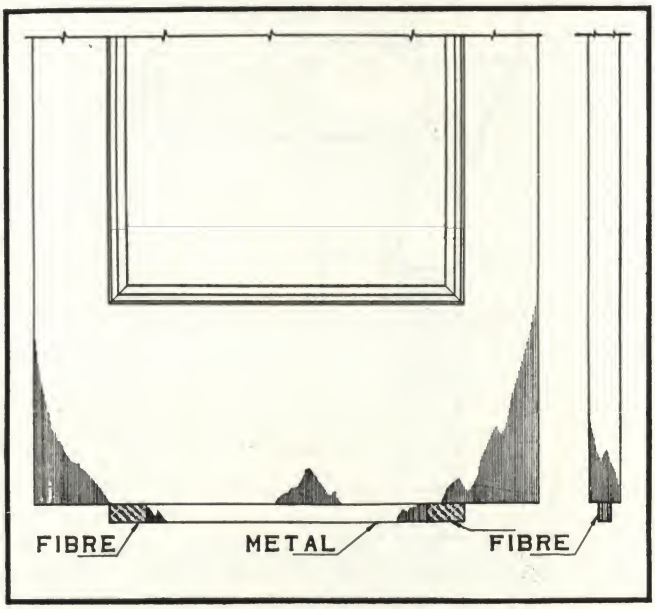


Fig. 10. This Illustrates the Thorp Method of Eliminating Light Strikes Below Elevator Doors and of Reducing Noise
Note hard fibre

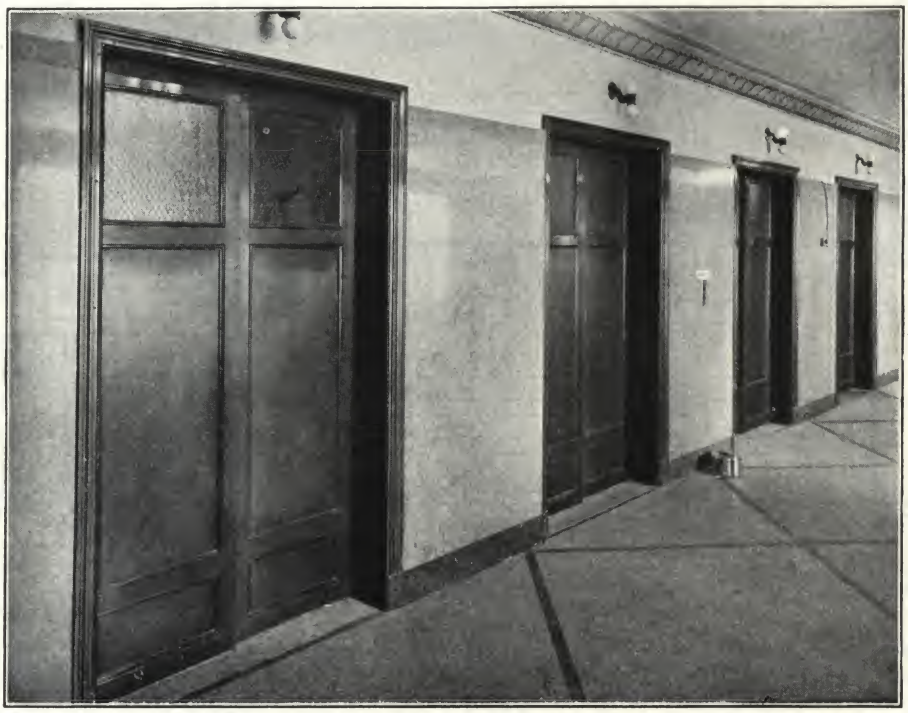


Fig. 11. Thorp Elevator Doors As Installed in the New Baker Building, Minneapolis, Minn.
LARSON & MCLAREN, Architects

Continued on next page

Entrance Doors

Thorp bronze and copper entrances are especially suited to public buildings, such as office buildings, hotels, theaters, etc.

The construction is identical with Thorp steel covered doors except an inside lock seam joint is used instead of welding which is impossible in the case of bronze or copper. No solder is used.

Copper may be 18 oz. to 30 oz. Bronze may be 18 oz. (22 gauge) to 30 oz. (18 gauge). We also use 36 oz. (16 gauge) bronze in hair line joint construction as well as hollow bronze in 16 gauge.

Label Service

If called for, we label doors according to the National Board of Fire Underwriters' requirements for various types of openings. This should be specified when inquiring.

Catalogue

The reference book of Thorp Fire Proof Doors will be sent to any architect who will send for it on his firm stationery. This catalogue of 95 pages will furnish detailed and authoritative information on fire proof doors and allied products.



Fig. 13. Thorp Entrance Doors, Fayette County Courthouse, West Union, Iowa
JOHN G. RALSTON, Waterloo, Iowa, Architect



Fig. 12. Thorp Entrance Doors Were Specified by the Architects of the New Wise Community Center of Holy Congregation
FECHEIMER, IHORST & MCCOY, Cincinnati, Architects



Fig. 14. Thorp Entrance Doors, Main Vestibule Richard J. Kinsella School, Hartford, Conn.
WHITON & MCMAHON, Architects

THE UNITED METAL PRODUCTS COMPANY

CANTON, OHIO

BRANCH OFFICES

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BOSTON, MASS., 1042 Little Building
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CLEVELAND, OHIO, 703 Leader Building

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Member of the Producers' Council

Products

COMPLETE ELEVATOR ENTRANCES (Underwriters' Labeled).

HOLLOW METAL DOORS and TRIM.

HOLLOW METAL OFFICE PARTITION.

HOLLOW METAL FIRE WALL DOORS (Underwriters' Labeled).

CONDUO BASE.

Also Metal Moulding, including Picture Moulding, Cornices, Base, Chair Rail, etc.

Plant and Facilities

The U.M.P. Co.'s plant and entire facilities are devoted exclusively to the manufacture of elevator entrances, hollow metal doors, frames and trim, office partition, conduo base and other materials required for the complete furnishing of the interior of office buildings, hotels, apartment buildings, hospitals, schools, etc.

U.M.P. Standard Hollow Metal Doors and Trim

Stiles and Rails—Formed from No. 18 U.S. gauge steel, thoroughly pickled, double annealed, patent leveled, free from blisters, pits or other imperfections. Stiles and rails are formed of one piece of metal and interlocking channel is inserted in the stiles and rails providing reinforcement and also providing an interlocking member for the panel moulding. See illustration.

All stiles and rails have cork inserts of suitable size to prevent metallic sound.

Panels—Construction of two sheets of No. 18 U.S. gauge steel. A filler of asbestos and felt is inserted to make the over-all thickness of panel $\frac{5}{16}$ in. thick. Panels are inserted in a deep groove provided in panel moulding. Panel mouldings are neatly mitered or coped at all corners and intersections are welded. All seams and joints are oxy-acetylene welded their entire length. All joints are made perfectly level and invisible. Reinforcing bars of sufficient length and thickness are welded in hinge stile at all hinge cutouts. The bars are drilled and tapped for hinges. Reinforcing plates are spot welded in lock stile to receive locks, and additional reinforcements are placed in door to receive such hardware as is specified.

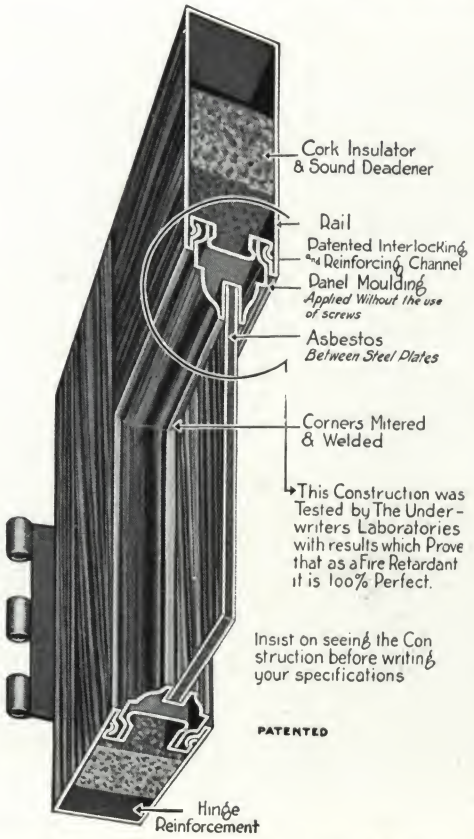
The construction noted above has been listed by the Underwriters' Laboratories, Inc., and has the Underwriters' approval.

Jambs—Made of the same quality steel as described for doors. No. 18 U.S. gauge steel for walls 7½ in. thick or less and No. 16 U.S. gauge steel for walls more than 7½ in. thick. Jambs are formed to detail and made to fit accurately over bucks, all intersecting members are neatly coped and fitted before shipment.

Casings—Made from cold rolled strip steel. All casing corners and miters are neatly welded and ground off to insure invisible joints. Casings are applied to frame with concealed clips.

Transom Sash—Constructed of No. 18 U.S. gauge steel similar to doors and properly reinforced for all necessary hardware.

Rough Bucks—Made from No. 14 U.S. gauge steel. Intersecting joints are accurately welded, adjustable crimped or corrugated anchors will be provided with rough bucks for building in wall. Bucks will receive dip coat of paint before shipment.



Detail Showing Construction of U.M.P. Door

Unit Frame — (Combining buck, jamb and casing in one.) Made from No. 12, 14 or 16 U.S. gauge steel of the same quality as described for doors. Combination frames are notched and reinforced for hardware. The frames will receive a baked-on prime coat. The finishing coats to be applied at building by painting contractor.

Finish — After fabrication, doors receive a dip coat of rust resisting enamel, the inside of panels are painted before being assembled, the dip coat is baked on and a filler is then applied over all uneven surfaces and baked. The filler coat is ground and sanded perfectly smooth. Two coats of high grade mineral paint are then applied, each baked on separately. All grained finishes receive two coats of best baking varnish—each coat is baked. All finished work is rubbed to an egg-shell gloss.

Continued on next page

Jambs, casing and mouldings are finished in the same manner as the doors.

Hardware—Applied to doors at factory before shipment, except where crating of materials might be interfered with. Drilling and tapping for such items as door and transom closers are done at the building by the erector after materials are installed.

Underwriters' Labels—The standard U.M.P. construction has been tested and approved by the Underwriters' Laboratories, Inc., and we have been granted the privilege of applying the Underwriters' label to doors for corridor, room partition and fire escape openings.

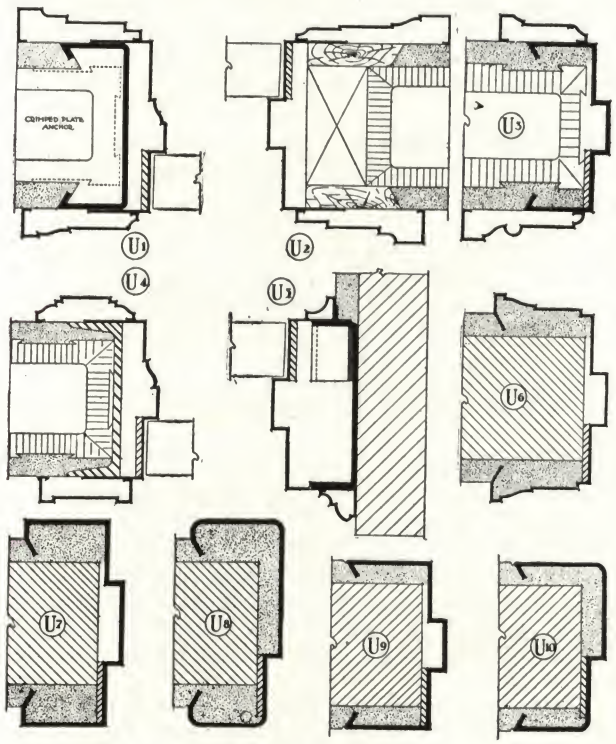
Fire wall doors to receive Class "A" labels can be furnished in hollow metal construction. Doors may be made from No. 18 U.S. gauge steel and the design may be of one or more panels to match surrounding work. Frames may be of the unit type not less than No. 14 U.S. gauge, or a No. 10 gauge rough buck only be used, together with a cabinet jamb No. 16 U.S. gauge. Frames must be of the built-in type.

Underwriters' labels can be furnished for fire wall, vertical shaft, fire escape and partition openings up to 4 ft. wide, 8 ft. high for single doors, and 8 ft. wide, 8 ft. high for pairs of doors.

Glass is not permitted in labeled fire wall or vertical shaft doors.

Shop Drawings—These illustrate all work in detail and are prepared and submitted for Architect's approval before materials are fabricated.

Samples—Samples of finish are submitted for approval before materials are finished.



Details of U.M.P. Standard Buck and Jamb Construction

Type U1—Rough buck, cabinet jamb and casing construction.
Type U2—Wood buck, cabinet jamb and casing construction.
Type U3—Combination buck and jamb, with separate applied casing.
Type U4—Channel iron buck, cabinet jamb and casing construction.
Type U5—Inverted buck. Cabinet jamb and scribe mould construction.
Type U6—Unit frame (combined buck, jamb and casing).
Type U7, U8, U9 and U10—Combination frames suitable for hospital or school construction.

Underwriters' labels can be furnished for all types of frames shown. Crimped or corrugated plate anchors will be furnished with frames where required

Doors of Etched Stainless Steel with Plastic Enamel Background



One of the newest developments in interior finish is the use of the ultra-modern types of German stainless steels, recently so successfully introduced to this country for many interesting applications. These permit of a wide variation in design, as the material can be etched in any pattern desired and colored backgrounds of plastic enamel applied by a recently perfected process.

United Metal Doors are available in Enduro Nirosta stainless steel, etched either in conventional or modernistic designs and inlaid with enamel in various colors to produce highly striking effects. The new plastic finish, whether applied on a stainless base or on ordinary steel is fireproof, weatherproof and waterproof. It is highly elastic and will give with the metal, eliminating all possibility of cracking or warping. This process is exclusive with United Metal. Specifications for this finish and samples will be mailed upon request.

Conduo Base

Combining base and wire conduit. United Metal Conduo Base is a combination base and distribution system for telephone, light and power wires. The use of U.M.P. Conduo Base eliminates the necessity of an expensive underfloor conduit system where tenant requirements cannot be predetermined.



If provision is made for the use of Conduo Base on exterior walls, all wires can later be distributed from this to the Conduo Base on subdividing partition walls or metal partition, and outlets for telephones, desk lamps, adding machines, etc., can then be had in any location in the room where required by the tenant.

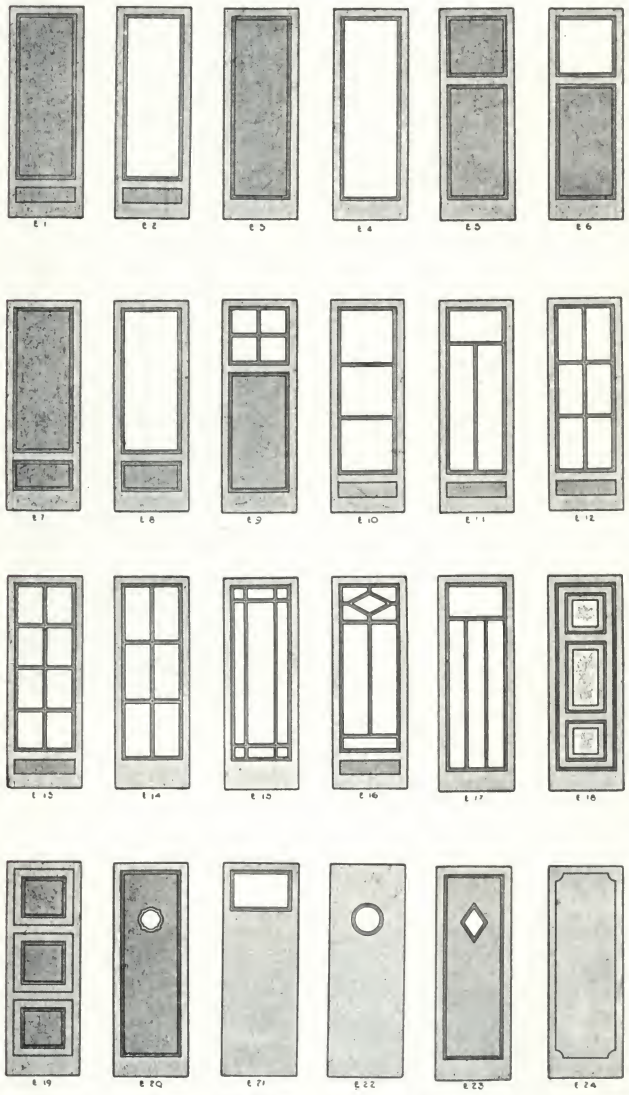
For further information regarding the use of Conduo Base please write or wire THE UNITED METAL PRODUCTS COMPANY.

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Elevator Enclosures

The basic construction of United Elevator Doors is similar to that of the swing doors described in detail on the preceding pages.

Special heavy reinforcing is used to compensate for the added stresses involved in power operation. Any required design can be furnished in door thicknesses of 1⅛, 1¼, and 1½ in. 1¼-in. doors are considered standard. United Doors are furnished in bronze or in steel, finished in solid colors or grained to simulate any natural wood.



Standard Elevator Door Designs

Underwriters' Labels—The importance of elevator enclosures as fire-stops has led to wide use of Underwriters' Labeled construction and to a very high degree of specialization on this grade of enclosure. United Metal has been a pioneer in this field and has been responsible for several important innovations in design. Progress along this line has now reached a point where virtually any type of United Elevator Enclosure, except those in which glass is used, can be furnished with the label of the Underwriters' Laboratories. This certified construction covers doors, frames, sills and hardware, providing complete fire protection at highly vulnerable points.

It is a matter of common knowledge that the only ready avenues for fire in the modern, slow-burning type of building are the elevator shafts, which are all too frequently inadequately protected and function as chimneys in a blaze of any size. In any building which is heavily occupied it is vital that all elevator openings be protected by steel construction which has been tested and guaranteed to afford a definite degree of protection. The mere fact that steel is the material used is not enough. Interlocking members of United Doors and Frames are so designed that they positively prevent the passage of fire and smoke, yet they do not detract in any way from the finished appearance of the enclosure. Safety is secured at no sacrifice of beauty.

Insurance companies take cognizance of the fact that fires confined to the floor upon which they originate seldom assume serious proportions. The security provided by United Underwriters' Labeled Enclosures is reflected in correspondingly lower insurance rates. A simple calculation will develop that this type of construction pays for itself completely in relatively few years time, since there are no upkeep costs involved and no materials of a perishable nature included in the design.

Another Fire-safe Specialty—Among many other fire-safe specialties, United has developed a special type of elevator enclosure for use in connection with swinging doors to push button elevators. The door, frame and sill all finish flush on the hatch side and a steel facia plate is provided to fill the space between the top of the door and the sill above, presenting a solid barrier to fire when the door is closed.

One of the principal purposes of this new development is to guard against accidents which sometimes result on this type of elevator from the projection of the door frame and sill into the finished shaft.

Specifications and details covering United Flush Hatch construction for swinging doors to push button elevators will be furnished upon request.

Hollow Metal Partitions

The U.M.P. Standard Hollow Metal Partition is made entirely from the best quality of cold rolled furniture stock steel. The panel sections are welded together in varying widths to fit any floor or room layout.

The base, cornice and mullion members are specially designed for the reception of telephone and light wires.

The U.M.P. Office Partition is interchangeable, and can be adapted to varying conditions without damage to floors, walls or surrounding work.

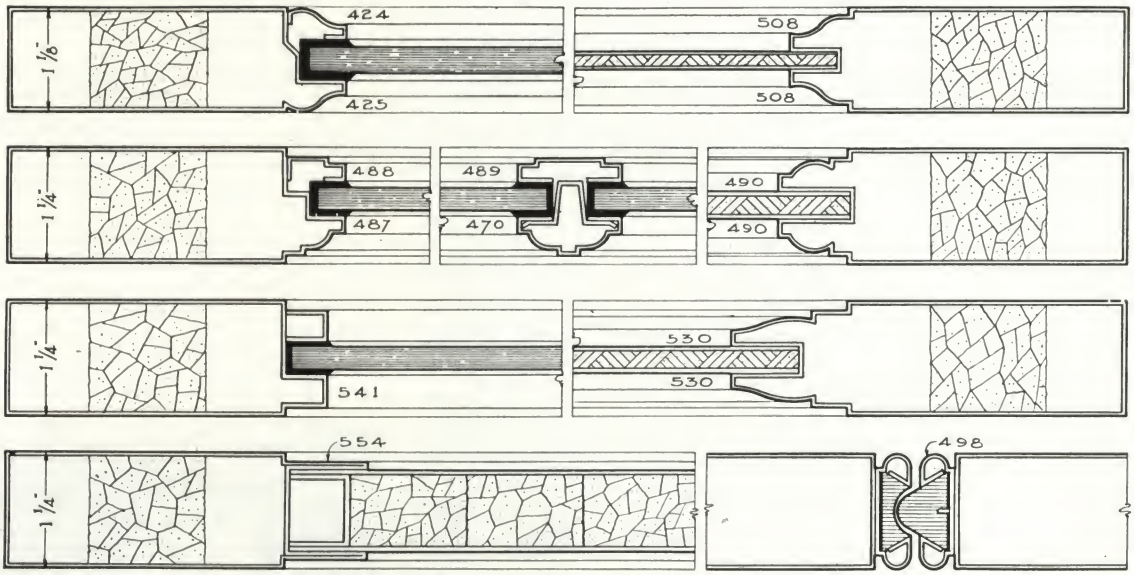
Engineering Service

Back of the entire line of United Hollow Metal Doors and Trim is United engineering service.

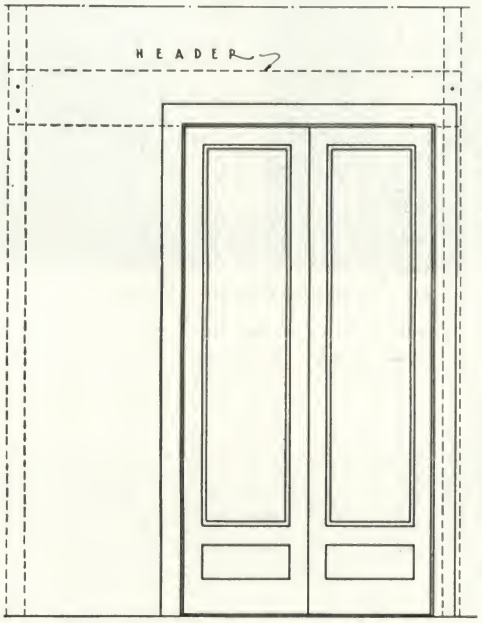
Architects have had good reason to be suspicious of many offers of service of this kind. In a regrettably large number of cases it proved to be either inadequate or unsound, or both. In the United organization it is the guiding factor back of the whole operating plan.

United engineers have to their credit many of the largest as well as the most unusual and difficult hollow metal installations in this country. Since new problems are always arising it is essential that an engineering staff keep an open mind and be prepared to co-operate to the fullest extent to carry out the architect's ideas. We believe this state of mind will be found to exist in our organization to a degree that will make United service a welcome innovation to many architects.

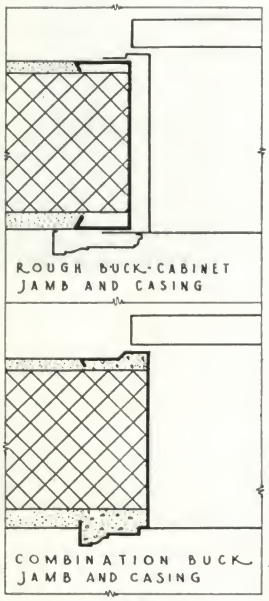
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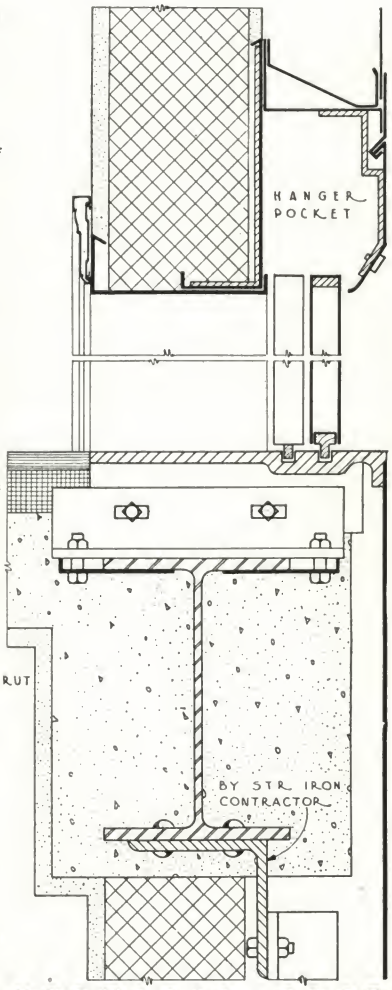
STANDARD DOOR SECTIONS

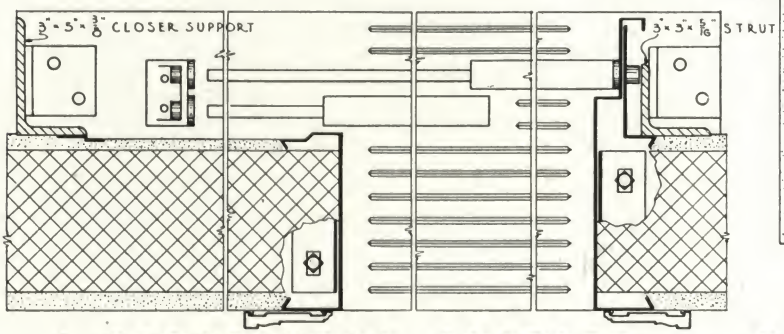


ELEVATION



ALTERNATE JAMB SECTIONS





HORIZONTAL SECTION

VERTICAL SECT

STANDARD DETAIL OF A
TWO SPEED ELEVATOR ENCLOSURE
THE UNITED METAL PRODUCTS CO

VARIETY FIRE DOOR COMPANY

Manufacturers of All Kinds of Fireproof Doors

Sacramento and Carroll Avenues, CHICAGO, ILL.

ATLANTA, GA.
BIRMINGHAM, ALA.
BUFFALO, N. Y.
CHARLOTTE, N. C.
CLEVELAND, OHIO
COLUMBUS, OHIO
DALLAS, TEX.
DAVENPORT, IOWA
DAYTON, OHIO
DECATUR, ILL.
DETROIT, MICH.
FORT WAYNE, IND.
GRAND RAPIDS, MICH.
HOUSTON, TEX.
INDIANAPOLIS, IND.
KANSAS CITY, MO.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEW YORK, N. Y.
OMAHA, NEB.
PHILADELPHIA, PA.
PITTSBURGH, PA.
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Products

UNIVERSAL PASSENGER ELEVATOR DOORS.

HOLLOW METAL FIREPROOF DOORS and TRIM.

KAL-O-MINE METAL COVERED FIREPROOF DOORS and TRIM.

VAMANCO and VARCLAD COUNTERBALANCED FREIGHT ELEVATOR DOORS.

Also manufacturers of Cross Horizontal Folding Doors, Saino Fire Doors and Shutters, Tin Clad and Metal Covered Doors and Trim.

Universal Passenger Elevator Doors

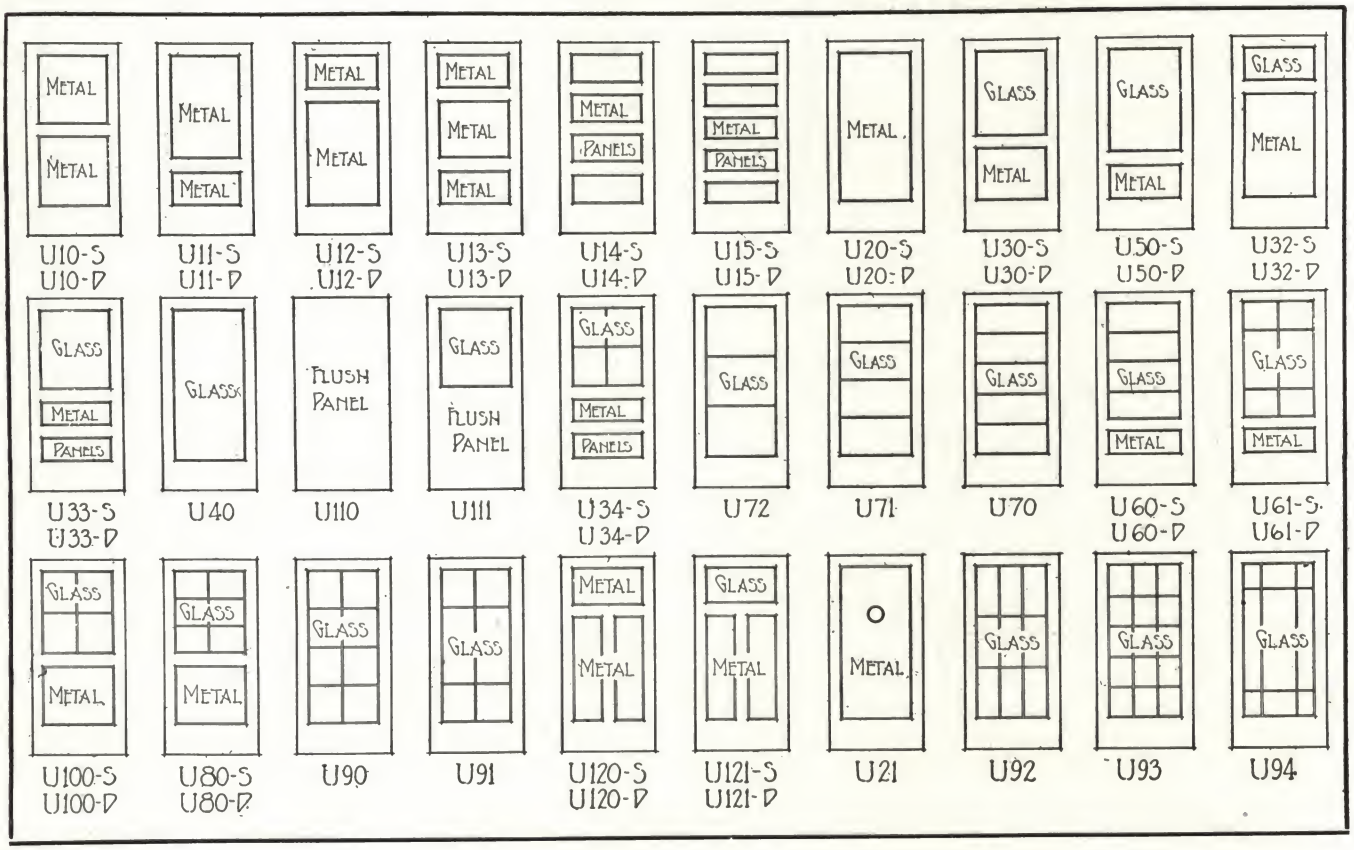
Type V. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type V. U. passenger elevator doors are constructed of No. 18 gauge furniture metal throughout, with all connections between stiles and rails formed by continuous lock joints and solidly welded over entire length of joint. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.

Type M. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type M. U. passenger elevator door construction is similar to V. U. type except that both shaft and corridor sides of door have recessed panels finished against stiles and rails with drawn mouldings mitered and welded. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.

Type T. U.—VARIETY FIRE DOOR COMPANY'S "Universal" Type T. U. passenger elevator doors are constructed of rectangular tubes drawn from No. 14 gauge cold rolled strip stock and welded. All connections between stiles and rails are formed by continuous lock joints and solidly welded over the entire length of joint. Finish is either air dried, baked enamel in any color, or grained to match any kind of wood finish.



Universal Passenger Elevator Doors



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Specifications for Counterbalanced Freight Elevator Doors—Vamanco Varclad Doors

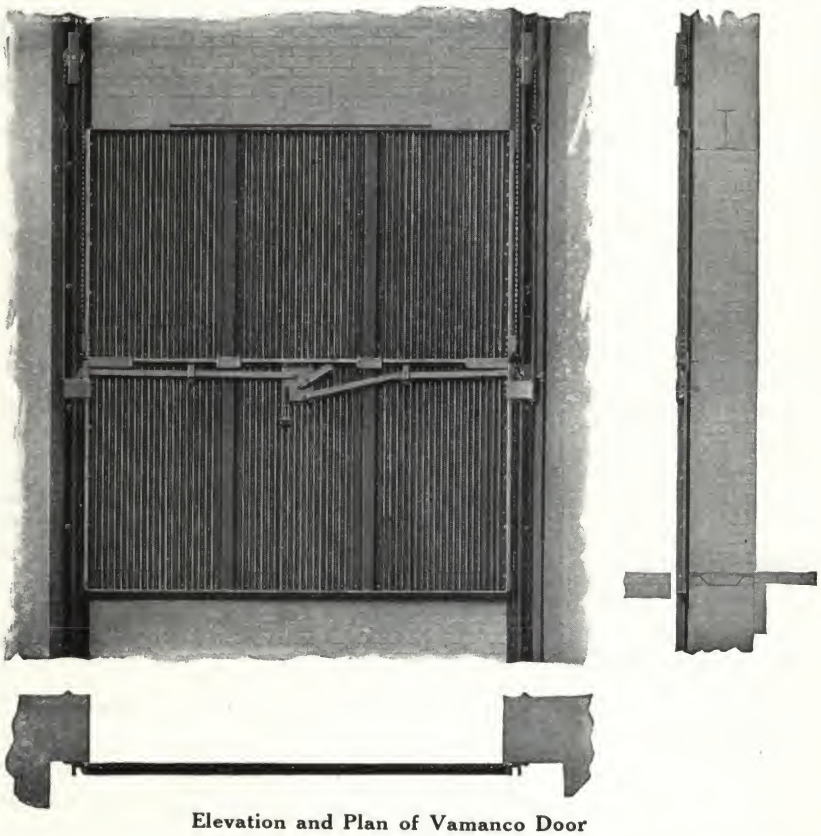
(1) Freight Elevator Doors—All door openings to freight elevator, except penthouse doors, shall be counterbalanced doors as sold by Variety Fire Door Company and shall be type known as [Vamanco] [Vamanco Hollow Metal] [Varclad] [Varclad Kal-O-Mine].

(2) Work Furnished by Manufacturer—The manufacturer shall furnish, freight allowed to freight station nearest building site: (a) all doors complete with guides, roller bearing sheaves, bar locks, trucking sills, bolts, anchors and all necessary hardware to properly secure doors to walls of shaft; (b) drawings and full directions required for erection; (c) all parts to receive priming coat of metallic paint at factory.

(3) Underwriters' Label—All doors shall be approved and labeled by Underwriters' Laboratories, Inc., for "Fire Door for Vertical Shaft."

(4) Special Lock—Special lock shall be provided at (ground) floor to permit access to elevator shaft when all doors are closed.

(5) Operation—Doors to be manually opened and closed: (a) If electric interlocks are desired add: Each door to be provided with a Varlock operated by bar locks so that when door is *unlocked* the current will be cut off from the car and it will be impossible to run the car until all doors are closed and locked. (b) If full automatic operation is desired add: Door contractor to furnish mechanical operating device to open and close doors automatically by simply pressing button when car is at landing. This device to be full circuit type and to contain interlocks cutting current from car when door is unlocked.



Elevation and Plan of Vamanco Door

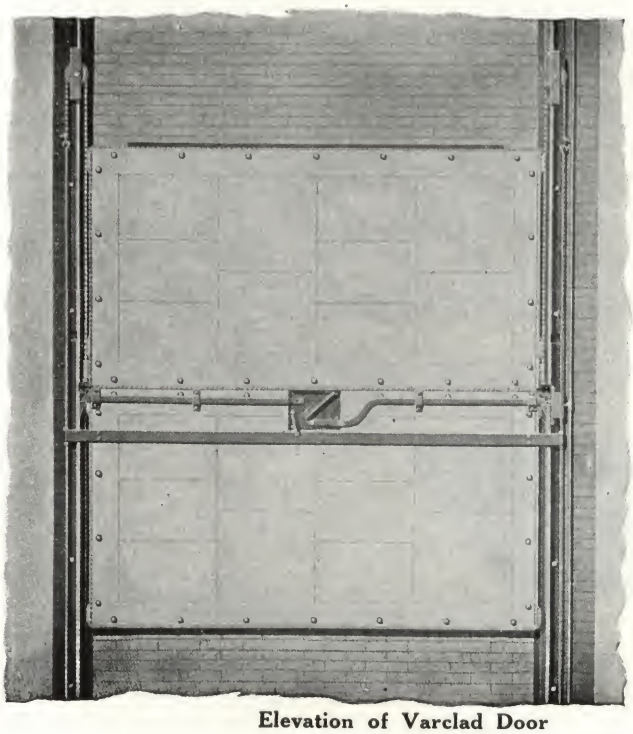
(6) Trucking Sills—All doors shall be provided with special design trucking sills (state if for heavy or light duty) so that no part of load passing over doors will be sustained by door mechanism or guides, but will be carried entirely by sill of building.

(7) Glass Panels—Each door shall be equipped with a panel 12 in. square, arranged to receive ¼-in. wire glass (glass by glazing contractor). The glass panels are to be backed by a sliding metal panel, with fuse link for automatic closing and doors must bear the Underwriters' label.

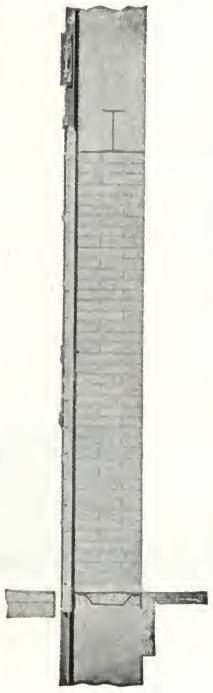
(8) Clearance—There shall be not more than 1½-in. clearance between door and elevator car at all floors. In case there is any inequality of construction of shaft that will not allow this, the architect will decide whether to cut the masonry or put extension on doors to make correction of same, which is to be charged to contractor who built the shaft.

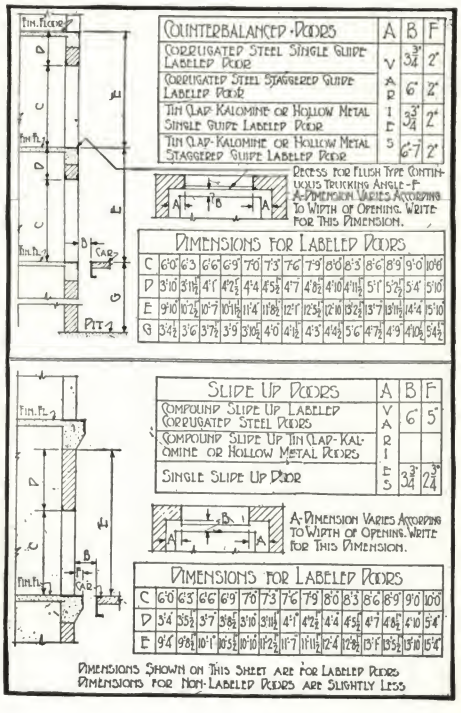
(9) Erection—The manufacturer shall erect the entire equipment in a substantial manner and shall leave the installation in perfect working order.

(10) Painting—The contractor shall apply 2 coats lead and oil paint to all parts exposed to view, in colors selected by the architect, as specified under "painting."



Elevation of Varclad Door





TRUSSBILT STEEL DOORS INC.

SUCCESSORS TO GROSS METAL PRODUCTS CO.

Manufacturers of Hollow Metal Doors, Frames and Trim

2575 Como Avenue
ST. PAUL, MINN.

3303 Como Avenue
MINNEAPOLIS, MINN.

REPRESENTATION IN ALL PRINCIPAL CITIES

Products

ALL-STEEL TRUSSBILT FLUSH DOORS, HOLLOW STEEL and BRONZE DOORS, FRAMES, TRIM and ELEVATOR FRONTS.

Also Rolled Integral Frames.

Hollow Metal

A general line of hollow metal doors, frames and trim is manufactured by this company, in addition to the Trussbilt Flush Panel Door.

Trussbilt Doors

The surface, being of 18 gauge steel reinforced continuously with a steel core giving an unsupported width of only 2¼ in., is perfectly flat and is finished in either solid color or beautiful wood grain effects, giving them a warm and attractive appearance.

A careful survey of erection costs proves that a complete unit of Trussbilt frame and door can be installed at a cost very little above a complete wood unit, and in several cases on actual installations were quoted lower than wood by general contractors.

Underwriters' Labeled Doors and Frames

Where required doors and frames can be furnished with Underwriters' label.

Specification

All doors, where shown on the plans or schedule, shall be steel Trussbilt Flush Doors 1¾ in. thick, built with a continuous 28 gauge truss-structured core, the apexes of which are flat and continuously engaged with the 18 gauge exterior shells and are spot-welded both vertically and horizontally thereto on approximately 2¾-in. centers. The webs of that truss-structured core are reversely oblique, straight and flat in cross section affording a compressed tension core that connects the two exterior shells and will not stretch, straighten or buckle under pressure or strain.

After doors are finished they shall be thoroughly cleaned then completely immersed twice in a semi-enamel primer, so the interior as well as the exterior surface is completely covered; no filler or putty of any kind allowed. Doors then shall be primed or finished in either our standard grained oak, mahogany or walnut (solid color) (or finished according to sample as selected by the architect).

Two coats of varnish shall then be applied, each coat baked on, the final coat being rubbed to an eggshell gloss.

Service

Trussbilt Engineers have devoted their entire time and thought to the development of the Trussbilt Flush Door from the standpoint of stability and appearance. They have equipped the plant with the most modern machinery, particularly for the 1¾-in. flush door, of their own design, to secure efficiency in construction, their aim being *quality* and *service* to the ultimate user.

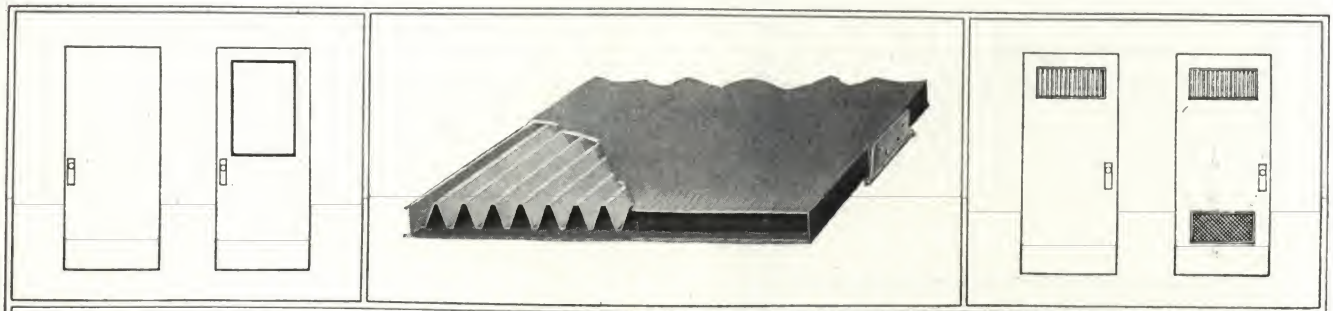
Doors of 1⅜-in. thickness can be made but at a slight increase in price.

All products guaranteed to be of the highest standard of workmanship, material and quality.

Installations of Hollow Metal Doors, Frames and Trim

A partial list of installations executed by us with the names of their architects.

Public Safety Building, St. Paul, Minn., Frank X. Tewes
Nordic Hotel, Minneapolis, Minn., Sund & Dunham
Hercules Powder Co., Hercules, Del.
U. S. Post Office, Milwaukee, Wis.
Columbus Hospital, Great Falls, Mont., Shanley-Willson & Hugenin
Jersey City Hospital, Jersey City, N. J., John T. Rowland, Jr.
Washington Athletic Club, Seattle, Wash., Sherwood D. Ford, Don M. Clippinger, Associate
Hotel Douglas, Newark, N. J., Wm. E. Lehman



Various Types of Trussbilt Flush Doors and Descriptive Cut

KALMAN STEEL COMPANY

Manufacturers of Steel Door Frames

CHICAGO, ILL.

For Other Offices, see our page on Concrete Reinforcement

Products

STEEL BUCK; STEEL BUCK AND JAMB; KALMANTRIM.

Also other related products.

For Concrete Reinforcement, Steel Joists, Metal Lath and Allied Products, see Manufacturers' Index.

Kalman Steel Buck

The new Kalman Steel Buck replaces wood rough buck, ground and standing trim in constructing interior or exterior door, plaster jamb, and borrowed light openings.

The Kalman Steel Buck has been perfected by the KALMAN STEEL COMPANY for use with clay, gypsum tile or solid plaster partitions, or in brick and masonry walls, and it has many definite advantages when used with wood stud walls and metal lath.

(1) It provides a heavy galvanized steel member in place of the usual wood buck.

(2) It eliminates plaster cracks caused by warping of the wood buck.

(3) It provides a steel lintel, eliminating plaster cracks due to shrinkage.

(4) It provides a superior construction at no increase in cost.

(5) It eliminates wood grounds and provides a positive finish and edge for the plaster.

(6) It provides positive anchorage between buck and wall.

(7) It permits of the elimination of standing trim.

(8) It eliminates the necessity for patching and pointing of plaster.

(9) It eliminates unsightly split casings.

(10) It increases wall space.

(11) It reduces maintenance cost.

(12) It reduces fire hazard.

(13) It eliminates dust catchers.

(14) It permits architectural flexibility and harmony.

(15) It can be erected quickly and easily.

(16) It adds years of life to a building.

Kalman Steel Buck and Jamb

The new Kalman Steel Buck and Jamb has certain advantages because of its unusual design.

(1) The sides of the frame closely engage the wall tile.

(2) It provides perfect plaster grounds.

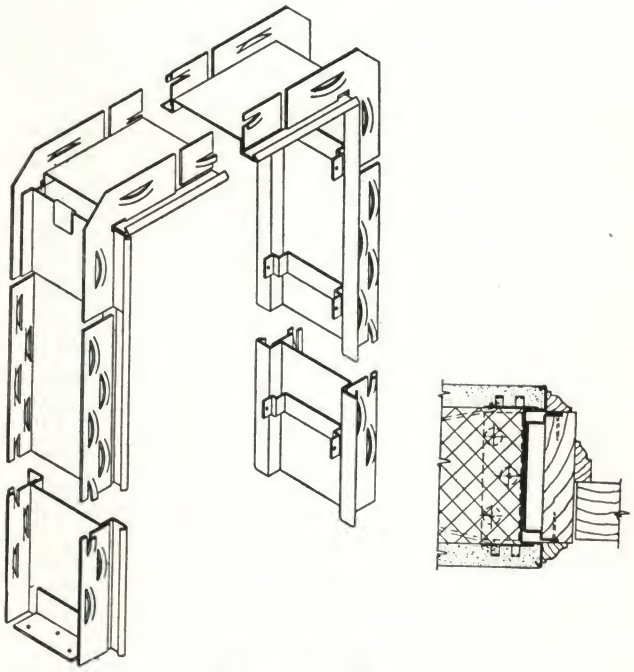
(3) It provides surface attachment and reinforcement for plaster through rows of loops.

(4) Where initial corrosion is objectionable, the surface is galvanized.

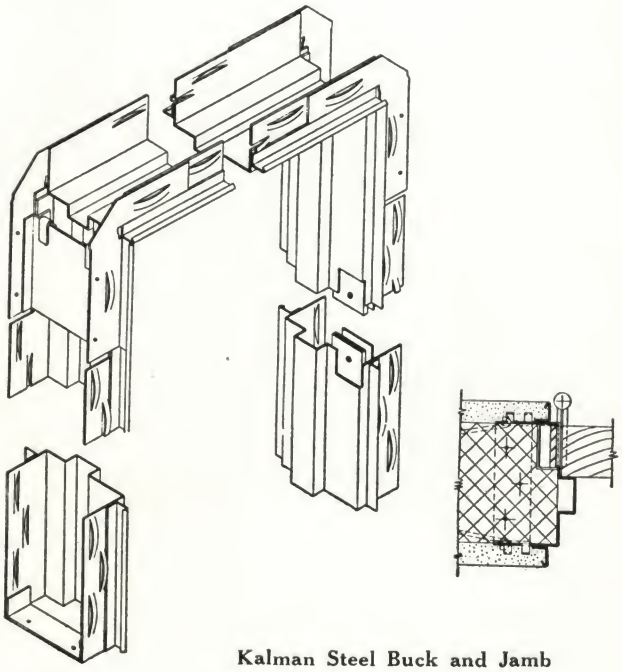
(5) Wall anchors can be attached at any point.

(6) It is simple in design, possesses character as steel instead of an imitation of wood, and is in keeping with the modern trend in architecture.

In addition, the Kalman Steel Buck and Jamb offers all the advantages listed for the Kalman Steel Buck.



Kalman Steel Buck



Kalman Steel Buck and Jamb

PETERSON AND NEVILLE, INC.

Manufacturers of Steel Combination Door Frames

365 Dorchester Avenue, BOSTON, MASS.

Products

"Steelweld" Door Frames.

Also Tanks, Cement Forms and Platform Skids.

For our Hospital Furniture and Pressed Steel Products for Kitchens, see Manufacturers' Index.

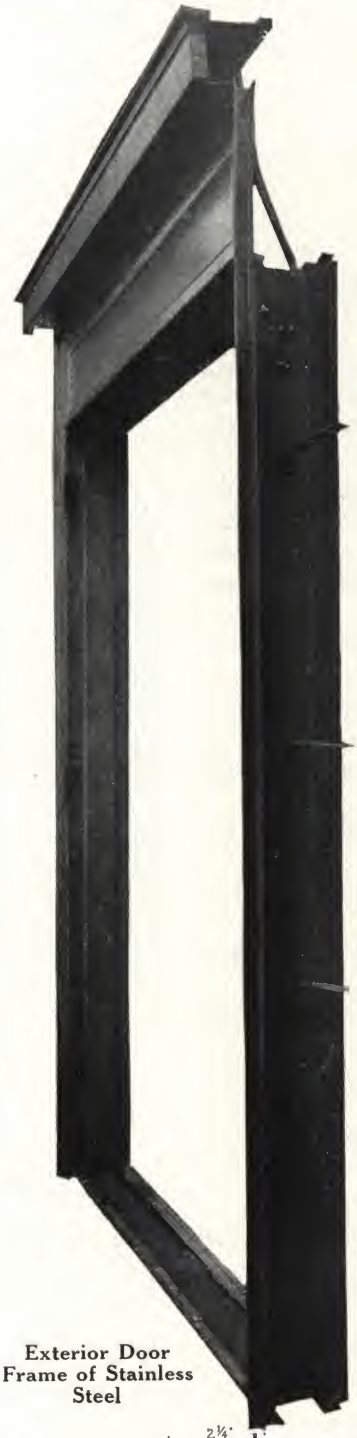
Stainless Steel Exterior Door Frames and Window Casements

We call to the architects' attention the great possibilities presented by the new chrome steel alloys for use in exterior door frames and casements. These alloys are generally known as *stainless steel.*

The accompanying illustration shows an exterior door frame made of stainless steel. This metal will not rust nor deteriorate in any way and pressed steel door frames made of this metal are as enduring and ornamental as built-up frames of bronze or gray iron castings.

We will be pleased to submit quotations to architects and contractors from their own sketches, or we will furnish drawings showing the use of economical mouldings to be made of stainless steel.

We will be pleased to quote and submit sketches on exterior door frames made of sheet bronze.



Exterior Door Frame of Stainless Steel

Steel Combination Door Frames

Five types of our steel combination door frames are shown in cuts A, B, C, D and E below.

These frames are suitable for all interior openings and are complete frames in every detail, embodying the buck, jamb and trim, with provisions made to receive all hardware, such as hinges, striking plates, locks and pads for door checks or any other special hardware.

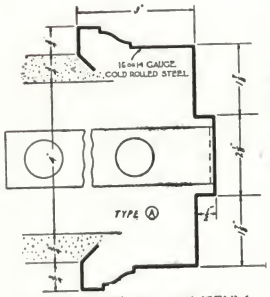
"Steelweld" door frames are made of steel, are fireproof and free from defects. They will not sag, warp or open up at the joints. All joints are gas-welded and ground to a smooth finish.

The economy of "Steelweld" frames becomes apparent when you consider that the erection of a "Steelweld" frame comprises the total cost of erecting a finished door opening.

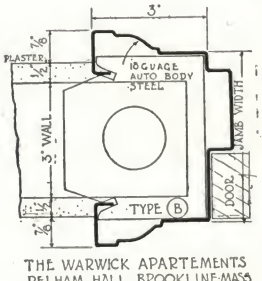
The buck, jamb and trim are all in one piece so there is no further cost of erecting the finished jamb and trim.

Our frames can be made to accommodate walls of varying thickness, from a 2-in. wall up.

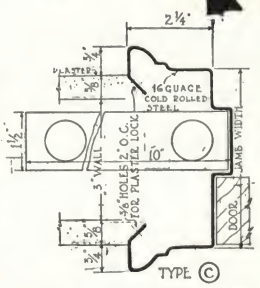
There are several designs of steel anchors that are used with these frames as shown in types A, B, C, D and E.



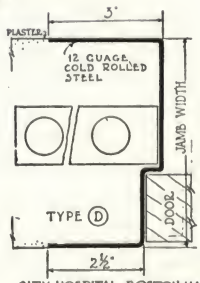
NORTH STATION COLISEUM
BOSTON & MAINE RAILROAD
BOSTON, MASS.
DWIGHT P. ROBINSON CO. ENGINEERS
FUNK & WILCOX, ARCHITECTS



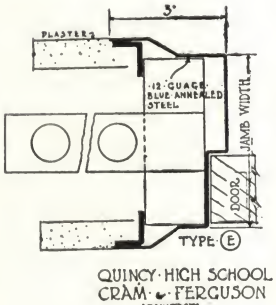
THE WARWICK APARTEMENTS
PELHAM HALL BROOKLINE, MASS
MYLES STANDISH BOSTON, MASS
ALDEN PARK BROOKLINE, MASS
AND PHILADELPHIA PENNSYLVANIA



HOTEL STATLER BOSTON
DWIGHT P ROBINSON CO ENGINEERS
GEO B POST ARCHITECT NEW YORK



CITY HOSPITAL BOSTON MASS
COOLIDGE AND SHATTUCK
ARCHITECTS BOSTON



QUINCY HIGH SCHOOL
CRAM & FERGUSON
ARCHITECTS

REVOLVING DOORS, INC.

TELEPHONE
CHICKERING 4-1420

542 West 27th Street
NEW YORK, N. Y.

OFFICERS

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Products and Services

REVOLVING DOORS of every description and of any desired material.

Specialists in all Mechanical Devices as applied to Revolving Doors.

Complete installations contracted for anywhere in the United States and Canada.

Automatic Panicproof Revolving Door

Wings are suspended from a universal ball bearing located in a dustproof oil chamber mounted on a carriage running on tracks. The wings can be folded centrally and moved to one side in the usual manner. Each wing is hung to the center post with spring hinges, which hold it under spring control when the braces are detached, preventing slamming of the wings against each other and possible breakage of glass.

The Slip-bar—The braces which hold the wings in rotating position are the vital feature of a panicproof door. This company uses neither cables nor chains, but manufactures the only slip-bar brace that pushes or pulls out under undue pressure. Brace is positive in action, durable, and conforms to building and fire department regulations.

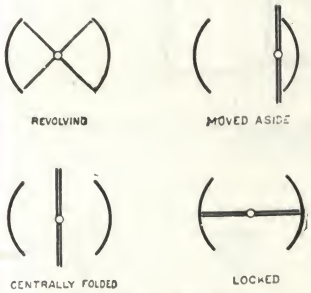


Diagram of Different Positions of Wings



Standard Design No. 106, Panicproof Slip-bar Construction

Adaptable to slight architectural changes. Any material; any wood or hardware finish; kick plates and key locking bolts when desired

Some Recent Installations

The following is a list of some recent installations with the names of the architects and contractors who were connected with the work:

New York, N. Y.

Hotel Pierre, 61st Street and Fifth Avenue, Geo. A. Fuller Co., Contractors; Schultze & Weaver, Architects—3 doors

Long Island City Savings Bank, Bridge Plaza North, Long Island City, N. Y.
Branch: Grand and Sixth Avenues, Astoria, N. Y.

National City Bank *Branches:* 57th Street and Seventh Avenue, 13th Street and Fifth Avenue, 400 Amsterdam Avenue, 167 East 72d Street, Jamaica Avenue and 218th Street, Queens Village

Y. M. H. A., 92d Street and Lexington Avenue, J. H. Taylor Construction Co., Contractors; Necarsulmer & Lehlbach, Architects; Gehron & Ross, Associate Architects

Horn & Hardart Restaurant, 122 Pearl Street, T. J. Murphy Co., Inc., Contractors; F. P. Platt & Bro., Architects—2 doors

Manhattan Towers, 76th Street and Broadway, Barr & Lane, Inc., Contractors; Tillion & Tillion, Architects

Hotel Pennsylvania Tea Room, West 33d Street, Edward Mulcahy, Contractor; McKim, Mead & White, Architects

Hotel St. Moritz, 59th Street and Sixth Avenue, Harper Organization, Contractors; Emery Roth, Architect—Installed for Norman-Seton, Inc.

Childrens Courthouse, Grand Concourse, Bronx, N. Y., Butler Construction Co., Contractors; Max Hausle, Architect

New York Telephone Co., 271 Amsterdam Avenue, H. L. Fischer, Inc., Contractor; C. N. Whinston & Bro., Architects

Silver House, Corner Pearl and Moore Streets, Cauldwell-Wingate Co., Contractors; Warren & Wetmore, Architects

Brooklyn, N. Y.

Fulton Royal Restaurant, Flatbush Avenue Extension and Fulton Street, Charnin-Silverstein Co., Inc., Contractors

Silvers Lunch Stores, Inc., 571 Fulton Street, B. H. Whinston, Architect—2 doors

Other Localities

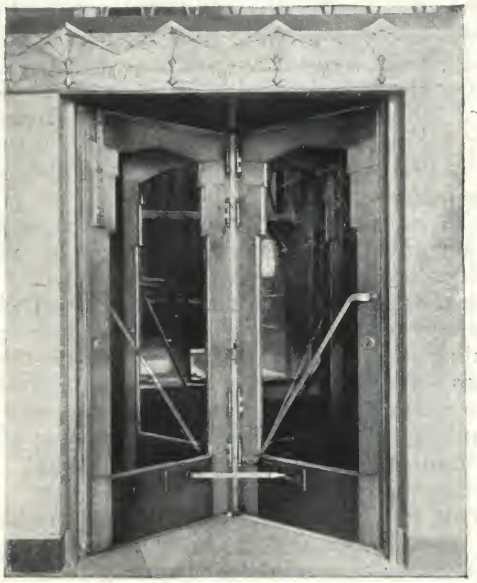
First Mechanics National Bank, Trenton, N. J., York & Sawyer, Architects—Installed for The W. H. Jackson Co.

Sage, Allen & Co., Hartford, Conn., E. A. Dennison & Associates, Architects—4 doors

New York State National Bank, 75 State Street, Albany, N. Y.—2 doors

Agricultural National Bank, 100 North Street, Pittsfield, Mass., D. Herbert Pike, Contractor; Halsey, McCormack & Helmer, Architects

Delaware Land Development Co., Market and 9th Streets, Wilmington, Del., Wark Co., Contractors; B. T. Converse, Architect; P. T. Harris, Associate Architect—Installed for Norman-Seton, Inc.



One of Six Revolving Doors, Western Union Telegraph Co. Building, Hudson and Worth Streets, New York, N. Y.

VOORHEES, GMELIN & WALKER, Architects
MARC EIDLITZ & SON, INC., Contractors
Installed for GENERAL BRONZE CORPORATION

THE ATCHISON REVOLVING DOOR CO.

MAIN OFFICE AND FACTORY
INDEPENDENCE, KAN.

AGENCIES IN 70 OF THE PRINCIPAL CITIES OF THE UNITED STATES AND CANADA
Consult City or Telephone Directory for Name of Nearest Representative or Write the Main Office

Products

REVOLVING DOORS, complete with wings, enclosures, ceilings; also cornices, pilasters and ornament (except where these duplicate adjacent work, they are omitted). Adjoining swing doors, trim and accessories where desired.

In bronze, all white metals, cabinet woods.

Wings alone for marble enclosures only. Not furnished for wood or metal enclosures.

Revolving Door Benefits

Health—Prevent drafts, control ventilation, eliminate dust.

Convenience—Save floor space, reduce entrance effort by elimination of wind pressure, prevent confusion by automatically dividing in-and-out traffic.

Capacity—2000 to 3000 persons per hour each way (greater than is usual with swing doors).

Economy—20% annual return on investment in fuel saving. Increased rentable area.

Always Open—To traffic, in and out simultaneously.

Always Closed—To winds, cold and dust, and heat.

General Data—Manufacturer's Recommendations

Adaptability—For office buildings, hotels, banks, stores and all public and semipublic buildings where periodic or continuous heavy traffic exists.

Capacity Provision—The ideal entrance is one provided with revolving doors of sufficient capacity for normal traffic, flanked by single or pairs of swing doors. (See suggested arrangements or send plan of present entrance for individual recommendations.)

Where not originally included, provision should be made for future installations with the least structural change. Preliminary suggestions will be gladly submitted by our service department.

Sizes—For dimensions see cuts No. 164 and No. 166 (second page following). 4-wing doors *should not be less* than 6 ft. inside diameter. The standard is 6 ft. 6 in. except in hotels where 7 ft., 7 ft. 6 in. or even 8 ft. is needed for the convenient handling of luggage.

3-wing doors may be 4 ft. 6 in. to 5 ft. 6 in. in diameter. They are adapted for use where space is too small for 4-wing door or where less capacity is required.

Inside height should be 7 ft. to 8 ft., standard being 7 ft. base plates.

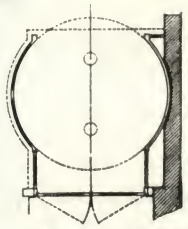
Bronze or nickel base plates are quoted separately, and should be used on exposed surfaces of all wood walls. Standard on metal doors.

Access to Bearing—Space over door *should* (not *must*) be accessible for oiling and adjusting main bearing. Ceiling access panels available, though not desirable.

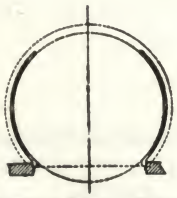
Glass—That the braces may be set sufficiently high to reduce racking strains, 24 in. is recommended as the minimum height from floor to bottom of wing glass.

Avoid internal angles which cause breakage. Beveling is undesirable because of refraction.

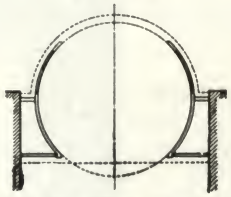
Marble Enclosures—Atchison wings are ideal for use with marble enclosures, as no ceiling slot is needed, and slabs can be supported from bearing channel which lies directly over it. Only a 1¾-in. center hole is needed —no other provision prior to placing of wings, except access to space overhead. Always provide anti-flap bevel or relief at ends of walls.



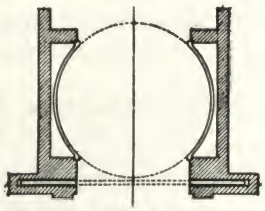
A—One Wall against Blank Building Wall—Screen Doors at Outside



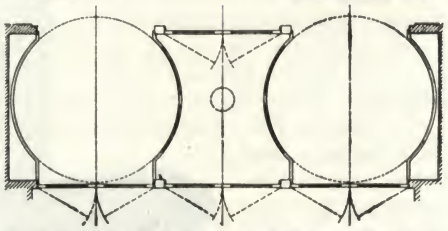
B—Common Layout Taking Place of Pair of Swinging Doors



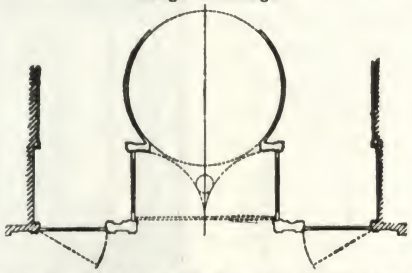
C—To Set Between Thick Masonry Jambs



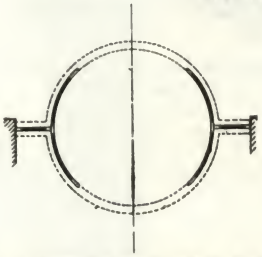
D—Placed in Existing Vestibule, Sliding Doors at Outside



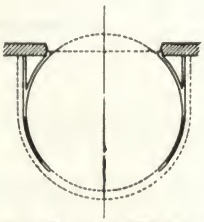
E—Combining Revolving and Swinging Doors for Large Buildings



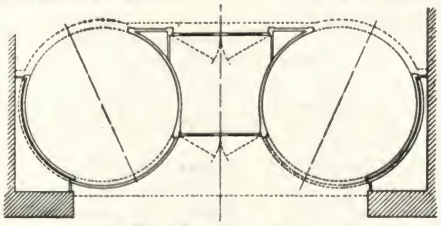
F—Another Combination with One Pair Outer Swing Doors Used as Connecting Jambs



G—Having Swing Doors or Side Lights at Either Side of Enclosure



H—With Enclosure Walls Straight Back to Building Wall



I—Special Layout to Get Two Revolving Doors and Small Swing Doors Into Narrow Opening—Note Curved Sliding Doors at Exterior

Suggested Layouts

Continued on next page

Types

Type NLD or NLE Full-folding and Safety Exit or Panicproof—For doors that are the *sole* exits for massed crowds (not offices, banks or hotels). Their added expense is not warranted for exits where side swinging doors are present or for average exit conditions. Wings assume full line collapsed position and allow passage at either side without revolving. They *also fold aside* like Type PB. See cut No. 165 (following page).

Type NLD is equipped with push-bar-release, monel cable brace and toggle tightener which will open under panic conditions without knowledge of the mechanism, but which *will not* release under jars, ordinary traffic, or wind pressure. Type NLE is equipped with simple automatic releasing cast bar braces.

Type PB Full-folding—Standard wings fold aside in pairs, on pivots, and lie entirely back of the chord line. They lock or unlock from either inside or outside at both top and bottom in diagonal position. (See Plan No. 92.) They may be fastened (to ceiling only) in crosswise, quartering or lengthwise position.

Type C Semi-folding—Wings fold into one plane not detached from central pivot and in lengthwise position only (to allow unrestricted passage and passing objects through).

Note: When revolving, *they have the same value* as other types, and are adapted to use where traffic does not justify investment in the more expensive types.

For dark room use, we make a two-wing lightproof door, with double air-lock strips. Send for details.

Type NLK—Overhead carriage suspension dispenses with side folding pivots, uses a ceiling slot and folds to one side. This type is for those who prefer, at a lower price, a door without the distinctive Atchison features.

Special Features

"Curved Wings"—An exclusive basic improvement in design of outstanding importance surpassing all secondary improvements affecting manner of folding, collapsing and locking. The "curved wings" increase usable space 6 in. in front of the body, permitting a more natural, upright position and easy stride in the line of traffic than is possible with the straight wing.

The "curved wing" is quoted at actual extra cost, under a policy of many years standing.

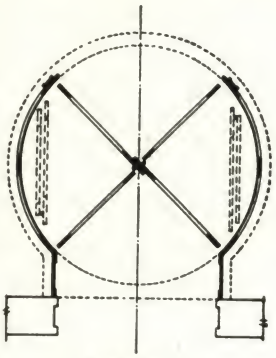
Experience *shows* that breakage of "curved wing" glass is extremely rare. A replacement plate may be carried or can be obtained promptly from stock at cost.

Folding of Wings—When desired, the wings (with exception of Types C and NLK) fold aside in pairs and *lie entirely back* of the enclosure wall opening or chord line *leaving full unrestricted passage space.* Note the particular advantages in this respect of the "curved wing" design. The folding operation may be accomplished with ease in 30 seconds.

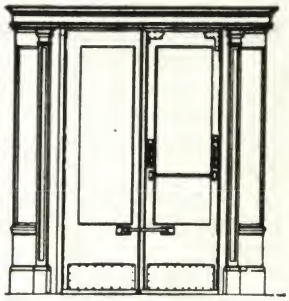
No Ceiling Slot—Due to the Atchison method of folding, the conspicuous and unsightly ceiling slot with traveling suspension carriage is eliminated, except in Type NLK.

Screen Doors—Light double acting screen or flap doors may be hung with removable hanging strips to enclosure wall ends without interference with wings (an exclusive Atchison feature).

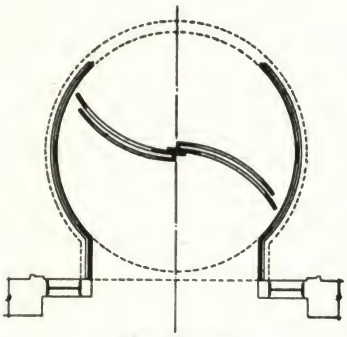
Air Lock Strips—Especially designed and selected to maintain the air lock with just the proper amount of friction. Easily adjusted. Consist of wide flexible rubber strips at bottom; heavy felt strips at top;



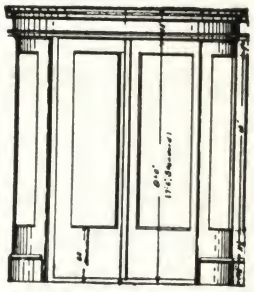
Plan No. 6



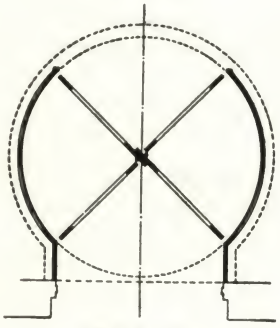
Elevation No. 7



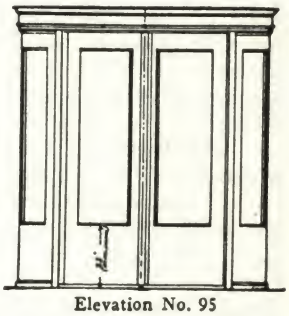
Plan No. 92



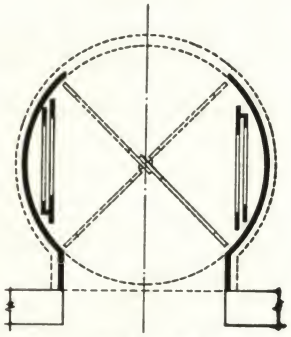
Elevation No. 91



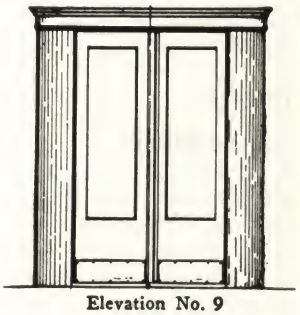
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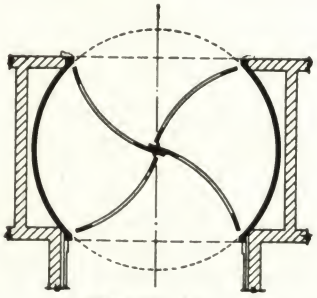
Elevation No. 95



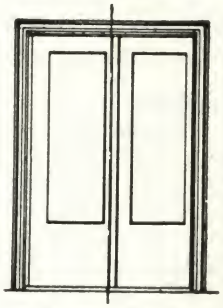
Plan No. 8



Elevation No. 9



Plan No. 16



Elevation No. 18

Standard Design Layouts

Continued on next page

tapered moulded rubber side strips with piano felt edges.

Materials, Construction and Finish

Wood—Wings and enclosures of all cabinet woods veneered over an improved type of laminated core construction. Material, construction and workmanship commensurate with the highest quality of cabinet work.

High class painters' finish applied by skilled workmen in any finish. (Samples of standard finishes on request.)

Metal Covered—Bronze, or nickel-silver or other white metal plate overlay construction in No. 16 gauge (recommended) or No. 20 gauge, applied with special metal-holding waterproof adhesive, under heavy pressure, to hardwood faced laminated cores, with hairline reinforced joints.

Note: This construction is particularly recommended for all except aluminum wings over hollow metal construction because of (1) greater stiffness to meet twisting strains (usually absent in swing doors), (2) less weight for the required stiffness (essential to avoid undesirable momentum and inertia effects), (3) lower cost, (4) greater fire resistance.

Finishes to match adjacent work. Bronze recommended in fine-line medium oxidized or statuary, not lacquered. (Samples on request.)

Hollow Metal—Enclosures furnished in No. 10 and No. 12 gauge, with drawn and extruded moulds. Wings in No. 14 gauge, specially constructed for stiffness.

Hollow Aluminum Wings—Developed with the help of the Aluminum Company of America, these are one-third to one-half the weight of other metal wings. Easy to start. Reduced momentum. Very strong and stiff. Biggest improvement since the "Curved Wing."

Hardware—Heavy, plain design, cast bronze or white metals in polished or brushed natural finish.

Cylinder locks (master-keyed if desired) are standard equipment on full-folding types, optional with overhead carriage types.

Stock Doors and Enclosures

To be had in one design only, as shown, size 6 ft. 6 in. diameter by 7 ft. high. In oak, gum or birch. All types, with or without glass in enclosure walls. Finished to suit.

At considerable saving over cost of door especially designed.

Specifications

Furnish and install, where shown on plans and details, revolving doors as made by The Atchison Revolving Door Co., Independence, Kan.

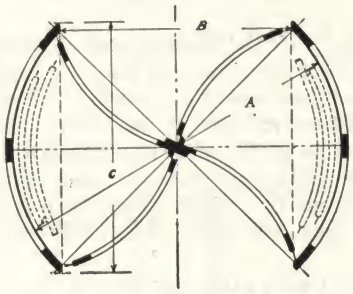
(Here specify optional requirements.)

Design: Special or stock. Type: PB; C; NLD; NLE, or NLK. Wings. "Curved" or "Straight." Material and finish. Connections. Special equipment, ceiling lights. Master-keyed cylinders, etc. Write for suggested detail open specification form if desired.

Facilities

Experience—Atchison Revolving Doors have been made continuously since 1906. An outgrowth of 50 years' experience.

Plant—Modern, efficiently planned and lighted, one-story 75,000 sq. ft. area. A woodworking factory, complete metal covered and hollow metal door shop. A complete foundry. Every part except lock cylinders from the simplest wood to the most elaborate metal doorway executed under one roof and supervision.

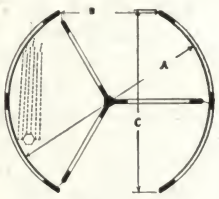


No. 164. "Curved Wing" Door Floor Plan

Note folded position of wings

Dimension Table

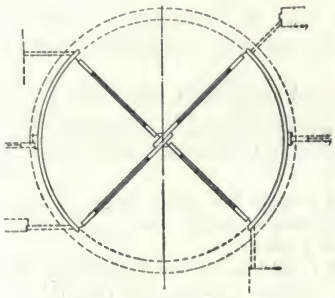
A	B	C
6'0"	4' 2½"	4' 7½"
6'6"	4' 6¾"	4'11¾"
7'0"	4'11 "	5' 4 "
7'6"	5' 3¼"	5' 8¼"
8'0"	5' 7½"	6' 0½"



No. 166. 3-Wing Door Floor Plan

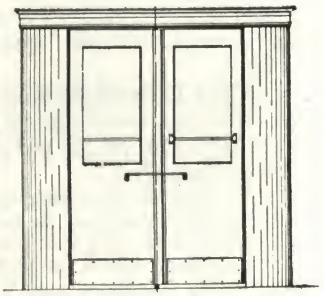
Dimension Table

A	B	C
4'6"	2'2½"	4'2"
5'0"	2'5½"	4'7"
5'6"	2'8½"	4'2"

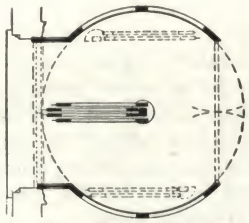


Plan of Stock Door

Dot lines representing various connections which can be applied at job

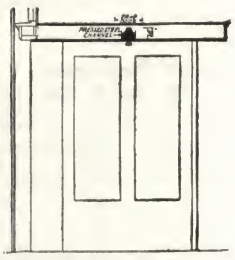


Elevation of Stock Door



No. 165. Floor Plan Type NLD Safety Exit Door

Showing screen doors



No. 169. Section Through Typical Ceiling

Showing connection at transom bar

Location—Favorable small town manufacturing conditions; low living costs and good shipping facilities.

Patents—The "Curved Wing" and other Atchison exclusive features are protected by patent. This company will guarantee against loss or damage from any infringement suits.

Quotations and Ordering

Agents can generally quote direct on stock designs. Due to numerous variations in material, design, finish and equipment, other doors must be quoted by the factory.

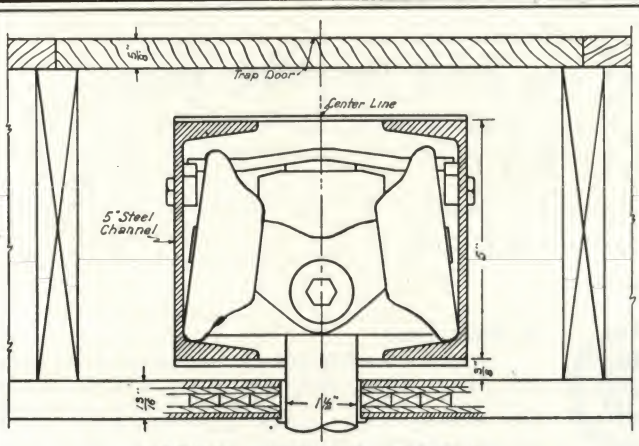
Sketch plans and designs furnished promptly.

We urge the placing of orders in the spring and summer to avoid seasonal congestion of fall and winter.

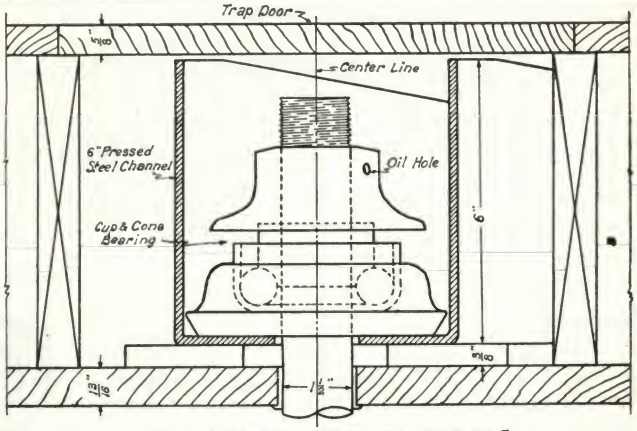
References

Lists of notable installations and references furnished on application.

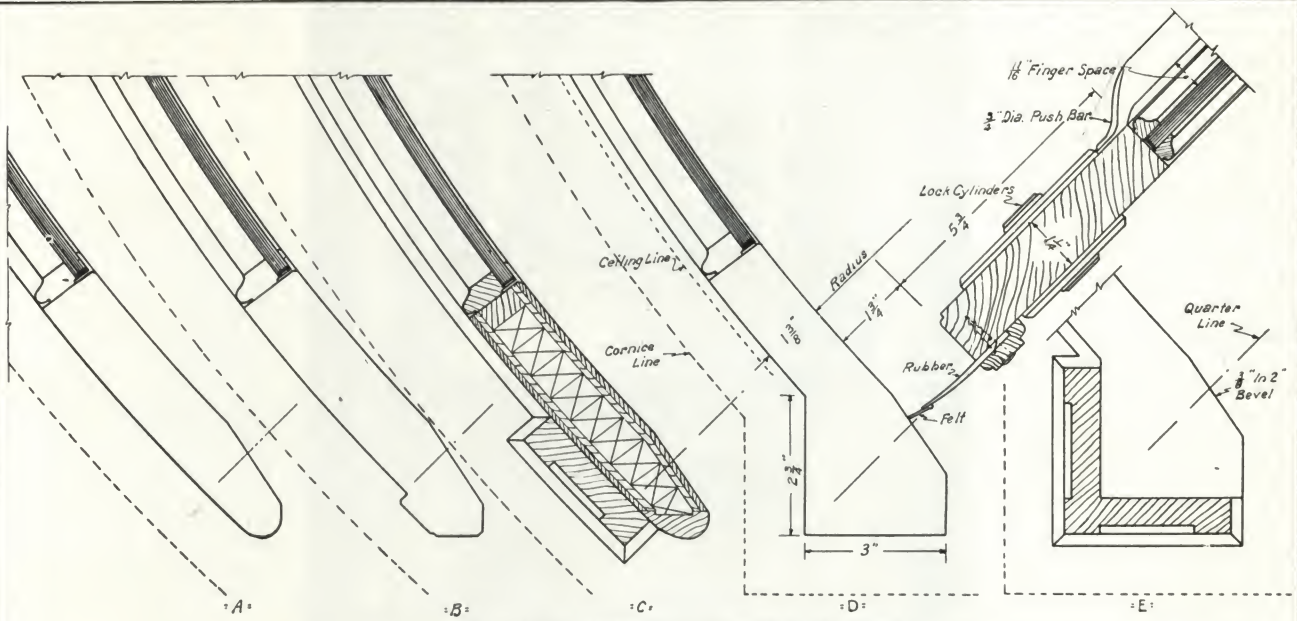
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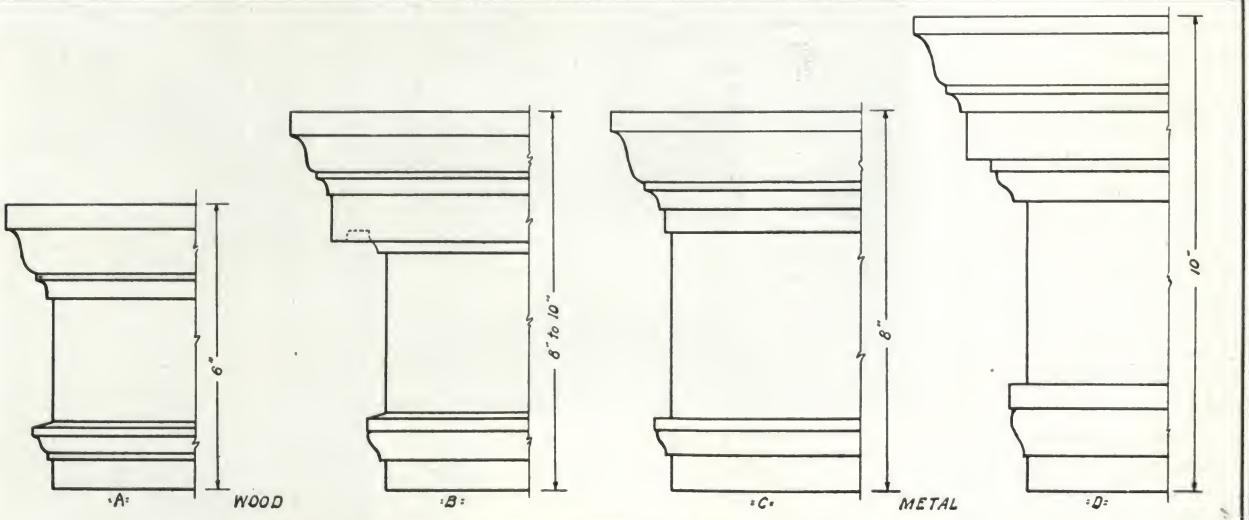
OVERHEAD SUSPENSION TYPE-K
CARRIAGE AND CHANNEL SECTION



FULL-FOLDING TYPES PB AND NLE
STATIONARY BEARING & CHANNEL



WALL ENDS ARRANGED IN ORDER OF COST



STANDARD CORNICE PROFILES RECOMMENDED

ATCHISON REVOLVING DOOR ~ RECOMMENDED DETAILS

SCALE 3" = 1'-0"

THE NEWMAN MANUFACTURING CO.

FOUNDED 1882

Bronze, Aluminum, Nickel, Steel and Wood Revolving Doors

MAIN OFFICE AND PLANT

CINCINNATI, OHIO

BRANCHES: CHICAGO AND NEW YORK

SALES OFFICES IN 84 UNITED STATES CITIES

Products

HOLLOW BRONZE, ALUMINUM, NICKEL, MONEL METAL and STEEL REVOLVING DOORS.

KALAMEIN BRONZE and STEEL REVOLVING DOORS.

WOOD REVOLVING DOORS.

For our pages on Ornamental Metal Work, Windows, Storefronts, Doors and Grilles, refer to Manufacturers' Index.

For Wrought Iron Work and Lighting Fixtures, see our Midwest Metal Art Division in Manufacturers' Index.

Facilities

The Newman plant contains 226,000 sq. ft. of space, and is devoted exclusively to ornamental metal work, employing 450 skilled craftsmen. The Door Department is second to none in size and facilities, and we are prepared to execute contracts for all varieties of doors and entrances, including revolving doors of our own design.

Co-operation

It is always a pleasure to co-operate with architects on problems involving the use of revolving doors. We welcome opportunities to offer suggestions and prepare details, together with estimates of cost, positively free of charge or obligation.

Send elevations and measurements, and we will gladly assist you through our Engineering and Drafting Departments, to the limit of our capabilities.

United States patents covering the original features of Newman Revolving Doors have been regularly applied for.

A Reference

As part of a $300,000.00 installation of our bronze and nickel silver work, the seven sets of Newman Revolving Doors in the Carew Tower, Cincinnati's new 49-story office, garage, store and hotel building, are recommended for special inspection. These hollow nickel silver doors, hung in ornate bronze enclosures, with solid sliding doors, constitute one of the finest installations of its type in the United States.

Construction

Newman Revolving Doors are hung in ceiling and floor discs of especially hardened steel which are housings for ball bearings. Each of these discs has four rounded grooves in which rest the four door panels, and these grooves are sufficiently deep to render the doors panic-proof, and yet permit of instantaneously collapsing the panels whenever necessary. There are fewer parts than make up any other revolving doors on the markets, especially since any and all braces and other features are done away with. Also, it will be noted, the panels may be of almost any thickness.





Carew Tower, Cincinnati, Ohio
WALTER W. AHLSCHLAGER and DELANO & ALDRICH, Associated Architects

Continued on next page

Advantages

(1) Operating in ball bearings; quiet, easily turned, and more enduring.

(2) Panicproof. Cannot be sprung or semi-collapsed with ordinary usage.

(3) No braces (rods or chains) to obstruct the way. No keys needed to unlock the panels in case of emergency, or when doors are to be folded together. An exclusive feature.

(4) Less parts than other doors. Easier to service, and to clean and oil.

(5) Weatherproofed with felt or rubber weather-stripping.

(6) Manufactured by a company specializing in highest grade ornamental metal work, assuring a wide range of styles of enclosures to choose from.

(7) Practically unlimited as to thicknesses of door panels. An exclusive feature.

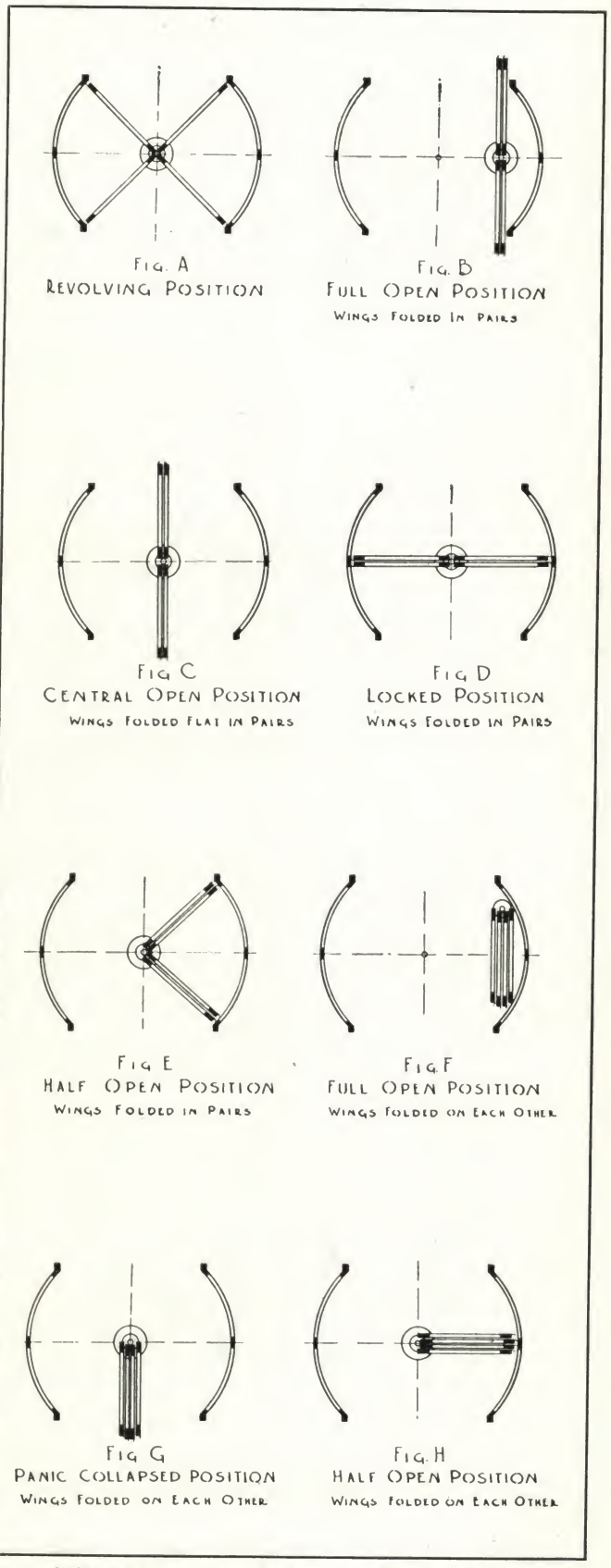
(8) Easiest of all revolving doors to collapse. A quick, hard jerk of two panels simultaneously, results in "jumping" the panels from their grooves, and an exactly similar jerk of the other two panels renders all four free-swinging, so that they may be folded together with one hand, after which they may be placed in any one of the positions shown in the detailed drawing.



Carew Tower, Cincinnati, Ohio
STARRETT BROTHERS, Builders

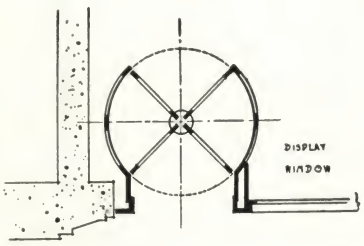
Literature, etc.

Please write for complete recommended specifications, being sure to mention the material in which you are interested.

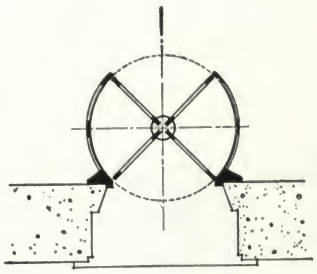


Collapsed Positions of Newman Revolving Doors
(Patents applied for)

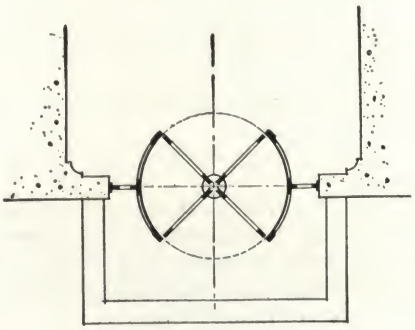
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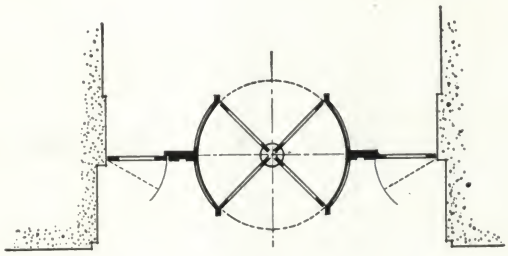
· STORE · ENTRANCE ·



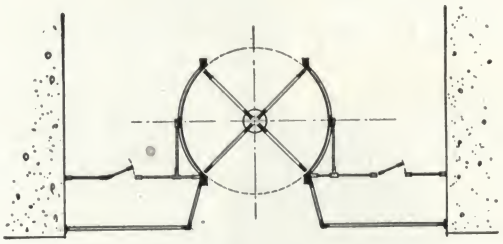
· COMMON · LAYOUT ·



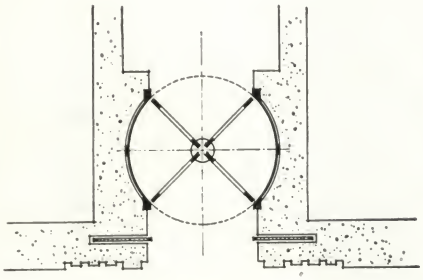
· ENCLOSURE ·
· HALF · EXPOSED ·



· SINGLE · DOOR WITH · SIDE ·
· LIGHTS · OR · SWINGING · DOORS · ON · EACH · SIDE ·

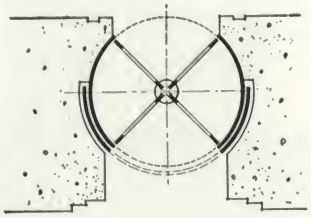


· STORE · FRONT ·

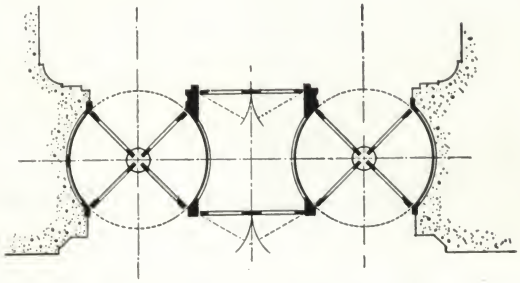


· ENCLOSURE ·
IN · WALLS · OF · VESTIBULE ·

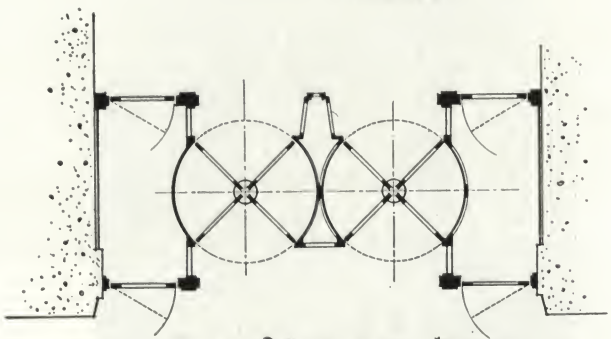
· SUGGESTIVE ·
· LAYOUTS ·
· REVOLVING · DOORS ·



· CURVED · SLIDING ·
· DOORS ·



· TWIN · REVOLVING · DOORS ·
· SWINGING · DOORS · BETWEEN ·

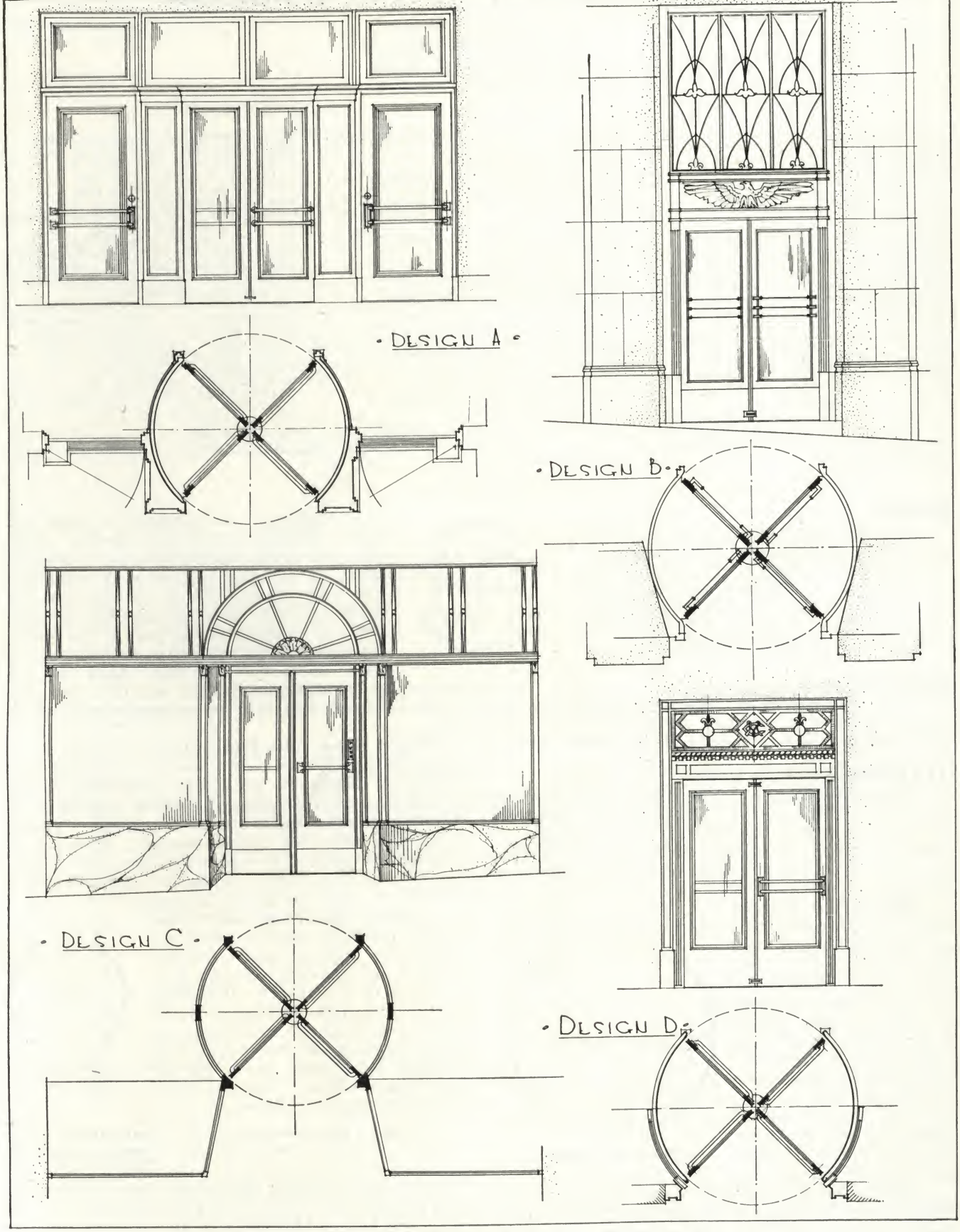


· TWIN · REVOLVING · DOORS ·
· SWINGING · DOORS · ON · BOTH · SIDES ·

THE NEWMAN REVOLVING DOOR

(Patents applied for)

Continued on next page



THE NEWMAN REVOLVING DOOR

(Patents applied for)

VAN KANNEL REVOLVING DOOR CO.

ESTABLISHED 1889

TELEPHONES
LUDLOW 6350, 6351, 6352, 6353, 6354

716 Whitlock Avenue
NEW YORK, N. Y.

REPRESENTATIVES

ATLANTA, GA., 675 Greenwood Ave., N. E.
BALTIMORE, MD., 509 No. Charles St
BIRMINGHAM, ALA., 513 No. 21st St.
BOSTON, MASS., 1042 Little Bldg.
BUFFALO, N. Y., 519 Jackson Bldg.
BUTTE, MONT., 51 East Broadway
CANTON, OHIO, P. O. Box 314
CHARLESTON, W. VA., 215 Hale St.
CHARLOTTE, N. C., Builders Bldg.
CHATTANOOGA, TENN., 821 East 11th St.
CHICAGO, ILL., Tribune Tower Bldg.
CINCINNATI, OHIO, 209-11 East 6th St.
CLEVELAND, OHIO, 1137 Schofield Bldg.
COLUMBIA, S. C., 17 Carolina Bank Bldg.
COLUMBUS, OHIO, 145 No. Front St.
DALLAS, TEX., 3015 Grand Ave.
DAYTON, OHIO, 494 Ludlow Arcade
DENVER, COLO., 812 Twelfth St.
DES MOINES, IOWA, P. O. Box 935
DETROIT, MICH., 420 U. S. Mortgage Bldg.
EL PASO, TEX., NEFF-STILES CO.
ERIE, PA., 405 Scott Bldg.
EVANSVILLE, IND., INTERNATIONAL STEEL AND IRON CO.
FARGO, N. D., 217 Broadway
FORT WAYNE, IND., 1751 Lindley Ave.
GREENSBORO, N. C., 314 Banner Bldg.
HARRISBURG, PA., 18th and Mulberry Sts.
INDIANAPOLIS, IND., 633 Architects' and Builders' Bldg.
JACKSONVILLE, FLA., Florida National Bank Bldg.
KANSAS CITY, MO., 1215 Midland Bldg.
KNOXVILLE, TENN., 712 So. Gay St.
LIMA, OHIO, 410 Opera House Block
LOS ANGELES, CAL., 408 So. Spring St.
LOUISVILLE, KY., 1446-48 Levering St.
MEMPHIS, TENN., 242 Madison Ave.
NASHVILLE, TENN., 57 Arcade Bldg.
NEW ORLEANS, LA., 319 Dryades St.
NORFOLK, VA., 235-37 Monticello Arcade Bldg.
OMAHA, NEB., 1914 Vinton St.
PHILADELPHIA, PA., 1600 Walnut St.
PHOENIX, ARIZ., P. O. Box 145
PITTSBURGH, PA., 1052 Century Bldg.
PORTLAND, ME., 31½ Exchange St.
PORTLAND, ORE., 61-7 Albina Ave.
RALEIGH, N. C., P. O. Box 1494
RICHMOND, VA., 202 Davis Bldg.
ROANOKE, VA., 507 Commerce St.
ROCHESTER, N. Y., Builders Exchange Bldg.
ST. LOUIS, MO., Century Bldg.
ST. PAUL, MINN., 2694 University Ave.
SALT LAKE CITY, UTAH, 204 Dooly Bldg.
SAN FRANCISCO, CAL., C. J. WATERHOUSE & SONS CO., 55 New Montgomery St.—Telephone, Garfield 6480
SEATTLE, WASH., 216-17 Walker Bldg.
SHREVEPORT, LA., 310 Ricou-Brewster Bldg.
SIOUX FALLS, S. D., 213 Paulton Bldg.
SYRACUSE, N. Y., 938 University Block
TERRE HAUTE, IND., 125 So. 7th St.
TULSA, OKLA., 714-5 Philcade
WASHINGTON, D. C., 1427 Eye St., N. W.
WILKES-BARRE, PA., Miners Bank Bldg.
WINNIPEG, CAN., 120 Lombard St.

AGENTS FOR JAPAN AND KOREA: UCHIDA TRADING CO., LTD., 11 Park Place, NEW YORK, N. Y.
AGENTS FOR CHINA: PAUL I. FAGAN & CO., 433 California Ave., San Francisco, Cal., and 29 Kiangse Road, P. O. Box 592, SHANGHAI, CHINA

Products

VAN KANNEL REVOLVING DOORS (3-Wing and 4-Wing styles) in three distinct types:
Automatic Collapsible, Panic Proof Type.
Standard "C" Rigid Brace Arm Type.
Standard "N" Rigid Brace Arm Type.
Also manufacturers of Van Kannel Revolving Pantry Windows (Patented).

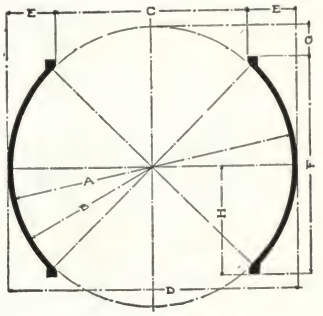
Original Patentee

This company is the pioneer manufacturer and original patentee of revolving doors; its patents cover every practical improvement and substantial feature.

Van Kannel Revolving Doors

Automatic Burglar Lock—Van Kannel Revolving Doors may be furnished with an automatic electrically controlled burglar lock which may be actuated by any number of push buttons located in any part of the building. Closing the circuit insures instantaneous locking of the door.

Materials—Materials used for entire construction are any kind of hardwood, bronze or steel on a metal frame or wood core covered with various gages of metals in either copper, steel or bronze, using the following gages—Nos. 24, 20, 16. Revolving door vestibules may be made of other materials such as marble, tile or cement, as may be needed in order to carry out architectural treatments.



Dimension Diagram

Stock Designs—Several stock designs are carried on hand in plain oak and birch, on which practically immediate delivery can be quoted. See stock series and stock special doors as illustrated.

Automatic Collapsible, Panic Proof Type—This type of door has 3 or 4 wings hung independently of each other on a central shaft of metal and wings are held together by flexible cables. This type of door gives a feature of absolute safety at all times and under all conditions. The safety feature lies in the fact that the revolving wings are so arranged that by application of pressure to any part of the revolving door, slightly more than necessary to revolve door, the revolving wings will instantly and automatically collapse and fold outwardly in line of egress, leaving a free, unobstructed passageway.

Rigid Brace Arm Type, Styles "C" and "N"—These two types consist of either 3 or 4 wings, held together in their radial position by rigid braces; wings are collapsed only by means of pressing a spring when it is desired to have doors open in the middle, or pushed to one side for a wide open passageway. These types, although collapsible as to folding of wings, are not automatically so, as in case of automatic collapsible, panic proof type of door previously described.

3-Wing Revolving Door—The 3-wing revolving door is especially adapted for entrances that are too small to accommodate a 4-wing door at least 6 ft. in diameter. It is being used to a great extent in entrances to toilet rooms in schools, institutions and public buildings and the company has installed 34 of these doors for the Prudential building, Newark, N. J. Approximately, 5 ft. diameter.


3-Wing Revolving Door

TABLE OF DIMENSIONS—FT.-IN.

A	B	C	D	E	F	G	H
5-10	2-11	3-11½	6-1	1-0¾	4- 7¼	7⅜	2- 3⅝
6- 0	3- 0	4- 1	6-3	1-1	4- 8½	7¾	2- 4¼
6- 2	3- 1	4- 2½	6-5	1-1¼	4-10	8	2- 5
6- 6	3- 3	4- 5¼	6-9	1-1⅞	5- 0¾	8⅝	2- 6⅜
6-10	3- 5	4- 8	7-1	1-2½	5- 3½	9¼	2- 7¾
7- 0	3- 6	4- 9½	7-3	1-2¾	5- 5	9½	2- 8⅛
7- 2	3- 7	4-10¾	7-5	1-3⅛	5- 6½	9¾	2- 9¼
7- 6	3- 9	5- 1½	7-9	1-3¾	5- 9¼	10⅜	2-10⅝
7-10	3-11	5- 4¼	8-1	1-4⅜	6- 0	11	3- 0
8- 0	4- 0	5- 5¾	8-3	1-4⅝	6- 1½	11¼	3- 0¾

DESCRIPTIVE DATA

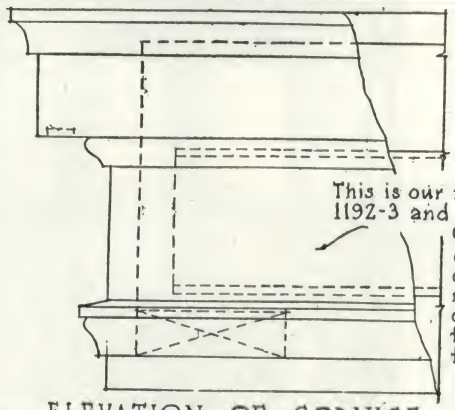
Standard Type Wings—Thickness, 1¼ to 1½ in., wood; 1 to 1½ in., metal.

Panic Proof Type Wings—Thickness, 1¼ in., wood; 1 to 1¼ in., metal.

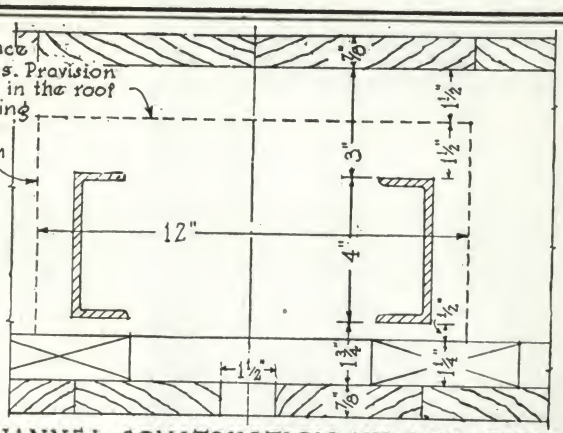
Door Vestibules—4 ft. 8 in. to 6 ft. diam., 3 wings; 6 ft. to 8 ft. diam., 4 wings; 7 ft. diam., normal.

Standard Size—7 ft. to 7 ft. 6 in. vestibules. Large enough for maximum capacity.

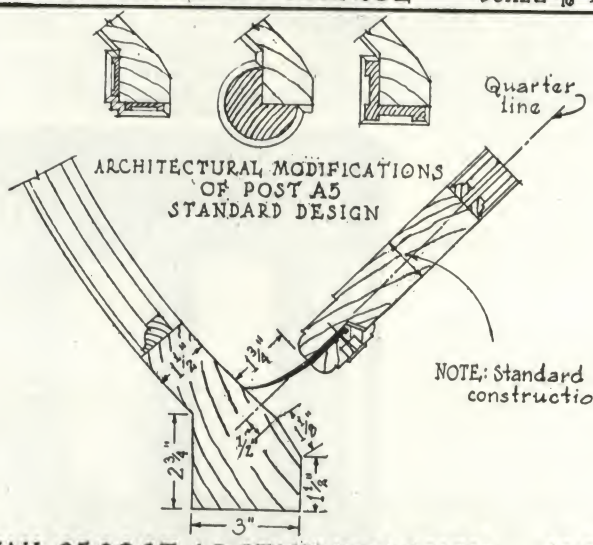
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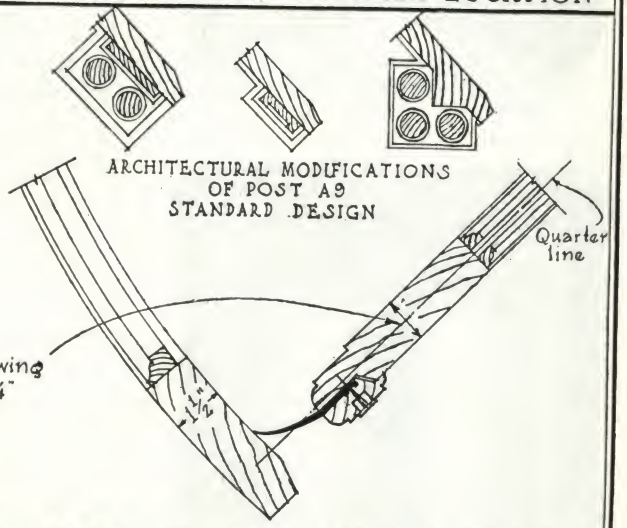
ELEVATION OF CORNICE. SCALE 3/16"=1"



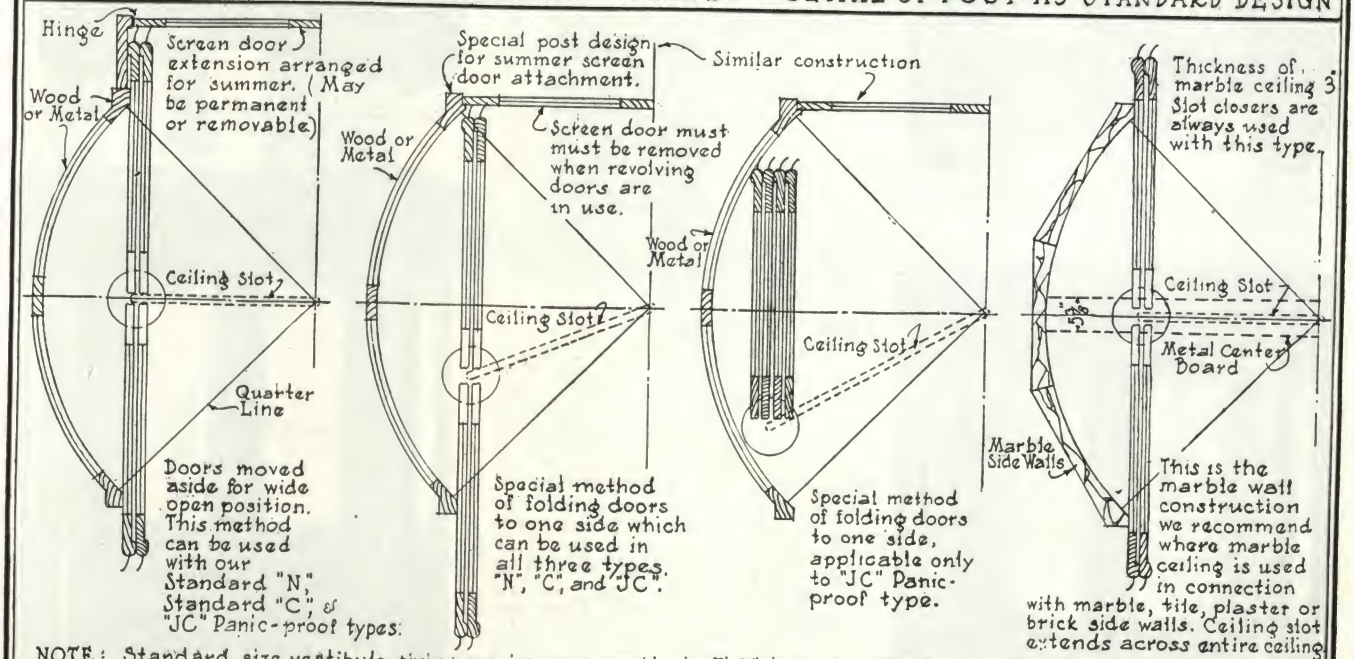
CHANNEL CONSTRUCTION AND LOCATION



DETAIL OF POST A5 STANDARD DESIGN SCALE 3/16"=1"



DETAIL OF POST A9 STANDARD DESIGN



NOTE: Standard size vestibule giving maximum capacity is 7'-0" diameter, 7'-0 high. Revolving doors are made in 3-wing and 4-wing types. The 3-wing type vestibule ranges from 4'-8" to 6'-0" diameter, and the 4-wing type ranges from 6'-0" to 8'-0" diameter. Normal diameter 7'-0". We also make 6-wing type doors, but do not advocate their use.

VARIOUS TYPES OF VESTIBULE CONSTRUCTION TO PERMIT CONVENIENT FOLDING OF WINGS

CONSTRUCTION DETAILS OF THE VAN KANNEL REVOLVING DOOR.

Continued on next page

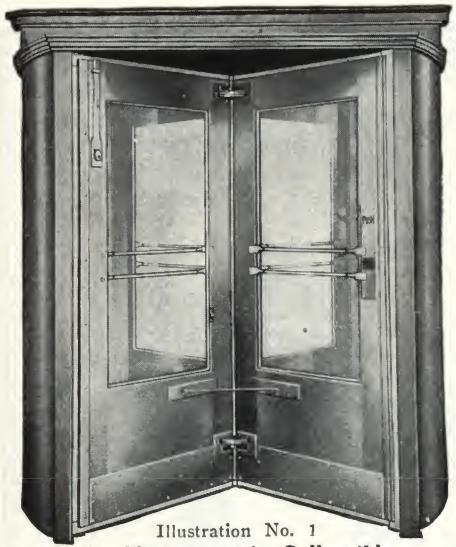


Illustration No. 1

Type JC Automatic Collapsible Standard Design 1192-1

Material: bronze

Design 1192-1-U: vestibule finished inside only



Illustration No. 3

Type C Rigid Brace Arm (Collapsible) Standard Design 1192-3

Material: oak



Illustration No. 5

Type Stock JC Automatic Collapsible Standard Design 8

Material: birch; size, 6 ft. 6 in. x 6 ft. 11 in.

STOCK DESIGNS

Specifications for Standard Equipment

The revolving door contract to include the revolving wings, circular walls, ceiling and cornice, together with all necessary mechanism, hardware, push bars, push plates, key locks and kick plates. All glass, either bent or flat, to be best selected American polished plate.

Type JC, Illustrations No. 1 and 2—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Design [1192-1] [1192-2] [1192-3] [1192-4] (see illustrations 1 to 4) Automatic Collapsible. Material: (if wood) the kind selected to match surrounding trim; (if metal) either kalamein plate on wood core construction or hollow metal.

Type C, Illustration No. 3—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Design [1192-1] [1192-2] [1192-3] [1192-4] (see illustrations 1 to 4) Collapsible. Material: (if wood) the kind selected to match surrounding trim: (if metal) either kalamein plate on wood core construction or hollow metal.

Stock "Special" Illustration No. 4—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Design Stock "Special" Automatic Collapsible Panic Proof mechanism. Woodwork to be birch. Finish to match surrounding trim.

Stock Standard Design 8, Illustration No. 5—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Standard Design 8, Automatic Collapsible Panic Proof mechanism. Woodwork to be birch. Finish to match surrounding trim.

Stock Standard Design 9, Illustration No. 6—Furnish and install where shown on plans, revolving doors of the VAN KANNEL REVOLVING DOOR Co. make, Standard Design 9, Automatic Collapsible. Woodwork to be gumwood. Finish: [bronze lacquer] [mahogany] [walnut] [oak].

Type "N" Fixtures

This type of fixture may be applied to any 4-wing design of Van Kannel Revolving Door, made of any material. The four wings are held in their revolving position by means of metal brace arms in the form of hooks. When it is desired to fold the wings for any reason it is only necessary to unhook the brace arms and hook them back against the fixed wings, since all the four brace arms are attached to these wings by means of sockets. After the brace hooks are caught back, as above mentioned, the two hinged wings can be folded and the revolving door may assume positions illustrated on following page.

Positions Assumed by Wings

Note on following page position assumed by wings of various types here shown.



Illustration No. 2

Type JC Automatic Collapsible Standard Design 1192-2

Material: bronze



Illustration No. 4

Type Stock JC Automatic Collapsible Standard Design 7

Material: birch; size, 7x7 ft.



Illustration No. 6

Type Stock JC Automatic Collapsible Standard Design 9

Material: gumwood; size 6 ft. 4 in. x 6 ft. 10 in.

Finish: bronze lacquer (also mahogany, walnut and oak)

Continued on next page

Position Assumed by Wings

Illustrations below are for the purpose of showing positions assumed by wings and do not illustrate "Stock Designs." Key to positions assumed by wings, referring to designs illustrated on preceding page is tabulated at the bottom of this page.

Architectural Literature

Check your files to see that you have the following important Architectural Literature:

Second Edition Manual of Revolving Door Construction and Architectural Design—twenty-four pages; and eight-page Specification Folder.

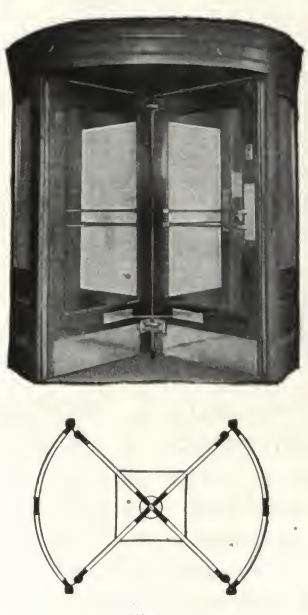


Fig. 1
REVOLVING POSITION
Four wings extended, permitting persons to pass in and out, at the same time excluding noise, rain and snow, heat and cold, wind and dust



Fig. 2
LOCKED POSITION
Four wings folded in pairs and placed across vestibule, securely locked or bolted. Lock operates from both sides

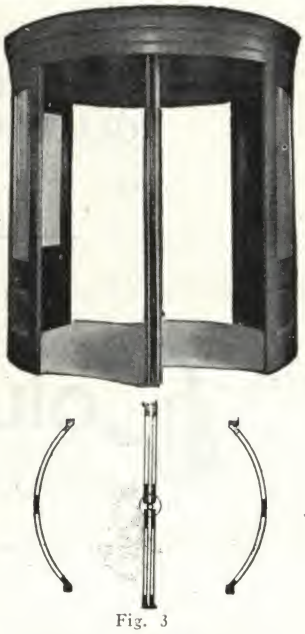


Fig. 3
CENTRAL OPEN POSITION
Wings folded flat in pairs and held in position by folding bars, making two passages separating traffic

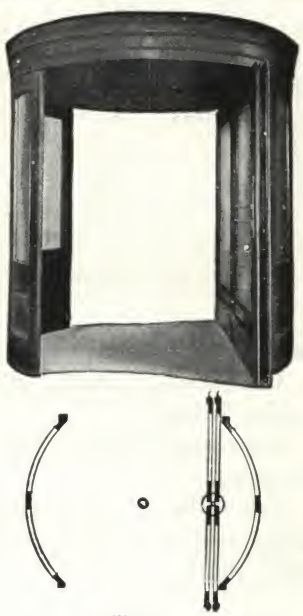


Fig. 4
FULL OPEN POSITION
Wings folded and moved aside, making available full width of entrance

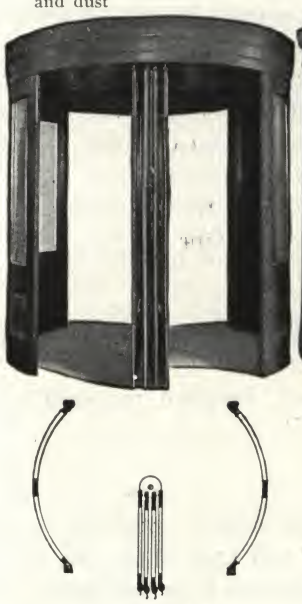


Fig. 5
PANIC COLLAPSED POSITION
Wings folded on each other in outward position, dividing traffic into two streams

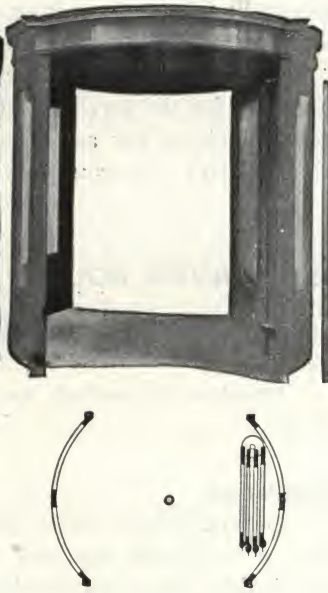


Fig. 6
FULL OPEN POSITION WITH WINGS COLLAPSED
Wings folded on each other and moved to one side making available full width of entrance

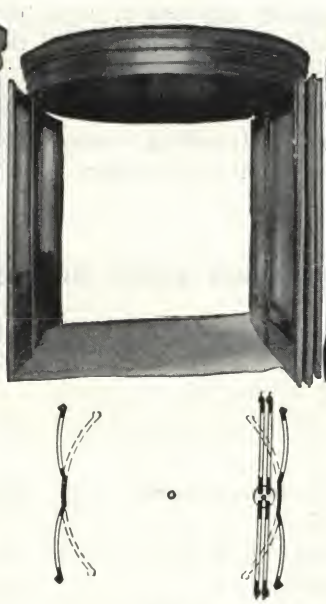


Fig. 7
FULL OPEN POSITION WITH FLEXED WALLS
Wings folded and moved aside with hinged walls flexed for added space

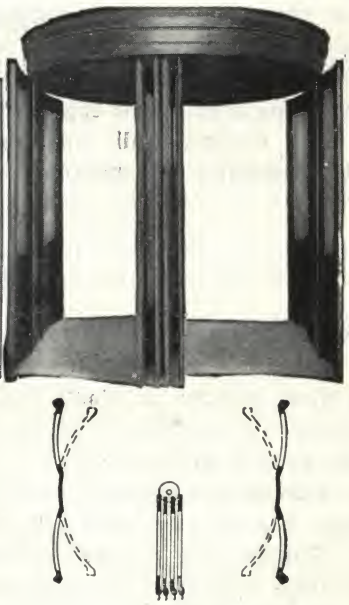


Fig. 8
PANIC COLLAPSED POSITION WITH FLEXED WALLS
Wings folded on each other in outward position with walls flexed for added space

Positions Assumed by Wings—All Types of Doors

Note: One wing may also be folded at a time if desired.

TYPE STOCK "SPECIAL"—Positions Nos. 1, 2, 3, 4, 5 assumed by wings.

TYPE C COLLAPSIBLE—Positions Nos. 1, 2, 3, 4 assumed by wings.

TYPE N COLLAPSIBLE—Positions Nos. 1, 2, 3, 4 assumed by wings.

TYPE JC AUTOMATIC COLLAPSIBLE—Positions Nos. 1, 2, 3, 4 and 5 assumed by wings.

Note A—Special trolley construction can be furnished which will permit wings to assume position shown in Fig. 6.

Flexed Walls—In order to provide added entrance space where desired, flexed wall construction can be furnished which will permit wings to assume positions shown in Figs. 7 and 8.

THE COLUMBUS ROLLING DOOR CORPORATION

Manufacturers of Columbus Steel Rolling Doors and Shutters

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COLUMBUS FIRE DOORS and SHUTTERS.

For Columbus "Rol-Up-Over" Garage and Industrial Service Doors, see Manufacturers' Index.

Columbus
STEEL ROLLING
DOORS AND SHUTTERS

Columbus Experience

The Columbus line of steel rolling service doors and automatic labeled fire doors and shutters, while new from the standpoint of manufacture, are old from the standpoint of engineering experience, design and production, because of the fact that the officers of THE COLUMBUS ROLLING DOOR CORPORATION and the majority of the engineers are pioneers in creating and designing all types of steel rolling doors, and particularly the automatic labeled door designed for fire protection in all classes of risks.

Thirty years in developing patentable devices in connection with the art, make possible modern developments and refinements of many features in the construction and production of Columbus Steel Rolling Service and Fire Doors and insure for the architect and contractor a most satisfactory product.

Service

Our Engineering Department will gladly co-operate with the architect in making correct layouts of installation when drawings are on the board.

Do not hesitate to ask for this assistance when necessary for the service is gladly rendered and without cost, even in so far as to sending an engineer to your office to work with your own men.

COLUMBUS STEEL ROLLING SERVICE DOORS

Construction

Columbus Steel Rolling Doors are constructed in the most modern of plants and of the finest quality materials in accordance with specific engineering detail. *Each door is built to order.*

Curtains—Composed of interlocking open hearth copper bearing steel slats galvanized.

Guides—Are of steel, mounted at sides of jambs or within openings where necessary.

Shafting—Heavy and journaled in interchangeable malleable iron brackets.

Gears—Machine moulded.

Barrels—Ample diameter to prevent excessive deflection.

Springs—Helical oil tempered steel springs, perfectly calibrated to correct requirements, enclosed within the barrels and on the shafting.

Bearings—May be several kinds, depending upon the load required and are usually babbited or bronze, though in motor equipment roller and ball bearings are used.

Hoods—Galvanized steel, designed for each type of door.

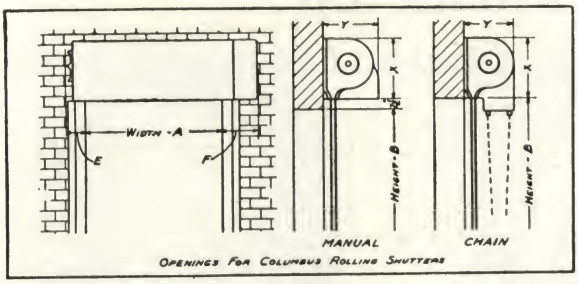
Installation

General utility doors are usually mounted on the face of wall with brackets and coils above the lintel, with inside face of guides flush with face of jambs, but door may be mounted beneath or within the lintel with guides on the jambs where the need arises.

Methods of Operation

Doors up to 100 sq. ft. and less than 8 ft. in height may be raised or lowered by hand like a window curtain. Larger doors can be operated by crank shaft and gear by endless chain with reduction gear, or by motor. In the latter case, complete description of current with drawing of clearances is required.

Continued on next page



OPENINGS FOR COLUMBUS ROLLING SHUTTERS

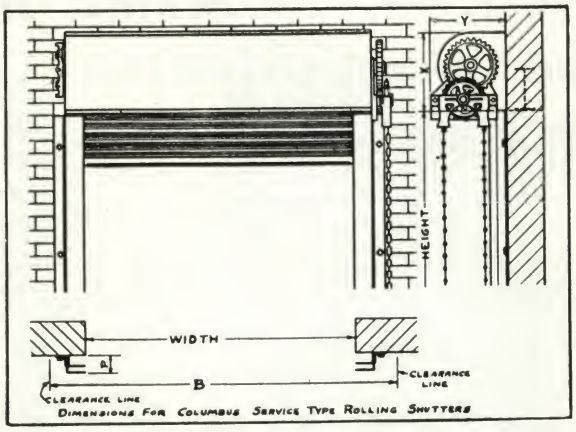
OPENINGS FOR COLUMBUS SHUTTERS—FACE OF WALL

Manual Automatic

Height (B), ft.	Width (A), ft. 3	4	5	6	7	8	9	10
6	E– 6 in. F–12½ in.							
7	X–15½ in. Y–15½ in.				E–6 in. F–12½ in.			
8			X–16 in. Y–15½ in.			E– 6 in. F–12½ in.		
9	E– 6 in. F–12 in.					X–18 in. Y–18 in.		
10	X–17 in. Y–17½ in.							
11			E– 6 in.		F–12½ in.			
12			X–19 in.		Y–18½ in.			

Chain Automatic

Height (B), ft.	Width (A), ft. 5	6	7	8	9	10	11	12
6								
7			E– 8 in. F–12 in.					
8			X–16½ in. Y–20 in.					
9								
10								
11					E– 8 in. F–13 in.			
12					X–18 in. Y–21 in.			



DIMENSIONS FOR COLUMBUS SERVICE TYPE ROLLING SHUTTERS

COLUMBUS SERVICE TYPE ROLLING SHUTTERS

Height, ft.	Width, in. X	Y	Width, in. X	Y	Width, in. X	Y
	Operated by Handle in Bottom Bar					
8	18	16½				
10	19	17½				
	Operated by Chain or Gears					
8	13½	11¼	14	12¾	17	15
10	13½	11¾	15	13½	18	15½
12	16	13½	16	13½	19	17
14	16½	14¼	17	15¼	19	17½
16	17	15¼	18	16½	22	20

Note: B—Width plus 8 in. on small doors. Width plus 10 to 12 in. on large doors.

COLUMBUS FIRE DOORS AND SHUTTERS

Types

Fire doors and shutters are installed under the supervision of the Underwriters' Laboratories, Inc., and are labeled by us under inspection: "Laboratory Label Service Applied For."

Exterior window shutters are automatic only. This type of shutter can be furnished in a concealed type with coil built in above the lintel and grooves attached to window frame.

Emergency release operable from floor level can be used for periodic reliability tests.

Limitations

Exterior Walls—Not automatic, not to exceed 100 sq. ft.

Width or height not to exceed 12 ft.

Fire Walls, Vertical Shaft and Roof Partitions—Limited to 80 sq. ft.

Width or height not to exceed 12 ft.

Weights—Exterior doors, 22 gauge; other door 20-16 gauge.

Features of Columbus Fire Doors

(A) Powerful starting spring motor insuring closure when link fuses at predetermined temperature. Main counterbalance not disturbed.

(B) Safety device controlling speed of closure and eliminating impact at sill or injury to persons under door.

(C) Proper location of fusible links insuring quick action.

(D) Automatic release protected from weather.

(E) A means which allows relative expansion of parts.

(F) Non-corrosive metal in bearings and contact point in automatic release.

(G) Fusible release for relative expansion.

(H) End locks designed to close concaved ends of slat preventing passage of flame.

(I) An automatic inner baffle plate controlled by fusible link blocking passage of flame around curtain barrel.

(J) Doors can be opened or closed without difficulty after automatic closure.

(K) Automatic control can be reset by simply putting in a new fuse and raising door rapidly. Initial spring adjustment permanent.

(L) Columbus Fire Doors are available for service purposes at all times and will close automatically from any position.

Fire doors exceeding 80 sq. ft. and 12 ft. in height may be had with Underwriters' certificate by securing approval of the Underwriters on each job. Such service should be indicated on the order: Laboratory Label Service Applied For.

Methods of Operation

Manual—Large fire doors exceeding 100 sq. ft. can be equipped with chain hoist or bevel gear with hand crank.

Motor—Motor units are compact, powerful, equipped with reduction gears, limit switches, magnetic brake, reversing panel, emergency hand chain, push buttons or knife switches. Conduit or wiring not included. Unit is mounted on special brackets.

ESTABLISHED 1846

CORNELL IRON WORKS, INC.

Steel Rolling Shutters and Doors; Underwriters' Labeled Fire Doors and Shutters

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CORNELL IMPROVED DEEP ARCH INTERLOCKING SLAT STEEL ROLLING SHUTTERS and DOORS, handle, chain, crank, or motor operated, for residences, office buildings, garages, wharves and piers, warehouses, elevator shafts, store fronts, craneway openings, etc.

UNDERWRITERS' LABELED FIRE DOORS and SHUTTERS.

Send for 32-page Catalogue, with complete dimensions, specifications, etc.

Location

Cornell doors are manufactured in Greater New York in a modern one-story factory.

Unexampled shipping facilities by all railroads, as well as water routes to all points on the east, south and west coasts, and the Great Lakes.

Experience

CORNELL IRON WORKS, INC., is the oldest rolling door manufacturer in the United States. Cornell doors have been in use for over 50 years. Our later types embody many modern improvements.

CORNELL ROLLING DOORS

Description

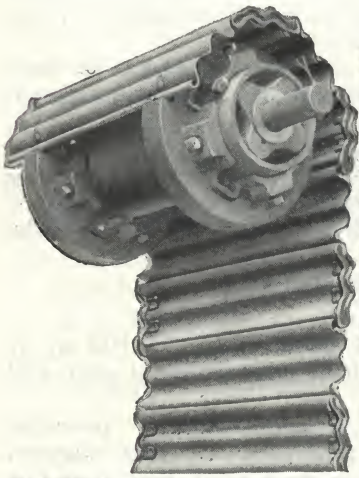
Cornell steel rolling doors are designed for the closure of all types of openings. They offer fire and burglar protection, combined with neat appearance and economy of space.

The curtains run in vertical side guides, and coil around a horizontal shaft above the opening.

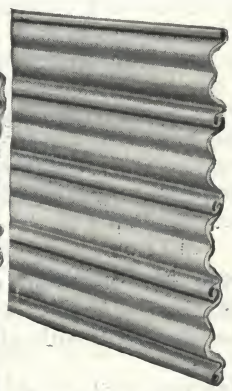
The weight of the curtain is counterbalanced by springs in the shaft, which permit it to remain stationary in any position.

Why Cornell Rolling Doors

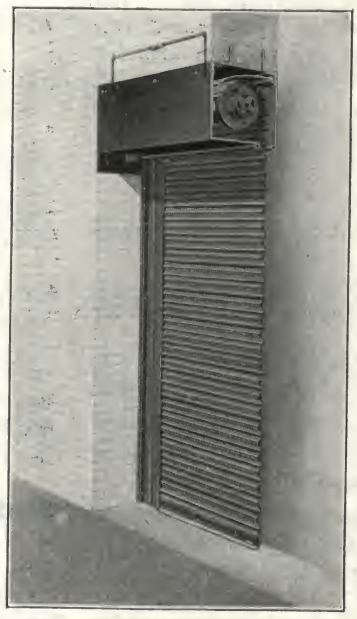
They take the minimum of room. They are all-steel and will last as long as the building. They operate with surprising ease in the largest sizes. They are easily repaired, after accident, with a few new slats quickly inserted.



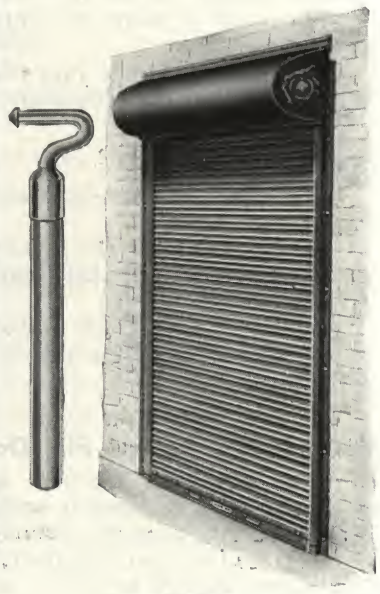
End View of Shaft and Curtain
Note malleable iron end locks and deep arch of slat



Front View of Slat Curtain
End locks removed

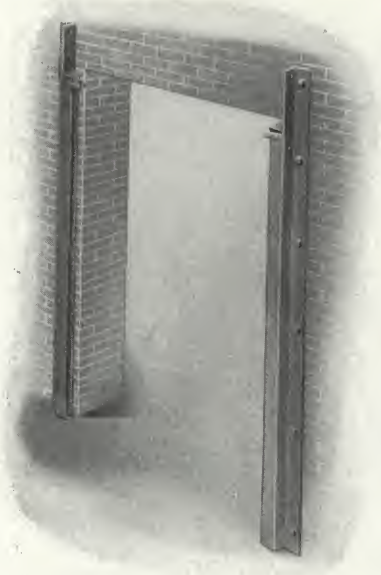


Sectional View of Llenroc Labeled Door, between Jamb Location
Note the fuse link and the hinged baffle plate which drops on the curtain top in case of fire

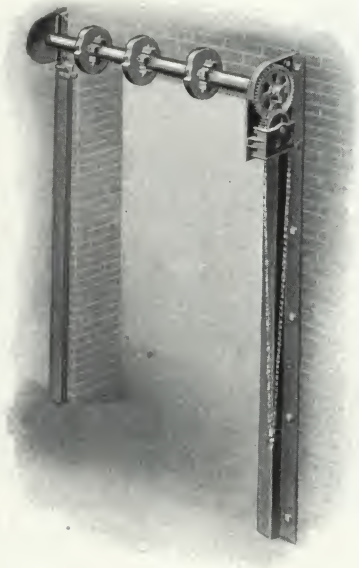


Type SCF Door
Abbreviation for self-coiling operation, face of wall location. Standard up to 80 sq. ft. It can be operated from either side by handles. Pole furnished gratis where required

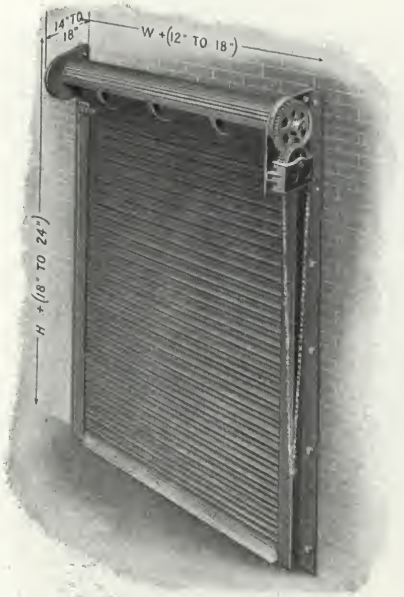
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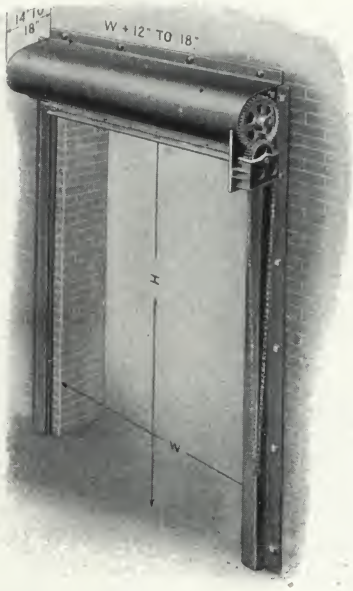
1st Step
Channel shaped guides in place. Fastened at the top with a through bolt. Expansion bolts below



2nd Step
Steel brackets attached supporting the shaft. Note the self-contained construction, making for easy erection

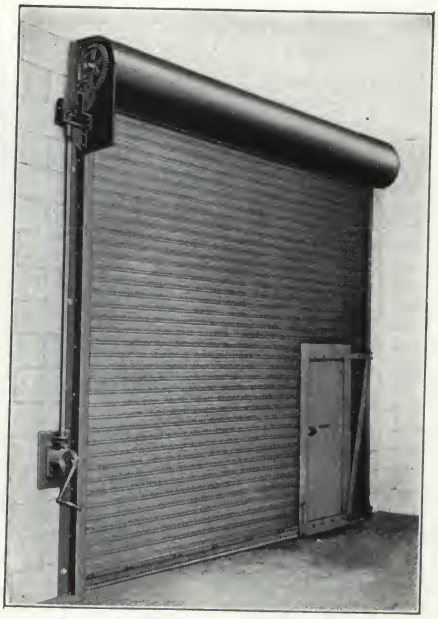


3rd Step
Steel curtain in place. Note the dimension limits giving approximate clearances required

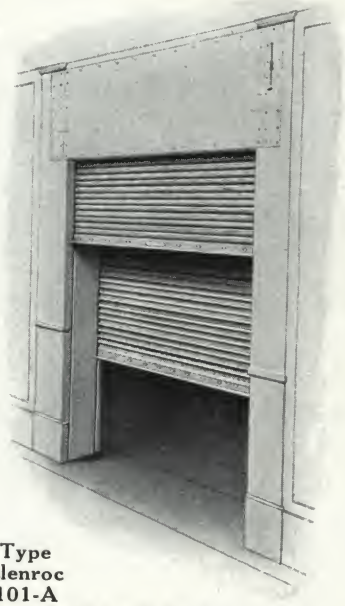


4th Step
Curtain rolled up with hood in place. The cylindrical hood is fastened to the wall with expansion nails. Note approximate clearances

Erection of a Cornell Chain Gear Face of Wall Door Type CGF
Four steps in the erection of a Cornell chain gear face of wall door. Abbreviation "CGF" specifying the type. The chain and gearing may be placed on the left side if preferred. The pipe shaft contains the counterbalancing springs. This is the standard door for openings over 80 sq. ft. up to the large motor driven installations



Type HCF Door with Wicket
Abbreviation for hand crank operation, face of wall location. Easily operated from either side of wall. Note the small wicket, or pilot, door, the frame of which swings out when the big door has coiled



Type Llenroc 101-A
Double and Superimposed
One door coils above the other thus economizing space. Makes a neatly concealed installation for fine buildings. Both doors labeled

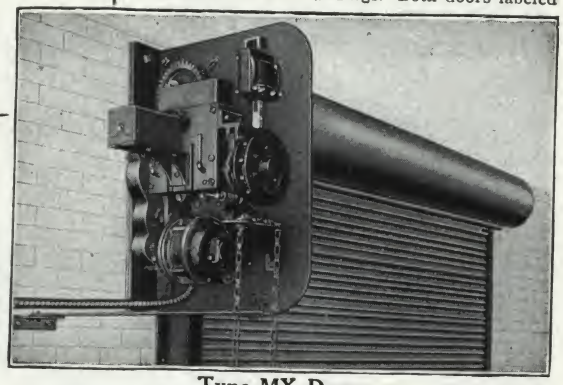
Operation

There are four typical methods of operation:

Self-coiling Type—Standard for openings up to 80 sq. ft. and below 8 ft. in height. Push up and pull down by handles on the bottom bar. The quickest acting construction possible.

Hand Chain and Gearing Type—Standard for larger openings. Shaft revolved by endless hand chain, acting through single, or compound, gearing on an overhead gear bracket.

Motor Drive Type—Standard for the largest openings up to 45 ft. in width.



Type MX Door
Standard electric motor drive for smaller doors. Note the self-contained, direct connected construction, the enclosed gears, the limit switch, solenoid brake and emergency hand chain

Continued on next page

Automatic Closing Type—Controlled by fusible links. Made to Underwriters' standards, labeled by Underwriters' Laboratories, Inc., and approved by Factory Mutual Laboratories. Thirty designs of labeled fire doors, including: Fire wall doors, Class "A"; vertical shaft doors, Class "B"; corridor and room partition doors, Class "C"; and exterior doors and shutters, Class "D."



Llenroc Type

The most used construction for automatic fire doors. Placed on the face of the wall and carrying A, B, C or D label. Note the fuse link.

Llenroc is Cornell spelt backwards and denotes automatic doors labeled by Underwriters' Laboratories, Inc.

Cornell Improved Interlocking Steel Slat Curtains

Designed to give unusual rigidity against wind pressure, having a depth at the crown of 7/8 in. The appearance is attractive from either side, as the curtain is made up of a series of cold rolled steel mouldings with deep relief.

The end locks are made of malleable iron, designed for maximum wear and strength. Furnished in U. S. gauges from No. 16 to 22, cold rolled and galvanized.

Non-corroding Curtains

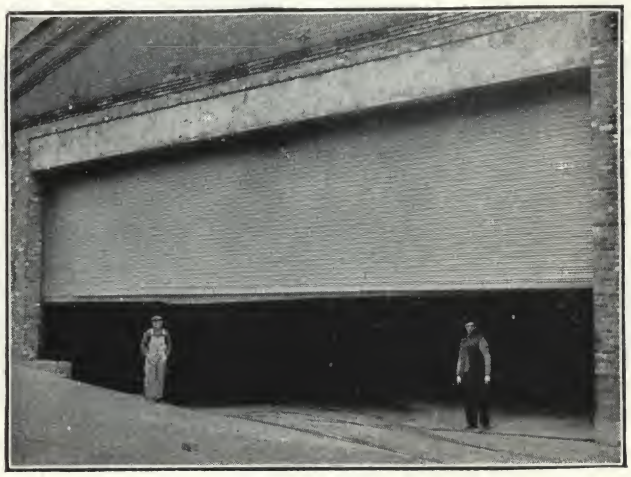
Of cold rolled bronze, aluminum, stainless steel, or zinc interlocking slats. An original Cornell product. Require no painting. Of great service in resisting coal gas, acid fumes, severe salt water exposure, etc. Give a very handsome finish at comparatively small extra cost.

Cornell Patented Non-corroding Curtain Bottoms

Experience proves that all exposed doors and shutters of steel corrode fastest at the bottom.

To neutralize this, Cornell Iron Works, Inc., has originated the feature of using 12 to 18 in. of bronze, or stainless steel, bottom slats for exposed doors.

The extra cost is small and the life of the installation may often be more than doubled by this method.



Widest Rolling Door Ever Made—45 ft., Motor Driven

Motor Driven Units

Cornell motor drives are made in a self-contained unit, completely assembled in the shop. The gears can not get out of alignment.

The worm is placed under the worm wheel, is completely enclosed, and runs in an oil bath.

Automatic starters are furnished with all installations.

Electric brakes are furnished where required.

Equipment is G-E material.

Operation—On pushing the proper button, the solenoid acts to open the brake and the door moves up or down, as the case may be, at a rate of approximately 1 ft. per second.

On reaching the top or bottom of the door travel, the limit switch operates, automatically cuts off the current, stops the motor, cuts out the brake magnet and lets the brake go on with full power, locking the entire mechanism against further travel.

The action is foolproof.

Door may be stopped at any point in its travel, by simply throwing the switch. This operation automatically puts on the brake, and the door stops promptly.

Underwriters' Labeled Fire Doors

Cornell rolling doors have been thoroughly tested by Underwriters' Laboratories, Inc., Chicago, and carry their label for the following types of openings:

Fire Wall Doors—Made of No. 16 gauge and labeled up to 80 sq. ft. in size—Class A.

Vertical Shaft Doors—Made of No. 20 gauge and labeled up to 80 sq. ft. in size—Class B.

Corridor and Room Partition Doors—Made of No. 20 gauge and labeled up to 80 sq. ft. in size—Class C.

Exterior Doors and Shutters—Made of No. 22, or No. 20 gauge, and labeled up to 100 sq. ft. in size—Class D.

Note: Doors larger than the above limits can be made to Underwriters' specification and a certificate of inspection furnished.

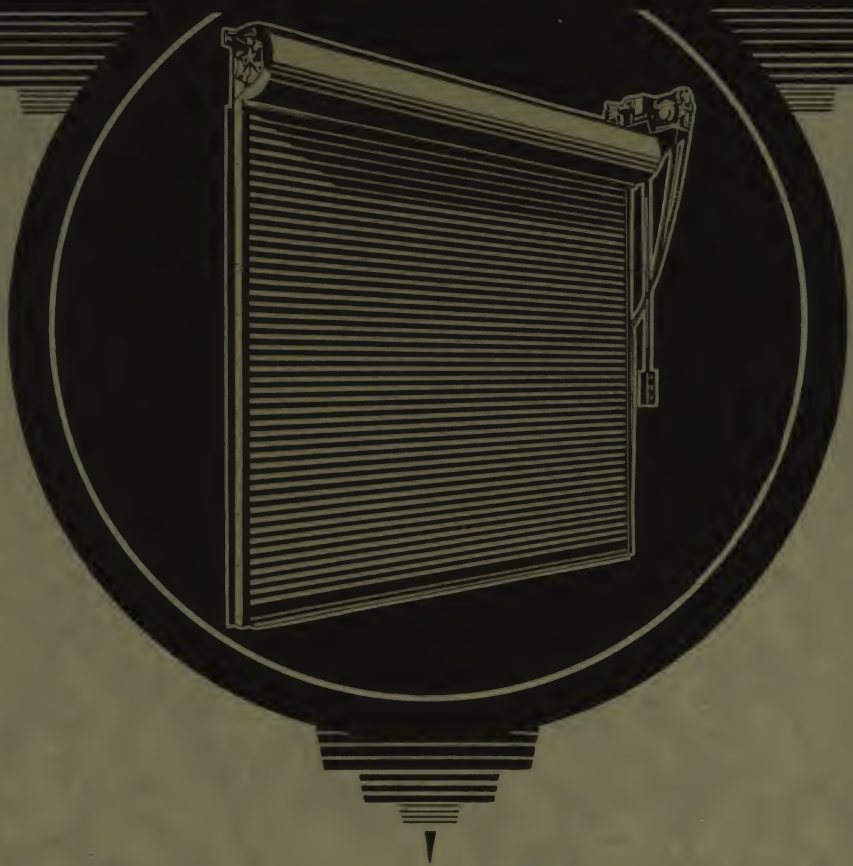
Catalogue and Service

Write for 32-page catalogue, and call on our Engineering Department for free advice and suggestions.



Double Fire Doors, with Concealed Coils, Horn and Hardart Restaurant, New York, N. Y.

MAHON
ROLLING
STEEL DOORS



THE R. C. MAHON COMPANY
DETROIT, MICHIGAN

THE R. C. MAHON COMPANY

Manufacturers of Rolling Steel Doors

DETROIT, MICH.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Product

MAHON ROLLING STEEL DOORS.

For Mahon Permanent Steel Floor Forms, Steel Roof Deck, Kalamein and Tin Clad Doors, and Cast Iron Roof Sumps, see page numbers in Manufacturers' Index.

MAHON STEEL ROLLING DOORS
APPROVED BY THE UNDERWRITERS' LABORATORIES INC.

Mahon Rolling Steel Doors Meet Every Requirement Under Any Condition

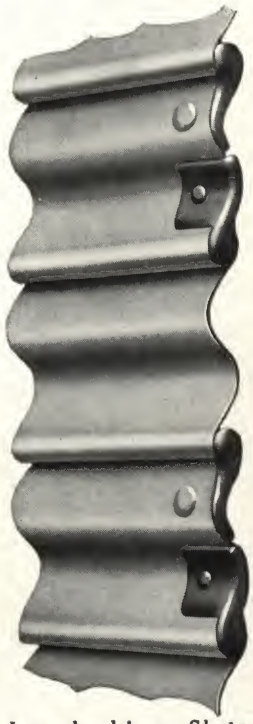
Mahon Rolling Steel Doors are manufactured from the highest grade material obtainable. They are produced in many labeled and non-labeled types to meet every requirement of industrial or commercial use.

Standard Doors

Mahon Standard (non-labeled) Rolling Steel Doors are made with specially designed interlocking slats rolled from copper bearing electro-galvanized steel, and fitted with malleable iron end locks to provide maximum rigidity and ease of operation. The tubular roller shaft to which the shutter curtain is attached is exceptionally rigid, and operates in bronze bearings fitted into the end brackets. End brackets are heavy gray iron castings. These are of numerous sizes and shapes to accommodate the many door sizes and the various types of operators.



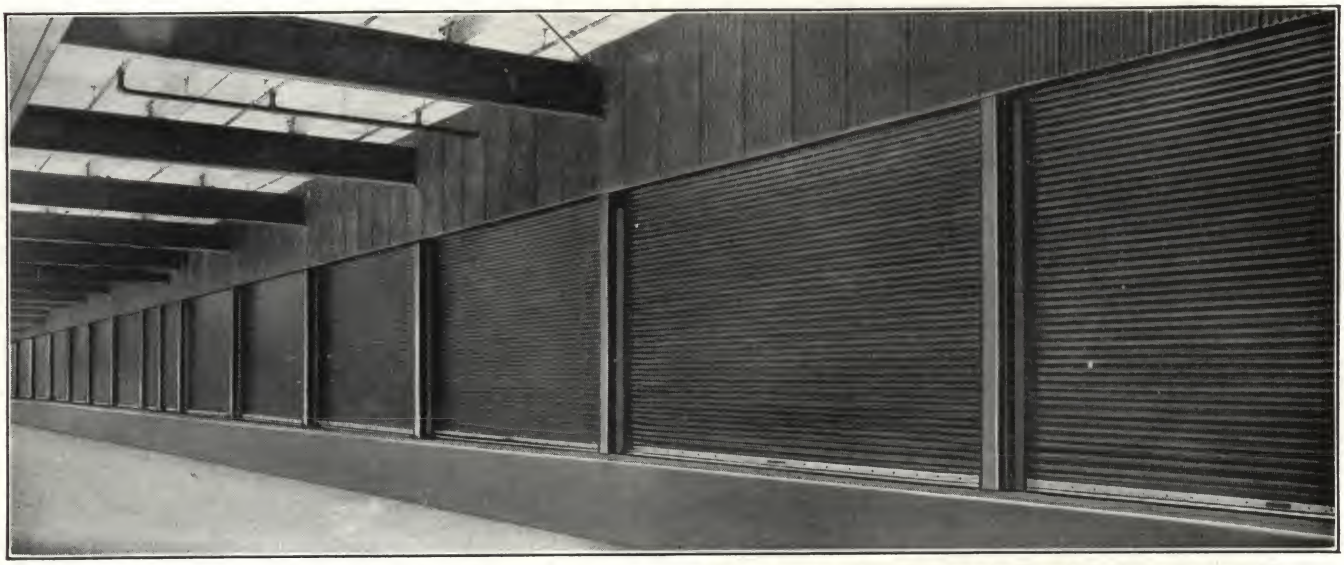
Mahon Rolling Steel Door 27x18 Ft. Installed in an Industrial Plant



Interlocking Slats Showing Arrangement of Malleable Iron End Locks As Used on Mahon Standard Rolling Steel Doors



Mahon Rolling Steel Door Installed at the Hupmobile Plant, Detroit, Mich.



An Installation of 20 Mahon Rolling Steel Doors at the Terminal Warehouse of the Interstate Trucking Co., Detroit, Mich.

Continued on next page



A Typical Installation of a Mahon Rolling Steel Door Equipped with Standard Power Operating Unit

The weight of the shutter curtain is counterbalanced by means of coil springs located inside the roller shaft.

The tension of these springs is adjustable to provide perfect balance.

This feature, particularly important in manually operated doors, safely maintains the position of the shutter curtain at all times, and, in the case of electrically operated doors, relieves the load on the operating mechanism.

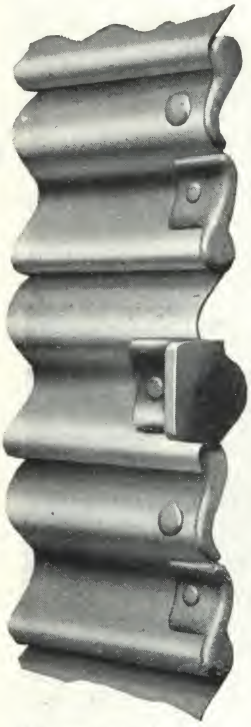
Installation

Mahon Rolling Steel Doors can be installed either on the face of the wall or in the door opening. Mounting on the face of the wall with guide channels clear of the door jambs is general practice. This method allows 100% clear opening and provides protection for the guides.

However, in many instances where headroom is limited, or other conditions prohibit "face of wall" mounting, Mahon Rolling Steel Doors can be installed in the door opening between jambs.

In "between jambs" installations the height of the door opening is decreased, due to the insertion of the roller housing below the lintel (the amount depending upon the height of the door opening) and the opening width is also decreased due to the insertion of the guide channels on the jambs.

These objections may be eliminated in new construction, where "between jambs" installations are desired, by including built-in-guide channels and providing space for the roller housing and operating mechanism in the original plans.



Mahon Interlocking Slats Showing Application of Wind Lock Lug

Intermediate Hinged Posts

In some instances where unusually wide openings are desired, it is more economical to use two rolling steel doors with an intermediate hinged post or removable post between.

Mahon Rolling Steel Doors installed in this manner can be equipped with either mechanical or power operators, and can be made to operate simultaneously or individually as desired.

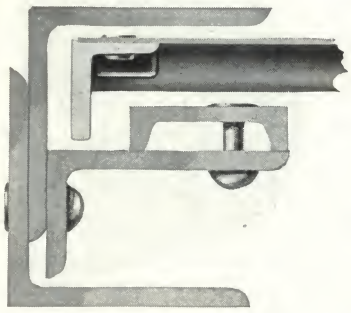
The intermediate post between doors can be released at the floor and removed or swung up clear of the opening after the doors are opened.

Wind Locks

Mahon Rolling Steel Doors of unusual width are fitted with wind locks to eliminate the possibility of the door pulling out of the guides due to excessive wind pressure.

Special end brackets and guides are provided to accommodate the wind lock lugs which are attached to the interlocking slats at intervals between the regular malleable iron end locks.

These wind locks are designed and installed so as to insure safe and easy operation even under extraordinary wind pressure.



Cross Section of Guide Channel Furnished with Doors Equipped with Wind Locks



Guide Mouth of Special End Bracket Furnished with Doors Equipped with Wind Locks

Operation—Mechanical and Power Operators

Mahon Rolling Steel Doors can be furnished equipped with handles on the bottom rail, continuous chain gear operator, hand crank operator, or power operating units.

Doors of moderate size equipped with handles on the bottom rail, for manual operation, are perfectly balanced by means of an adjustable counterbalancing mechanism. They can be easily opened or closed by one person.

The continuous chain gear operator for medium sized doors consists of a continuous chain, sprocket, and a series of gears. When installed on Mahon Underwriters' Labeled Rolling Steel Doors, the chain gear operator is equipped with an automatic release, which,

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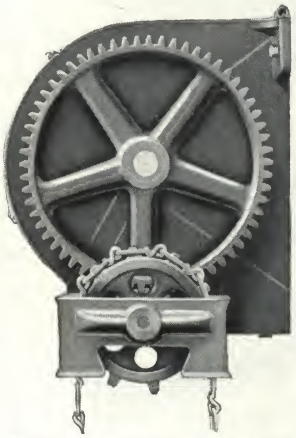
in case of fire, disengages it simultaneously with the release of the automatic closing mechanism.

The hand crank operator consists of a hand crank gear box, shaft with universal joints, and a series of gears on the roller bracket.

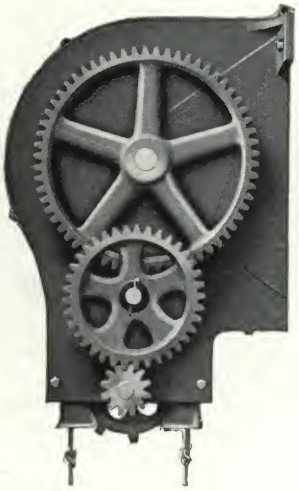
The crank can be located on either side of the wall, or, removable cranks can be furnished and the operator installed for operation of the door from both sides of the wall.

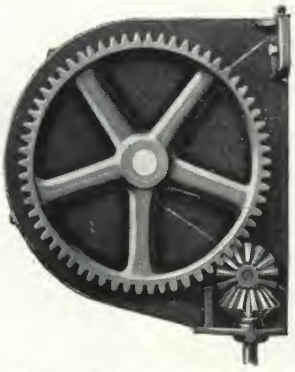
Mahon Power Operating Units are available in two types: Standard and Special. The Standard power operating unit is mounted directly on the end bracket of the roller housing, while the Special power operating unit is mounted on an independent bracket which can be located so as to meet unusual conditions where the Standard unit is not applicable.

The Standard power operating unit, however, is very compact and requires a minimum of headroom. It consists of an electric motor, speed reducer, sprockets and chain.



Mahon Simple Chain Gear Operator





Mahon Compound Chain Gear Operator and the End Bracket and Gear Arrangement for Mahon Hand Crank Operator

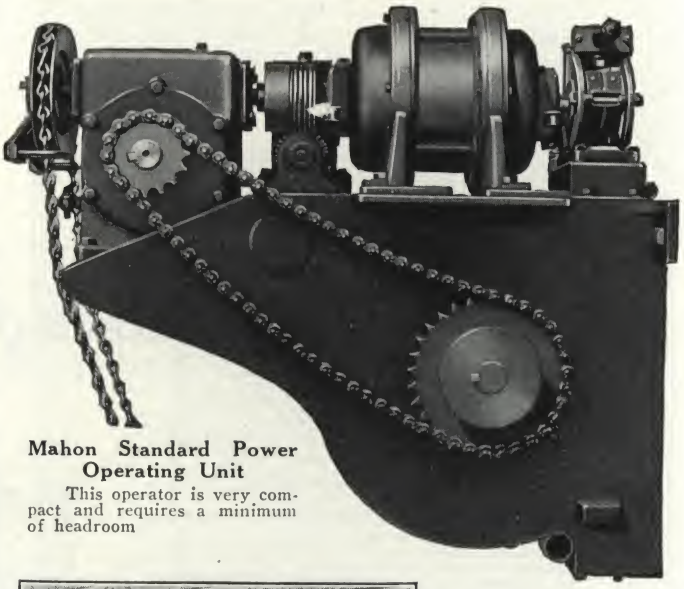
Control is by means of a push button switch, including "open" and "close" buttons, and an emergency "stop" button.

The door is set in motion by pushing either the "open" or "close" buttons, and is automatically stopped in the open or closed position by mans of a limit switch and a solenoid brake. The door can be instantly stopped in any position by pushing the emergency "stop" button.

Both Mahon Standard and Special Power Operators are equipped with an auxiliary continuous chain and sprocket for operation in case of failure in the electrical system. The chain normally hangs over the chain guide when not in use.

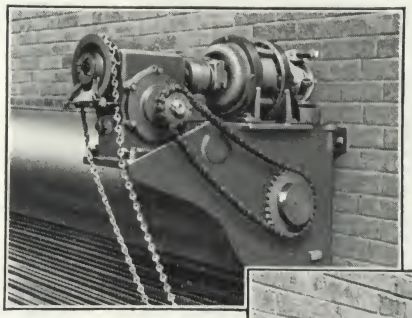
All wiring and conduit to be furnished by others, but must be installed in accordance with wiring diagram furnished by THE R. C. MAHON COMPANY.

Note: Requests for estimates or bids on power operated doors must include information as to type of current available.



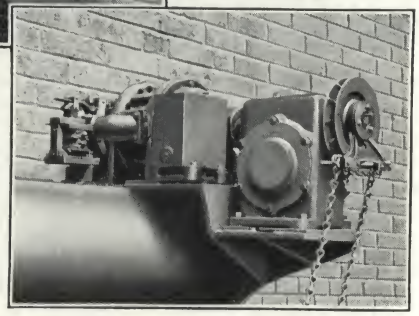
Mahon Standard Power Operating Unit

This operator is very compact and requires a minimum of headroom



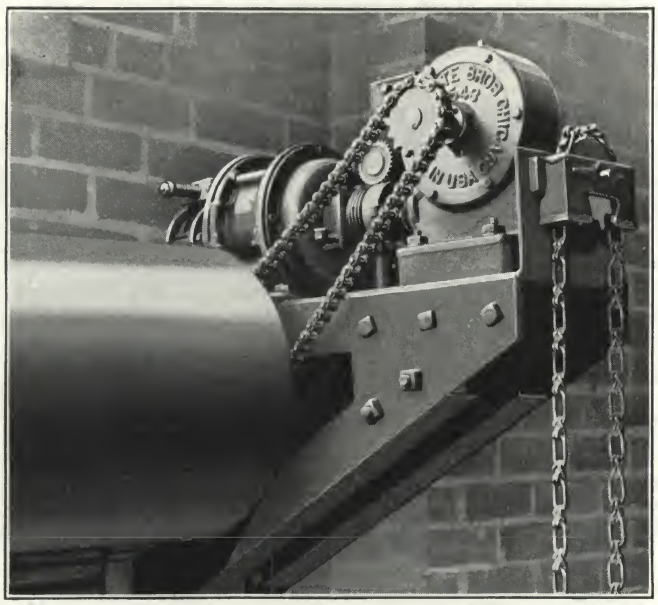
Right and Left Quarter Views of Mahon Standard Power Operating Unit

Showing the ingenious arrangement of various units in relation to the roller housing



Right

Shows Auxiliary Hand Chain Sprocket and Disposition of Chain During Power Operation



Mahon Special Power Operating Unit Used with Mahon Standard Rolling Steel Doors Where Conditions Do Not Permit Use of Mahon Standard Power Operating Unit

Continued on next page

Mahon Underwriters' Labeled Rolling Steel Doors

Mahon Underwriters' Labeled Doors are approved by the Underwriters' Laboratories, Inc., within certain limitations in total area as specified by the Underwriters' for various opening classifications. These limitations are based on requirements of the Underwriters' Laboratories, Inc., and apply to all fire doors of this type.

Fire Wall Doors, Class "A"—Approved for fire wall openings not exceeding 80 sq. ft. in area.

Vertical Shaft Doors, Class "B"—Approved for vertical shaft openings not exceeding 80 sq. ft. in area.

Corridor and Room Partition Doors, Class "C"—Approved for corridor or room partition openings not exceeding 80 sq. ft. in area.

Exterior Doors, Class "D" — Approved for exterior wall openings not exceeding 100 sq. ft. in area.

Note: For 100% rating neither dimension of the above listed openings may exceed 12 ft. Mahon Rolling Steel Fire Doors, however, can be manufactured in strict accordance with the Underwriters' specifications and furnished with manufacturer's certificate for larger openings where fire protection is desirable, or where insurance ratings are involved.

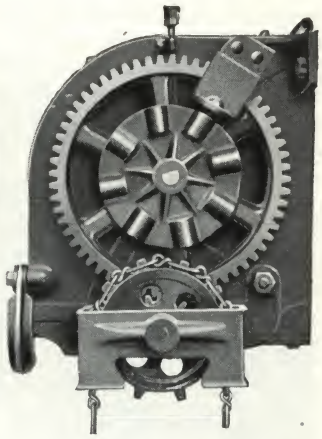
Operation—Underwriters' labeled rolling steel doors normally remain open. They are equipped with an automatic closing mechanism and release device which is actuated by fusible links in case of fire.

These doors, however, can be operated in general service if desired, being fitted with handles on the bottom rail for manual operation, or equipped with a chain gear operator for mechanical operation.



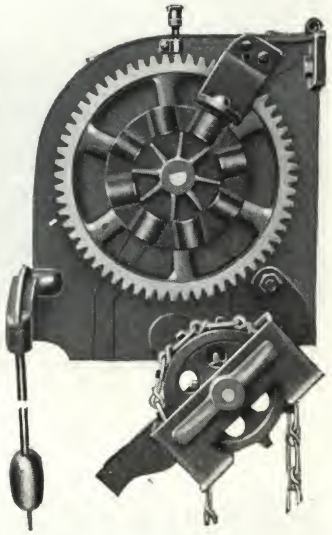
Mahon Interlocking Slats with Continuous Malleable Iron End Locks as Required by the Underwriters' Laboratories, Inc.





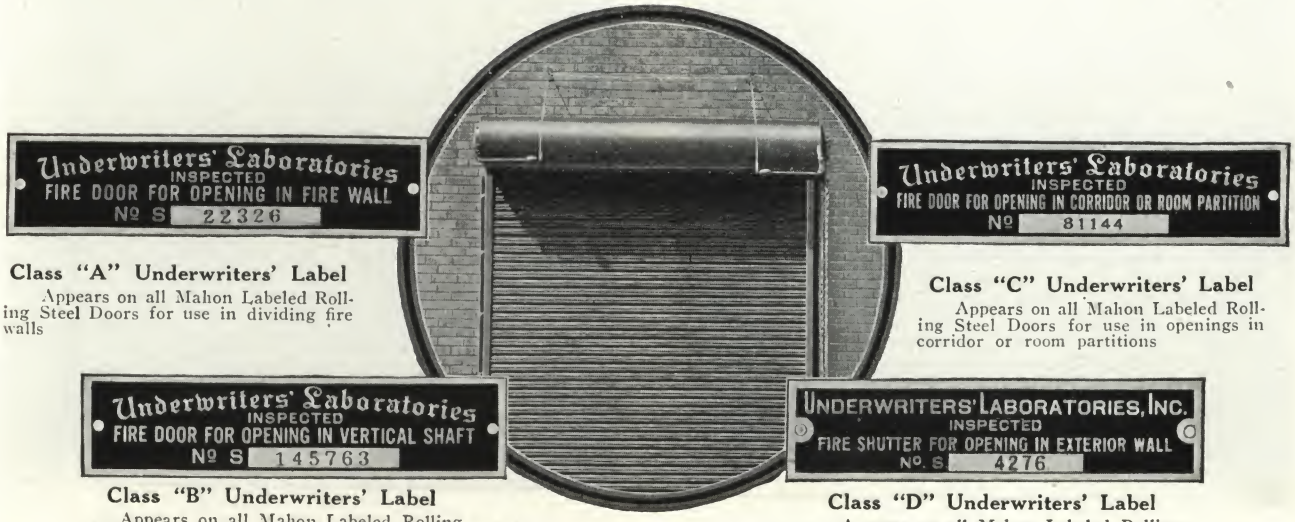
Above is release device which releases the automatic closing mechanism in case of fire. *Right* is the chain gear operator used with Mahon Underwriters' Labeled Doors





Above is release device released. *Right* is the chain gear operator disengaged. In case of fire the chain gear operator is disengaged simultaneously with the release of the automatic closing mechanism

In the event of fire, the automatic closing mechanism is released by means of fusible links and the door closes. A flame stop baffle plate, also released



Class "A" Underwriters' Label
Appears on all Mahon Labeled Rolling Steel Doors for use in dividing fire walls

Class "C" Underwriters' Label
Appears on all Mahon Labeled Rolling Steel Doors for use in openings in corridor or room partitions

Class "B" Underwriters' Label
Appears on all Mahon Labeled Rolling Steel Doors for use in openings in vertical shafts

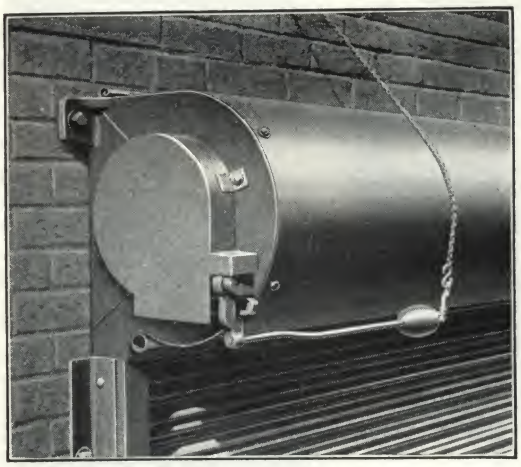
Class "D" Underwriters' Label
Appears on all Mahon Labeled Rolling Steel Doors for use in openings in exterior walls

Mahon Underwriters' Labeled Rolling Steel Doors are built in strict accordance with Underwriters' specifications

Continued on next page

automatically, closes the space between the hood and the roller shaft preventing the passage of flames through the hood. In the case of mechanically operated Underwriters' labeled doors, the chain gear operator is automatically disengaged simultaneously with the release of the automatic closing mechanism.

Mahon Underwriters' Labeled Rolling Steel Doors can be quickly reset by one person and put in operation without delay after automatic closing.



Steel Housing Which Protects the Automatic Closing Mechanism from Dirt and Corrosion



Fusible Link
Type used on Mahon Underwriters' Labeled Doors to release the automatic closing mechanism in case of fire



Mahon Rolling Steel Door, Type 200-ML
An Underwriters' labeled Class "A," "B," "C" and "D" push-up type door, mounted on the face of the wall.
For detailed installation drawing see page 9



Mahon Rolling Steel Door, Type 100-M
A Standard non-labeled, non-automatic push-up type door mounted on the face of the wall.
For detailed installation drawing see page 8



Mahon Rolling Steel Door, Type 300-ML
An Underwriters' labeled Class "A," "B," "C" and "D" push-up type door, mounted in the opening between jambs.
For detailed installation drawing see page 10

Continued on next page



Mahon Rolling Steel Door, Type 400-ML

An Underwriters' labeled Class "A" push-up type door, mounted in the opening between jambs.

For detailed installation drawing see page 11



Mahon Rolling Steel Door, Type 600-CHL

An Underwriters' labeled Class "A," "B," "C" and "D" chain gear operated door mounted on the face of the wall.

For detailed installation drawing see page 13



Mahon Rolling Steel Door, Type 500-ML

A double Underwriters' labeled Class "A" push-up type door mounted in the opening between jambs.

For detailed installation drawing see page 12

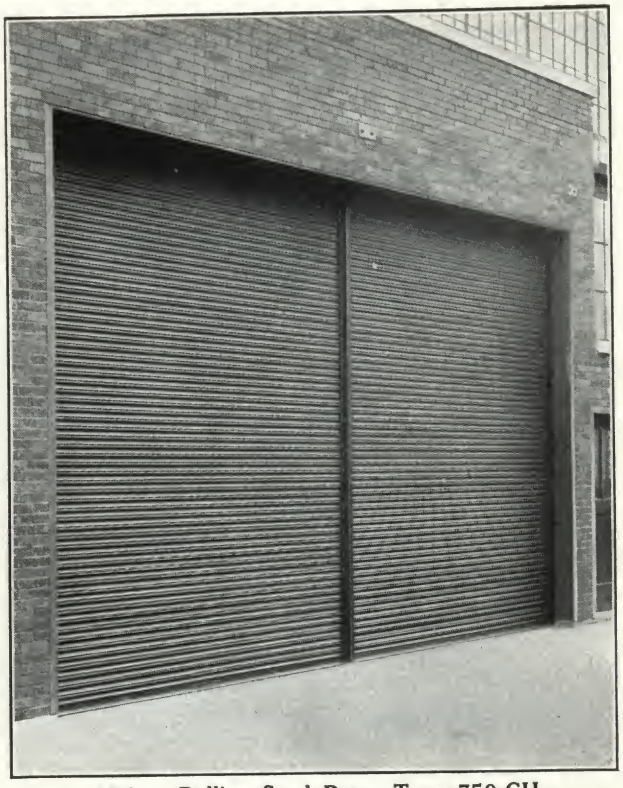


Mahon Rolling Steel Door, Type 700-CH

A Standard chain gear operated door mounted on the face of the wall.

For detailed installation drawing see page 14

Continued on next page



Mahon Rolling Steel Door, Type 750-CH

Two Standard chain gear operated doors mounted on the face of the wall with a special center bracket and an intermediate hinged or removable post between.

For detailed installation drawing see page 15



Mahon Rolling Steel Door, Type 900-P

A Standard power operated door mounted on the face of the wall.

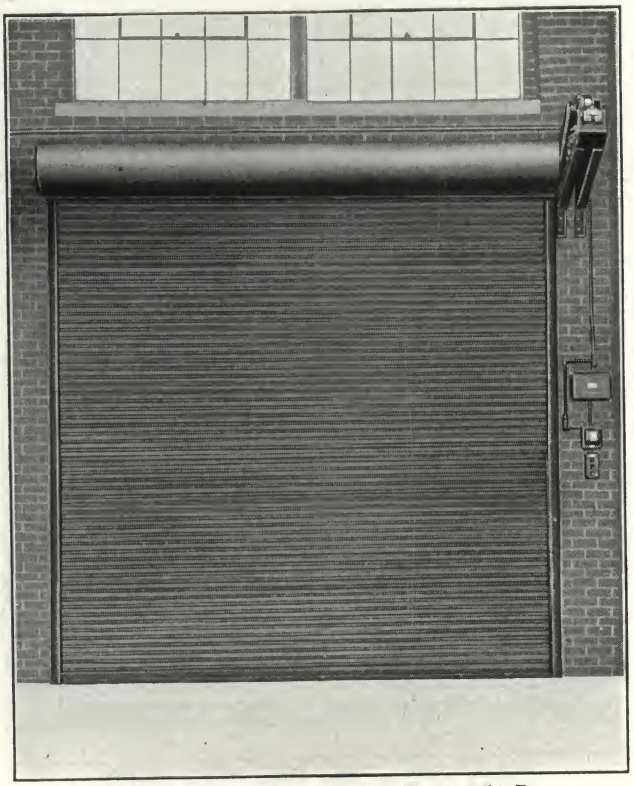
For detailed installation drawing see page 17



Mahon Rolling Steel Door, Type 800-CR

A Standard crank operated door mounted on the face of the wall.

For detailed installation drawing see page 16



Mahon Rolling Steel Door, Type 950-P

A Standard door equipped with Mahon Special Power Operating Unit.

For detailed installation drawing see page 18

Continued on next page

Standard Push-up Type—Mounted on Face of Wall

TYPE 100-M

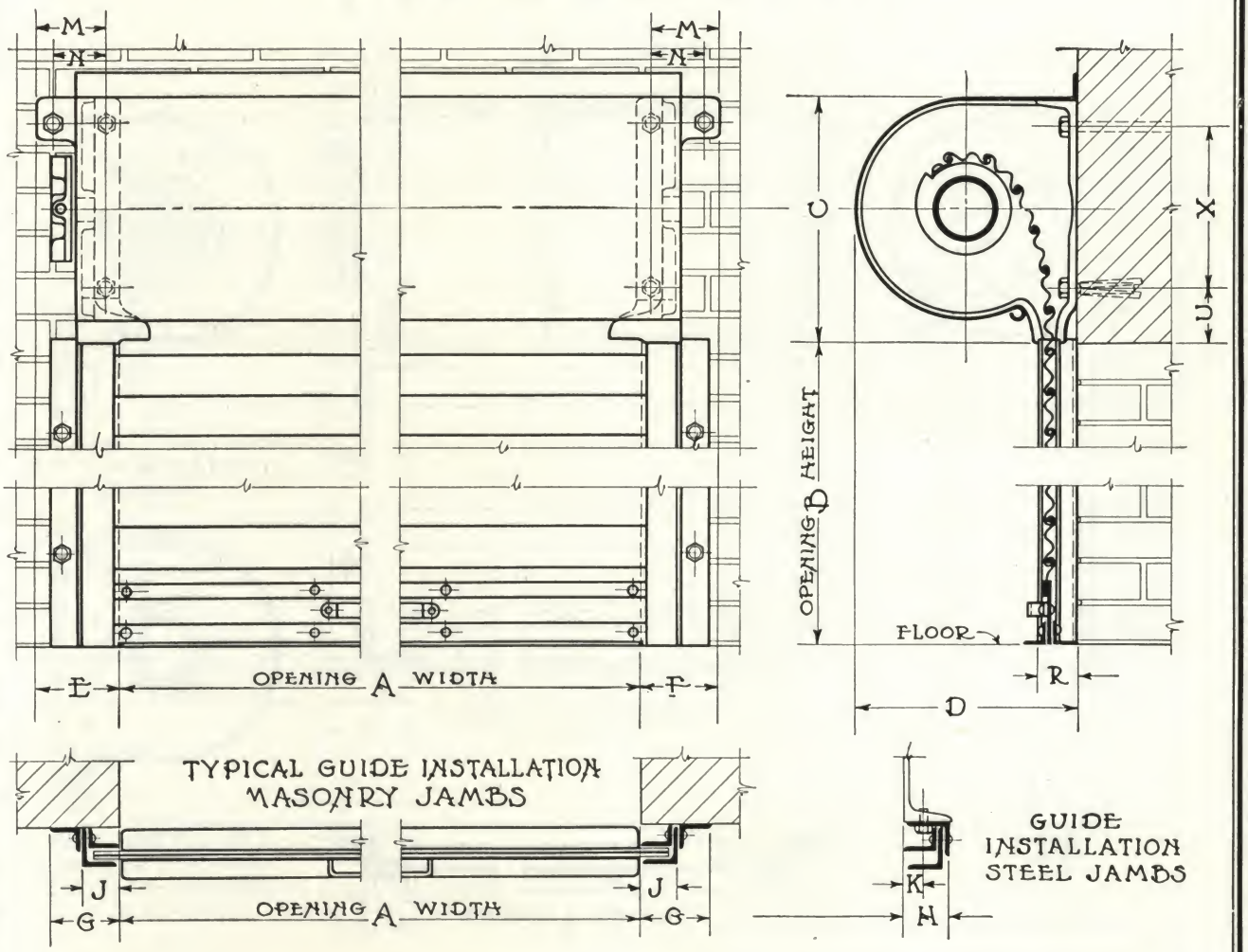


TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
3'-6"	7'-0"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
4'-0"	7'-6"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
4'-6"	8'-0"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
5'-0"	8'-6"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
5'-6"	9'-0"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
6'-0"	9'-6"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
7'-0"	10'-0"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
8'-0"	10'-6"	15¾"	14½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	10½"	2⅝"
9'-0"	11'-0"	17¾"	16½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	12½"	3⅝"
10'-0"	11'-6"	17¾"	16½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	12½"	3⅝"
12'-0"	12'-0"	17¾"	16½"	5"	5"	4¼"	2½"	2¼"	1⅛"	4⅜"	3⅜"	3½"	12½"	3⅝"

Continued on next page

Push-up Type—Underwriters' Labeled Class "A," "B," "C" and "D"—Mounted on Face of Wall

TYPE 200-ML

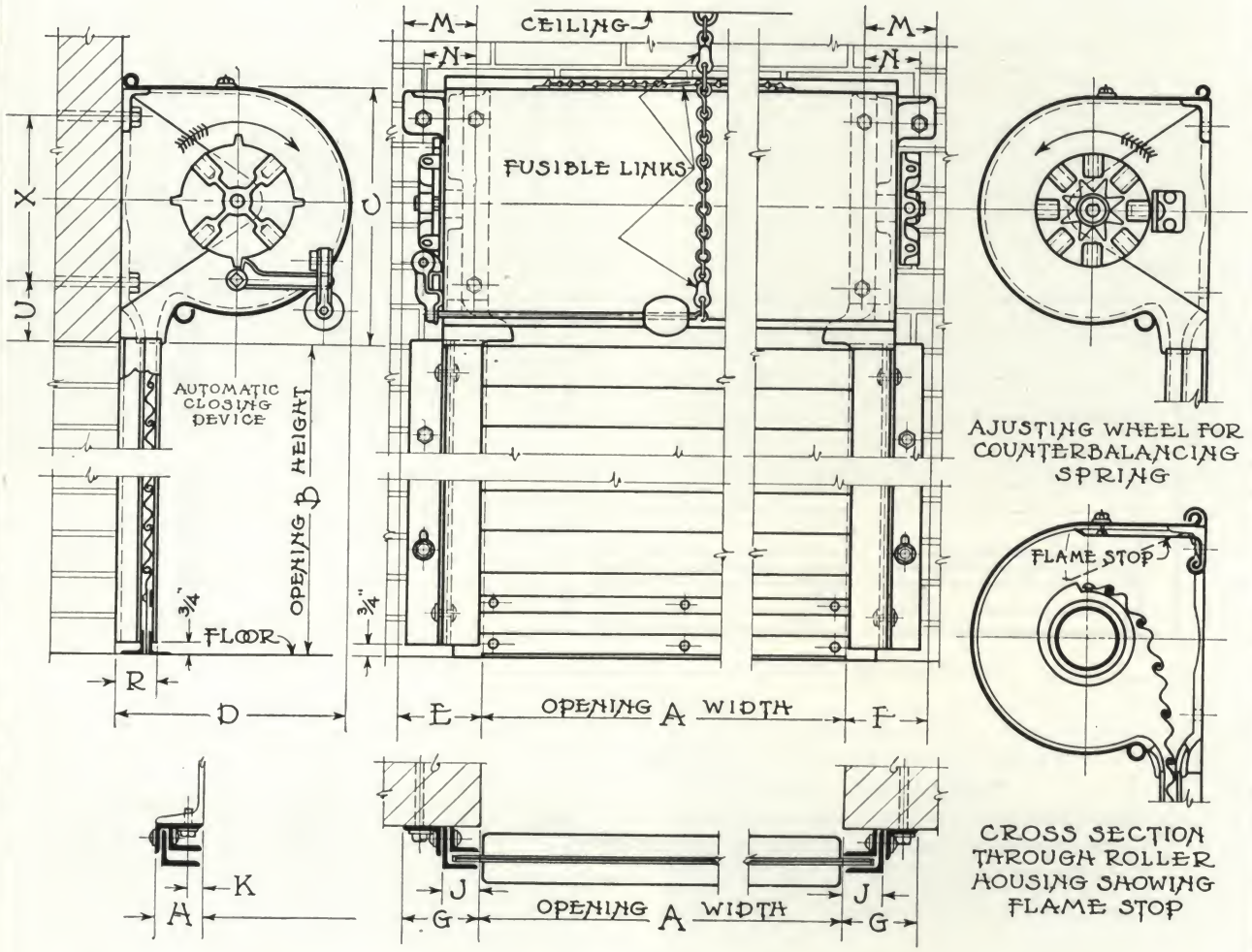


TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
4'-0"	6'-0"	15 3/4"	14 1/2"	5 1/2"	5 1/2"	4 1/4"	2 1/2"	2 1/4"	1 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
4'-6"	6'-6"	15 3/4"	14 1/2"	5 1/2"	5 1/2"	4 1/4"	2 1/2"	2 1/4"	1 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
5'-0"	7'-0"	15 3/4"	14 1/2"	5 1/2"	5 1/2"	4 1/4"	2 1/2"	2 1/4"	1 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
5'-6"	7'-6"	15 3/4"	14 1/2"	5 1/2"	5 1/2"	4 1/4"	2 1/2"	2 1/4"	1 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
6'-0"	8'-0"	15 3/4"	14 1/2"	5 1/2"	5 1/2"	4 1/4"	2 1/2"	2 1/4"	1 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
7'-0"	8'-6"	15 3/4"	14 1/2"	6"	6"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
8'-0"	9'-0"	15 3/4"	14 1/2"	6"	6"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
9'-0"	9'-6"	15 3/4"	14 1/2"	6 1/2"	6 1/2"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
10'-0"	10'-0"	15 3/4"	14 1/2"	6 1/2"	6 1/2"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
11'-0"	11'-0"	17 3/4"	16 1/2"	7"	7"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"
12'-0"	12'-0"	17 3/4"	16 1/2"	7"	7"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"

Continued on next page

Push-up Type—Underwriters' Labeled Class "A," "B," "C" and "D"—Mounted Between Jambs

TYPE 300-ML

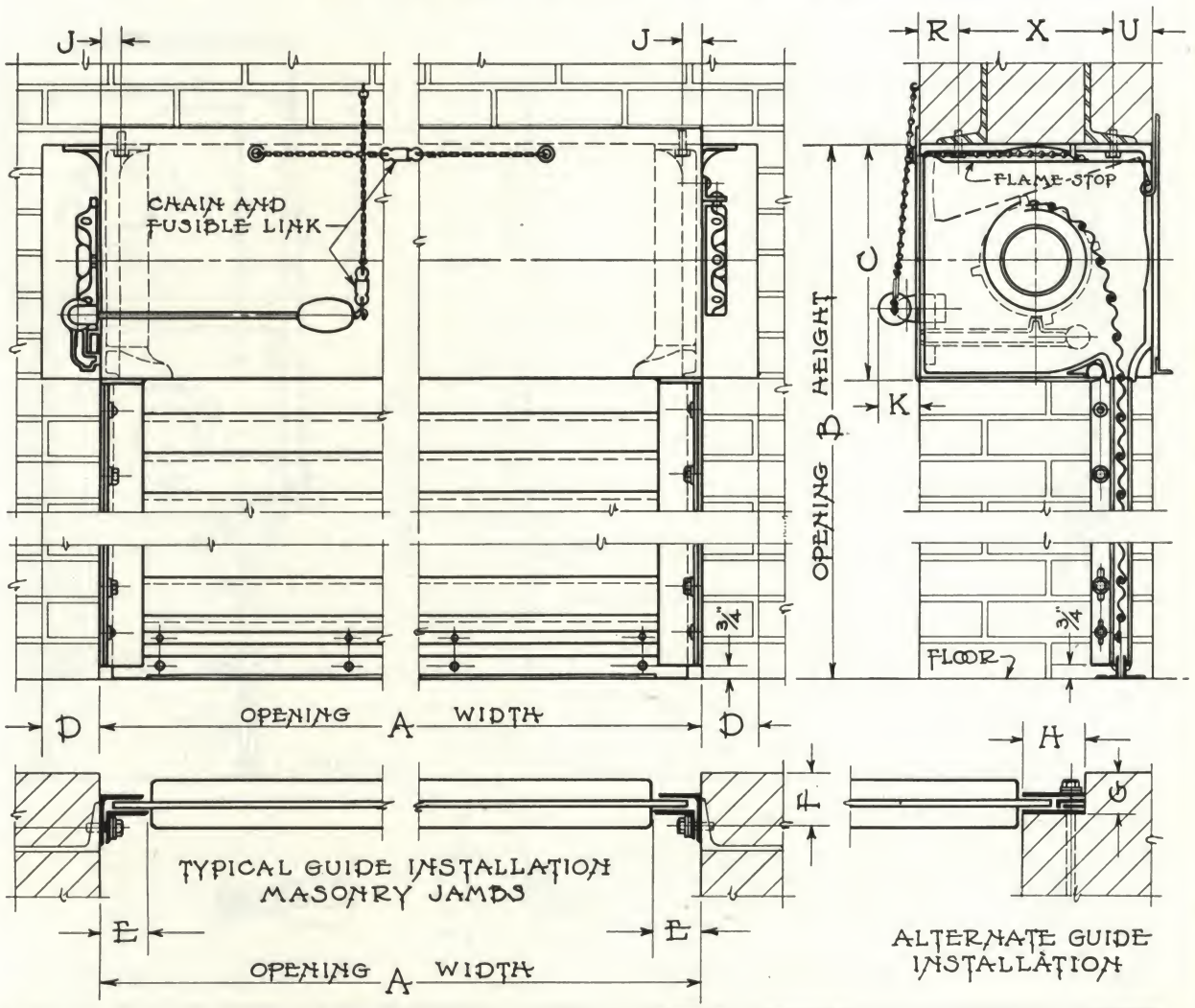


TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
6'-0"	6'-0"	15"	3½"	2¼"	3⅝"	4½"	4"	1¼"	2½"			2½"	9½"	2½"
6'-6"	6'-6"	15"	3½"	2¾"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	2½"
7'-0"	7'-0"	15"	3½"	2¾"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	2½"
7'-6"	7'-6"	15"	3½"	2¾"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	2½"
8'-0"	8'-0"	15"	3½"	2¾"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	2½"
8'-6"	8'-6"	15"	3½"	3¼"	3⅝"	4½"	5"	1¼"	2½"			2½"	9½"	2½"
9'-0"	9'-0"	15"	3½"	3¼"	3⅝"	4½"	5"	1¼"	2½"			2½"	9½"	2½"
9'-6"	9'-6"	15"	3½"	3¼"	3⅝"	4½"	5"	1¼"	2½"			2½"	9½"	2½"
10'-0"	10'-0"	15"	3½"	3¼"	3⅝"	4½"	5"	1¼"	2½"			2½"	9½"	2½"
10'-6"	10'-6"	15"	3½"	3¾"	3⅝"	4½"	5½"	1¼"	2½"			2½"	9½"	2½"
11'-0"	11'-0"	15"	3½"	3¾"	3⅝"	4½"	5½"	1¼"	2½"			2½"	9½"	2½"

Continued on next page

Double Push-up Type—Underwriters' Labeled Class "A"—Mounted Between Jambs

TYPE 400-ML

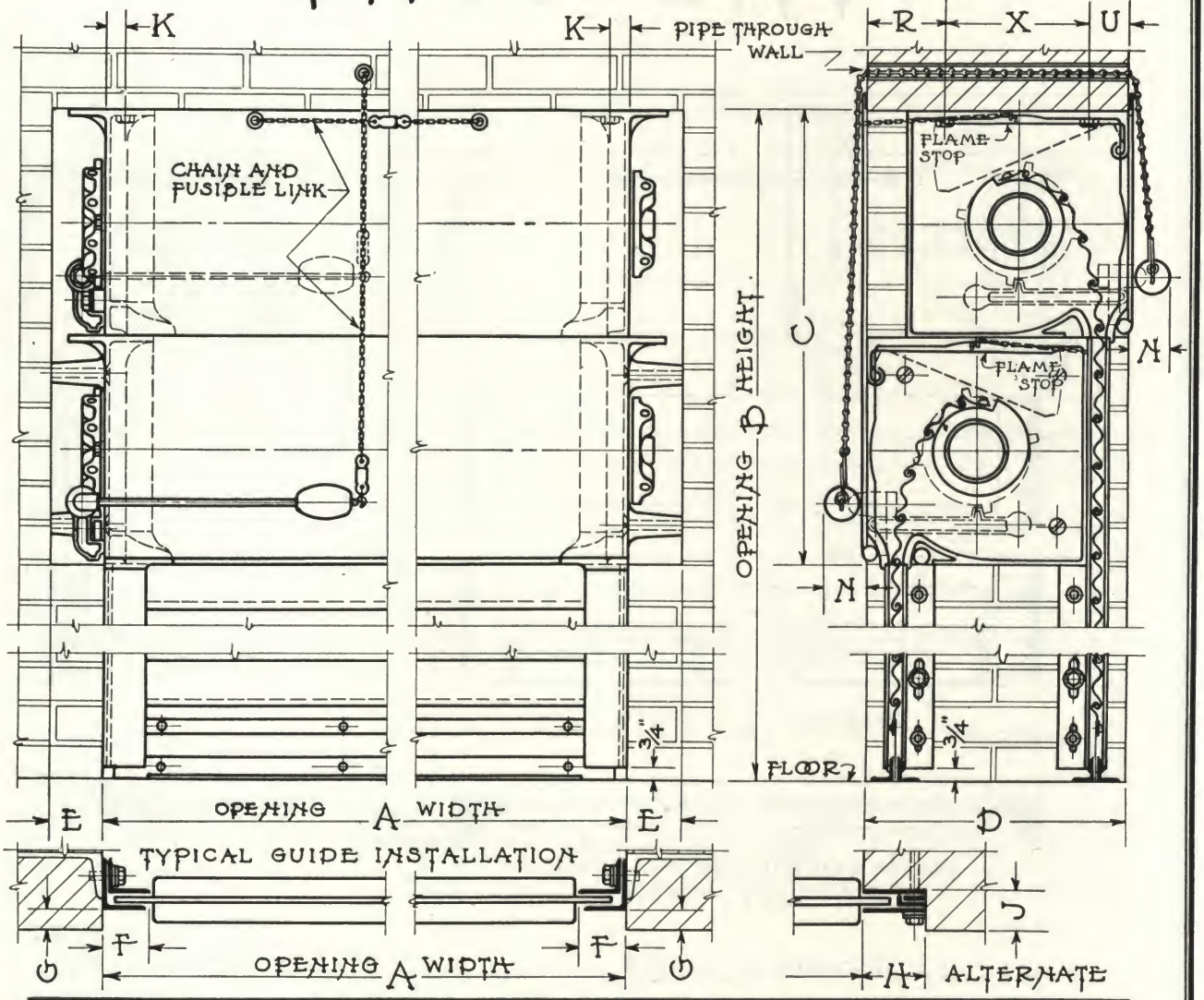


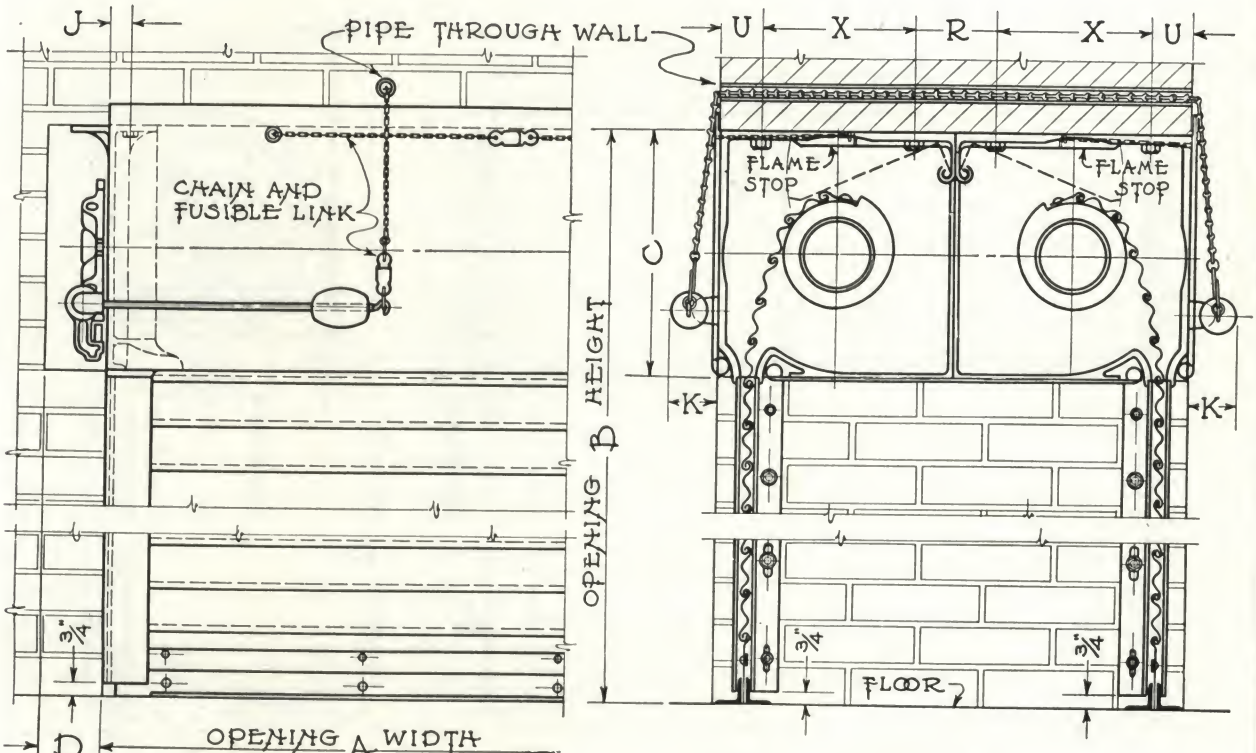
TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

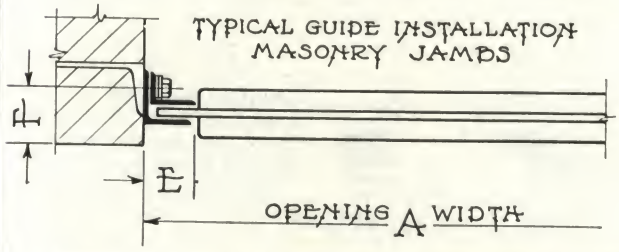
A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
6'-0"	6'-0"	2'-6"	17½"	3½"	2¼"	1½"	3½"	4½"	1¼"		2½"	2½"	9½"	5½"
6'-6"	6'-6"	2'-6"	17½"	3½"	2¾"	1½"	4"	4½"	1¼"		2½"	2½"	9½"	5½"
7'-0"	7'-0"	2'-6"	17½"	3½"	2¾"	1½"	4"	4½"	1¼"		2½"	2½"	9½"	5½"
7'-6"	7'-6"	2'-6"	17½"	3½"	2¾"	1½"	4"	4½"	1¼"		2½"	2½"	9½"	5½"
8'-0"	8'-0"	2'-6"	17½"	3½"	2¾"	1½"	4"	4½"	1¼"		2½"	2½"	9½"	5½"
8'-6"	8'-6"	2'-6"	17½"	3½"	3¼"	1½"	4½"	4½"	1¼"		2½"	2½"	9½"	5½"
9'-0"	9'-0"	2'-6"	17½"	3½"	3¼"	1½"	4½"	4½"	1¼"		2½"	2½"	9½"	5½"
9'-6"	9'-6"	2'-6"	17½"	3½"	3¼"	1½"	4½"	4½"	1¼"		2½"	2½"	9½"	5½"
10'-0"	10'-0"	2'-6"	17½"	3½"	3¼"	1½"	4½"	4½"	1¼"		2½"	2½"	9½"	5½"
10'-6"	10'-6"	2'-6"	17½"	3½"	3¾"	1½"	5"	4½"	1¼"		2½"	2½"	9½"	5½"
11'-0"	11'-0"	2'-6"	17½"	3½"	3¾"	1½"	5"	4½"	1¼"		2½"	2½"	9½"	5½"

Continued on next page

Double Push-up Type—Underwriters' Labeled Class "A"—Mounted Between Jambs

TYPE 500 ML







ALTERNATE GUIDE INSTALLATION

NOTE

WITH THIS ARRANGEMENT, FUSING OF LINK ON EITHER SIDE OF THE FIRE WALL WILL INSTANTLY RELEASE BOTH DOORS WHICH WILL CLOSE AUTOMATICALLY

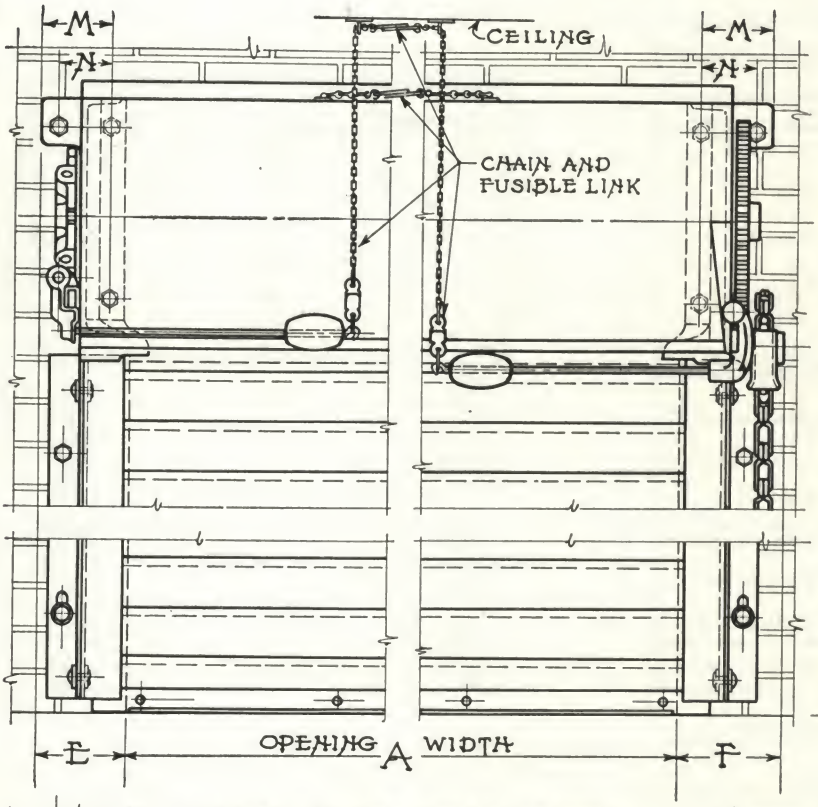
TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

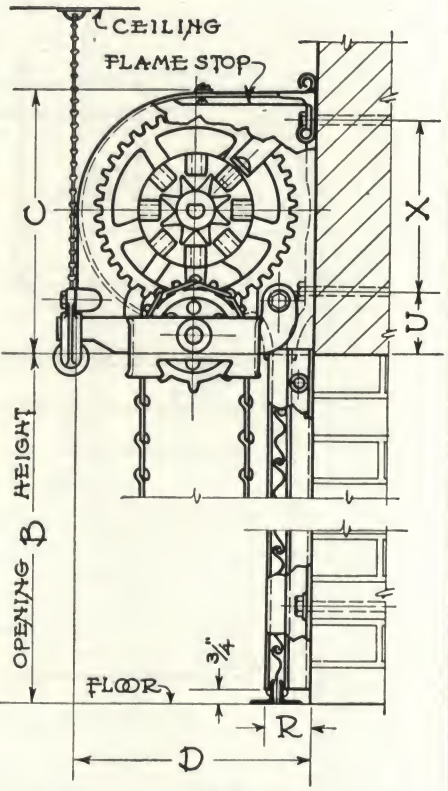
A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
6'-0"	6'-0"	15"	3½"	2¼"	3⅝"	4½"	3½"	1¼"	2½"			2½"	9½"	5"
6'-6"	6'-6"	15"	3½"	2¾"	3⅝"	4½"	4"	1¼"	2½"			2½"	9½"	5"
7'-0"	7'-0"	15"	3½"	2¾"	3⅝"	4½"	4"	1¼"	2½"			2½"	9½"	5"
7'-6"	7'-6"	15"	3½"	2¾"	3⅝"	4½"	4"	1¼"	2½"			2½"	9½"	5"
8'-0"	8'-0"	15"	3½"	2¾"	3⅝"	4½"	4"	1¼"	2½"			2½"	9½"	5"
8'-6"	8'-6"	15"	3½"	3¼"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	5"
9'-0"	9'-0"	15"	3½"	3¼"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	5"
9'-6"	9'-6"	15"	3½"	3¼"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	5"
10'-0"	10'-0"	15"	3½"	3¼"	3⅝"	4½"	4½"	1¼"	2½"			2½"	9½"	5"
10'-6"	10'-6"	15"	3½"	3¾"	3⅝"	4½"	5"	1¼"	2½"			2½"	9½"	5"
11'-0"	11'-0"	15"	3½"	3¾"	3⅝"	4½"	5"	1¼"	2½"			2½"	9½"	5"

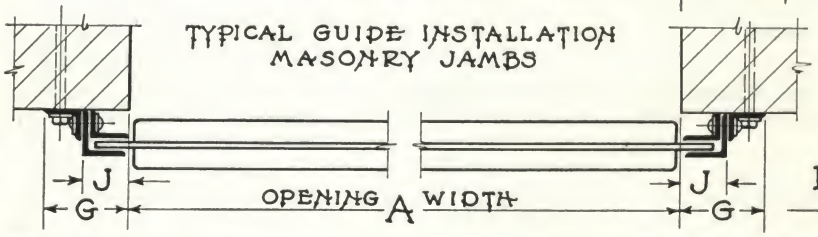
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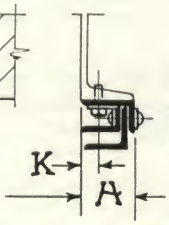
Chain Gear Operated—Underwriters' Labeled Class "A," "B," "C" and "D"—Mounted on Face of Wall

TYPE 600-CHL









NOTE

CHAIN GEAR IS DISENGAGED BY FUSIBLE LINK RELEASE PERMITTING DOOR TO CLOSE AUTOMATICALLY

TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
6'-0"	6'-0"	15 3/4"	14 1/2"	5 1/2"	6 1/2"	4 1/4"	2 1/2"	2 1/4"	1 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
6'-6"	6'-6"	15 3/4"	14 1/2"	6"	7"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
7'-0"	7'-0"	15 3/4"	14 1/2"	6"	7"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
7'-6"	7'-6"	15 3/4"	14 1/2"	6"	7"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
8'-0"	8'-0"	15 3/4"	14 1/2"	6"	7"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
8'-6"	8'-6"	15 3/4"	14 1/2"	6 1/2"	7 1/2"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
9'-0"	9'-0"	15 3/4"	14 1/2"	6 1/2"	7 1/2"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
9'-6"	9'-6"	15 3/4"	14 1/2"	6 1/2"	7 1/2"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
10'-0"	10'-0"	15 3/4"	14 1/2"	6 1/2"	7 1/2"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
10'-6"	10'-6"	15 3/4"	14 1/2"	7"	8"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
11'-0"	11'-0"	17 3/4"	16 1/2"	7"	8"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"

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Standard Chain Gear Operated—Mounted on Face of Wall

TYPE 700-CA

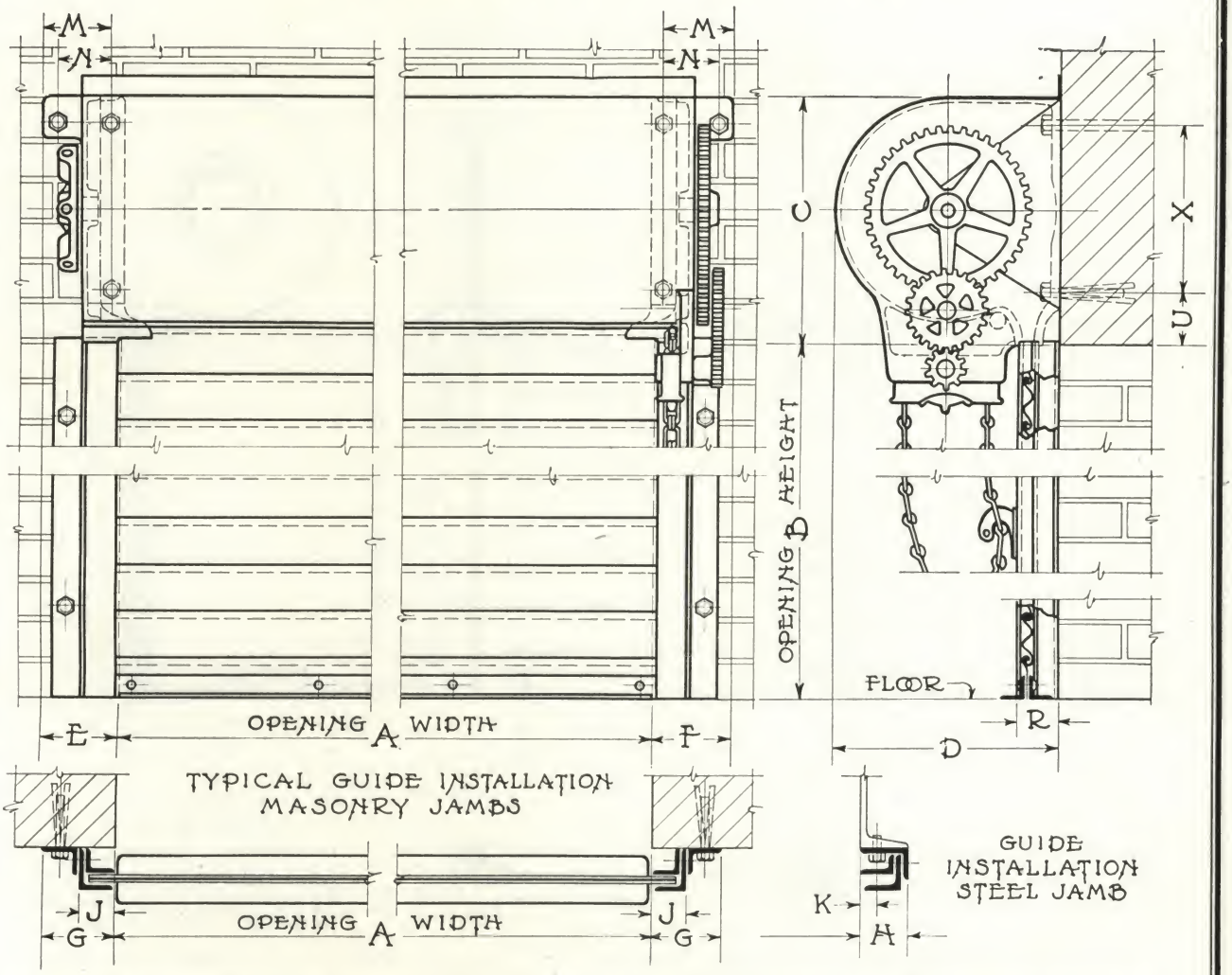


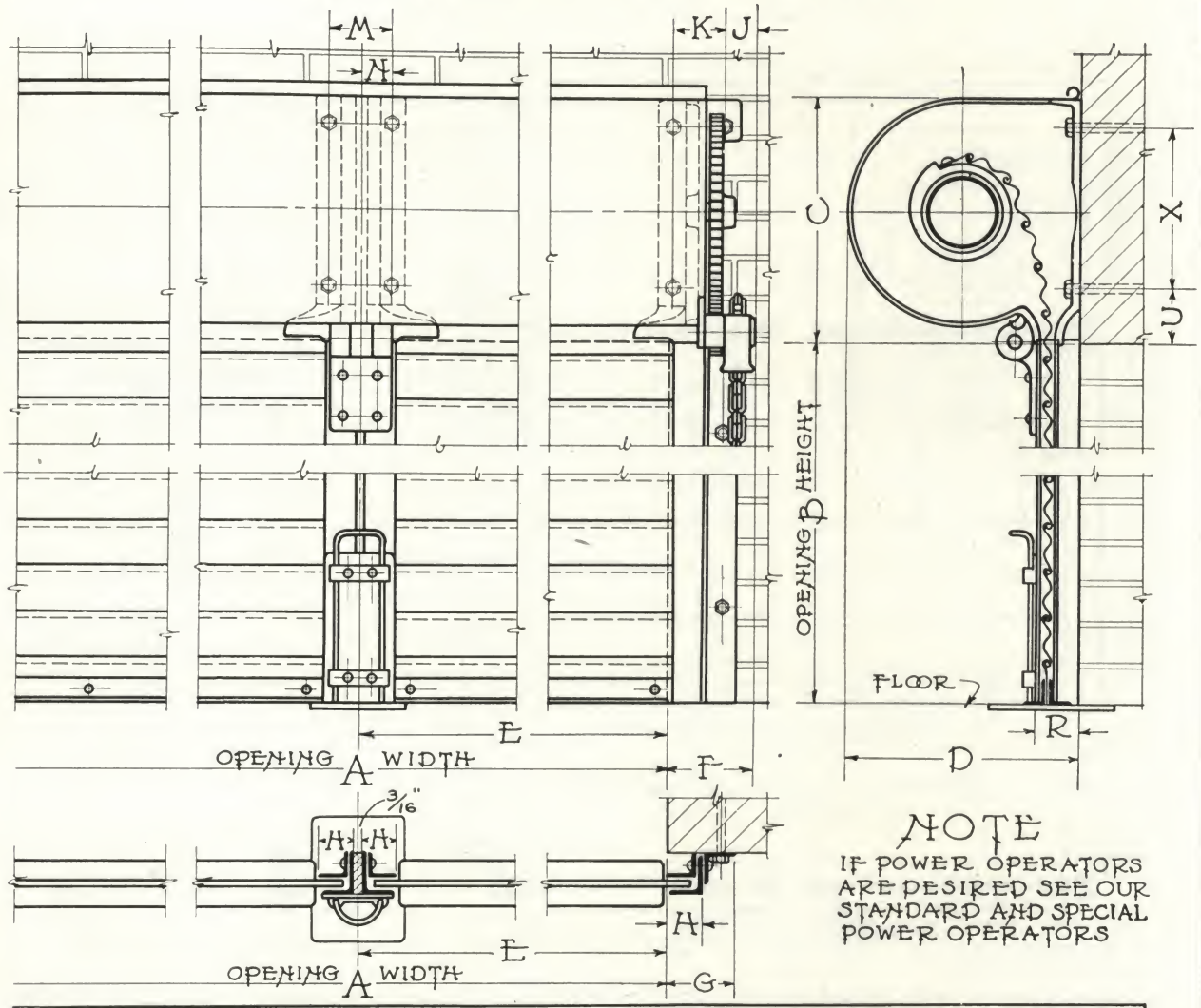
TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
12'-0"	12'-0"	15 3/4"	14 1/2"	5 1/2"	5 1/2"	4 1/4"	2 1/2"	2 1/4"	1 1/8"	4 3/8"	3 3/8"	3 1/2"	10 1/2"	2 5/8"
14-0"	14-0"	17 3/4"	16 1/2"	6"	6"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"
16-0"	16-0"	17 3/4"	16 1/2"	6"	6"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"
18-0"	18-0"	17 3/4"	16 1/2"	6"	6"	4 3/4"	3"	2 3/4"	1 5/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"
20'-0"	19'-0"	17 3/4"	16 1/2"	6"	6"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"
22'-0"	20'-0"	17 3/4"	16 1/2"	6"	6"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"
24'-0"	21'-0"	17 3/4"	16 1/2"	6"	6"	5 1/4"	3 1/2"	3 1/4"	2 1/8"	4 3/8"	3 3/8"	3 1/2"	12 1/2"	3 5/8"
26'-0"	22'-0"	19 3/4"	18 1/2"	6 1/2"	6 1/2"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	14 1/2"	3 5/8"
28'-0"	23'-0"	19 3/4"	18 1/2"	6 1/2"	6 1/2"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	14 1/2"	3 5/8"
30'-0"	24'-0"	19 3/4"	18 1/2"	6 1/2"	6 1/2"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	14 1/2"	3 5/8"
32'-0"	25'-0"	19 3/4"	18 1/2"	6 1/2"	6 1/2"	5 3/4"	4"	3 3/4"	2 5/8"	4 3/8"	3 3/8"	3 1/2"	14 1/2"	3 5/8"

Continued on next page

Standard Chain Gear Operated with Intermediate Hinged Post

TYPE 750-CA



NOTE
IF POWER OPERATORS ARE DESIRED SEE OUR STANDARD AND SPECIAL POWER OPERATORS

TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
20'-0"	8'-0"	15¾"	14½"	10'-0"	5½"	4¼"	2¼"	1¾"	3⅜"	3½"	1¾"	3½"	10½"	2⅝"
22'-0"	9'-0"	15¾"	14½"	11'-0"	5½"	4¼"	2¼"	1¾"	3⅜"	3½"	1¾"	3½"	10½"	2⅝"
24'-0"	10'-0"	15¾"	14½"	12'-0"	5½"	4¼"	2¼	1¾"	3⅜"	3½"	1¾"	3½"	10½"	2⅝"
26'-0"	11'-0"	15¾"	14½"	13'-0"	6"	4¾"	2¾"	1¾"	3⅜"	3½"	1¾"	3½"	10½"	2⅝"
28'-0"	12'-0"	15¾"	14½"	14'-0"	6"	4¾"	2¾"	1¾"	3⅜"	3½"	1¾"	3½"	10½"	2⅝"
30'-0"	13'-0"	17¾"	16½"	15'-0"	6"	4¾"	2¾"	1¾"	3⅜"	3½"	1¾"	3½"	12½"	3⅝"
32'-0"	14'-0"	17¾"	16½"	16'-0"	6"	4¾"	2¾"	1¾"	3⅜"	3½"	1¾"	3½"	12½"	3⅝"
34'-0"	15'-0"	17¾"	16½"	17'-0"	6½"	5¼"	3¼"	1¾"	3⅜"	3½"	1¾"	3½"	12½"	3⅝"
36'-0"	16'-0"	17¾"	16½"	18'-0"	6½"	5¼"	3¼"	1¾"	3⅜"	3½"	1¾"	3½"	12½"	3⅝"
38'-0"	17'-0"	17¾"	16½"	19'-0"	6½"	5¼"	3¼"	1¾"	3⅜"	3½"	1¾"	3½"	12½"	3⅝"
40'-0"	18'-0"	17¾"	16½"	20'-0"	6½"	5¼"	3¼"	1¾"	3⅜"	3½"	1¾"	3½"	12½"	3⅝"

Continued on next page

Standard Crank Operated—Mounted on Face of Wall

TYPE 800-CR

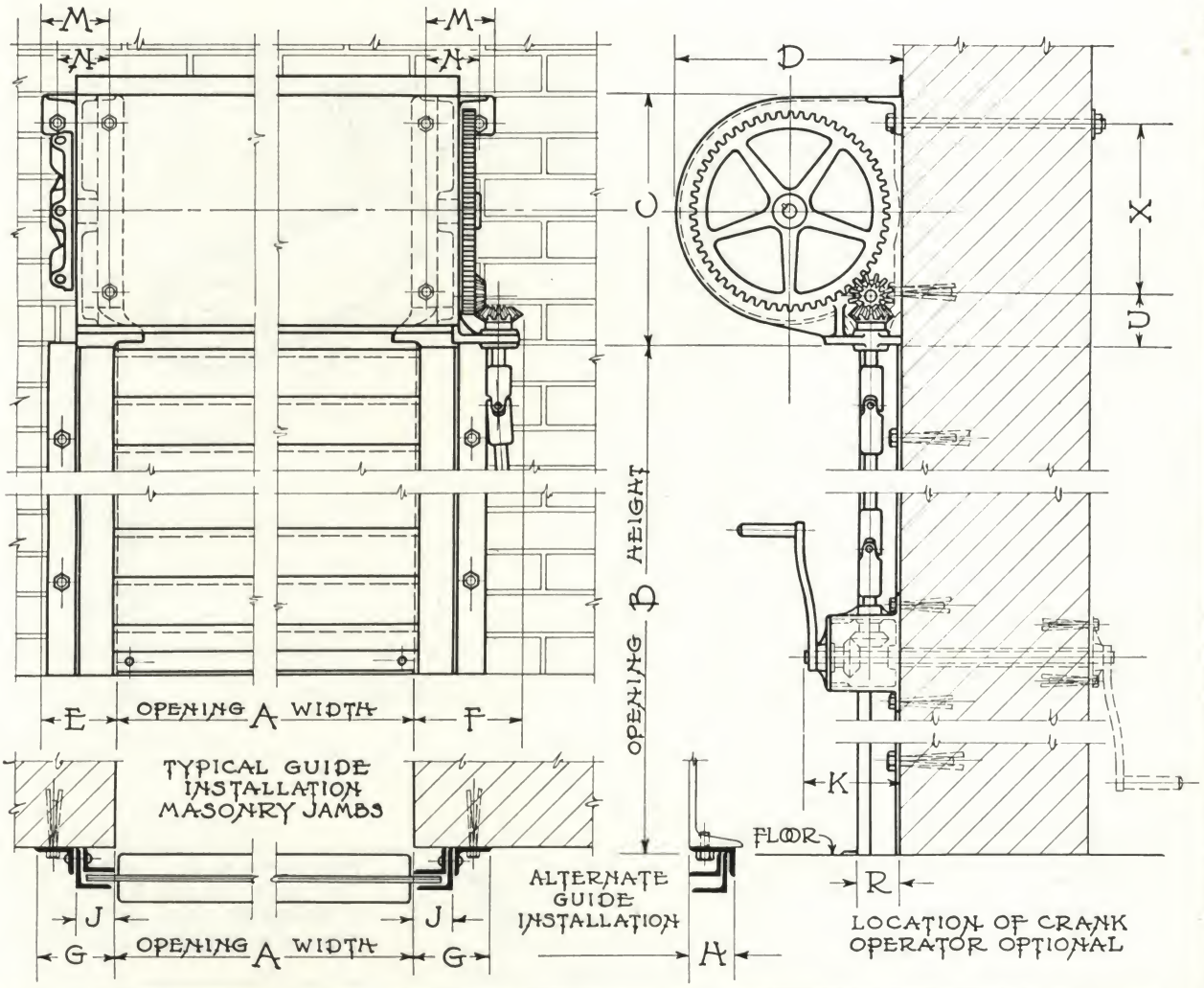


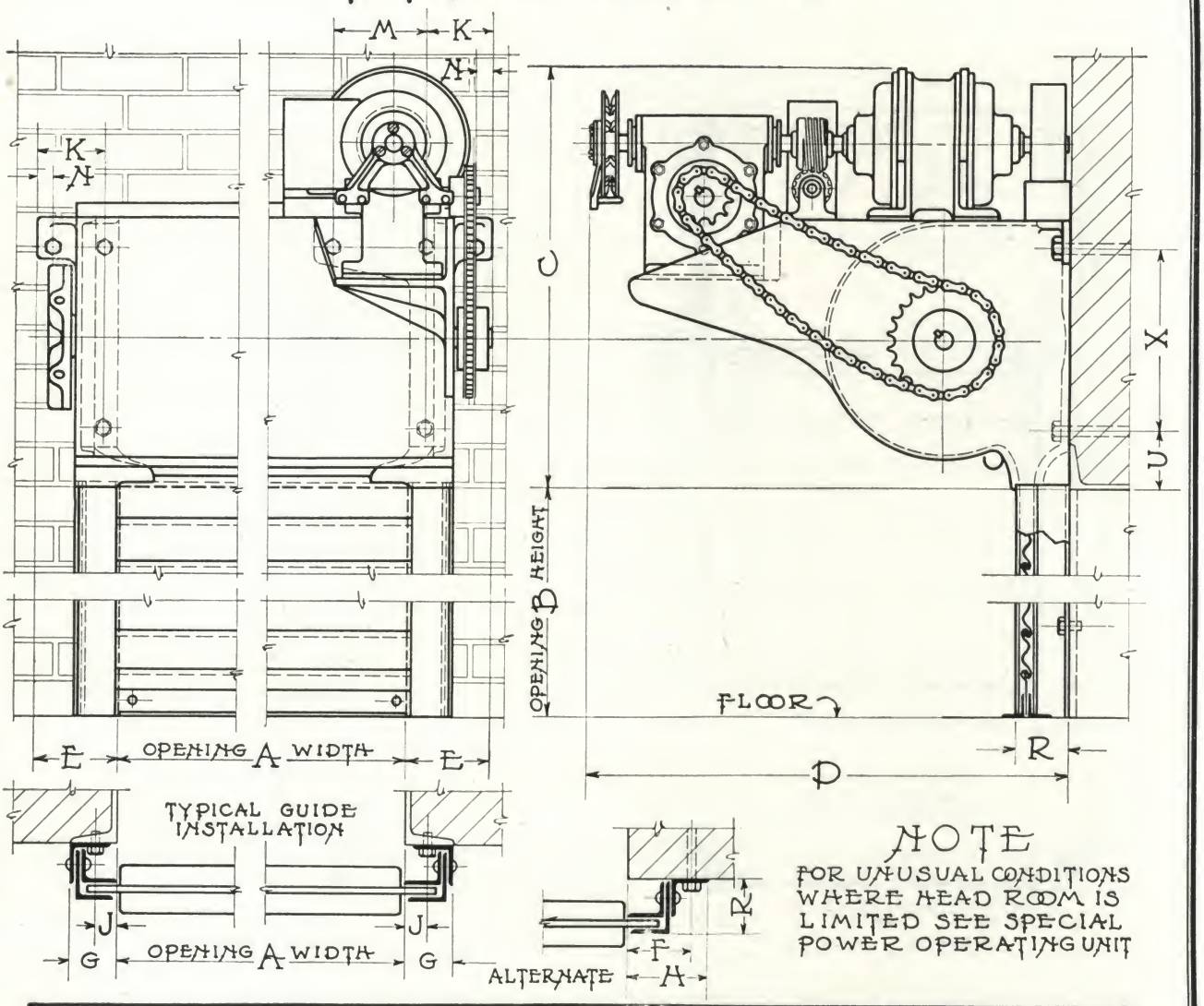
TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
6'-0"	8'-0"	15¾"	14½"	5"	6½"	4¼"	2½"	2¼"	6½"	4⅜"	3⅜"	3½"	10½"	2⅝"
7'-0"	9'-0"	15¾"	14½"	5"	6½"	4¼"	2½"	2¼"	6½"	4⅜"	3⅜"	3½"	10½"	2⅝"
8'-0"	10'-0"	15¾"	14½"	5"	6½"	4¼"	2½"	2¼"	6½"	4⅜"	3⅜"	3½"	10½"	2⅝"
9'-0"	11'-0"	15¾"	14½"	5"	6½"	4¼"	2½"	2¼"	6½"	4⅜"	3⅜"	3½"	10½"	2⅝"
10'-0"	12'-0"	15¾"	14½"	5"	6½"	4¼"	2½"	2¼"	6½"	4⅜"	3⅜"	3½"	10½"	2⅝"
11'-0"	13'-0"	17¾"	16½"	5"	6½"	4¼"	2½"	2¼"	6½"	4⅜"	3⅜"	3½"	12½"	3⅝"
12'-0"	14'-0"	17¾"	16½"	5"	6½"	4¼"	2½"	2¼"	6½"	4⅜"	3⅜"	3½"	12½"	3⅝"
13'-0"	15'-0"	17¾"	16½"	5½"	7"	4¾"	3"	2¾"	6½"	4⅜"	3⅜"	3½"	12½"	3⅝"
14'-0"	16'-0"	17¾"	16½"	5½"	7"	4¾"	3"	2¾"	6½"	4⅜"	3⅜"	3½"	12½"	3⅝"
15'-0"	17'-0"	17¾"	16½"	5½"	7"	4¾"	3"	2¾"	6½"	4⅜"	3⅜"	3½"	12½"	3⅝"
16'-0"	18'-0"	17¾"	16½"	5½"	7"	4¾"	3"	2¾"	6½"	4⅜"	3⅜"	3½"	12½"	3⅝"

Continued on next page

Standard Power Operated—Mounted on Face of Wall

TYPE 900-P



NOTE

FOR UNUSUAL CONDITIONS WHERE HEAD ROOM IS LIMITED SEE SPECIAL POWER OPERATING UNIT

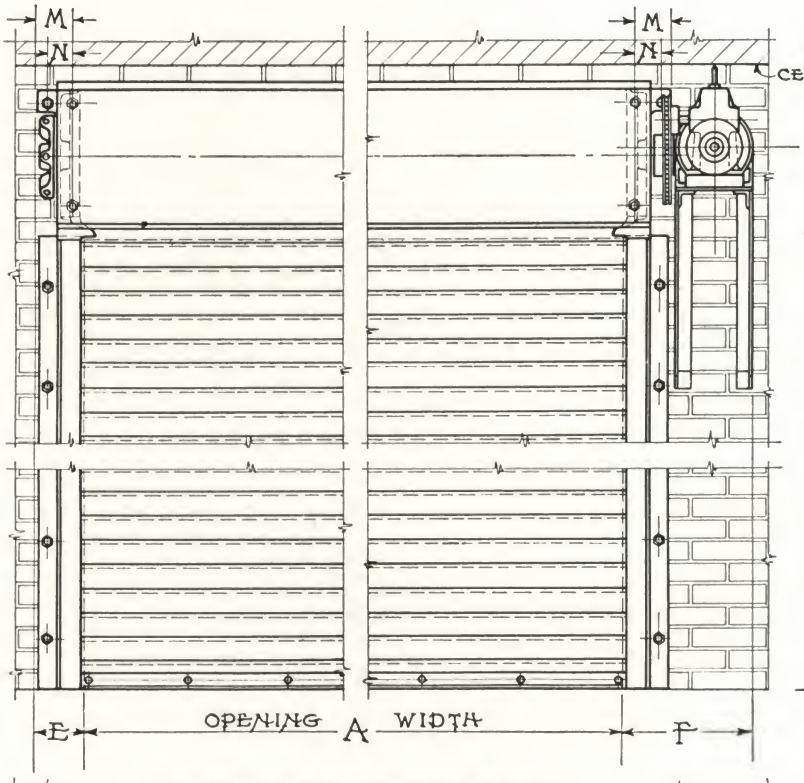
TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

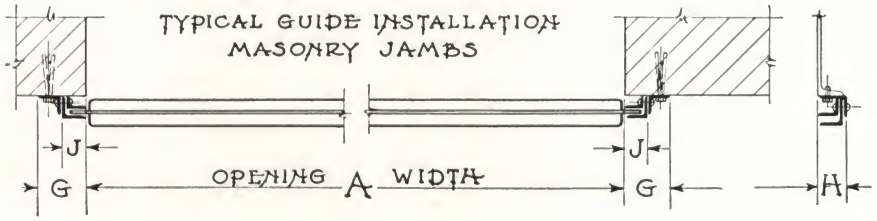
A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
10'-0"	10'-0"	2'-4½"	2'-9"	5"	3½"	2½"	4¼"	1⅛"	4⅜"	6⅛"	1"	3½"	10½"	2⅝"
11'-0"	10'-6"	2'-4½"	2'-9"	5"	3½"	2½"	4¼"	1⅛"	4⅜"	6⅛"	1"	3½"	10½"	2⅝"
12'-0"	11'-0"	2'-4½"	2'-9"	5"	3½"	2½"	4¼"	1⅛"	4⅜"	6⅛"	1"	3½"	10½"	2⅝"
13'-0"	11'-6"	2'-4½"	2'-9"	5½"	4"	3"	4¾"	1⅝"	4⅜"	6⅛"	1"	3½"	10½"	2⅝"
14'-0"	12'-0"	2'-4½"	2'-9"	5½"	4"	3"	4¾"	1⅝"	4⅜"	6⅛"	1"	3½"	10½"	2⅝"
15'-0"	12'-6"	2'-6"	3'-0"	5½"	4"	3"	4¾"	1⅝"	4⅜"	6⅛"	1"	3½"	12½"	3⅝"
16'-0"	13'-0"	2'-6"	3'-0"	5½"	4"	3"	4¾"	1⅝"	4⅜"	6⅛"	1"	3½"	12½"	3⅝"
17'-0"	13'-6"	2'-6"	3'-0"	6"	4½"	3½"	5¼"	2⅛"	4⅜"	6⅛"	1"	3½"	12½"	3⅝"
18'-0"	14'-0"	2'-6"	3'-0"	6"	4½"	3½"	5¼"	2⅛"	4⅜"	6⅛"	1"	3½"	12½"	3⅝"
19'-0"	14'-6"	2'-6"	3'-0"	6"	4½"	3½"	5¼"	2⅛"	4⅜"	6⅛"	1"	3½"	12½"	3⅝"
20'-0"	15'-0"	2'-6"	3'-0"	6"	4½"	3½"	5¼"	2⅛"	4⅜"	6⅛"	1"	3½"	12½"	3⅝"

Continued on next page

Standard Door with Special Power Operating Unit

TYPE 950-P





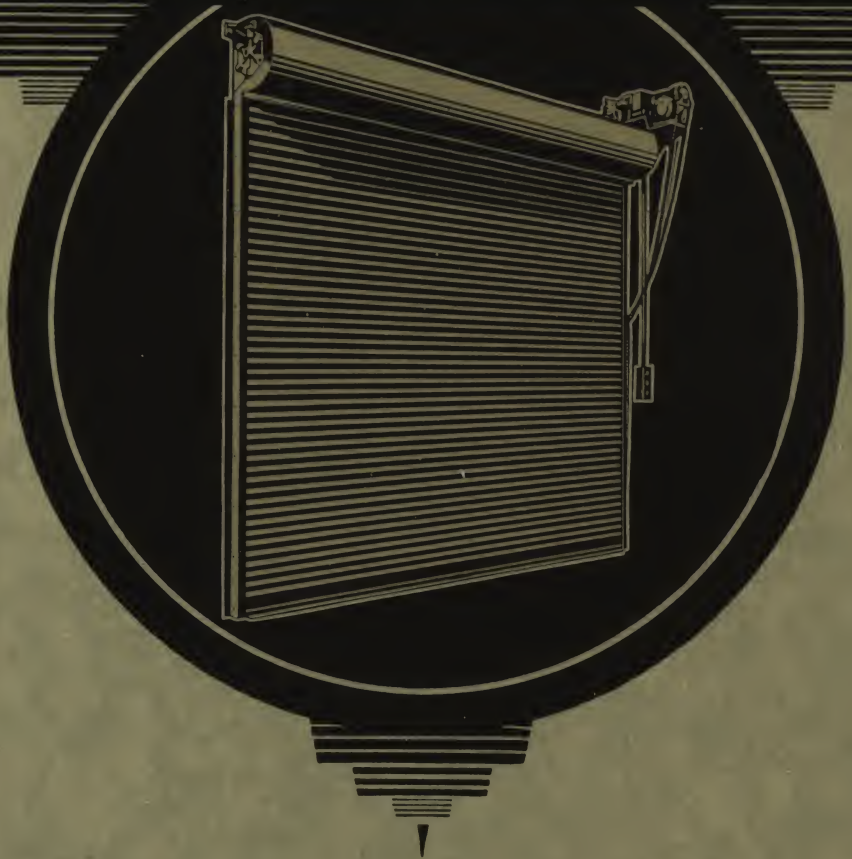
NOTE

LOCATION OF OPERATOR IS VARIABLE UP OR DOWN TO MEET UNUSUAL CONDITIONS WHERE HEAD ROOM IS LIMITED

TABLE OF DIMENSIONS FOR VARIOUS OPENING SIZES

A	B	C	D	E	F	G	H	J	K	M	N	U	X	R
10'-0"	10'-0"	15¾"	14½"	5"	14"	4¼"	2½"	2¼"	2'-6"	4⅜"	3⅜"	3½"	10½"	2⅝"
12'-0"	11'-0"	15¾"	14½"	5"	14"	4¼"	2½"	2¼"	2'-6"	4⅜"	3⅜"	3½"	10½"	2⅝"
14'-0"	12'-0"	15¾"	14½"	5½"	14"	4¾"	3"	2¾"	2'-6"	4⅜"	3⅜"	3½"	10½"	2⅝"
16'-0"	13'-0"	17¾"	16½"	5½"	14"	4¾"	3"	2¾"	2'-6"	4⅜"	3⅜"	3½"	12½	3⅝"
18'-0"	14'-0"	17¾"	16½"	6"	17"	5¼"	3½"	3¼"	3'-0"	4⅜"	3⅜"	3½"	12½"	3⅝"
20'-0"	15'-0"	17¾"	16½"	6"	17"	5¼"	3½"	3¼"	3'-0"	4⅜"	3⅜"	3½"	12½"	3⅝"
22'-0"	16'-0"	17¾"	16½"	6"	17"	5¼"	3½"	3¼"	3'-0"	4⅜"	3⅜"	3½"	12½"	3⅝"
24'-0"	17'-0"	17¾"	16½"	6"	20"	5¼"	3½"	3¼"	3'-2"	4⅜"	3⅜"	3½"	12½"	3⅝"
26'-0"	18'-0"	17¾"	16½"	6½"	20"	5¾"	4"	3¾"	3'-2"	4⅜"	3⅜"	3½"	12½"	3⅝"
28'-0"	19'-0"	19¾"	18½"	6½"	20"	5¾"	4"	3¾"	3'-2"	4⅜"	3⅜"	3½"	14½"	3⅝"
30'-0"	20'-0"	19¾"	18½"	6½"	20"	5¾"	4"	3¾"	3'-2"	4⅜"	3⅜"	3½"	14½"	3⅝"

MAHON
ROLLING
STEEL DOORS



THE R. C. MAHON COMPANY
DETROIT, MICHIGAN

THE KINNEAR MANUFACTURING CO.

Exclusively Door Manufacturers

820-870 Field Avenue
COLUMBUS, OHIO

BRANCH OFFICES

BOSTON, MASS., 294 Washington Street
NEW YORK, N. Y., 342 Madison Avenue
PHILADELPHIA, PA., 503 Wesley Building
WASHINGTON, D. C., 1111 Investment Building
PITTSBURGH, PA., 1723 Oliver Building
NEW ORLEANS, LA., 730 Hibernia Bank Building
CLEVELAND, OHIO, 528 Union Building
CINCINNATI, OHIO, 528 Walnut Street
DETROIT, MICH., 812 Ford Building
CHICAGO, ILL., 128 Wells Street
KANSAS CITY, MO., 111 Railway Exchange
SAN FRANCISCO, CAL., 444 Market Street

AGENTS IN PRINCIPAL CITIES

Products

STEEL ROLLING DOORS and SHUTTERS.
FIRE DOORS and SHUTTERS.
WOOD ROLLING DOORS for Roundhouses.
WOOD ROLLING INTERIOR PARTITIONS.
WOOD BIFOLDING DOORS.
STEEL BIFOLDING DOORS.
VERTICAL SLIDING DOORS.
STEEL ROLLING DOORS and SHUTTERS for service purposes.

For our pages on Garage Doors, see Manufacturers' Index.

KINNEAR ROLLING DOORS
TRADE-MARK

Types

Kinnear steel rolling doors and shutters are manufactured and sold under two distinct classifications, viz., Service and Labeled Types. Service doors are designed entirely for such openings as do not require Underwriters' label and where insurance rates are not a consideration.

Construction of Steel Rolling Doors

Kinnear steel rolling doors are constructed of the highest class of materials by mechanics especially trained in the exclusive manufacture of doors.

Curtain proper on all Kinnear doors is made of open hearth interlocking steel slats galvanized and equipped with malleable iron endlocks. Curtain is coiled upon barrel journalled in heavy cast iron brackets and travels in steel guides mounted at sides of openings.

Curtain is counterbalanced by means of helical springs which are enclosed in barrel.

Galvanized hood of steel of suitable design is supplied with each door.

Method of Installing Rolling Doors

Service doors in general are mounted on face of wall with brackets and coil entirely above the bottom of lintel and with inside face of guides flush with face of brick or concrete jamb.

Where headroom is limited and door can not be mounted on face of wall, it can be mounted in the opening, in which case the brackets and coil would be mounted directly under lintel and guides would be located on the jamb.

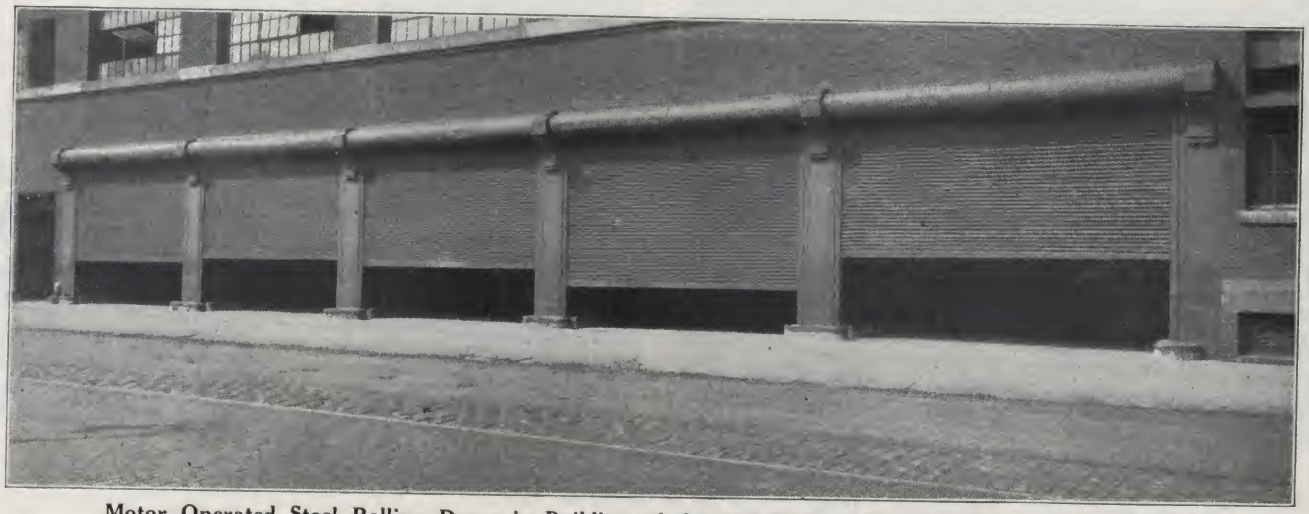
Operation of Rolling Doors

Doors may be operated as follows:

Push-up type of doors for openings not exceeding 100 sq. ft. can be operated in the same manner as window shade, being perfectly counterbalanced and same can be opened from either side.

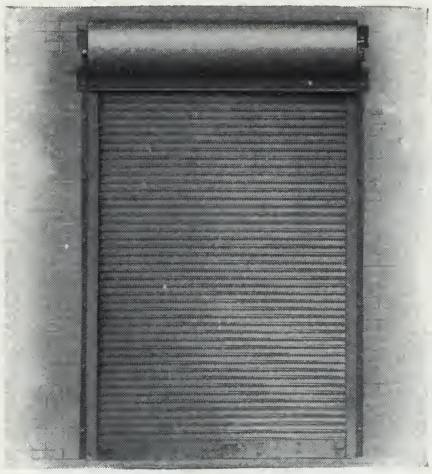
Doors can be operated by means of reduction gearing and endless chain, or by means of crank, shafting and gear.

Where motor operation is desired, it is necessary to have complete description of current and drawing showing clearances and general conditions.



Motor Operated Steel Rolling Doors in Building of the 399 Hudson Street Corp., New York, N. Y.

Continued on next page



Elevation



Vertical Section

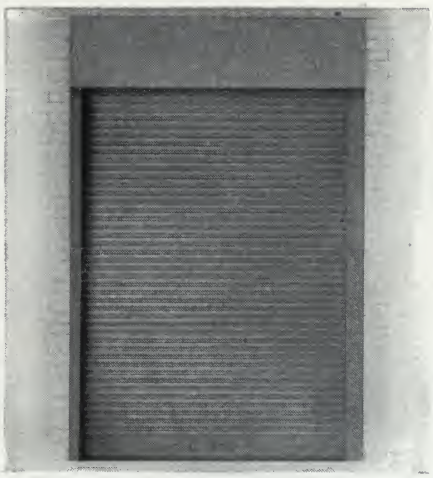


Cross Section



F.M. 10. Construction

Mounted on face of wall.
Push-up type, entirely counterbalanced.
Can be opened or closed from either side.
Provided with suitable lock.
Available for openings not in excess of 100 sq. ft.



Elevation



Vertical Section

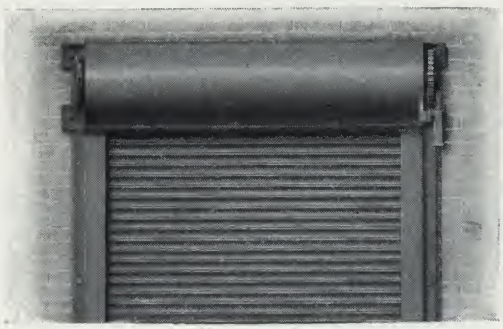


Cross Section

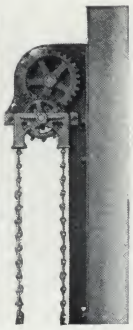


B.M. 10. Construction

Mounted in opening.
Can be opened or closed from either side.
Curtain entirely counterbalanced.
Paneled hoods can be provided



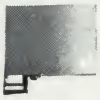
Elevation



End View

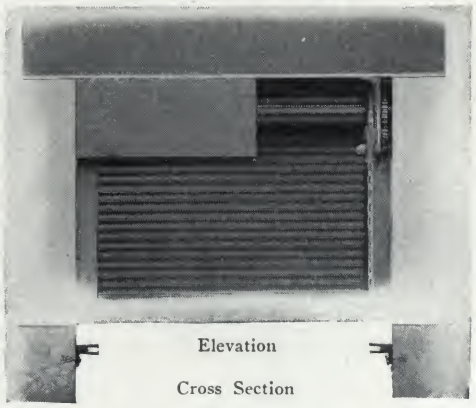


Cross Section



Construction No. F.H. 20

Mounted on face of wall; counterbalanced by springs.
Operated by means of endless chain, sprocket and gear



Elevation

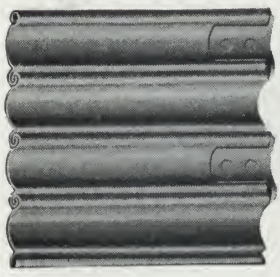
Cross Section



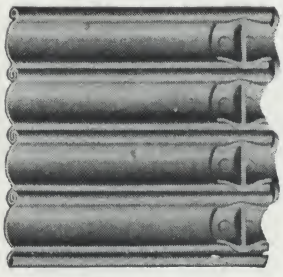
Vertical Section

Construction No. B.H. 20

Mounted in opening; counterbalanced by springs.
Operated by means of endless chain, sprocket and gear









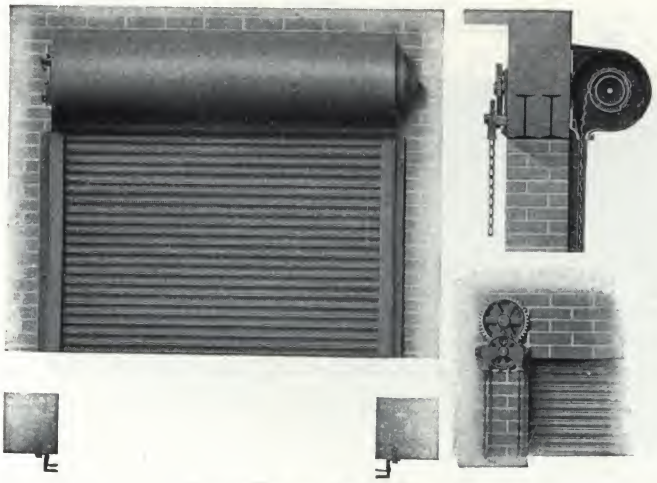
Concave and Convex Sides of Interlocking Steel Slat No. 2

Illustrations to the left show slat No. 2 fitted with alternate endlocks; those to the right, fitted with continuous endlocks. Slat No. 2 is 1⅞ in. wide on centers; depth of crown, ½ in. Made in gauges Nos. 24, 22, 20, 18 and 16.

Especially adaptable to shutters equipped with mechanical operating device.

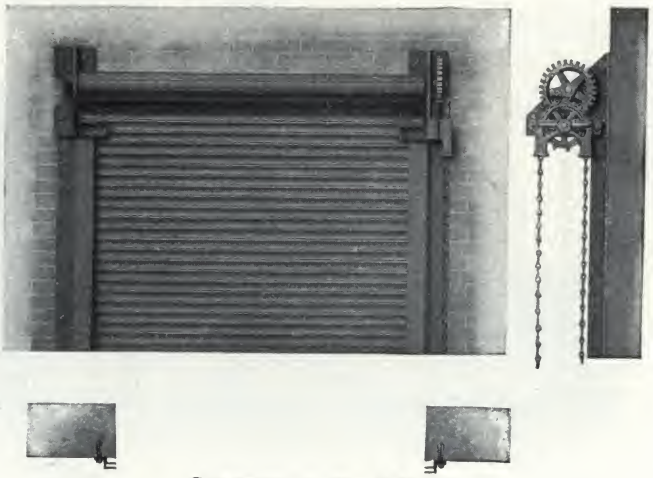
In cases of extremely wide openings, Kinnear No. 4 slat is used. This type of slat is larger than the No. 2 slat

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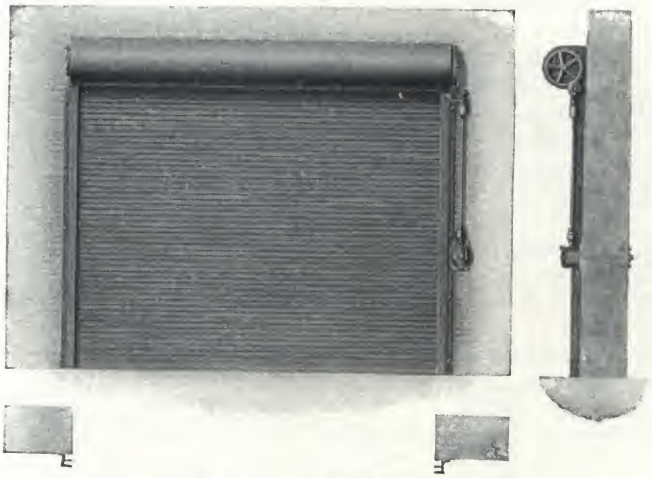
Construction No. F.H. 61

Door mounted on exterior face of wall. Operated from within building by means of endless chain, sprocket and gear, and by shaft extending through the wall. May be locked on inside by means of a chain lock



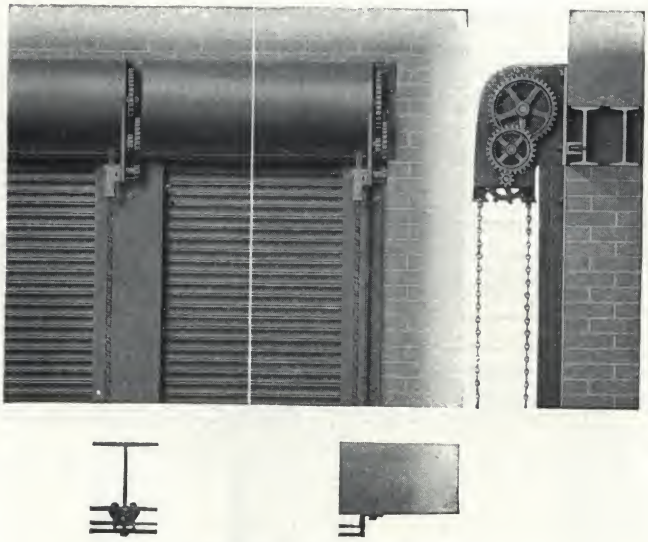
Construction No. F.H. 30

Mounted on interior face of wall; not furnished with hood. Open type of bracket facilitates erection. After brackets are in place, curtain barrel can be dropped into bearings. Closed brackets necessitate erection of both brackets and barrel together



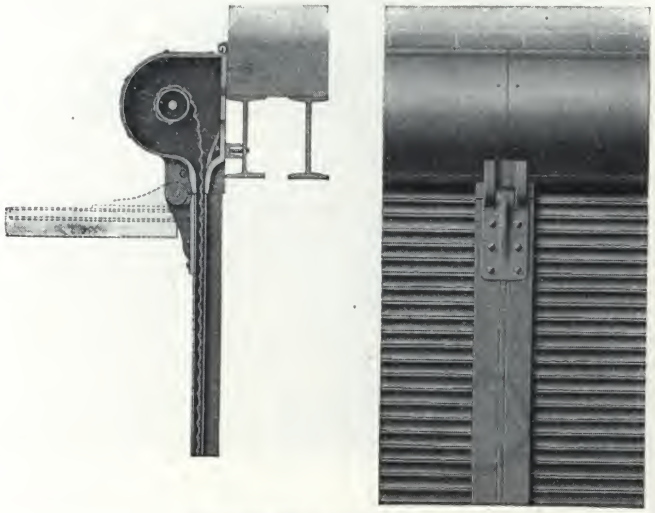
Construction No. F.C. 20

Mounted on face of wall. Operated by means of crank, imparting movement to the curtain barrel through shaft and suitable gear. Can be made to operate from either inside or outside of building, or both.
Operation from one side only is standard arrangement



Construction No. F.H. 23

Modification of construction No. F. H. 20. A compact design well adapted to large openings, separated by narrow post



Intermediate Movable Posts

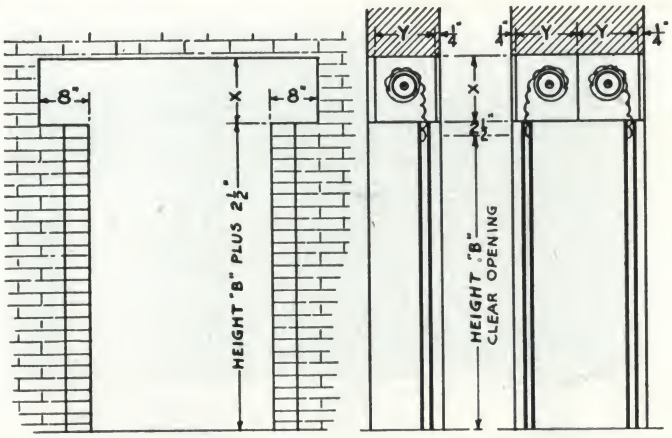
Wide openings can be frequently more economically closed by a number of small doors, than by a single large one, using, between doors, movable posts hinged to brackets. After doors are open, posts are swung up out of the way by ropes and pulleys

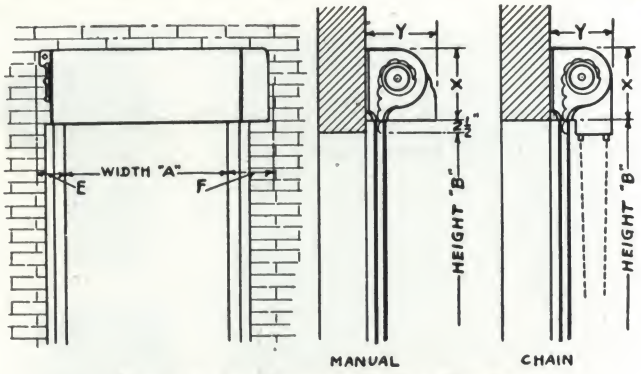


Interior of Pier 32, San Francisco

Steel rolling doors arranged with movable intermediate posts shown above, making entire opening available

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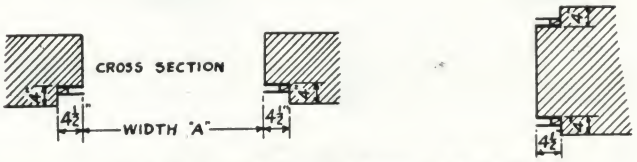




Openings for Kinnear Rolling Shutters

FACE OF WALL—MANUAL—AUTOMATIC

Height B, ft.	Width A, ft. 3	4	5	6	7	8	9	10
6	E = 6 in. X = 15½ in.		F = 12½ in. Y = 15½ in.					
7					E = 6 in. F = 12½ in.			
8			X = 16 in. Y = 15½ in.			E = 6 in. F = 12½ in. X = 18 in. Y = 18 in.		
9	E = 6 in. F = 12 in. X = 17 in. Y = 17½ in.							
10								
11				E = 6 in. F = 12½ in. X = 19 in. Y = 18½ in.				
12								



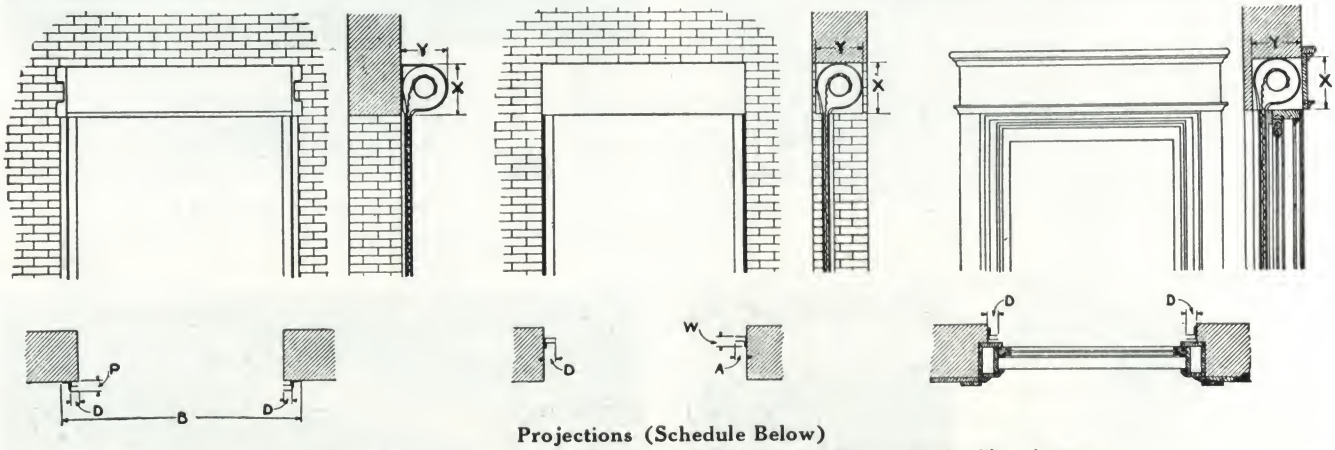
Openings for Kinnear Rolling Shutters

BETWEEN JAMB AUTOMATIC

Height B, ft.	Width A, ft. 3	4	5	6	7	8	9	10
6	X = 16½ in. Y = 12¾ in.							
7								
8			X = 17 in. Y = 13¾ in.					
9					X = 19 in. Y = 15¾ in.			
10	X = 18 in. Y = 14¾ in.							
11				X = 20 in. Y = 16¾ in.				
12								

FACE OF WALL—CHAIN—AUTOMATIC

Height B, ft.	Width A, ft. 5	6	7	8	9	10	11	12
6								
7								
8			E = 8 in. X = 16½ in.	F = 12 in. Y = 20 in.				
9								
10								
11							E = 8 in. X = 18 in.	F = 13 in. Y = 21 in.
12								



Projections (Schedule Below)

Above are indicated the salient dimensions of usual sizes of standard service types of Kinnear steel rolling shutters.
View to the left shows shutter placed on face of wall; central view shows shutter placed between jambs, and that to the right shows curtain with concealed coil. The following dimensions are for shutters of height and width indicated:

Height ft.	Width 3 to 7 ft. Groove depth "D," 2 in. Y in.	X in.	P in.	A in.	W in.	Width 7 to 11 ft. Groove depth "D," 2½ in. Y in.	X in.	P in.	A in.	W in.	Width 11 to 14 ft. Groove depth "D," 3 in. Y in.	X in.	P in.	A in.	W in.	Width 14 to 20 ft. Groove depth "D," 3½ in. Y in.	X in.	P in.	A in.	W in.
6	12¾	12¾	3	4	3	12¾	14	3	4½	3½										
8	14¼	14¼	3	4	3	16½	18	3	4½	3½										
10	15¼	17	3	4	3	17½	19	3	4½	3½										
6	11	13	2½	5	3	11	13	2½	5½	3½	12¾	14	2½	6	4	15	17	3½	8	4½
8	11	13	2½	5	3	11¼	13½	2½	5½	3½	12¾	14	3½	6	4	15	17	3½	8	4½
10	11¾	13½	3½	5	3	11¾	13½	3½	5½	3½	13½	15	3½	6	4	15½	18	4	8	4½
12	13½	15	3½	5	3	13½	16	3½	5½	3½	13½	16	3½	7½	4	17	19	4	8	4½
14	14¼	16	3½	5	3	14¼	16½	3½	5½	3½	15¼	17	3½	7½	4	17½	19	4	8	4½
16	15¼	17	3½	5	3	15¼	17	3½	7	3½	16¼	18	4	7½	4	20	22	4	8	4½
18	15¼	17	3½	5	3	15½	18	3½	7	3½	17	19	4	7½	4	22	24	4	8	4½

Sizes above division line apply to shutters operated by handle in bottom of curtain. Those below division line apply to shutters operated by endless chain or crank and bevel gear. Dimension "P" applies only to face of wall constructions. Dimension "W" only to "between jamb" constructions. Dimension "D" in the between jamb section applies only to manually operated shutters. Use projection "A" for both sides where chain operation is used. Dimension "B" should always be at least 8 in. wider than width of door opening for moderate sized shutters, and for very large shutters 10 or 12 in. and more if possible. We do not recommend manually operated construction for curtains of larger area than approximately 100 sq. ft.; chain hoist should be used on larger sizes. Any unusual sizes, direct correspondence is advisable.

Continued on next page



Underwriters' Labels

Fire Doors and Shutters

Constructed under the supervision of the Underwriters' Laboratories, Inc., and labeled as above.

Important Features—Kinnear fire doors and shutters are specially designed for fire protection.

Details of construction have been carefully developed. The following are some of the important features:

(1) An auxiliary or inner hood is automatically dropped and closes the space between the barrel and outer hood, thereby preventing the passage of flame over the barrel.

(2) Special endlocks closing the concaved ends of slats and preventing the passage of flame around the edge of the curtain.

(3) Fusible washers employed in the construction of grooves which melt and allow the members composing the grooves to expand without buckling.

(4) Non-corrodible metal used for bearings and contact points of the automatic release.

(5) Single line contact bearings in releasing levers.

(6) Provision made for expansion of parts for all temperatures up to 2000° F.

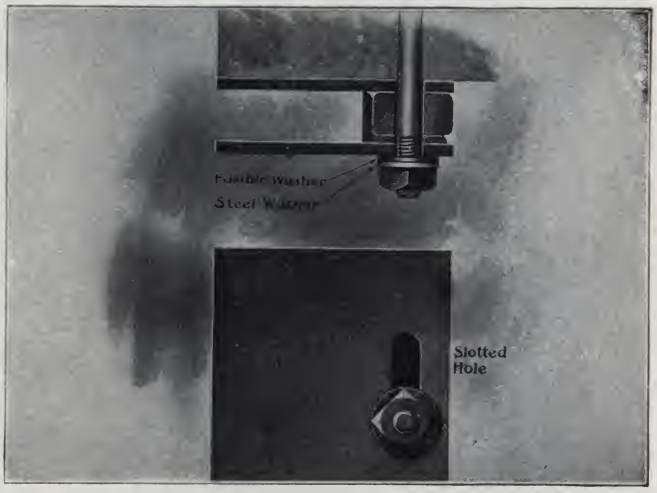
(7) Disposition of fusible links, insuring prompt closing.

(8) The enclosure of automatic release, protecting it from the weather.

(9) Safety device controlling the speed of curtain in automatic closure.

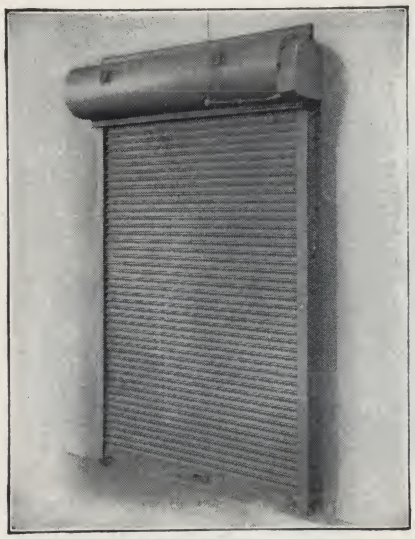
Catalogues—General Catalogue No. 51 and the special Fire Door Catalogue No. 53 illustrate many additional types and their applications. These doors and shutters are designed to obtain easy operation in normal service, and are easily opened and reset by a single person after automatic closure.





Salient Features of Kinnear Fire Doors and Shutters

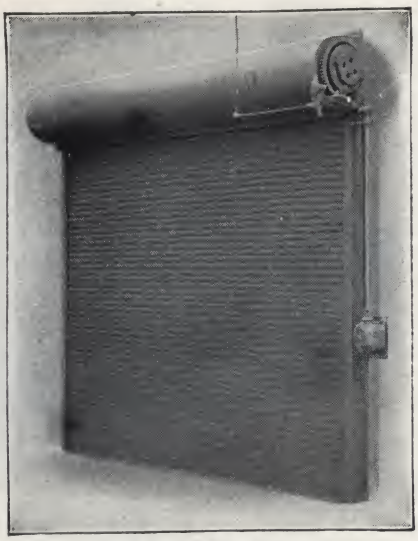
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Manual Operation



Chain Operation



Crank and Shaft Operation

A Few Types of Akbar Construction

Salient Features of Akbar Construction, a Distinctive Kinnear Product

(1) The automatic closing of this type of door is insured by a powerful starting force which diminishes as door is set in motion.

(2) A special safety device is provided on each door which controls drop of door in automatic closure and which eliminates every element of danger, as well as the violent impact common to other types.

(3) Can be opened and reset without difficulty after automatic closure.

(4) Are available for service purposes at all times and will close automatically from any open position.

Akbar doors are available in three methods of operation:

Manual by means of handles in bottom of bar

Endless chain with reduction gears

Crank through bevel gears and vertical shaft.

The Underwriters' Laboratories, Inc., label service covers all Akbar constructions for exterior openings not exceeding 100 sq. ft. where width or height does not exceed 12 ft.

On fire walls, room partitions, elevator shafts and corridor openings the limit of area is 80 sq. ft., the width or height not to exceed 12 ft. Doors in excess of these areas are factory inspected by representatives of the Underwriters' Laboratories, Inc., and a certificate is issued which is a guarantee that the doors are constructed according to label requirements with the exception of size.

When this service is required it must be indicated with the order.



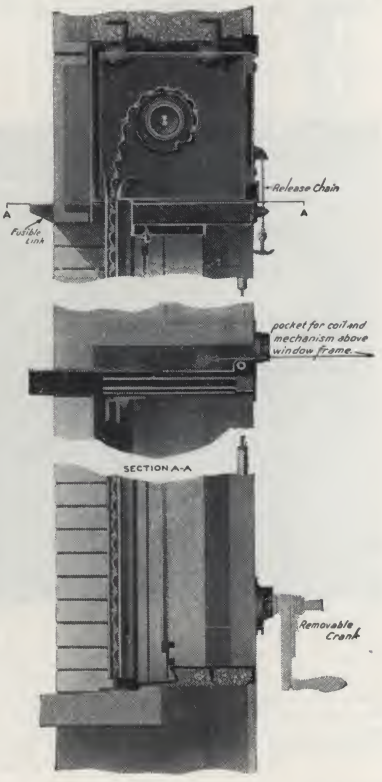
Salient Features of Superior Construction for Exterior Windows

Labeled for exterior window openings not in excess of 100 sq. ft., neither dimension exceeding 12 ft.

Normally remains in open position, closing automatically by means of fusible link.

Equipped with impact device striking a hammer blow of 200-inch pounds simultaneously with fusing of link or actuating of reliability treating device.

Can be tested for reliability of operation and raised after test from floor level through a gearless rewinding device.



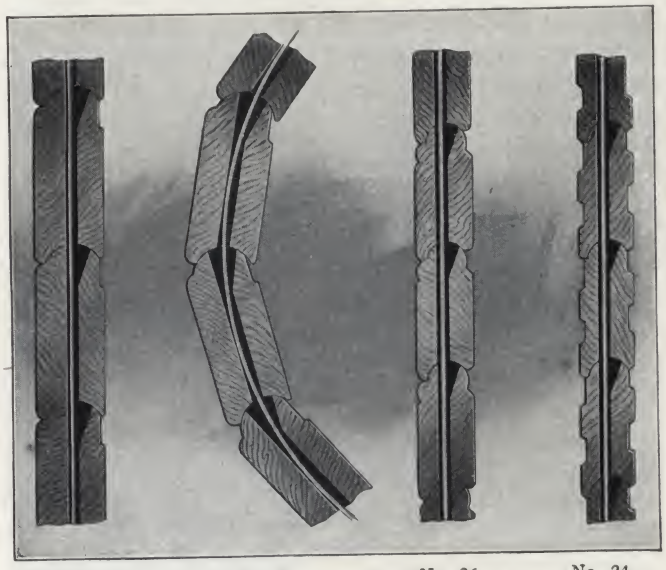
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Wood Rolling Doors and Partitions

For Roundhouses—Wood rolling doors are particularly desirable in cases where chemical action is liable to deteriorate steel. This is particularly true in roundhouses and chemical plants.

These doors are constructed of wood slats assembled on phosphor bronze ribbons placed at proper intervals. Slats are made of cypress and treated with a coat of wood preservative.

Slat No. 27 is used on exterior doors.



No. 27 No. 27 No. 26 No. 24

Sections of Wood Slats

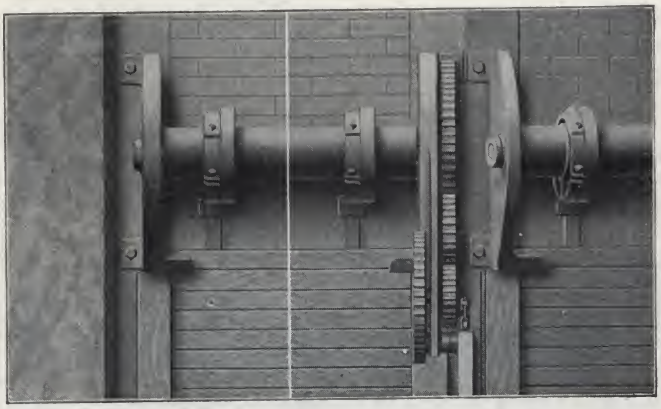
For Schools, Churches, etc.—Curtains are composed of slats assembled on phosphor bronze ribbons.

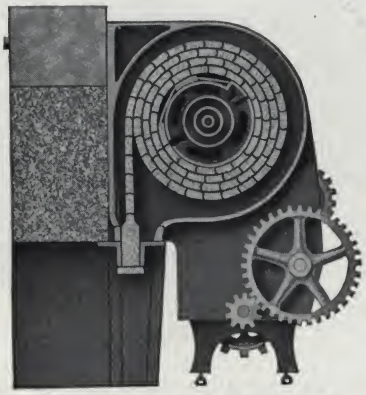
Made in long leaf yellow pine, cypress, quarter sawed oak and birch.

Slats Nos. 24 and 26 are for interior work; slat No. 27 for exterior work.

Illustration shows cross section through slats.

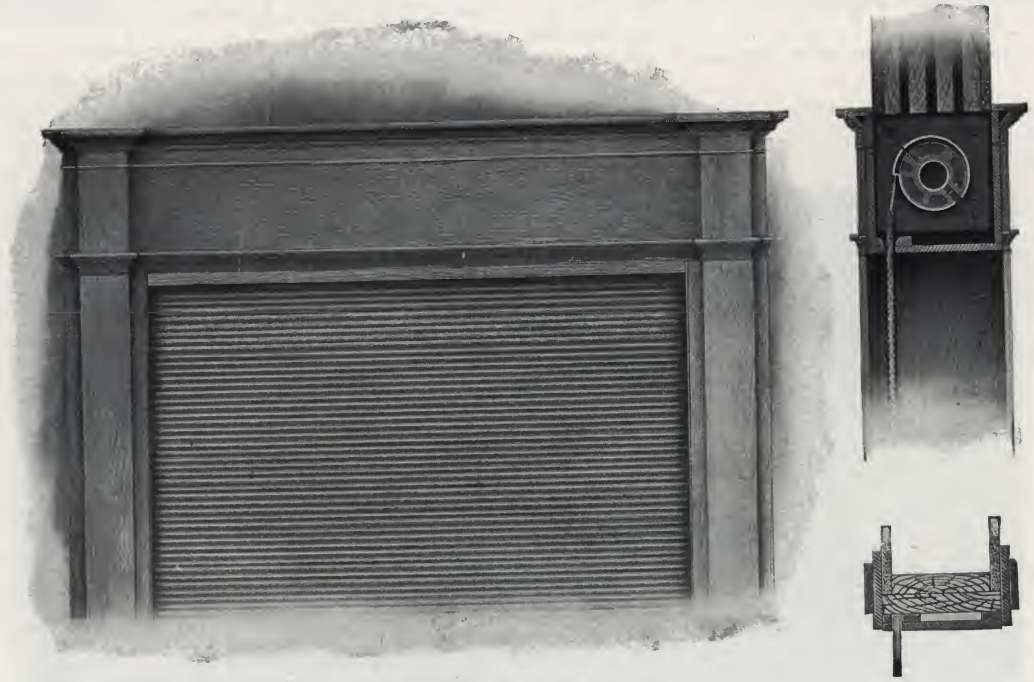
The opening through which the ribbon passes is so shaped that, during flexure of the curtain, there is no change in the relative length of the slats or curtain; nor is there any danger of pinching the ribbon.





Construction No. F.H.W. 22

Designed especially for roundhouses. Doors mounted on face of wall above opening; travel in grooves at sides. Counterbalanced by springs; operated by means of endless chain and reduction gear



Construction No. W.B.M. 10

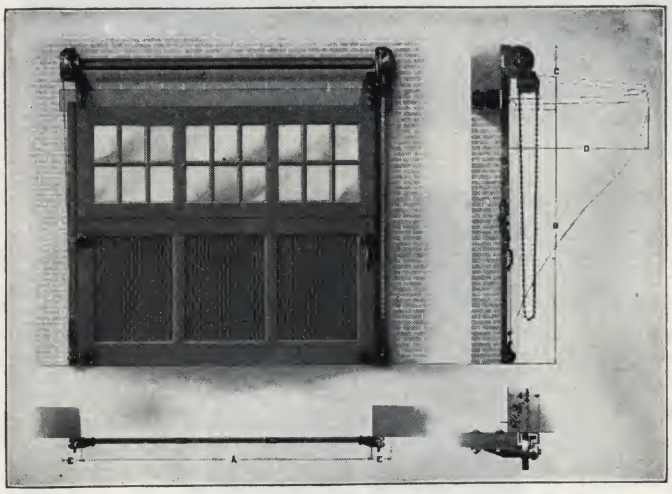
Application of wood rolling door for interior partition. Coil is concealed under lintel; operated by means of handle in bottom of rail. Mechanical operating devices are arranged for large doors. Can be concealed within the casing. Casing and grooves are not supplied, but should be included in general carpenter work

Continued on next page

Bifolding Doors, Wood or Steel

In cases where light is desired through doors, the bifolding type lends itself readily to such condition. These doors may be constructed either of wood or steel, and are of two sections hinged at the center and pivoted at top of opening. The upper panel may be fitted with sash, giving a glass area of about two-thirds the total area of the panel.

Bifold No. 5—This is without doubt the most practical bifolding door now on the market, requiring less clearance at both head and sides of opening than do most other types.



Bifold No. 5

CLEARANCES REQUIRED FOR BIFOLD NO. 5

Height										
B	6′ 0″	7′ 0″	8′ 0″	9′ 0″	10′ 0″	11′ 0″	12′ 0″	13′ 0″	14′ 0″	15′ 0″
C	26½″	26½″	26½″	26½″	28½″	31″	33″	35″	35″	37″
D	3′ 10″	4′ 4″	4′ 10″	5′ 4″	5′ 11″	6′ 6″	7′ 1″	7′ 8″	8′ 2″	8′ 9″
E	8″	8″	8″	8″	8″	10″	10″	10″	10″	10″

Dimension A should not exceed 18 ft; dimension B should not exceed 15 ft.

Kinnear Bifold No. 5 is designed with a spring counterbalance, eliminating the heavy counterweights usually used on this type of door. Steel cables connect the door to the counterbalancing device at the top of the opening. Bottom panel is fitted with rollers which travel in guides attached to wall and transmit the thrust.

The simplicity and sturdiness of the mechanism reduces maintenance to a negligible factor and renders quick and easy operation. Less side clearance is required as there are no counterweights. Send us a sketch showing conditions as they actually exist and we will show how this flexible construction adapts itself to other than standard conditions.

Kinnear panels are fabricated in our own factory from extra heavy materials and are built on a purely quality basis. Write for prices and catalogue.

Vertical Sliding Doors

This type of door is particularly suitable for freight houses, piers and warehouses where light is essential through doors.

The door comprises two or more sections consisting of trussed frame covered with corrugated iron, hung independently with chains connected with counterbalance weights. Operated by means of endless chain and suitable reduction gearing.

Where doors are mounted on steel columns, guides and weight boxes should be incorporated as a part of the column, and should be supplied by the steel contractor, according to details supplied by our Engineering Department.

This type can also be supplied to be mounted on the face of the wall, in which case we furnish weight box and guides as part of the equipment.

It is advisable to procure definite information from the factory in connection with the above type of door.



Pennsylvania Railroad Fruit House, Pittsburgh, Pa.

Continued on next page

Kinnear Power Units

Rolling doors are especially adaptable to electric motor operation and Kinnear power units are available for all sizes of rolling doors. If the arrangement as shown in the illustration is not feasible other applications can be provided.

Electric Power Operation—

The rolling doors are operated by means of the motor driving the curtainbarrel through reduction gearing. The operation is accomplished by the following means:

By pushing a button on the operating switch the pilot circuit is closed through the magnet of the automatic starter which then closes the main circuit through the motor. The motor then operates the door. The limit switch will at the termination of the travel break the current through the automatic starter magnet, which will consequently interrupt the motor circuit and simultaneously the magnet brake will close, stopping the motor. The door can be stopped at any intermediate point by means of the stop button on the switch from where it can be operated either up or down.

Electric Motor—

Series wound motors with high starting torques are used for direct currents and high torque elevator motors for alternating currents.

Lubrication—

Means are provided for the lubrication of all bearings.

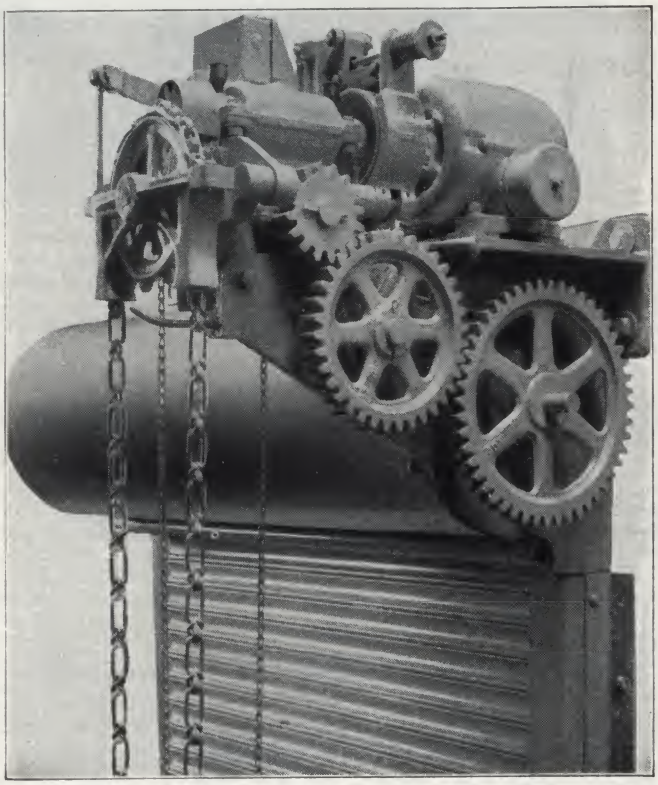
Emergency Operation—

For cases of emergency, means are provided for the operation of the door manually with sprocket and chain. This emergency device is disengaged during motor operation and the control for engaging and disengaging this device from the driving mechanism is operated from the floor. Arrangements are provided that prevent the motor from operating until this device is disengaged.

Control Switches—

The control switches consist of a fused service switch, enclosed safety type and externally operated; heavy duty 3 push button switches with open, close and stop buttons, and a remote control magnet reversing panel switch. The reversing panel is enclosed and furnished with a thermal overload relay.





Kinnear Power Units

Wiring—

The wires, wire conduit and fuses are not furnished or installed by The KINNEAR MANUFACTURING Co., but are to be established in accordance with the diagram supplied by the Kinnear Company.

Engineering—

Details, specifications and other information will be furnished upon request. All requests for engineering data or quotations must be accompanied by the electrical current characteristics as follows:

Alternating current: voltage .... phase .... cycle .... ; direct current: voltage.

In General—Kinnear power units are the result of years of painstaking effort, are compact, sturdy, and are long past the experimental stage.

Kinnear motor operated doors are in general use everywhere and are great time savers on large openings.

If you have door problems it will give us pleasure to help develop them.

Write for detailed information.

ESTABLISHED 1900

GEO. W. JOHNSON MFG. CO.

INCORPORATED 1906

Johnson Steel Rolling Doors and Shutters

ST. LOUIS, MO. KANSAS CITY, MO.

REPRESENTATIVES IN PRINCIPAL CITIES

Products

STEEL ROLLING DOORS and SHUTTERS.

Types

Johnson Steel Rolling Doors and Shutters are furnished in two general types:

(1) Service doors and shutters—where labels are not required;

(2) Underwriters' labeled doors and shutters—for the protection of openings where insurance rates are a consideration.

Labeled doors and shutters are built in strict accordance with the Underwriters' requirements for proper classification of the openings for which they are intended. They are inspected and labeled at our factory by a representative of the Underwriters' Laboratories, Inc.

The Underwriters classify openings, and specify gauges of curtains as follows:

Division fire wall	Class A—No. 16 U. S. gauge
Interior vertical shaft	Class B—No. 20 U. S. gauge
Corridor or room partition	Class C—No. 20 U. S. gauge
Exterior wall	Class D—No. 22 U. S. gauge

Labels are attached to doors for openings not over 80 square feet in area for classes A, B, and C, and not over 100 square feet for class D, with a maximum allowable dimension of 12 feet in either width or height for all classes. "Certificates of Inspection" are issued by the Underwriters' Laboratories, Inc. for oversized doors.

Operation

Push-up, by means of handles on bottom plates of nominal sized doors.

By chain, sprocket and reduction gearing.

By crank, shafting and reduction gearing.

By electric motor operating equipment.

Installation

Generally on face of wall with brackets and shaft above the lintel. Where necessary or desirable, with brackets within the opening under the lintel and with guides attached to the jambs. Such an installation can be made in existing openings, but better method is to prepare the opening by providing pockets for the brackets and rabbetted jambs to receive and protect the guides.

Advantages

Steel rolling doors leave entire floor space available; are easily operated regardless of size, are economical in maintenance, are long lived, and are unaffected by climate changes.

Construction Features

The drum, around which the curtain coils, revolves on *roller bearings* around a *stationary* center shaft supported by the end brackets. Highest grade oil-tempered flat motor springs, contained in the drum, are used to counterbalance the weight of the curtain. *Speed and ease of operation are assured by the full roller-bearing shaft construction, and an improved and perfected internal gear drive to the door drum is used on all chain, crank and motor operated doors.* The drum supplies continuous support to the curtain at the point of attachment.

Curtains are constructed of interlocking slats formed from rust-resisting cold rolled steel galvanized to meet the requirements of the Underwriters' Laboratories, Inc. Malleable iron endlocks, riveted to the curtain edges, prevent lateral movement of the slats and provide a wearing surface in the guides.

Brackets are constructed of reinforced steel plates, this construction combining great strength with minimum weight, and readily adapting itself to the difficult and unusual requirements often encountered.

Castings are soft gray iron, malleable or steel, moulded from properly designed metal patterns and fully machined where required. Steel or malleable iron castings are used for all parts requiring great strength, and all gear shafts are of cold rolled steel.

Galvanized sheet metal hoods are furnished on all doors to cover the coils.

Alemite fittings are provided for easy and proper lubrication on all principal bearings.

Where required, doors are provided with means for locking.

Motor Operators—Powerful but compactly designed. Mounted directly on the door bracket or on a bed plate independently supported, and directly coupled to the door shaft. Units consist of motors, magnetic solenoid brakes, reduction gears and gear driven limit switches. Reduction gears are enclosed and run in an oil bath. Control equipment usually consists of a magnetic reversing switch with thermal relay for motor protection, and one or more three-button push-button stations marked "Open," "Close" and "Stop." General Electric Company's electrical equipment is standard. Provision is made for emergency hand operation.



Johnson Face of Wall Automatic Fire Door

Continued on next page



Union Pacific Freight House, Topeka, Kan.

STANDARD CLEARANCES REQUIRED FOR DOOR COILS

Please note these are standard dimensions; modifications can be made to meet conditions.

Clear opening height, feet	Face of wall doors, distance above lintel, inches	Face of wall doors, projection from wall, inches	Between jamb doors, clear opening to lintel, inches	Between jamb doors, dimension through wall, inches
Up to 9	19	16	19	16
9 to 12	20	17	20	17
12 to 16	21	18	21	18
16 to 18	24	21	24	21
18 to 21	25	22	25	22
21 to 25	26	23	26	23

DIMENSIONS REQUIRED FOR STANDARD OPERATING MECHANISMS: MEASUREMENTS TAKEN FROM LINE OF OPENING JAMB

Please note these are standard dimensions; modifications can be made to suit conditions.

Opening width, feet	Non-automatic doors, inches			Automatic doors, inches			
	Adjusting end	Chain end	Crank end	Plain end	Chain end	Crank end	Automatic end
Up to 10	6½	8½	8½	4½	8½	8½	8
10 to 14	7	9	9	5	9	9	8½
14 and over	7½	9½	9½	6	9½	9½	9

CLEARANCES REQUIRED FOR STANDARD GUIDES

Please note these are standard dimensions; modifications can be made to suit conditions.

Clear opening width, feet	Face of wall construction, inches		Between jamb construction, inches	
	For attachment to masonry	For attachment to steel	Plain end of door	Operating end
Up to 8	4½	3	3½	4½
8 to 10	5	3½	4	5
10 and over	6	4	4½	5½

Note: Dimensions given above include $\frac{5}{16}$-in. distance the front edges of guides set back from jambs.

SPECIFICATION NUMBERS FOR "JOHNSON" STEEL ROLLING DOORS AND SHUTTERS

Types	Face of wall installation			Between jamb installation						Motor operated
				In prepared opening			In plain opening			
Service non-aut.	Push-up	Chain	Crank	Push-up	Chain	Crank	Push-up	Chain	Crank	**Classification of Opening**
	100	110	120	10R	11R	12R	10P	11P	12P	
	700	710	720	70R	71R	72R	70P	71P	72P	"A" division fire wall openings
Underwriters' labeled automatic	600	610	620	60R	61E	62R	60P	61P	62P	"B" interior vertical shaft "C" corridor or room partition
	500	510	520	50R	51R	52R	50P	51P	52P	"D" exterior door openings
	400	410	420	40R	41R	42R	40P	41P	42P	"D" window openings
Non-aut. labeled	300	310	320	30R	31R	32R	30P	31P	32P	"D" exterior door openings

MAJESTIC IRON WORKS, INC.

Manufacturers of Steel Rolling Doors Exclusively

3144-46 Maypole Avenue, CHICAGO, ILL.

MAJESTIC ROLLING STEEL SHUTTERS

Special Features—Latest Mechanical Improvements

LOCAL REPRESENTATIVE

Types

Service Doors where labels are not required, and Automatic Shutters —self-closing bearing Underwriters' label.

Operation

Push-up or manual type.

Regular chain sprocket and gearing control.

Back of door special chain sprocket and gearing control.

Electric motor operating equipment.

Automatic self-closing.

Installation

On face of wall or under lintel.

Our Engineering Department will furnish all necessary information and assist in the solution of unusual or difficult problems.

Construction Details

Curtain—Made of 16, 18 and 20 gauge galvanized copper bearing steel interlocking type. Slats equipped with one-piece malleable iron endlocks. Curtain fastened to barrel with a special clamp. (No holes are drilled in curtain.)

Brackets—Are heavy castings and bolted directly to the angle guides.

Barrel—Steel tubing with spool shaped combination flanged gear at each end. This makes curtain self-center aligning when coiling up; and prevents end of curtain from rubbing against guides and side of bracket or from jamming. The barrel revolves about hexagonal shaft on radial ball bearings contained in the flanged gears.

Counterbalancing Spring—Oil tempered helically formed, fastened to the hexagonal shaft with special security attachment, thus preventing anything from working loose inside of main curtain barrel. The spring is enclosed in steel tubing for protection against atmospheric conditions. The size and length of spring is accurately computed to give absolute counterbalance.

Gears—Of machined teeth are completely enclosed under hood for protection against weather conditions.

Hood—Galvanized steel, angular shaped, for proper watershed. Angle reinforcements at top and bottom.

Guides—Are of heavy steel sections to withstand heavy bumps and to provide a deep groove for curtain. Guides extend above the bottom line of lintel to provide for attachment of bracket which transmits load of barrel to jambs. This method of bracket attachment also guarantees alignment of curtain and grooves.

Chain Operator—Is a one-piece sprocket and pinion gear completely covered with a cast iron housing with special oiling attachment. Sprocket is completely enclosed to prevent chain from coming off.

Motor Operator—This is an integral part of the shutter and not an attached accessory. It consists of a specially designed motor of correct horsepower, magnetic brake, limit switch, reversing switch with emergency overload cutout, push button station and emergency hand chain operator. This equipment is completely wired and tested in the factory. Complete enclosure makes it weatherproof for outside erection. Electrical connection at building consists only of power connection from line to operator.

Underwriters' Automatic Shutters—Self-closing in case of fire. Have been tested and approved as standard by the Underwriters' Laboratories, Inc., and carry their label for openings in fire wall, vertical shaft, corridor or room partition and openings in exterior walls, if required.

Features

Simplicity of design, reduction in the number of moving parts, absolute counterbalancing and the elimination of friction permits easy and positive manual operation regardless of size.

Less power is required for motor operator. Repairs or installation of new parts can be easily made if it should become necessary.

Method of attachment permits easy and speedy erection and guarantees alignment of curtain and groove.

Motor operator is smaller and less cumbersome. It can be installed inside or outside of the building without affecting its efficiency.

Stiffness of slats and depth of grooves provide sufficient strength to offset any adverse effect of wind pressure.

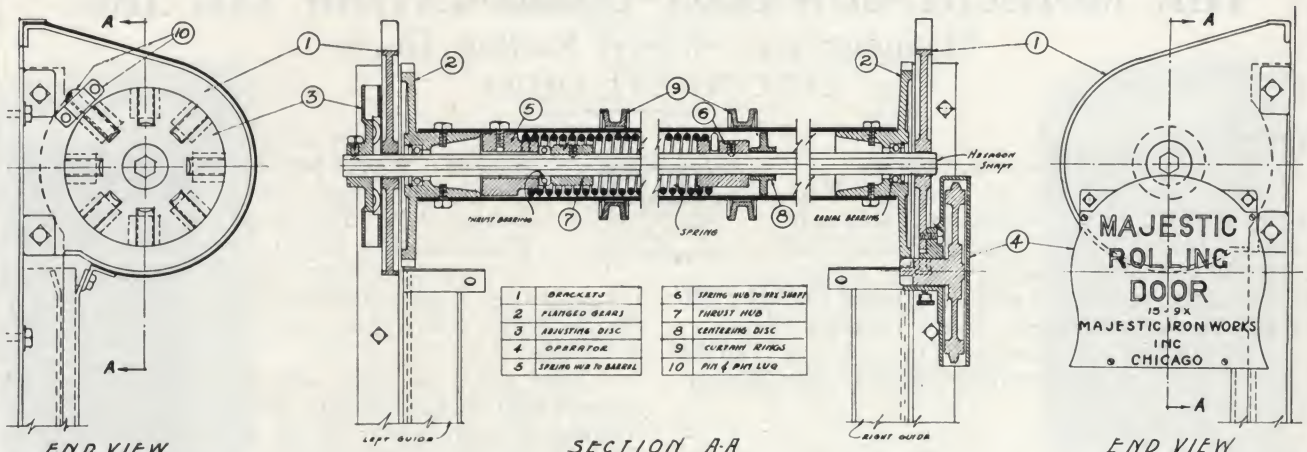
Back of door special chain and gear operator permits control of outside door without mechanism going through wall. This is a very important feature.

All parts of assembly painted, except operating mechanism.



Typical Installation—Majestic Steel Rolling Doors

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END VIEW
ADJUSTING DISC SIDE

SECTION A-A

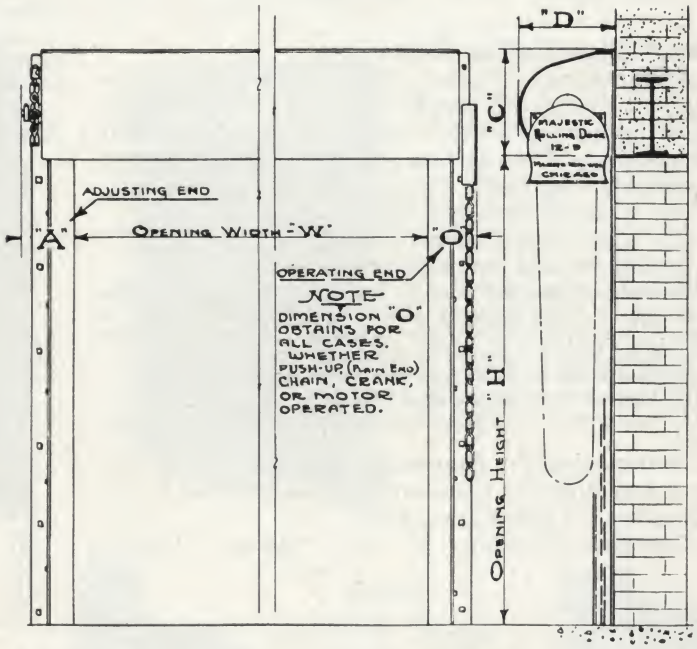
END VIEW
OPERATOR SIDE

Scale 1" = 1'-0"

MAJESTIC SERVICE ROLLING DOOR

CLEARANCES REQUIRED FOR MANUALLY OPERATED AND MOTOR OPERATED DOORS

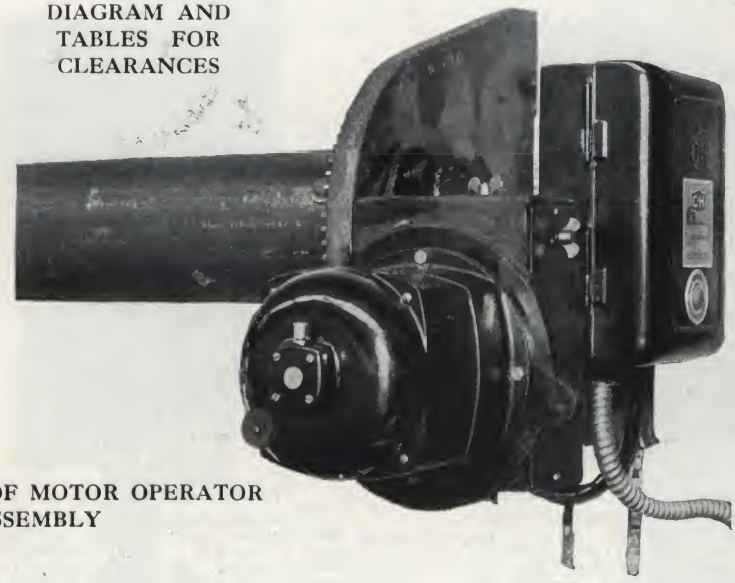
"W"	"H"	"A"	"O" Push Up	"O" Chain	"O" Crank	"O" Motor	"C"	"D"
0' to 6'	8'-0"	5"	4½"	5½"	15	15¾	12⅜	11"
6' to 8'	8'-0	6"	6"	6¼"	15½	16¼	12⅜	11"
8' to 10'	12'-6"	5¾"	5½	6"	15	16	15¼	13½"
10' to 12'	12'-6"	6½"	6	6½"	15½	16½	15¼	13½
12' to 14'	12'-6"	6¾"	6½	7"	16	17"	15¼	13½
14' to 16'	12'-6"	7¼"	—	7½"	16½	17½	15¼	13½
0' to 10'	17'-6"	6"	—	6½"	15	16½	17½	15½
10' to 12'	17'-6"	6½"	—	7"	15½	17	17½	15½
12' to 14'	17'-6"	7"	—	7½"	16	17½	17½	15½
14' to 16'	17'-6"	7½"	—	8"	16½	18"	17½	15½
16' to 18'	17'-6"	8½"	—	9"	17½	19"	17½	15½
20'	24'	8"	—	8½"	16½	18¼	20¾	18¼
22'	24'	9"	—	9¼"	17½	19¼	20¾	18¼
WRITE FOR CLEARANCES ON EXCEPTIONALLY LARGE OPENINGS							24"	23"



CLEARANCES REQUIRED FOR AUTOMATIC DOORS

"W"	"H"	"A"	"O" Push Up	"O" Chain	"C"	"D"
0' to 6'	9'-6"	7"	5"	5¾"	17"	13½"
6' to 8'	9'-6"	7¾"	5¾"	6½"	17"	13½"
8' to 10'	9'-6"	8"	6¼"	6¾"	17"	13½"
10' to 12'	9'-6"	8½"	6¾"	7¼"	17"	13½"
8' to 10'	OVER 9'-6"	9¼"	6¼"	7"	19¼"	15½"
10' to 12'	OVER 9'-6"	9¾"	6¾"	7½"	19¼"	15½"

DIAGRAM AND TABLES FOR CLEARANCES



LEFT—FULL SIZE DETAIL OF SLATS
No. 16, 18 or 20 GAUGE

RIGHT—VIEW OF MOTOR OPERATOR ASSEMBLY

THE MOESCHL-EDWARDS CORRUGATING CO., INC.

Manufacturers of Steel Rolling Doors

CINCINNATI, OHIO

Products

"Mecco" Steel Rolling Doors.

Also manufacturers of "Mecco" Fireproof Hollow Metal Windows; Kalamein Smoke Screens; "Mecco" Spanish Metal Tile; Garages; Marquises; Shingles (tin, galvanized or copper), Painted and Galvanized Roofing, Siding and Corrugated Sheets; Mecco Laundry Dryers.

For "Mecco" Kalamein and Tin Clad Doors, Jambs, Trim, Transoms and Moulding Sections, see Manufacturers' Index.

TRADE-MARK

Services

Our engineers are at your service at all times to give any data you may require.

Quotations will be furnished on any quantity or type. Get "Mecco" service and quality.

"Mecco" Steel Rolling Doors

Advantages—All-steel rolling doors have certain recognized general advantages over doors of other types. "Mecco" doors have other points of superiority that have won general recognition and are of special interest to architects, engineers, owners and contractors, viz.:

(1) Ease of erecting "Mecco" doors.
(2) Ease of operating "Mecco" doors.
(3) Extremely low maintenance cost.

Methods of Operation—(1) Handle on bottom bar. This is the push-up type, operated like a window shade. May be operated from either side of the opening. The area for the push-up type should not exceed 100 sq. ft.

(2) Operation by reduction gears and an endless chain.
(3) Operation by gears, shafting and crank.
(4) Operation by electric motor with local or remote control.

Underwriters' Approval—"Mecco" doors of twenty-four different types are listed and labeled by the Underwriters' Laboratories, Inc.

Curtains—Curtains of all "Mecco" Rolling Doors are made of galvanized, copper-bearing, open-hearth steel, interlocking slats. This is the grade of steel proven to be of greatest rust-resisting properties in tests conducted by the American Society for Testing Materials.

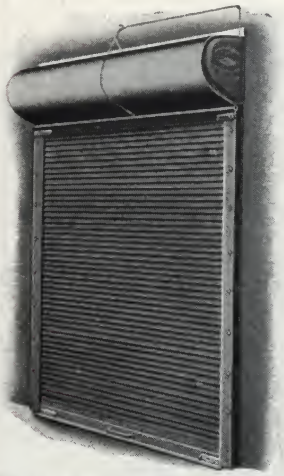


Slats are 3 in. wide and are formed with an intermediate rib of modified Z form, which greatly increases rigidity and strength of curtain. Interlock of slats is positive and absolutely secure. End locks of malleable iron prevent lateral movement of slats and furnish a wearing surface.

Labeled Doors—The following schedule is a complete list of "Mecco" Labeled Doors.

Type No.	Operation	Location	Operated by
Fire Wall Doors, Class A			
100	Automatic	Face of wall	Handles
102	Automatic	Face of wall	Crank
104	Automatic	In opening*	Handles
106	Automatic	In opening*	Crank
Doors for Vertical Shaft, Corridors and Room Partitions, Class B-C			
200	Automatic	Face of wall	Handles
202	Non-automatic	Face of wall	Handles
204	Non-automatic	Face of wall	Chain
206	Automatic	Face of wall	Crank
208	Non-automatic	Face of wall	Crank
210	Automatic	In opening*	Handles
212	Non-automatic	In opening*	Handles
214	Non-automatic	In opening*	Chain
216	Automatic	In opening*	Crank
218	Non-automatic	In opening*	Crank
Doors and Shutters for Exterior Openings, Class D			
300	Automatic	Face of wall	Handles
302	Non-automatic	Face of wall	Handles
304	Non-automatic	Face of wall	Chain
306	Automatic	Face of wall	Crank
308	Non-automatic	Face of wall	Crank
310	Automatic	In opening*	Handles
312	Non-automatic	In opening*	Handles
314	Non-automatic	In opening*	Chain
316	Automatic	In opening*	Crank
318	Non-automatic	In opening*	Crank

*"In opening" refers to doors coiling under the lintel.



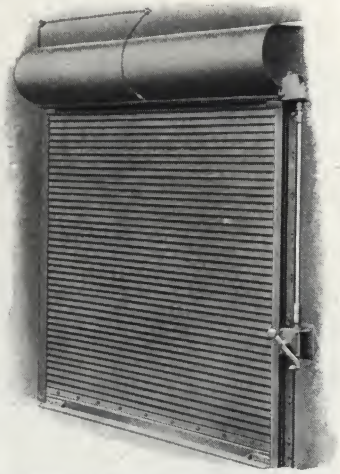
Types No. 100, 200 and 300

Manually operated by handle on the bottom bar. Mounted on face of wall. Types illustrated are automatic closing. May be operated from both sides of the opening



Types No. 104, 210 and 310

Manually operated by handle on the bottom bar mounted under the lintel with guides on face of the wall. Types illustrated are automatic closing. May be operated from both sides of the opening. Wall opening must be prepared for reception of this type door



Types No. 102, 206 and 306

Mechanically operated by crank and gear. Mounted on face of wall. Types illustrated are automatic closing. May be operated from one or both sides of the opening

Continued on next page

Types of Service Doors

NON-LABELED

Type No.	Mounting	Operated by
2	Face of wall	Manual
4	Between jambs	Manual
6	Face of wall	Chain
*7	Face of wall	Chain
8	Between jambs	Chain
10	Face of wall	Crank
12	Face of wall over 150 sq. ft.	Crank
14	Face of wall over 150 sq. ft.	Chain
*15	Face of wall	Chain

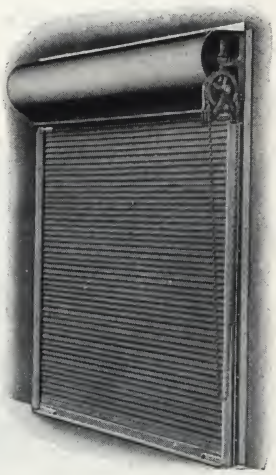
*Mounted face of wall, operated from opposite side of wall.



Type No. 2

Manually operated by handle on the bottom bar.

This type door is adapted for openings not over 10x8 ft. It is rapid in operation, working like a window shade. Door illustrated is mounted on the face of wall.



Types Nos. 6 and 14

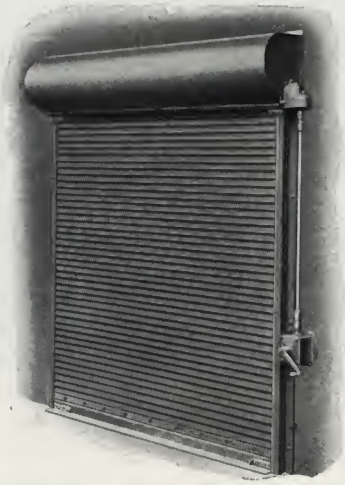
Chain and gear operated.

This type door is used where the height and area make a mechanically operated door desirable. Gears are simple or compound as required by weight or area of curtain. All parts requiring lubrication are easily accessible.

Types No. 10 and 12

Crank and gear operated.

This type of mechanical operation is used on doors of all dimensions and may be supplied for operation on one or both sides of the wall. It is particularly adapted for the latter.

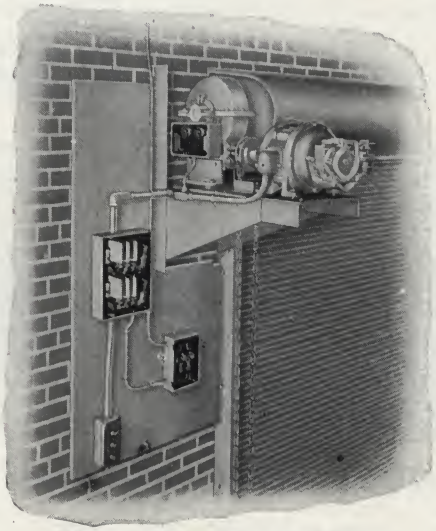




Type No. 4

Manually operated by handle on the bottom bar.

This door is mounted under the lintel and if necessary for architectural reasons the hood may be concealed by plaster or an ornamental cover. For convenience in operating, this door should not be used in openings over 10 ft. 0 in. x 9 ft. 6 in.



"Mecco" Motor Operated Door

"Mecco" Motor Operated Doors

"Mecco" Motor Operated Doors include the following equipment:

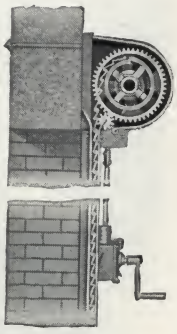
Motor, reduction gear, limit switches, reversing magnetic control, main line switch, emergency chain, push button control and solenoid brake when required.



(Left)

Manual

Operating handle on bottom bar. Mounted face of wall. Suitable for openings not over 10x8 ft.



(Right)

Crank and Gear

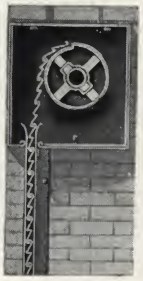
Operation may be from one or both sides of wall. No size limit



(Left)

Chain and Gear

Operation for larger doors. Mounted face of wall—can supply same operation for door mounted under lintel. No size limit



(Right)

Manual Door

Operation handle on bottom bar. Mounted under lintel. Suitable for openings not over 10 ft. x 9 ft. 6 in.

THE VARIETY ROLLING DOOR CO.

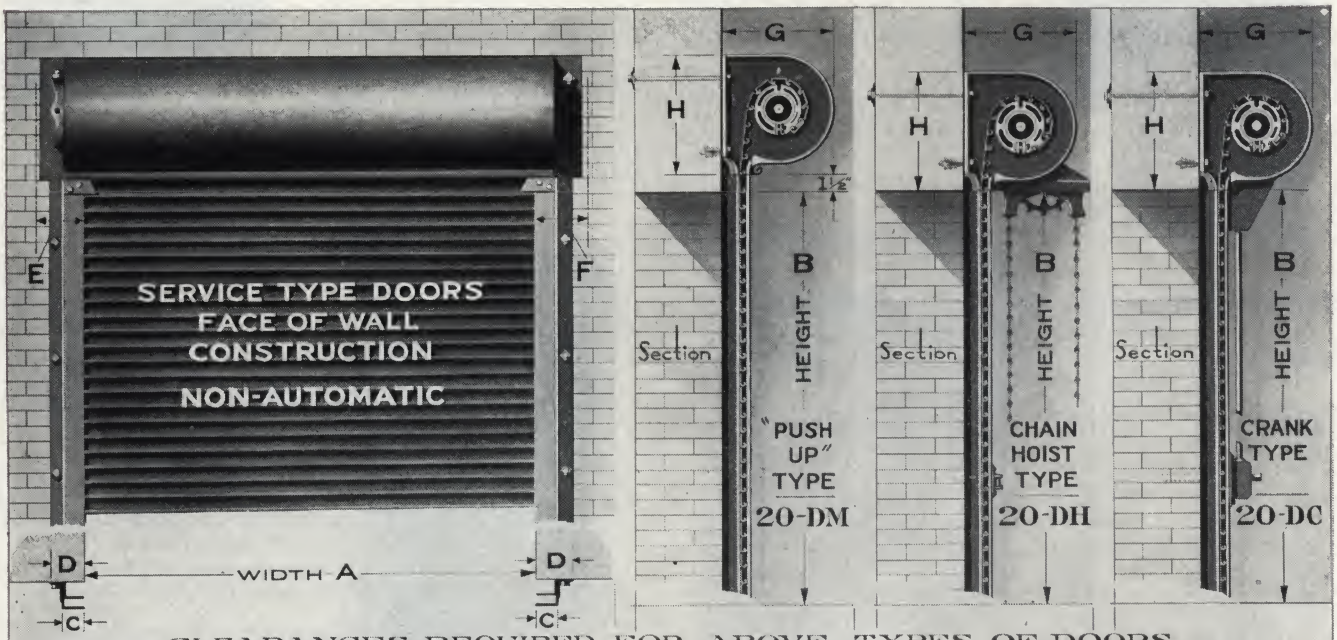
Manufacturers of All Types of Rolling Steel Doors: Manual, Automatic and Motor Operated

TELEPHONE
154

FACTORY AND GENERAL OFFICE
221 East Broadway, WESTERVILLE, OHIO

Products

Underwriters' Labeled Fire Doors.
Automatic Rolling Doors.
Motor Operated Rolling Doors.
Crank Operated Rolling Doors.
Chain Operated Rolling Doors.
Push-up Type Rolling Doors.
Doors furnished in sizes up to 45 ft. wide.



CLEARANCES REQUIRED FOR ABOVE TYPES OF DOORS.

WIDTH	"PUSH UP" TYPE			CHAIN HOIST TYPE			CRANK TYPE		
A	C	D	E	C	D	E	C	D	E
0' to 7'	2"	4½"	5"	2"	4½"	5"	2"	4½"	5"
7' to 12'	2½"	5"	5½"	2½"	5"	5½"	2½"	5"	5½"
12' to 20'	—	—	—	3"	5½"	6"	3"	5½"	6"
20' to 25'	—	—	—	3½"	6"	7"	3½"	6"	7"

For openings over 250 sq. ft. in area-write for clearance diagram

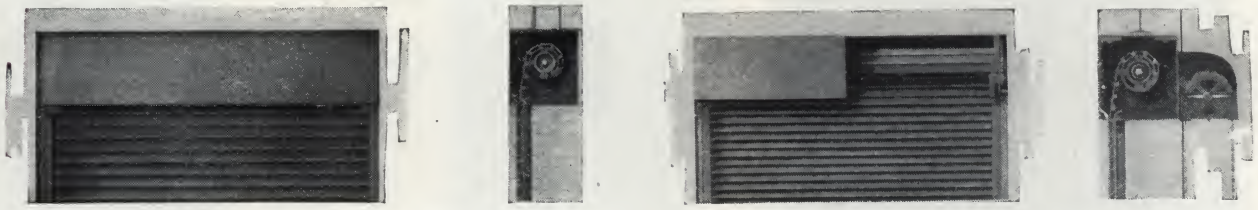
HEIGHT	SLAT-2		SLAT-4		WIDTH
B	G	H	G	H	F
6' to 7'	14"	15"	14"	15"	5"
7' to 8'	14"	15"	14"	15"	5½"
8' to 9'	14"	15"	16"	17"	5½"
9' to 10'	14"	15"	16"	17"	5½"
10' to 11'	16"	17"	16"	17"	5½"

HEIGHT	SLAT-2		SLAT-4		WIDTH
B	G	H	G	H	F
8' to 10'	14"	15"	16"	17"	7½"
10' to 12'	16"	17"	16"	17"	8"
12' to 16'	16"	17"	18"	19"	8½"
16' to 18'	18"	19"	18"	19"	10"
18' to 22'	18"	19"	20"	21"	10½"

HEIGHT	SLAT-2		SLAT-4		WIDTH
B	G	H	G	H	F
8' to 10'	14"	15"	16"	17"	11"
10' to 12'	16"	17"	16"	17"	11½"
12' to 16'	16"	17"	18"	19"	12"
16' to 18'	18"	19"	18"	19"	12½"
18' to 22'	18"	19"	20"	21"	13"

Condensed Illustrations and Clearances for "Face of Wall" Constructions (Class "D")
All the above constructions also furnished in "Under Lintel" (Class "U")

TWO TYPES OF THE "41" SERIES



Construction No. "41 UM" Service Type

Door is mounted under lintel and requires no cutting overhead or in jambs; push-up type; furnished with slide bolts; grooves and brackets may be recessed into jambs where projection of grooves into opening is undesirable.

Construction No. "41 UH" Service Type

Equipped with endless chain, sprocket and reduction gears, mounted under lintel or between jambs. Brackets and grooves may be recessed into jambs where projection of grooves into opening is undesirable.

"60" SERIES

All constructions shown on this page are furnished with Underwriters' Label for exterior openings, not exceeding 100 sq. ft., or 12 ft. in width or height, non-automatic.

All Service Doors Can Be Equipped with Electric Power Operator

Continued on next page

AUTOMATIC FIRE DOORS

These doors are designed so that they will automatically close during emergency. The smooth downward travel of the door is controlled by an oscillating escapement governor which is out of engagement during normal operation, permitting the curtain to operate freely. When equipped with chain hoist (endless chain, sprocket and gears), the chain hoist automatically disengages during emergency operation. The crank type is controlled by centrifugal governor.



CLEARANCES REQUIRED FOR ABOVE TYPES OF DOORS.

WIDTH	"PUSH UP" TYPE			CHAIN HOIST			CRANK TYPE		
A	C	D	E	C	D	E	C	D	E
0' to 6'	2"	4½"	12"	2"	4½"	12"	2"	4½"	12"
6' to 7'	2½"	5"	12½"	2½"	5"	12½"	2½"	5"	12½"
7' to 8'	2¾"	5½"	13"	2¾"	5½"	13"	2¾"	5½"	13"
8' to 9'	3"	5½"	13"	3"	5½"	13"	3"	5½"	13"
9' to 12'	3½"	6"	13½"	3½"	6"	13½"	3½"	6"	13½"

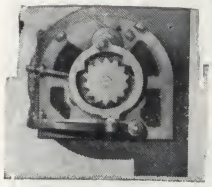
HEIGHT	SLAT-2		SLAT-4		WIDTH
B	G	H	G	H	F
6' to 8'	14"	15"	16"	17"	7"
8' to 9'	14"	15"	16"	17"	7½"
9' to 10'	14"	15"	16"	17"	8"
10' to 11'	16"	17"	16"	17"	8"
11' to 12'	16"	17"	17"	19"	8½"

HEIGHT	SLAT-2		SLAT-4		WIDTH
B	G	H	G	H	F
6' to 8'	14"	15"	16"	17"	8"
8' to 9'	14"	15"	16"	17"	8½"
9' to 10'	14"	15"	16"	17"	9"
10' to 11'	16"	17"	16"	17"	9"
11' to 12'	16"	17"	17"	19"	9½"

HEIGHT	SLAT-2		SLAT-4		WIDTH
B	G	H	G	H	F
6' to 8'	14"	15"	16"	17"	12"
8' to 9'	14"	15"	16"	17"	12½"
9' to 10'	14"	15"	16"	17"	13"
10' to 11'	16"	17"	16"	17"	13"
11' to 12'	16"	17"	17"	19"	13½"

Condensed Illustrations and Clearances for "Face of Wall" Constructions (Class "D")
All the above constructions also furnished in "Under Lintel" (Class "U")

Special Features of Construction for Automatic Fire Doors



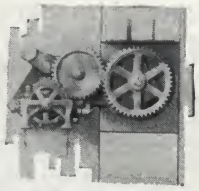
Oscillating Governor DM Type

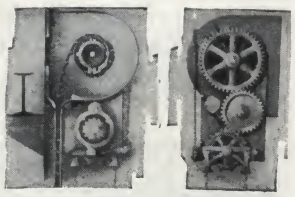


Automatic Release DM Type



Class "U" Chain Hoist Automatic Door





Two Views of Operator "DH" Type

"VARIETY" FIRE DOOR CLASSIFICATION

"61" Series	"D" and "U" Types	100 sq. ft. opening	Exterior wall
"60" Series	"D" and "U" Types	100 sq. ft. opening	Exterior wall
"33" Series	"D" Type	80 sq. ft. opening	Partition or vertical shaft
"33–33" Series	"D" Type	80 sq. ft. opening	Division or fire wall
"33–3" Series	"U" Type	80 sq. ft. opening	Division or fire wall
"65" Series	"D" and "U" Types	100 sq. ft. opening	Window openings

Labeled by the National Board of Fire Underwriters for standard sized openings; certificate issued for "Oversize" Openings.

ESTABLISHED 1876

THE J. G. WILSON CORPORATION

CABLE
"WILCORP, NEW YORK"

GENERAL OFFICES
11 East 38th Street, NEW YORK, N. Y.
P. O. Box 1194, NORFOLK, VA.

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HOUSTON, TEX., WALCOTT-MAISEY & PAIGE
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PHILADELPHIA, PA., THE J. G. WILSON CORPORATION
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Products

ROLLING STEEL DOORS, WILSON STANDARD and UNDERWRITERS' LABELED; ROL-OVER DOORS.

For "Sectionfold" Partition, Rolling Partitions and Shutters, Rolling Front and Disappearing Wardrobes, Venetian Blinds, see Manufacturers' Index.

TRADE-MARK

Wilson Steel Rolling Doors

Wilson Steel Rolling Doors have been proving for over fifty-three years that they are properly designed and constructed to give the longest service at a minimum operating expense.

The curtain proper is composed of interlocking corrugated galvanized steel slats, equipped with malleable iron end locks. The curtain is fastened to malleable iron barrels connected to wrought iron pipe and travels in steel guides.



"Big 4" Interlocking Slat



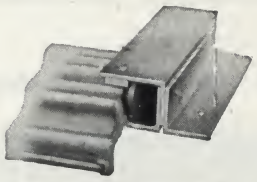
No. 2 Interlocking Slat with Fire Stops

Features of Construction

Interlocking Slats — They have a distinct advantage possessed by no other slat, in that being of corrugated form it has a far greater rigidity than ordinary channel formed slat.

The curtains of the Underwriter type are equipped with fire stops on the ends of slats, baffle plates in the hood, and (where permitted) automatic devices which cause them to close in case of fire.

Safety Groove and Wind Lock—An exclusive feature of Wilson doors. It is considered standard equipment for all doors over 14 ft. in width. Doors so equipped cannot possibly be blown from the grooves. The curtain will stand any conceivable wind pressure without excessive deflection. Wind pressure necessary to overcome the resistance of the Wilson Safety Lock in an 18-ft. span is 1000 lb.; 24-ft. span, 500 lb.; 30-ft. span, 300 lb. Wind velocity of 120 miles has a pressure of only 43 lb. per sq. ft.



Safety Groove and Wind Lock

Spring Tensioning Device—This, as furnished on Wilson doors where called for, permits of extremely accurate adjustment in counterbalancing the curtain. It is composed of a worm and feed in very compact enclosed form, assuring proper counterbalance. No pins or locks are used. It is self-sustaining and can be easily operated.

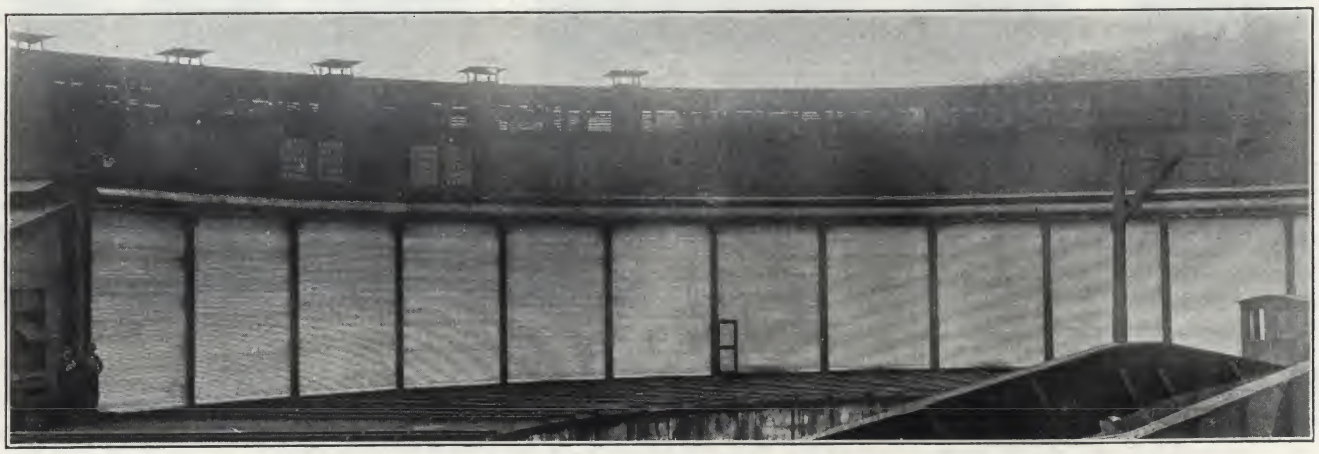
Operation of Wilson Non-labeled Rolling Steel Doors

Wilson rolling steel doors may be operated from either one or both sides of opening.

Small doors are usually raised and lowered by handles on bottom bar, and large doors are usually operated by chain gear, crank gear or electrically.

Self-coiling Operation — Wilson Types S. C. 11 and 22 are operated by hand by means of handles on bottom bar of door. This type is not recommended on openings over 10 ft. wide or more than 8 ft. in height, or exceeding 80 sq. ft.

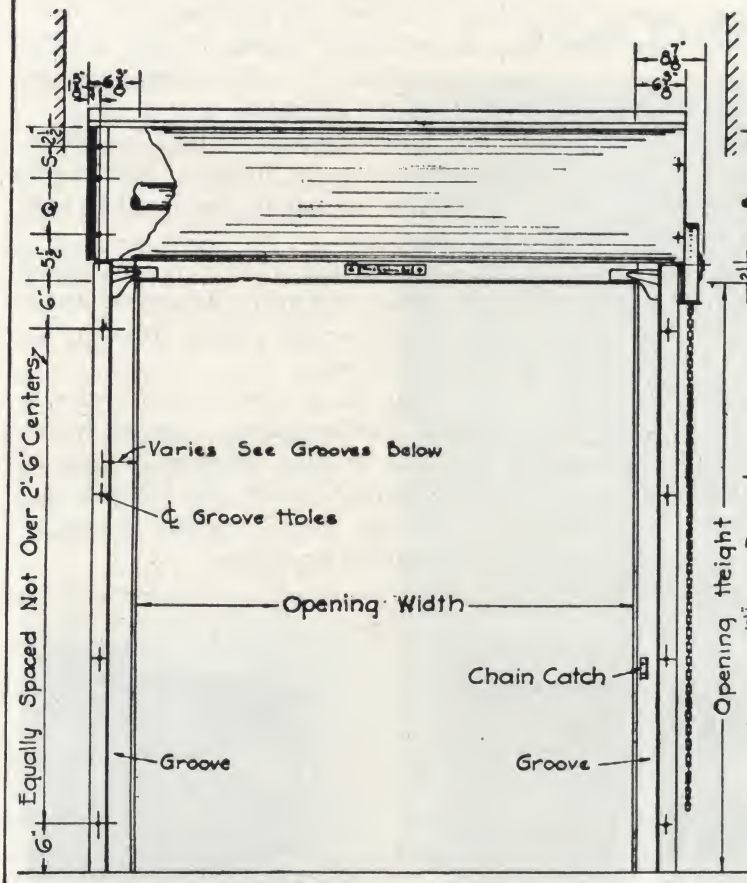
Chain or Crank Operation—Should be used for doors larger than limitations of self-coiling operation. Wilson Types C. G. 11 and 22 are operated by means of chain and gear. Wilson Type K. G. 11 is operated by crank gear. The chain operated door has been universally adopted as the standard service door.



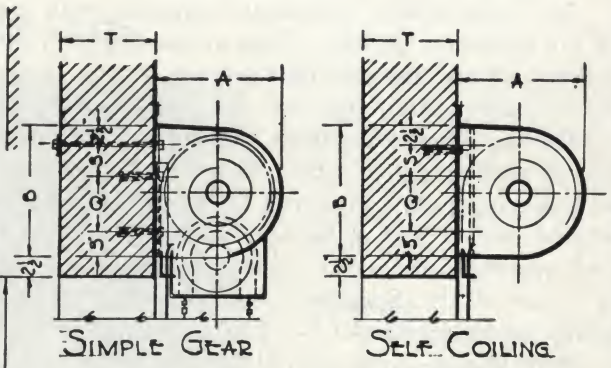
Rolling Aluminum Doors in Norfolk & Western Railway Roundhouse, Williamson, W. Va.

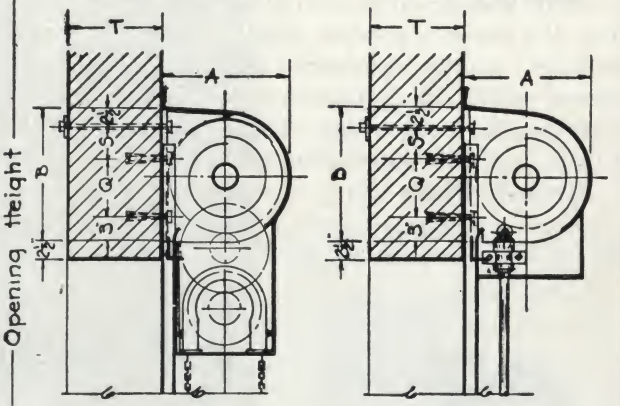
Continued on next page

COMMERCIAL ROLLING STEEL DOORS

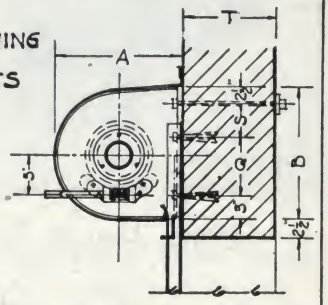


ELEVATION
SCALE: 1/2"=1'-0"



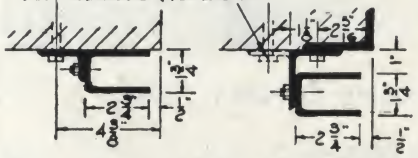


SECTIONS SHOWING GEARED BRACKETS
SCALE: 1/2"=1'-0"



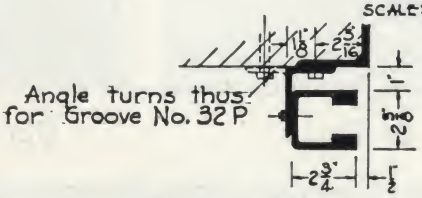
SECTION SHOWING SPRING TENSIONING DEVICE
SCALE: 1/2"=1'-0"

Angle Turns Thus for Groove No. 40 P



GROOVE No. 40A GROOVE No. 40N
SCALE: 1 1/2"=1'-0"
These Grooves to be used when Opening width is less than 14'-0" and Opening Heighth is less than 16'-0".

Angle turns thus for Groove No. 32 P



GROOVE No. 32 N.
SCALE: 1 1/2"=1'-0"
These Grooves to be used when Opening width is over 14'-0" and Opening Heighth is over 16'-0".

CLEARANCE SCHEDULE FOR COMMERCIAL ROLLING STEEL DOORS.

CHAIN OR CRANK OPERATED-BIG 4 SLAT					SELF COILING LITTLE 4 SLAT					SELF COILING No. 2 JR SLAT				
OPENING HEIGHT FT. IN. FT. IN.	A IN.	B IN.	Q IN.	S IN.	OPENING HEIGHT FT. IN. FT. IN.	A IN.	B IN.	Q IN.	S IN.	OPENING HEIGHT FT. IN. FT. IN.	A IN.	B IN.	Q IN.	S IN
7-0"	15	15 1/2	7	3	3-9	12	12 1/2	4	3	6-6	11	11 1/2	3	3
7-1 To 9-11	16	16 1/2	8	3	3-10 To 4-8	13	13 1/2	5	3	6-7 To 7-4	13	13 1/2	5	3
10-0 To 11-4	17	17 1/2	8	4	4-9 To 7-1	14	14 1/2	6	3	7-5 To 8-1	14	14 1/2	6	3
11-5 To 14-2	19	19 1/2	10	4	7-2 To 10-0	15	15 1/2	6	4	8-2 To 10-5	15	15 1/2	6	4
14-3 To 15-1	20	20 1/2	11	4										
15-2 To 17-0	21	21 1/2	11	5										
17-1 To 18-5	22	22 1/2	12	5										
18-6 To 20-10	23	23 1/2	13	5										

Notes - The above schedule of dimensions and clearances to be used in conjunction with details at top of page.
In addition to applications shown above, doors may be applied to one side of the wall and operated from the other.

Continued on next page

DETAILS FOR LABELED DOORS AND FIRE WALLS

Wilson Rolling Steel Fire Doors (Underwriters' Labeled)

Are exceptionally durable and equipped with special fire protective devices. Close automatically in case of fire, and are approved and labeled by the Underwriters' Laboratories, Inc., for the following services:

Vertical Shafts, Corridors and Room Partitions—Area of opening not to exceed 80 sq. ft.; neither width nor height of opening to exceed 12 ft. Curtains may be hung on face of wall or between jambs, self-coiling or crank operation, and where required are automatic closing in case of fire. Specify Wilson Type Nos. 21 to 26, inclusive, interlocking slat No. 2, No. 20 gauge.

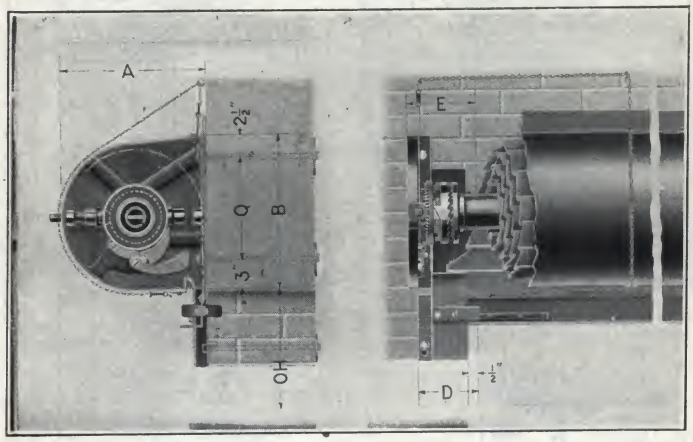
Fire Walls—Area of wall opening not to exceed 80 sq. ft.; neither width nor height to exceed 12 ft. Two doors are required, and may be hung on face of wall or between jambs, self-coiling or crank operation, and close automatically in case of fire. Specify Wilson Type Nos. 31 to 35, inclusive, interlocking slat No. 2, No. 16 gauge.

Exterior Walls—Area of wall opening not to exceed 100 sq. ft.; neither width nor height to exceed 12 ft. Curtain may be hung on face of wall or between jambs, self-coiling, chain or crank operation, and, where permitted, may be automatic closing in case of fire. Specify Wilson Type Nos. 41 to 51, inclusive, interlocking slat "Little 4," No. 22 gauge.

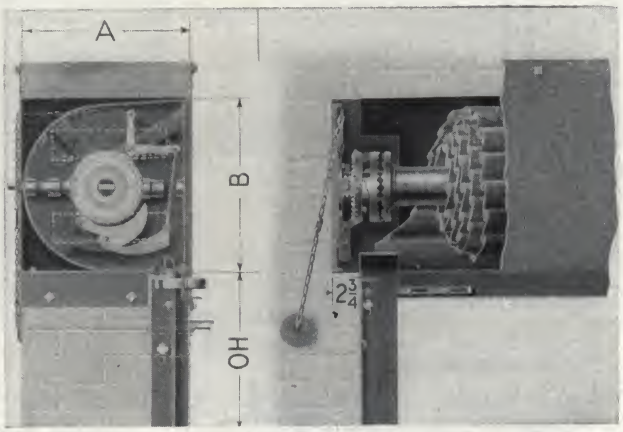
Automatic Closing Device—Where required, doors close automatically by the fusing of one of two links located at the head or side of opening, and near the ceiling.

Doors close easily on the sill and can be raised immediately after without difficulty. Automatic device can be reset and new link inserted without removing the hood or dismantling the door.

Grooves and bottom bar of door are provided with slotted holes to allow for expansion. Special fusible galvanizing is applied to grooves, allowing freedom of movement during expansion. Bolts for brackets and grooves are bolted through wall or attached to iron inserts furnished and installed by others.



DOOR APPLIED TO FACE OF WALL



DOOR APPLIED BETWEEN JAMBS

CLEARANCE SCHEDULE FOR UNDERWRITER LABELED ROLLING STEEL DOORS

CLASS A, B & C DOORS — No. 2 SLAT & FIRE STOPS			
OPENING HEIGHT FT. IN. — FT. IN.	A IN.	B IN.	Q IN.
4-10	14	14½	9
4-11 To 6-5	15	15½	10
6-6 To 8-0	16	16½	11
8-1 To 9-9	18	18½	13
9-10 To 12-0	19	19½	14
E Opening Width under 8'-0" equals 6" Opening Width over 8'-0" equals 7"			
D Opening Width under 8'-0" equals 5¼" Opening Width over 8'-0" equals 6¼"			

CLASS D DOORS — LITTLE 4 SLAT AND FIRE STOPS			
OPENING HEIGHT FT. IN. — FT. IN.	A IN.	B IN.	Q IN.
4-10	14	14½	9
4-11 To 6-5	15	15½	10
6-6 To 8-0	16	16½	11
8-1 To 8-7	17	17½	12
8-8 To 10-8	18	18½	13
10-9 To 12-0	19	19½	14
E Opening Width under 10'-0" equals 6" Opening Width over 10'-0" equals 7"			
D Opening Width under 10'-0" equals 5¼" Opening Width over 10'-0" equals 6¼"			

Continued on next page

WILSON POWER UNITS

Description

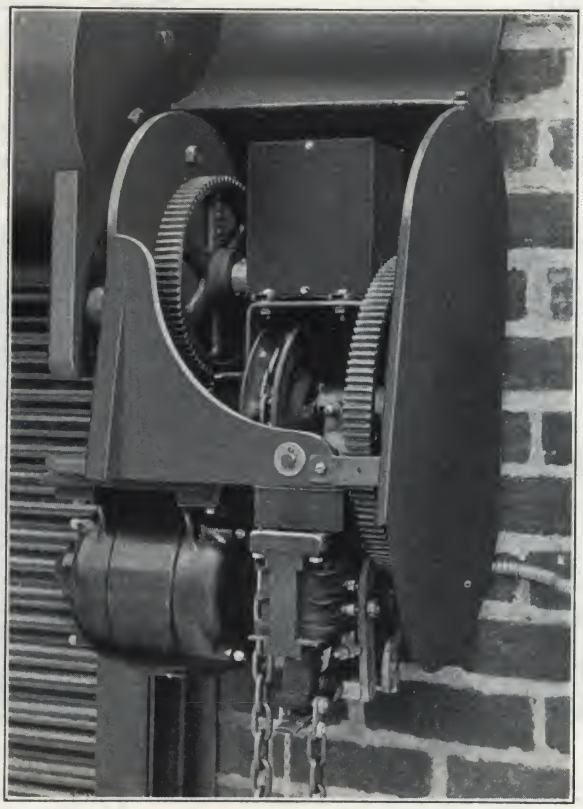
Wilson Power Units are all designed to meet the requirements of the various size doors and conditions existing on the job for which they are to be used. They vary from the smallest, our No. 8, to a large and extremely heavy, our No. 5.

The No. 8 unit is used for very light doors, using only a ¼ hp. motor. This power unit is used on light wood rolling partitions and our sectional overhead doors.

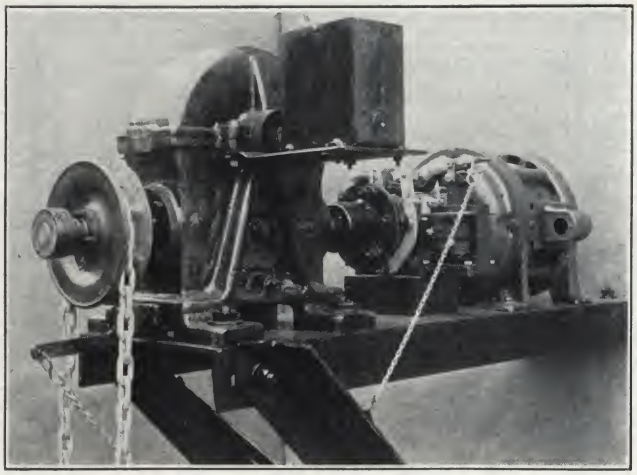
The No. 7 unit requires from ½ to ¾ hp. motors. It is designed to give maximum amount of efficiency in a minimum amount of space. Its high efficiency is due to the use throughout of machine cut gears. A minimum amount of noise is produced by using a high speed machine cut fiber gear on the motor shaft.

The No. 4 unit requires from 1 to 3 hp. motors; is equipped with a bronze worm gear running in oil. A roller chain is used to transmit power from the door shaft to the unit. This gives a flexible means of adjustment and helps to eliminate all unnecessary noises which result from failure to accurately line up cast iron gears.

The No. 5 unit is for extremely large doors requiring above 3 hp. motors. Its construction is similar to the No. 4 unit, differing only in that larger and heavier equipment is used throughout to meet the conditions for which it is required.



Wilson Power Unit Installation



Wilson Power Unit Equipped for Emergency Hand Operation

Controls

The operation of the doors is controlled through a push button station connected with a magnetic switch. The motor is automatically cut off when door is either fully opened or closed by a positive acting limit switch. The travel of the door may also be stopped at any intermediate point by pushing the third, or Stop-button, on the switch. The large units are all equipped with solenoid brakes, which automatically set when the current is cut off. A thermo-overload relay, mounted in the magnetic switch, prevents the electrical equipment against an overload in current.

Emergency Hand Operation

All units may be equipped with hand emergency chain operation. A clutch is built into the emergency wheel and operates by small hand chain. By engaging this clutch a contact is formed between the emergency wheel and the unit proper. The door is then ready for hand operation. This is standard equipment on all units other than our No. 8 and is furnished with No. 8 only when specified.

Continued on next page

ROL-OVER DOORS

Wilson Rol-Over Doors solve the problem of filling an opening with a satisfactory door when light is essential.

Features of Wilson Construction

Sections—Each section is built from either redwood or white pine, mortised and tenoned, and glued together with waterproof glue. The tenon extends clear through the bottom rail on each section. This allows water to drain out of the joints, decreasing the chance of decay and rot.

A Distinct Wilson Construction—All sections where wood panels are used are furnished with stuck moulding both sides. Where glass is required stuck moulding is used one one side only. All glass is to be furnished by others.

Panels — Redwood selected and tested panels only are used. These panels are built especially for exterior use with waterproof glue. Redwood panels are 3-ply wood both sides.

Hardware—Rollers are of solid steel (not pressed) ball bearing construction turning on a machined steel shaft.

Trunnions and hinges are pressed steel, bolted to the section. Each hinge is bolted across the stile and rail.

Track is of rolled steel, formed in section to give maximum strength.

Cylinder locks are supplied with all push-up doors. Lock is placed at side of door. In chain operated doors pin-lock only is furnished.

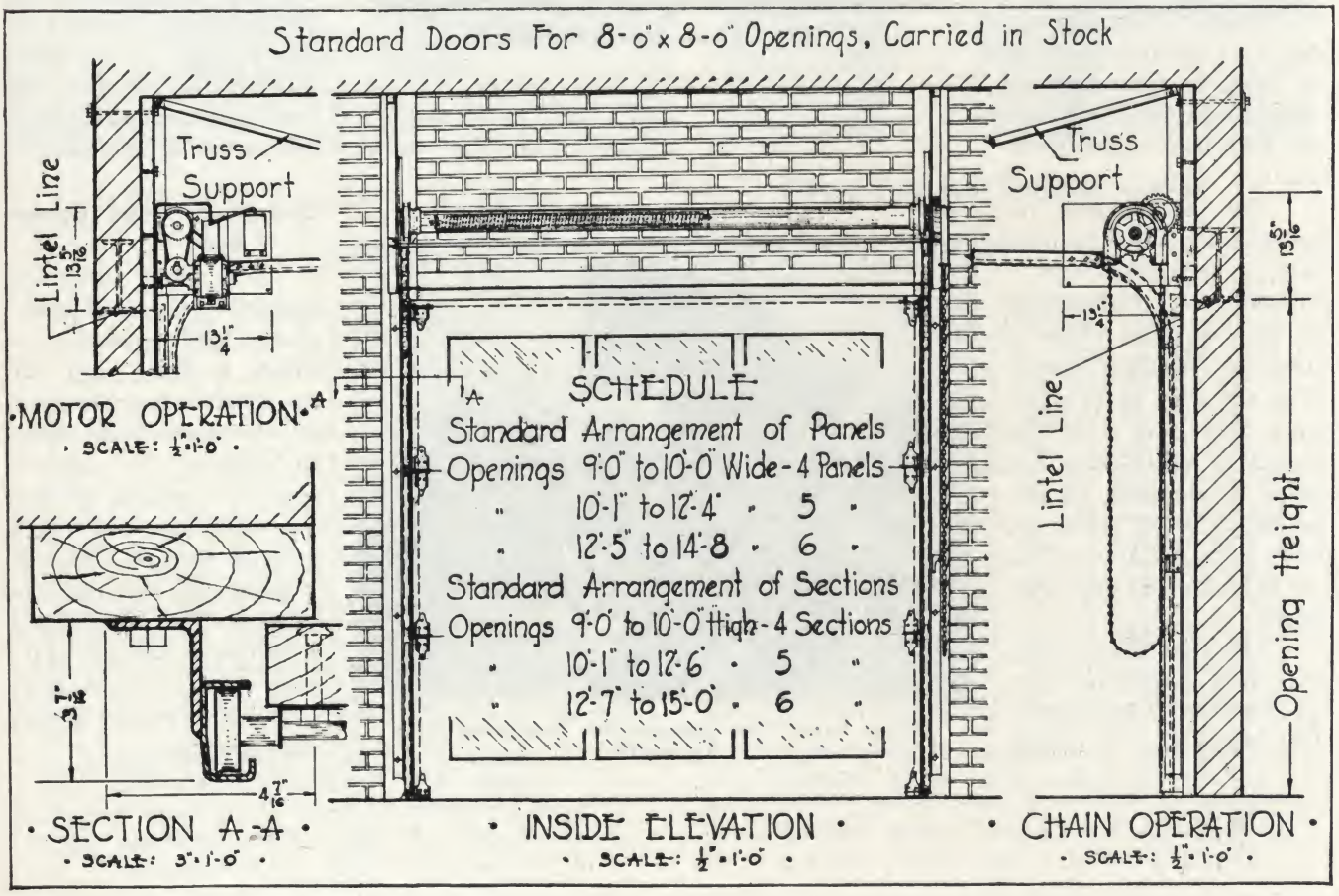
Counterbalancing—Ease of operation is accomplished by using helical oil-tempered spring enclosed in steel tubing, the amount of tension necessary to operate door being applied through an adjusting wheel located on outside of the steel bracket.

Flat drawn steel tempered bands, with ultimate tensile strength of 265,000 lb. per sq. in., or 4000 lb. per band, are used to lift the door. A coating of flexible finish is applied to the bands to prevent rusting.

Painting — A prime coat of paint is applied at factory before shipping.



Factory Installation of Rol-Over Door



DUSING AND HUNT, INC.

Underwriters' Labeled Tin Clad and Kalamein Doors and Frames

382 Michigan Avenue, BUFFALO, N. Y.

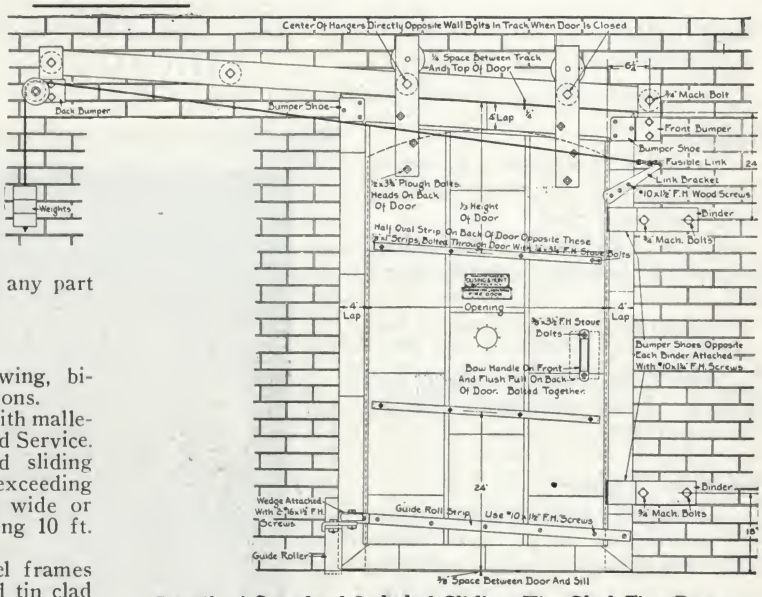
Products

UNDERWRITERS' LABELED TIN CLAD and KALAMEIN DOORS; PROJECTION BOOTH SHUTTERS.

Also Elevator Enclosures, Combination Steel Frames and Elevator Safety Gates.

Facilities and Service

Our Engineering Department, solving special fire door problems for 25 years, invites architects and builders to refer such matters to it. Our well-equipped factory enables us to give unusually speedy delivery, and we can erect doors built for service in any part of the United States.



Detail of Standard Labeled Sliding Tin Clad Fire Door

Tin Clad Heavy Duty Fire Doors

Types—Swinging, sliding, vertical sliding, bi-swing, bi-folding; in fact, any type to meet the various conditions.

Hardware—All hardware extra heavy in design. With malleable iron castings, and listed by the Underwriters' Labeled Service.

Approval—Labels can be obtained for tin clad sliding doors not exceeding 120 sq. ft.; height or width not exceeding 12 ft. For single swing doors not exceeding 6 ft. wide or 12 ft. high. For swinging doors in pairs not exceeding 10 ft. wide or 12 ft. high.

Steel Frames for Swinging Doors—Heavy steel frames or angle iron construction, made especially for labeled tin clad fire doors are furnished with automatic closing device and all other hardware attached.

Kalamein Doors

Doors are made in standard designs as detailed below, with or without Underwriters' Labels, or built to the architect's design if required.

Cores—All wood in cores of clear white pine, well seasoned and free from defects.

Metal Covering—Kalamein iron, furniture steel, copper or bronze in standard gauges.

Construction—Cores of solid pieces mortised and tenoned joints, panels of asbestos or composition board.

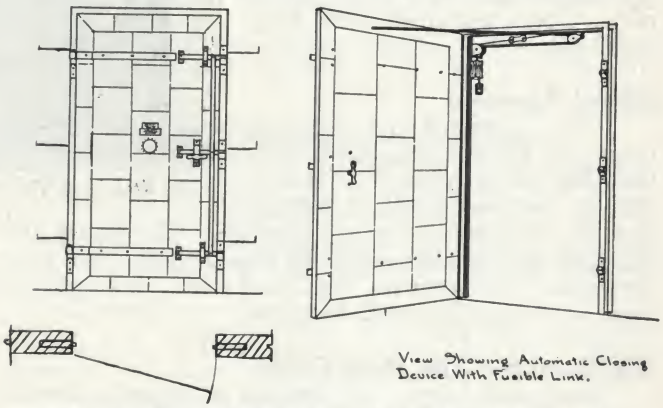
Metal covering drawn over wood cores and glued to panels under pressure, all by best and most modern practice, making surface of doors smooth and free from waves or buckles; all joints interlocked and filled so as to produce invisible seams.

Mouldings are furnished metal covered or hollow drawn, with invisible fasteners or screwed in place as desired, mitered accurately, made with profiles well defined.

Standard thicknesses for doors 1¾ or 2¼ in., according to conditions.

Finish—All doors receive a prime coat of paint before leaving our factory.

Approval—Our doors, jambs and trim have been approved by leading architects and contractors. Their long life and service on past installations has made this possible.



Standard Labeled, Swinging, Tin Clad Fire Door and Channel Iron Frame

Labeled Service

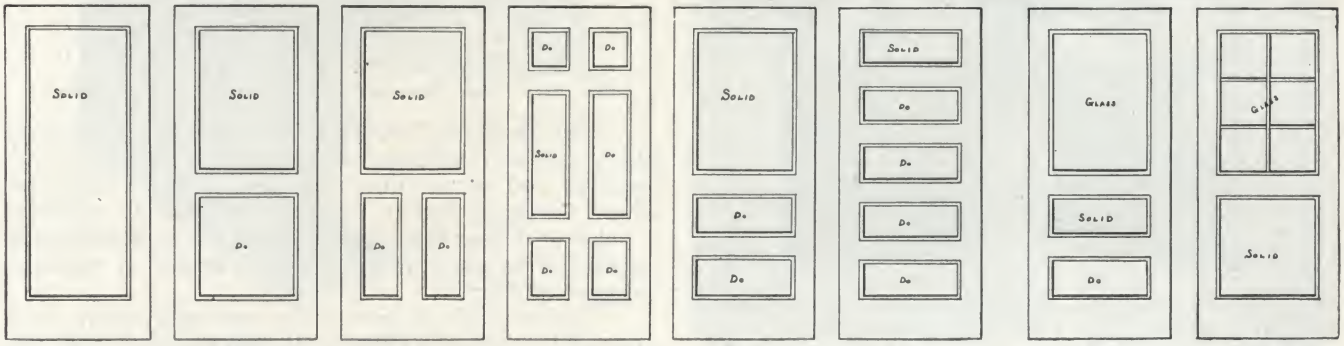
Stair and Elevator Doors—Single doors up to 48 in., in pairs to 96 in. Solid panels erected in channel iron frames or combination steel bucks with 5x5-in. butts, full surface type, mortised locks with ¾-in. throw bolts. Stair doors to be self-closing by means of door check.

Fire Escape and Tower Doors—Sizes same as above, hung in the same type of frame and with the same type of hardware. Doors can be constructed to receive 5 sq. ft. of wire glass.

Corridor and Partition Doors—Same as above, except that 8 sq. ft. of glass may be used.

Projection Booth Shutters

Automatic self-closing shutters with rolled steel frames, so constructed as to pass the State and local insurance rating boards. Also designed to be sound retarding as required where sound pictures are shown. Automatic closing device so designed that all shutters will close separately or as a unit. Details and prices will be furnished upon application.



Standard Labeled Kalamein Door Types

LYON-CARR FIRE DOOR COMPANY

Manufacturers of Underwriters' Labeled Tin-clad Fire Doors

TELEPHONE
WEST 2703

1737-1743 Walnut Street
CHICAGO, ILL.

Products

LION STANDARD TIN-CLAD FIRE DOORS and SHUTTERS bearing Underwriters' Label.

LION STANDARD FIRE DOOR HARDWARE bearing Underwriters' label.

DOUBLE-ACTING FIRE DOOR DEVICE.

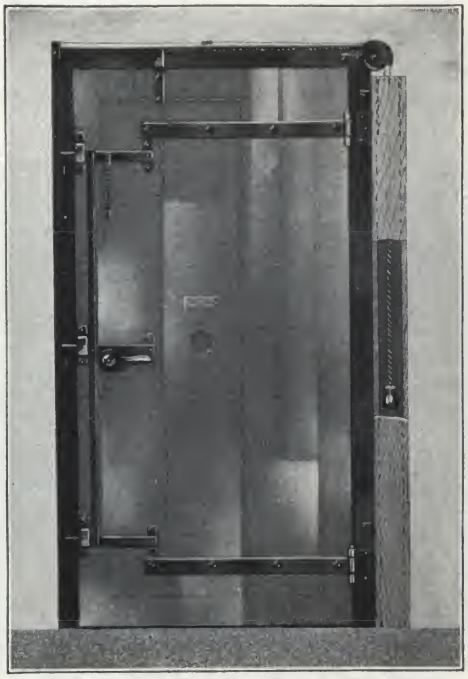
Also Lion Kalamein Doors and Frames; Lion Standard Meeker Elevator Doors.

Fire Door Types

Designed to conform to various wall conditions, they are of many kinds—swinging (both swinging and double), and sliding (either gravity, level, horizontal or vertical). Doors are made both 2-ply and 3-ply.

Official Approval

Lion standard tin-clad fire doors and fixtures are approved by the National Board of Fire Underwriters, the New England Mutuals and the Associated Factory Mutuals. The doors are inspected and labeled under the supervision of the Underwriters' Laboratories, Inc., and fully approved by local and State inspection bureaus.



Lion Standard Tin-clad Swing Fire Door

Double-Acting Fire Door Device

Illustrated below. No springs or hinges to break or wear out. Requires only occasional oiling or greasing. Of the sturdiest construction built to withstand hard usage from heavy and continuous trucking. Positive self-centering is achieved by a well designed arrangement of rocker sheaves, equalizers and weights. With plain or parabolic type doors. The device may be installed on existing double-acting doors. Timken Bearing Equipped.



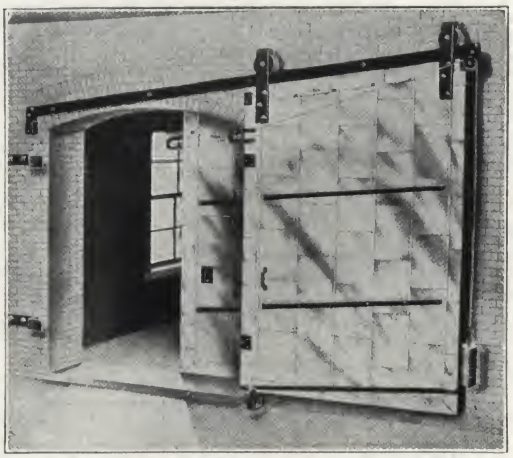
Double-Acting Device with Parabolic Type Door

Swinging Fire Doors and Shutters

In design this type can be either single or double swing and hung either to overlap the wall opening or fit in angle frame. Complete fire door hardware can be furnished with or without the fusible link automatic closing device. Window shutters are constructed so as to close flush with the face of wall or overlapping wall 4 in. on each side and top.

Sliding Fire Doors

Gravity fire doors are particularly adapted to fire wall openings on account of their easy operation. They are hung on inclined tracks which are pitched ¾ in. to the foot. The doors are held open by a counterbalance weight which is released by the melting of a fusible link when exposed to fire or excessive heat. When counterweight is released the door closes rapidly by force of gravity.



No. 301. Lion Standard Tin-clad Gravity Fire Door

Split-gravity fire doors are designed to meet conditions such as insufficient wall space on either side of opening, and permit doors to slide clear of jamb, or where overhead carrier track passes through opening.

Level sliding fire doors are used where headroom is insufficient to place the track on an incline as required for gravity door.

Vertical slide-up fire doors are used where it is impossible to install either horizontal slide or swing fire doors. Particularly adaptable for shaving vaults.

ESTABLISHED 1866

MERCHANT & EVANS CO.

Manufacturers of Fire Doors and Shutters

PRINCIPAL OFFICES

PHILADELPHIA, PA.

Also Sold by: GLOBE AUTOMATIC SPRINKLER COMPANY (General Agents)

OFFICES IN PRINCIPAL CITIES

"ALMETL" TRADE MARK REG. U.S. PAT. OFF.
FIRE DOORS AND SHUTTERS

Products

M & E "ALMETL" Labeled FIRE DOORS and SHUTTERS.

M & E "ALMETL" Unlabeled Doors, for factory and warehouse service.

For "Star" Roof Ventilators, see Manufacturers' Index.

M & E "Almetl" Labeled Fire Doors

Labeled "Almetl" Fire Doors and Shutters for all building openings under jurisdiction and control of insurance interests.

M & E "Almetl" Fire Doors are made in two thicknesses: 2¾ and 1⅞ in. The 2¾-in. door is labeled by Underwriters' Laboratories, Inc. for fire walls (Class A), vertical shafts (Class B), corridor and room partitions (Class C), and exterior openings (Classes D and E) when type and pattern are within the prescribed opening size limits.

The 1⅞-in. door is labeled by Underwriters' Laboratories, Inc. for Class B, C, D, and E situations when type and pattern are within the prescribed opening size limits.

Approvals—Inspected and labeled by the Underwriters' Laboratories, Inc., Chicago, Ill. and Factory Mutual Laboratories, Boston, Mass.; also approved and used by United States Government. Endorsed and recommended by over 250 National, State and Municipal fire and safety control authorities.

Types—Single sliding, pairs sliding, single swinging, pairs swinging, vertical sliding and horizontal lifting.

We also furnish "Almetl" Doors with convex heads, with panels for wire glass, with wicket gates, or recessed for overhead monorail systems.

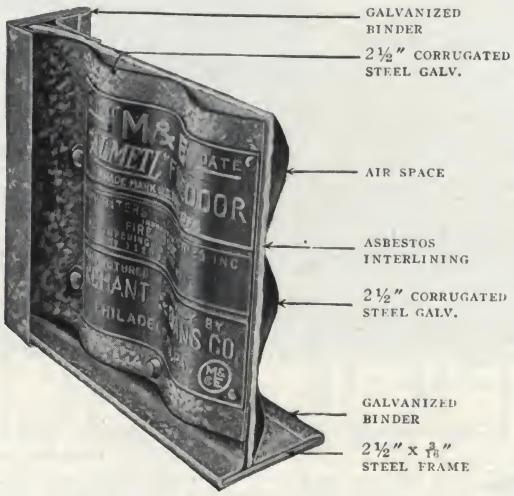
Sliding doors made sectional for assembly at destination when occasion requires; and doors to meet special requirements.

Advantages—Aside from the maximum reduction in insurance rates for installation of M & E "Almetl" Doors, the buyer is assured of 100% value, permanence and service due to the lasting and indestructible materials used in their construction. "Almetl" Doors are all steel and asbestos.

Twenty-year guaranteed—no better value in a "labeled" fire stop obtainable.

They are lighter, and the cost of maintenance is negligible.

Hardware—Fully approved and labeled hardware furnished with detailed erection prints.



Construction of "Almetl" Fire Door
Weight, 4¾ lb. per sq. ft.

Special hardware to meet unusual conditions when required. Lighter unlabeled hardware for unlabeled doors and panels.

Specification for Labeled Fire Doors

Fire doors where indicated on the plans or door schedule shall be M & E "Almetl," as manufactured by MERCHANT & EVANS CO. (principal office, 2035 Washington Avenue, Philadelphia, Pa.).

Doors shall be made of two thicknesses of No. 24 gauge—2½-in. corrugated galvanized steel transversely laid, interlined with asbestos roll board in a continuous rigid frame of 2½x⅞-in. bar steel bound in a heavy gauge galvanized steel covering tightly riveted to the frame.

Proper provision to be made for expansion and contraction without distortion.

Each door, whether sliding or swinging shall bear the label of the Underwriters' Laboratories, Inc., and also that of the manufacturer.

All hardware and automatic closing devices shall be in strict accordance with requirements of Fire Underwriters having jurisdiction.

M & E "Almetl" Unlabeled Service Doors

Unlabeled "Almetl" Service Doors for all commercial purposes—to enclose openings to street, yard, loading platforms; for sheds, exterior and interior openings of all kinds not subject to insurance control.

These doors are of the same sturdy construction as the labeled product, excepting slight reduction in insulation features.

The special merits and advantages of these doors are light weight, neat appearance, low cost, durability in service. They can be designed for every use and any building mechanic can install them, using standard warehouse door hardware.

Service

We or our 300 responsible and experienced "contracting and erecting licensees" will quote on "Almetl" Doors and Shutters separately, with or without "approved" hardware and installation—for any contract anywhere.

Our centrally located plant is equipped with up-to-date machinery and skilled workmen.

Our sales and engineering department is thoroughly informed and organized to advise on any unusual or complex installation problem.



Single Sliding Door



Single Swinging Door

THE PEELLE COMPANY

Manufacturers of Elevator and Dumbwaiter Doors

TELEPHONE
STAGG 0366

47 Stewart Avenue
BROOKLYN, N. Y.

DISTRICT OFFICES

ATLANTA, 413 Morris Building—Telephone, Walnut 5125
BOSTON, 510 Statler Building—Telephone, Hubbard 9377
BUFFALO, Jackson Building—Telephone, Lafayette 7143
CHICAGO, 333 North Michigan Avenue—Telephone, Central 6475
CLEVELAND, 605 Caxton Building—Telephone, Main 4053
DALLAS, 601 Construction Industries Building—Telephone, 7-5519
DETROIT, 405 Lincoln Building—Telephone, Cadillac 4920
PHILADELPHIA, 34 South 16th Street—Telephone, Rittenhouse 8243
SAN FRANCISCO, 534 Sixth Street—Telephone, Hemlock 0210

Products

PEELLE MOTORIZED FREIGHT ELEVATOR DOORS.

PEELLE MANUAL FREIGHT ELEVATOR DOORS.

PEELLE BI-FOLD INDUSTRIAL DOORS and PEELLE TELCO INDUSTRIAL DOORS—Motorized and Manually Operated.

PEELLE PRESSED STEEL DUMBWAITER DOORS.

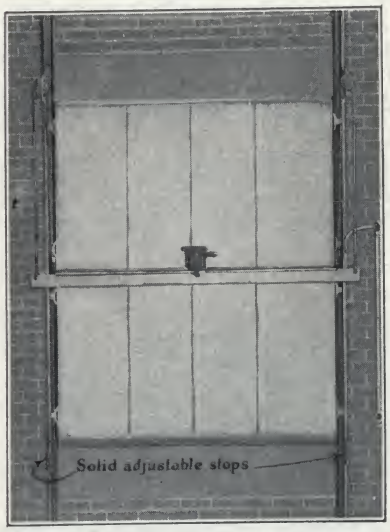
PEELLE MOTORIZED DOORS

Counterbalanced Freight Elevator Doors for Freight Elevator Enclosures

Peelle Counterbalanced Elevator Doors are adaptable to practically every freight elevator door requirement. Their ease of operation and enduring construction have been proven by over twenty years of satisfactory service.

Peelle Doors have been specified by architects for thousands of buildings.

Counterbalanced, Peelle Doors operate vertically inside the elevator shaft affording rapid and full clearance for loading and unloading. No counterweights are used.



Shaft Side View of Peelle Counterbalanced Door

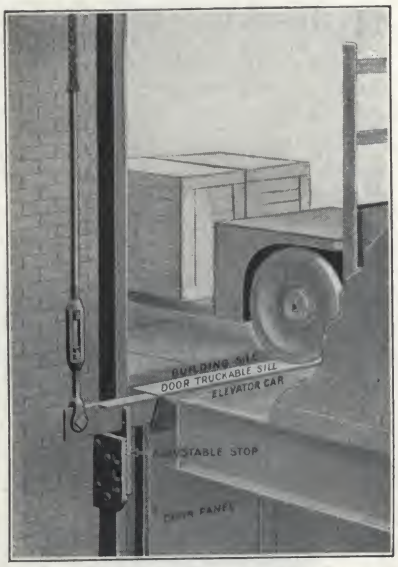
Anti-friction construction; heavy sheaves provided with double race ball bearings; heavy steel guide rails; smooth running steel chains; large latch handle; balanced design of component parts; all assure smooth mechanical action of Peelle Doors.

In addition to economically speeding up the handling of vertical traffic, Peelle Doors protect the elevator shafts against accident and the spread of fire. Numerous Peelle Door installations are equipped for greater efficiency with electric motors controlled by push button switch in car or on shaft side of door. They are also equipped for greater safety with electric interlocking system, preventing movement of car until all doors in shaft are closed. Experienced Peelle erectors install each door, making fault-proof operation certain. Consult our Engineering Department before specifying type of operation.

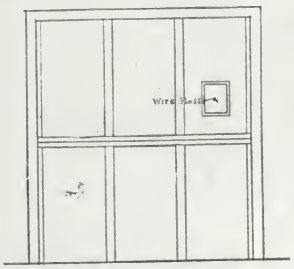
The Exclusive Truckable Feature—One of the cardinal features of Peelle Freight Elevator Doors is the *truckable* sill. It bridges the gap between door opening saddle and the elevator car. The upper edge of the lower half of the door rests rigidly level with the building floor sill. Besides being specially reinforced to stand the heaviest trucking into and out of elevators, this bar extends beyond the sides of the panel of the door, thus forming a bridge for smooth trucking.

Inasmuch as this sill rests on heavy steel stops fastened to the guide rails, there is always perfect and rigid alignment of the building floor and the trucking sill of the door. This *trucking* sill is endorsed as one of the most essential, simple and efficient features in elevator door construction.

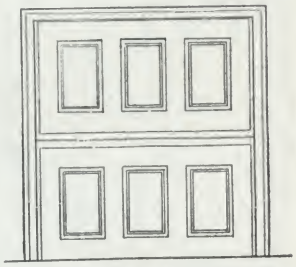
Special Heavy Duty Sill—We also make a reinforced trucking sill for unusually heavy loads. It is also recommended for openings of great widths.



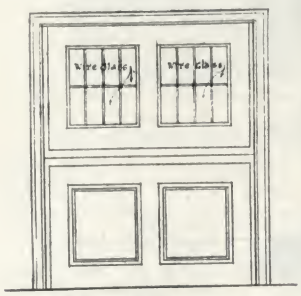
Shaft Side View Showing Manner of Supporting Peelle Counter-balanced Door in an Open Position



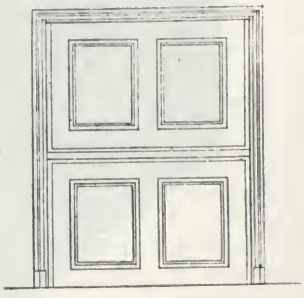
R-10 GALVANIZED METAL COVERED DOOR, WITH FLUSH PANELS
R-9 without Observation Light
R-11 with 2 Observation Lights



K-8 KALAMEIN PANELLED DOOR, WITH THREE SOLID PANELS IN EACH HALF.
Observation Light furnished if desired

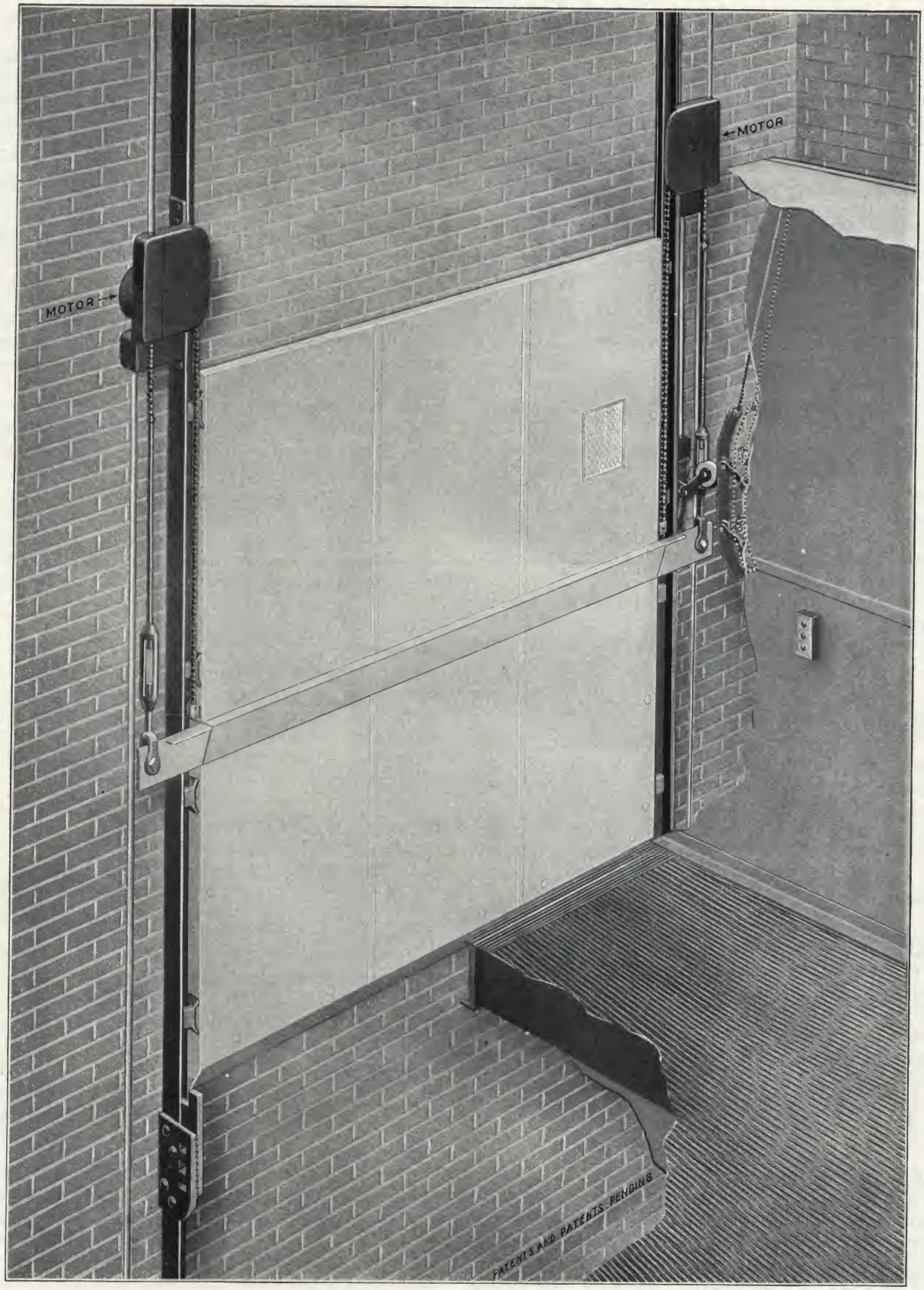


O-9 KALAMEIN PANELLED DOOR, WITH STANDARD SIZE STEEL SASH IN UPPER HALF



K-1 KALAMEIN PANELLED DOOR, WITH TWO SOLID PANELS IN EACH HALF
Observation Light or Lights furnished if desired

Continued on next page



Shaft View of Peelle Motorized Door

The Peelle Motorized Door is a standard, manually operated door with a motor built into each sheave housing. No auxilliary mechanism is required.

The space required between the elevator car and the shaft wall is the same as for manually operated doors.

The doors are controlled from push button stations. Automatic opening, in conjunction with the elevator control is standard on self-leveling elevators.

PEELLE MOTORIZED DOORS

Manual operation is possible at all times without disconnecting any mechanical or electrical parts.

The Motorized sheaves are standard for all doors, and are the same for either a-c. or d-c. primary current. 220 volt, 3 phase, 60 cycle is preferred.

Low maintenance and operating costs are assured by The Peelle Company's unqualified guarantee which is behind every Motorized installation.

Continued on next page

The Peelle Motorized Door

Description

PEELLE MOTORIZED DOORS

The Peelle Motorized Door is an electrically operated freight elevator door that has the driving mechanism built into each sheave housing, and is an integral part of the door.

A pair of motorized sheaves exert the power for opening and closing each door. The power is applied directly to the chains which connect the two halves of the door. All rods, arms, and auxiliary devices are eliminated. There are no unnecessary moving parts, therefore all of the power consumed is applied to the door.

The Peelle Motorized Door eliminates dividing the responsibility between a door manufacturer and a door operator manufacturer.

Doors for varying opening heights in the same shaft are as easily controlled as doors for equal height openings.

The Peelle Motorized Door may be operated manually at will. In cases of emergency, when manual operation is essential, elevator traffic continues without interruption. It is not necessary to call a mechanic to disconnect any of the mechanical or electrical parts. During manual operation, the same automatic electro-mechanical locking features are retained.

The equipment is fully protected electrically, which eliminates the possibility of injuring the motors. As a further protection to the entire equipment, the door will stop in case it meets an obstruction.

Construction

The Peelle Motorized Sheaves have a large factor of safety and are assembled in heavy malleable iron housings. The motors are completely enclosed and protected from dust, dirt, and all foreign matter. All bearings have ground rollers with inner and outer ground races. All bearings are sealed at the factory after being packed with a semi-fluid lubricant. Provision is made for gun lubrication.

Standardization

Peelle Motorized Sheaves are standardized, produced in quantities, and carried in stock at all Peelle Branch Offices. The same Peelle Motorized Sheaves are used for either alternating or direct primary current. When available, 220-volt 3-phase 60-cycles a-c. is preferred.

Peelle Branch Office will make replacement immediately.

Control

The doors may be controlled in any manner that the elevator control or other conditions demand. The doors are usually opened automatically as the elevator is leveling, or with a momentary push button, when independent of the elevator control. The doors are usually closed with a constant pressure push button. The closing operation may also be controlled by the elevator car switch. A stop button is always provided to stop the doors in any position of opening or closing. Suitable automatic electro-mechanical interstocks, and cams are provided to meet State or Municipal Codes having jurisdiction. The interlocking features require all doors to be closed before the elevator can operate, and that, only the door at which the elevator is at rest, or leveling, will open.

Cost of Operation

The cost of operating Peelle Motorized Doors is extremely economical. Each door consumes ½ kv-a. The current is across the line approximately 3 seconds per operation for an 8-ft. high opening.

Maintenance

The cost of maintenance will not go beyond the periodical greasing that is customarily given to elevator equipment.

Space Requirements

To install Peelle Motorized Doors, no provision for extra space is required. The space between the elevator and the shaft wall is the same as for manual doors. The return space at each jamb should be at least 10 in. In the penthouse, no equipment is required that interferes with the elevator machine and controller layout. Service power lines, a cutout switch having 15 amp. fuses, for each line of doors is all that need be provided by others.

Car Gates

Vertical Sliding Motorized Car Gates operate simultaneously with the doors. These gates are designed to increase the safety of high speed freight elevators, and to meet the requirements of State and Municipal Safety Codes that require their use. The speed of the gates is synchronized with the speed of the doors.

When to Use Peele Motorized Doors

Peelle Motorized Doors may profitably be used where any of the following conditions exist:

All freight elevators having a speed of 150 ft. per minute or greater. The advantage of high elevator speed is lost unless the Peelle Doors are motorized.

On all self leveling elevators. Peelle Motorized Doors open while the elevator is leveling, thereby gaining considerable time over manual operation.

On all freight elevators having continuous traffic. Peelle Motorized Doors open immediately upon the arrival of the elevator at its destination. The opening of the doors does not depend upon the physical condition of the elevator operator. As the fatigue of the elevator operator increases, the speed of the elevator traffic decreases when manually operated doors are used.

On all automatic push button controlled freight elevators. The cost of automatic elevators is justified only when used in conjunction with Peelle Motorized Doors.

On all elevators having doors at both ends of the shaft. Saves the time of the elevator operator walking to the door opposite the elevator car control.

On all elevators used for carrying freight that completely fills the elevator platform, which would make the latch of a manually operated door inaccessible to the elevator operator. Elevators may be loaded to capacity when the doors are motorized.

Continued on next page

PEELLE
MOTORIZED
DOORS

Specifications

To all of the openings in the freight elevator shafts, furnish, deliver, and erect in complete working order, Peelle Motorized freight elevator doors, equipped with individual motors for each door.

The door sections shall be constructed of two thicknesses of white pine, and covered with stretcher leveled, copper bearing, galvanized sheets, having vertical lock seams to form the manufacturer's R10 design.

The door sections shall be bolted into angle frames having angle shoe bars and malleable iron milled groove shoes. The door sections shall be equally balanced, and connected to each other with rust proof flexible cable chain.

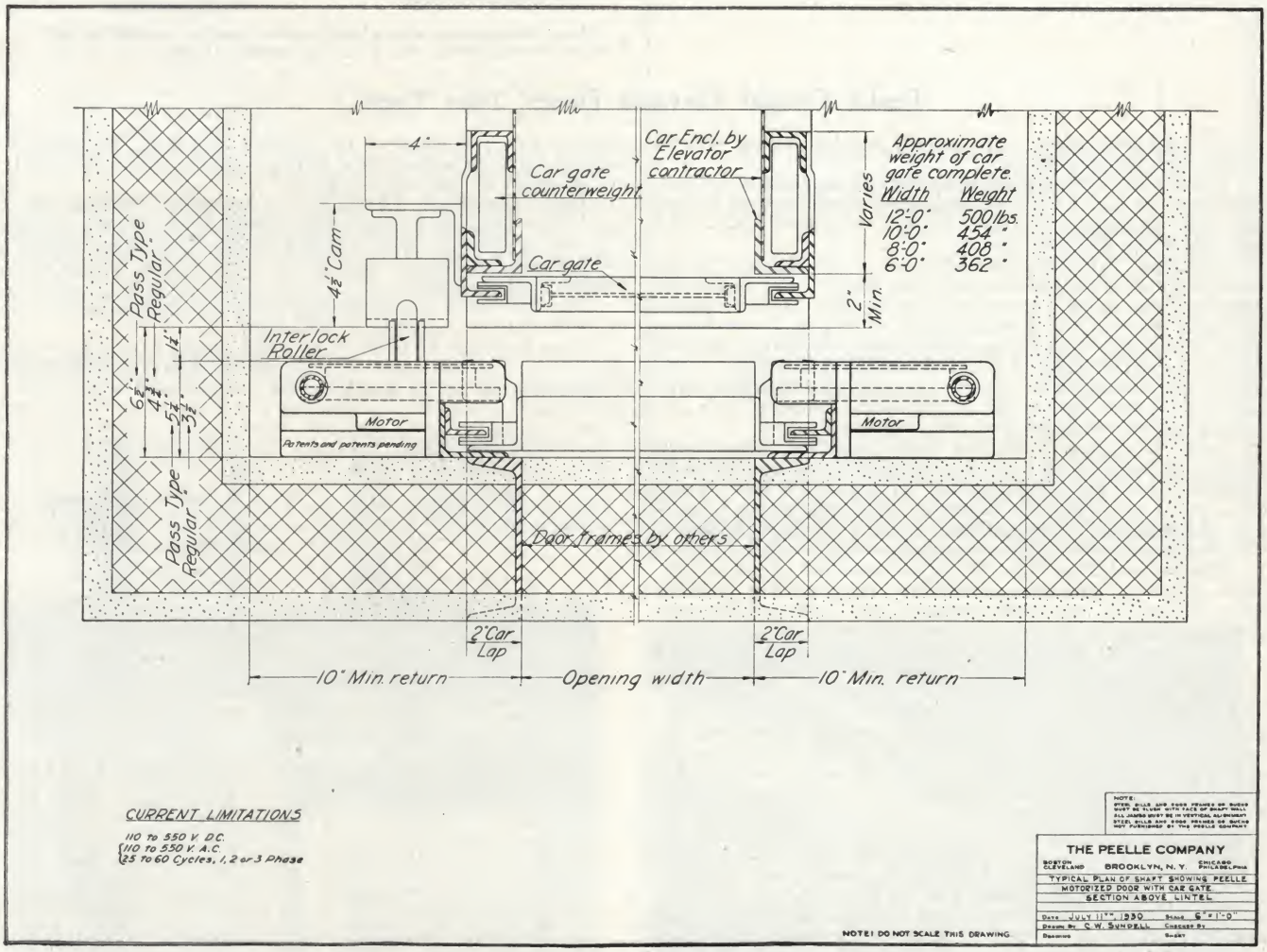
The upper edge of each lower section shall be equipped with a T bar truckable sill extending beyond the opening at each jamb, and shall rest on malleable stops securely riveted to the guides. The truckable sill shall support a trucking load equal to the capacity of the elevator. An astragal angle shall close the space between the two sections, when closed the full width of the opening.

The cable chains shall run over Peelle Motorized sheaves. All Motorized sheaves and equipment shall be entirely within the shaft, and so arranged that the doors may be operated manually without disconnecting any of the mechanical or electrical parts in case of power failure. The doors shall be controlled with push buttons, or in sequence with the elevator control, as conditions demand.

Vertical sliding Motorized car gates shall be installed at each end of each elevator where doors occur. Suitable provision for the installation of the car gates will be made by the elevator contractor, on the elevator platform.

Electro-mechanical interlocks, and suitable cams shall be furnished to make a complete Motorized door installation.

The entire installation shall be guaranteed for a period of two years against defects in workmanship and materials.



Clearances Required for Installation of Peelle Motorized Door

Continued on next page

Peelle Manual Freight Elevator Doors, Regular Type

For openings where minimum story heights meet the requirements shown on the vertical sections.

This metal clad door is composed of two layers of ⅞-in. selected white pine, clinch nailed together and covered with 24-gauge stretcher leveled galvanized sheets.

Framework is constructed of heavy angle steel which gives the door great strength and the ability to withstand severe use.

The angle frame and the metal covered panels are bolted together with patented combination lock nut washers, which finish flush on both sides of the door.

Large (patented) anti-friction shoes operate in heavy angle steel guide rails, rigidly fastened to masonry wall construction.

Peelle steel operating chains are permanently locked in place with patented locking device.

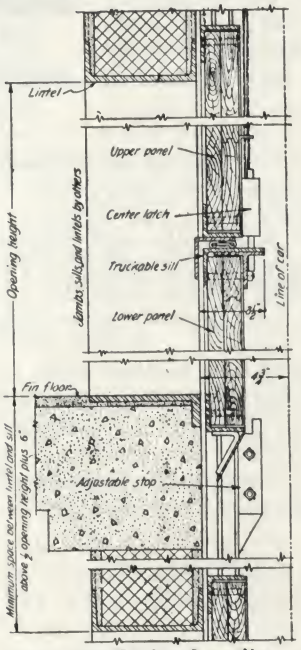
These chains operate over double radial ball bearing sheaves, permitting free, easy operation of even extremely large doors.

Drop forged steel adjustable turnbuckle rods aid fine adjustment.

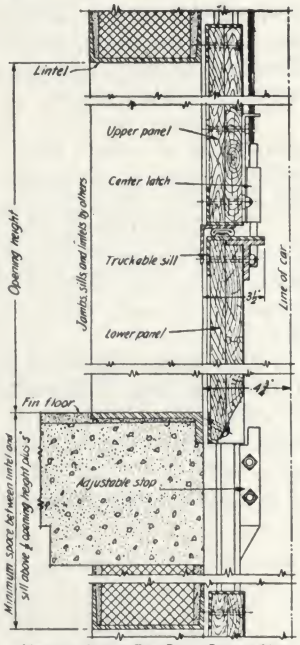
A positive action latch located at the center of each door is so designed that a slight pressure releases doors and exerts the greatest possible vertical pressure.

The doors are equipped with suitable electro-mechanical interlocks for all types of elevator control.

These doors have passed the rigid tests and inspection of the Underwriters' Laboratories, Inc., and bear their label.



VERTICAL SECTION THRU PEELLE REGULAR METAL CLAD (UNDERWRITERS' LABELLED) DOOR



VERTICAL SECTION THRU PEELLE REGULAR METAL CLAD (NON-LABELLED) DOOR

Note: Minimum of return from face of jamb to sidewall of shaft is 7 in. for manual doors, and 10 in. for motorized doors.

Peelle Freight Elevator Doors, Pass Type

For openings where story heights are too low to accommodate regular type doors.

These Pass Type Doors are demonstrating their excellence by widespread use in factories, garages and warehouses having high door openings and where constant and heavy traffic subjects the doors to heavy use.

The Pass Type Door embodies all of the features of the Peelle Regular Type Door as described above. The panels are staggered and operate on separate guide rails. When opened the upper panel of the door is permitted to pass by the lower panel of the door on the floor above, the lower panel likewise lapping the upper panel of the door on the floor below. (See details—A.) A movable, gravity operated, fire retarding steel lintel set on the upper edge of the door effectively seals the opening between masonry and door.

Detail B applies to elevator shaft conditions where story heights are not uniform; one floor permitting the use of Peelle Regular Type Doors, and distance between other floors being less Pass Type Doors are required. Also where door heights vary and floor heights are uniform, Peelle Pass Type and Regular Type Doors are used in conjunction with each other.

Regular and Pass Type Doors are installed one above the other to cover both these conditions. An extended trucking sill is provided on the Peelle Regular Type Doors to bridge the clearance between elevator car and building floor sill.

The Underwriters and Factory Mutual Companies label will be furnished with all Pass Type doors when specified.

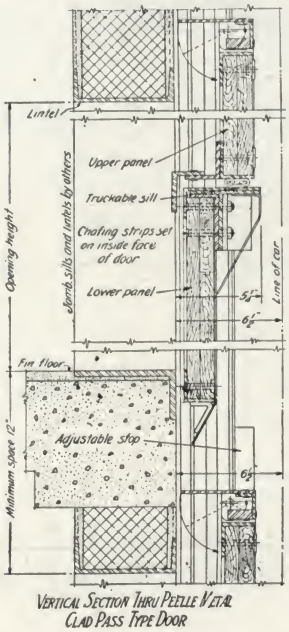
Elevator Shaft Construction Data—All details show the construction of Peelle Freight Elevator Doors when fastened to iron bucks. If no iron bucks are provided, and the jambs are of plain brick or concrete, the angle rail is reversed and the horizontal leg is bolted to the wall with through bolts. The construction in all other details remains unchanged. While Peelle Doors can be attached to walls of any construction, best results are obtained when channel or angle iron bucks securely anchored to the wall are provided. Plain terra cotta walls do not offer secure anchorage. The elevator shaft wall should be plumb and free from projections on the side at which the doors are to be installed. The openings should be built with the jambs flush with wall and in vertical alignment. Angle or channel jamb must be provided and set to reinforce hollow tile walls and should extend from sill to beam. Pressed metal bucks must be reinforced with internal angle on shaft side for fastening of Peelle rails.

If doors are installed directly above the elevator pit, it is necessary that the latter be deep enough to receive the lower half of the door in its descent. The requirement is a distance equal to half the height of the opening plus 3 in. No projection should be allowed for a similar distance above the lintel of the doors on the topmost floor.

Door Clearance Formula—To determine minimum distance from lintel of door opening to finish floor line above add 6 in. to one-half of door opening height for regular labeled counterbalanced doors, and 5 in. for regular non-labeled counterbalanced doors.

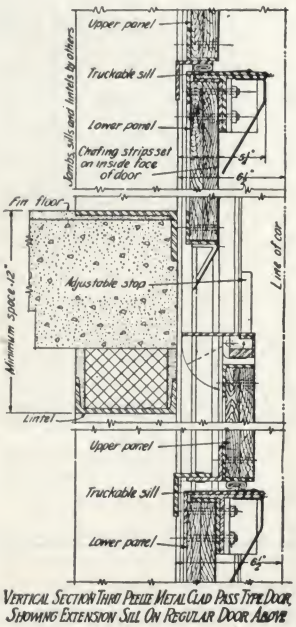
For Pass Type Counterbalanced Doors minimum space, 12 in. from lintel to finish floor line above.

Door openings 12 to 16 ft. in width should have 9-in. clear jamb return on shaft side of wall for fastening of hardware. Doors over 16 ft. in width should be provided with 11-in. jamb return.



VERTICAL SECTION THRU PEELLE METAL CLAD PASS TYPE DOOR

Detail A



VERTICAL SECTION THRU PEELLE METAL CLAD PASS TYPE DOOR, SHOWING EXTENSION SILL ON REGULAR DOOR ABOVE

Detail B

Note: Minimum of return from face of jamb to sidewall of shaft is 8 in. for manual doors, and 10 in. for motorized doors.

Continued on next page

Specifications for Peelle Bi-fold Type Doors

Manual Bi-fold Doors

All platform entrances shall have Peelle Bi-fold Doors as manufactured by THE PEELLE COMPANY, 47 Stewart Avenue, Brooklyn, N. Y.

Door panels shall be constructed with 2½-in. thick white pine stiles and rails with ⅞-in. panels in the lower half of the door, as detailed on the architect's drawings. The upper half of the door shall have provision for glass, but the glass and glazing is included in the glazing contract.

The hardware shall be of the malleable iron or wrought iron type, with roller and ball bearings throughout at all moving parts, to eliminate friction.

Each door shall be equipped with a self-opening device, so that the doors will automatically break when the door is unlatched, and the necessity for breaking the door by pulling it away from the wall by hand will be eliminated.

Each door shall also be equipped with a safety ratchet device to prevent the door from falling in case of chain failure.

Each door shall be balanced with counterweights connected to the bottom of each door with No. 6 flexible cable chain running over double race ball bearing cast iron turned groove sheaves mounted in cast iron housing, and bolted to the guide rails.

A lock shall be fastened to the door engaged with a keeper on the rail at each side of the door, so that the door may be unlatched from either side. Two latches shall be connected with a cold rolled rod of suitable size. Lock shall be so arranged that it will automatically engage the door against the wall by the action of the hand hoist, and shall permit the door to automatically break when the door latch is lifted. For doors up to 10 ft. wide furnish three top hinges and three center hinges. For doors up to 15 ft. wide, furnish four top hinges and four center hinges.

All weights for these doors shall be enclosed on three sides for full height of run of weight with a No. 16 gauge steel box secured to four 1½x1½-in. angles for guiding the weight.

Samples of all hardware, including the cable chain, shall be submitted to the architect for approval, before signing the contract for this part of the work.

Doors under 100 sq. ft. where neither the width nor height exceeds 10 ft., will operate manually without a chain hoist. Doors exceeding 100 sq. ft. or where the width or the height exceeds 10 ft., a differential geared hoist driven by an endless hand chain will open and close the doors. The hoist shall be mounted in a malleable or wrought iron housing with bronze bushings or ball bearings at all moving points. The hoist shall be so arranged that it will permit the door to lock automatically when it has reached its lower limit of travel.

Motorized Bi-fold Doors

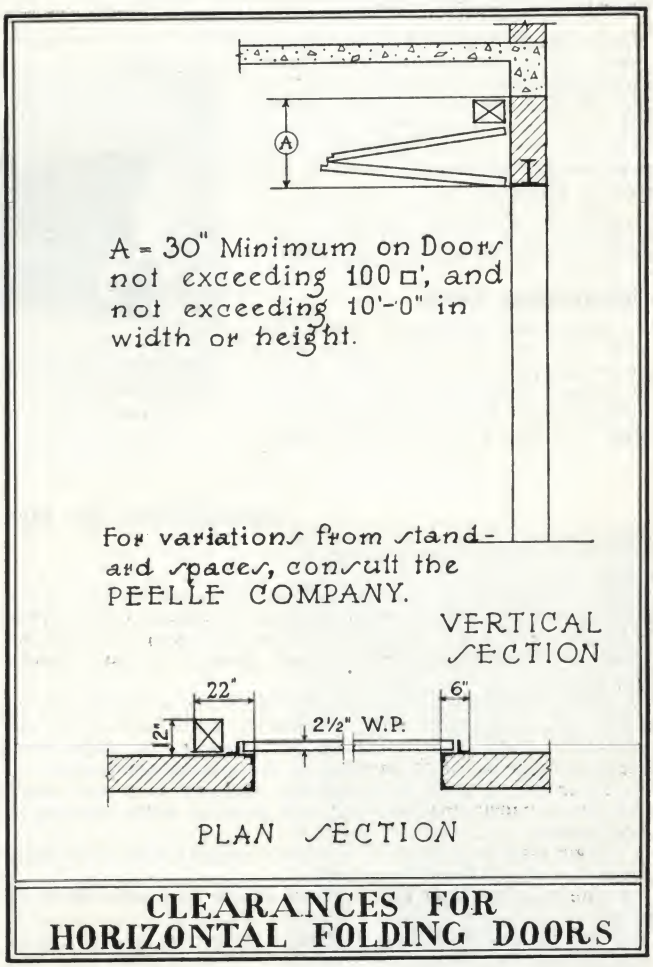
Motorized Bi-fold doors are so arranged that the momentary pushing of a button will automatically unlock and break the door and raise it to its upper limit of travel. The door will close by means of a constant pressure push button which will automatically stop the door in any position if the push button is released. The door will automatically close against the wall and lock when it reaches its lower limit of travel. The other specifications for electrically operated doors to be the same as for manually operated doors.

Sample Door

A complete sample door shall be tested by a representative of the architect and owner, in the presence of the door manufacturer, before final approval is given.

Guarantee

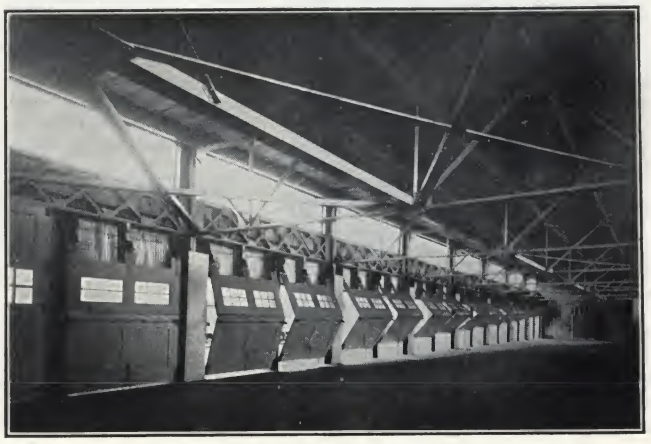
The entire installation shall be guaranteed for a period of two years against defects in workmanship and material; and all defective parts or workmanship shall be replaced free of charge during that period.



CLEARANCES FOR HORIZONTAL FOLDING DOORS



Peelle Bi-fold Doors Provide Maximum Opening with Minimum Headroom Requirement



Wall with Bi-fold Doors

Continued on next page

Peelle Heavy Service Tel-co Doors

The heavy type Peelle Tel-co Door is recommended for use at driveway entrances, railroad sidings, entrances to buildings where provision is made for loading freight cars within the building, at piers and other conditions where door openings are unusually large, and quick and easy vertical operation is desired.

Both halves of the door travel upward simultaneously, the lower half moving twice as fast as the upper half, reaching the lintel of the opening together.

Each condition requires special engineering study. The doors operate manually, by means of a chain hoist, winch hoist or motor.

For doors which will be constantly in use, the Peelle Electric Motor Operation is recommended.

A switch, conveniently located, operates this type of door, permitting rapid handling of traffic.

In the installation of four Peelle Tel-co Doors in the Manhattan Storage and Warehouse Building, Peelle engineers were called upon to assist in planning structural conditions necessitated by the problem of providing clearance for door operation upward, through and into the second floor to allow maximum headroom for entrance and exit on ground floor.

All four doors are operated from a central control point located conveniently over checking clerk's desk.

Construction Data

The doors are heavily constructed and will be furnished with wood or wood metal-covered panels, framed in heavy structural angle iron reinforced at the sides and operated in the Peelle patented anti-friction shoes over heavy steel guides.

Large sheaves, especially designed to increase the ease of operation, necessitates a clearance over the door opening lintel of one-half the height of the door plus 12 in. See sketch.

Where the width of the door exceeds the height, additional return space at the jambs may be necessary for standard cast iron counterweights.



Interior View of Hand Operated Heavy Service Tel-co Doors, Daniel Reeves Warehouse, New York, N. Y.



Exterior View of Four Motor Operated Tel-co Doors, Manhattan Storage & Warehouse Co., New York, N. Y.

Specifications for Heavy Service Tel-co Doors

To the exterior opening where indicated on the plans, furnish, deliver and erect in complete working order, Peelle Two-section Vertical Slide-up Motorized Doors as manufactured by THE PEELLE COMPANY, 47 Stewart Avenue, Brooklyn, N. Y.

Door sections shall be constructed of 2½-in. thick selected white pine stiles and rails, paneled in accordance with the architect's detail, with provision for glass in the upper half. Glass and glazing shall be done by the glazing contractor.

Door panels shall be completely enclosed in a steel angle iron frame with shoe bars and mill grooved shoes running in steel guides.

Door shall be connected to counterweights with cable chain running over machined sprockets.

The weights shall run in steel guides covered with sheet metal.

The cable chains shall run over motorized turned groove sheaves.

The controllers shall be of the automatic reversing type.

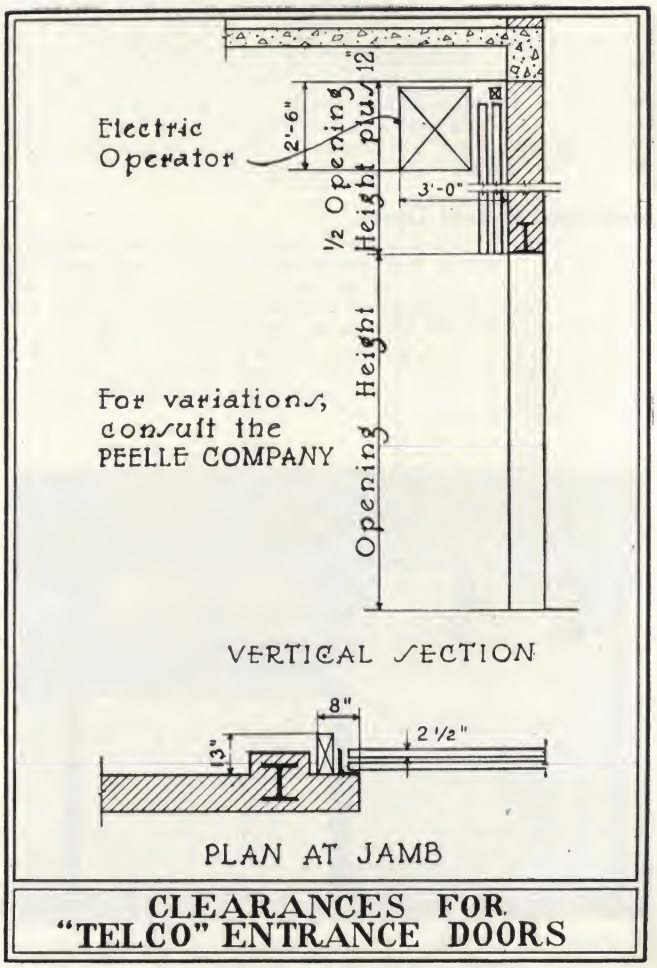
The design of the equipment shall permit manual operation at will, and in case of power failure without disconnecting any electric or mechanical parts.

Each door shall have a three-button control with a momentary opening and constant pressure button and a stop control button. These buttons shall be placed by this contractor as designated by the architect, but all conduit, wire and electrical wiring for the controller, motor, solenoid, limit switches and push buttons shall be furnished and installed by the electrical contractor.

Shop drawings shall be furnished by the manufacturer for the approval of the architect.

The entire installation shall be guaranteed against defects in workmanship and material for a period of two years, and must meet the approval of the owners, architect and general contractor in every respect.

Note: Manual operation may be specified when desired. When the opening of large doors is done manually, the operation is not so rapid, nor will the operator always clear the lintel with the door; thereby obstructing the opening. Electric operation raises the door to the full height of the door automatically.



CLEARANCES FOR "TELCO" ENTRANCE DOORS

Continued on next page

Peelle Pressed Steel Dumbwaiter Door

Description—The Peelle Dumbwaiter Door Unit is a light weight counterbalanced door mounted in steel guides with a combination pressed metal frame and trim. The entire unit is assembled in the factory, ready for setting into the masonry wall while the shaft is being built.

Convenience—The door operates on the inside of the shaft, and takes up no floor space in opening or closing. It may be adapted to any floor plan without confliction. Each door has a 6-in. observation light so that the dumbwaiter is visible with the door closed.

Durability—The unit is built of steel throughout. There are no parts to wear out, or weights to drop off. A heavy flat link chain connects the two door sections. The sheaves are double duty ball bearing type.

Operation—The two halves of each door are perfectly balanced, and have malleable shoes to eliminate friction. This construction, in conjunction with the ball bearing sheaves, provide easy and swift opening and closing.

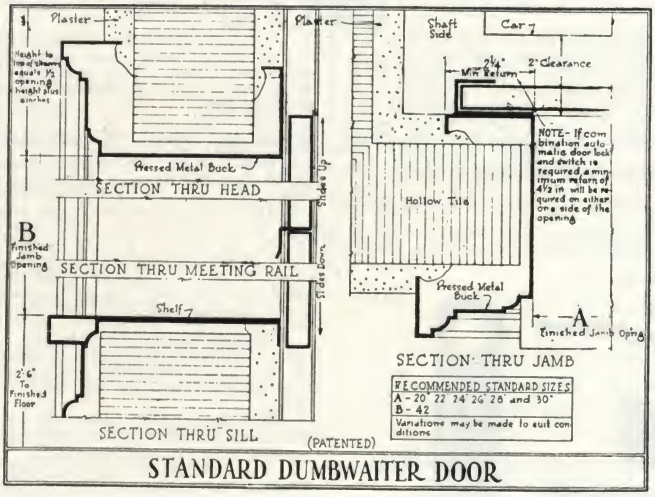
Safety—Each unit, for electric dumbwaiter, is provided with an electric interlock to prevent the operation of the dumbwaiter except when all doors in the shaft are closed. Each door is also equipped with an automatic lock that prevents the door being opened, except when the dumbwaiter is at the landing.

Erection—The doors, frames, guides and hardware are assembled in the factory to make a complete working unit. No field erection is required. The unit is built into the masonry wall like a window frame.

Economy—The first cost is the last cost. This unit saves maintenance and upkeep, saves floor space, saves time in opening and closing, and saves field erection.

Appearance — The frame is of pressed metal, with a neat trim, mitred and welded at the corners. The unit as a whole is designed to present a pleasing architectural appearance.

Note: Flush hospital trim can be furnished when it is preferred. The unit can be made of rust resisting steel when specified.



STANDARD DUMBWAITER DOOR


Front View of Peelle Pressed Steel Dumbwaiter Door

Specifications

The openings to the dumbwaiter shall be provided with Peelle Standard Dumbwaiter Door Units as manufactured by THE PEELLE COMPANY, 47 Stewart Avenue, Brooklyn, N. Y.

The doors shall be of the counterbalanced type, with pressed steel panels, a 6-in. observation light and combination frame and trim to fit a (4, 5 or 6-in.) wall with allowance for plaster on (one or both sides) all assembled with steel guides, sheaves and hardware ready for setting into the masonry wall. The material shall have a shop coat of paint before shipping. The Units shall be set plumb and in vertical alignment by the general contractor.

The doors shall be guaranteed for two years against defects in workmanship and materials by the manufacturer.

Dumbwaiter Door Locks (for Electric Dumbwaiter)—Each of the Peelle Dumbwaiter Door Units shall be equipped with the Peelle Combination Interlock and Automatic Lock. The wiring of the interlock and installation of the cam for operating the automatic locks shall be done by the dumbwaiter manufacturer.


Rear View of Construction of Peelle Dumbwaiter Door

RICHARDS-WILCOX MANUFACTURING CO.

INCORPORATED

Fire Doors and Hardware

AURORA, ILL.

CABLE ADDRESS
"RICHWILCO, AURORA"

CANADIAN FACTORY
LONDON, ONTARIO

For Branch Offices, see our other Pages

For R-W Garage and Industrial Doors and Hardware, Elevator Door Hardware and Equipment, see Manufacturers' Index

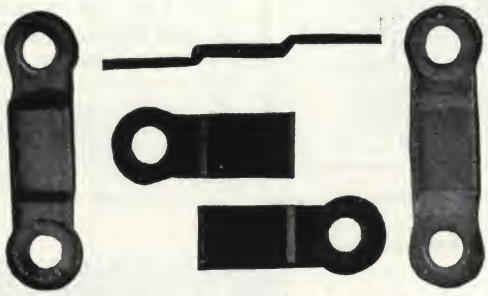
R-W Fire Door Hardware and Fire Doors

The R-W line of Fire Door Hardware is one of the most complete and extensive manufactured and is doubly certain of being perfect because inspected and labeled by the Underwriters' Laboratories, Inc.

Fire Insurance Companies offer a premium for the installation of R-W Automatic Fire Doors.

The complete line is not shown in this catalogue but the following is a list of types. Complete details and prices on application.

Two Link, Flat and Round Track, Fixtures for Single Sliding Doors with Incline Track
Single Link, Flat and Round Track Fixtures for Single Sliding Doors with Incline Track
Single Link Flat and Round Track Fixtures for Sliding Doors in Pairs, with Incline Track
Single Link Flat and Round Track Fixtures for Single Sliding Doors with Level Track
Single Link Flat Track Fixtures for Single Sliding Doors with Drop Bracket Level Track
Single Link Flat Track Fixtures for Pairs of Sliding Doors with Level Track
Single Link Flat Track for Pairs of Sliding Doors, with Level Track, Drop Bracket Type



Views of R-W No. 97 Fusible Link from Unretouched Photo

Shows sides of finished link and edge of semi-finished link (also, both sides of half-link phosphor-bronze blanks, before any soldering has been done on them)

Horizontal Turnover Fire Door Hardware
Two Section Vertical Fire Door Fixtures
Two Link Flat and Round Track Vertical Fire Door Fixtures for Single Vertical Doors
Fixtures for Single Swinging Fire Doors
Fixtures for Swinging Doors in Pairs
Fire Shutter Fixtures
Fixtures for Single Trap Doors
R-W Tin-Clad and Corrugated Sheet Metal Fire Doors
Angle Iron Door Frames for Face of the Wall
Angle Iron Door Frame, Rabbetted Type
Channel Frames
R-W Angle Iron Sills

Automatic Fire Door Equipment, Made Sensitive for Fires and Strong for Daily Service

It is vitally important that the fusible links of fire door equipment be so painstakingly fabricated and constructed that there is not the slightest element of imperfection in them. They must be so perfect that they will function instantly, in spite of having been subjected for years after installation to the deteriorating effect of natural influences; in spite of the fact that they may have become coated with grime, dust and other deleterious matter, as well as being subjected to heat, cold, dryness, dampness and other conditions inclined to reduce their sensitiveness to fire.

With these considerations vividly in mind, the Richards-Wilcox fusible link was developed, and its effective action in stopping many fires, saving millions of dollars in property values (in some cases years having passed since installation) gives irrefutable evidence of its perfection.

R-W No. 447 "FyeR-Wall" Sheet Metal Doors

Inspected by the Underwriters' Laboratories, Inc., under direction of the National Board of Fire Underwriters. Doors bear the Underwriters' label.

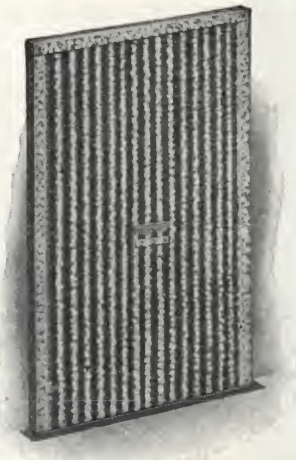
The vertical outside frame members of the door consist of a heavy angle and a light angle. The edge of the corrugated sheet on the exposed side of the door is flattened out and bent around the heavy angle of the frame which presents a neat finished appearance without exposed raw edges of steel. The light angle covers the end of the horizontal corrugated sheets on the wall side of the door. The top and bottom horizontal frame members are heavy bars of steel which are completely covered with galvanized sheet metal.

Allowances are made in the construction of the door so that when exposed to heat, all parts can expand freely without distorting the shape of the door. Therefore, in case of fire, the door will retain its normal position close to the wall, successfully preventing the passage of flames.

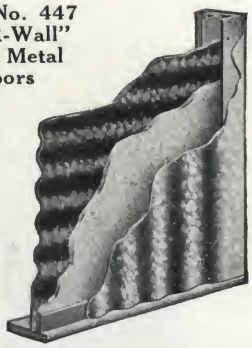
Built in either square top or incline top and can be mounted with sliding door hardware or with lap or flush types of swinging door hardware or vertical door hardware.

The construction of the door is exceptionally rigid so that it will maintain its shape under all conditions. The door is especially good in places where subjected to rough usage and where tin-clad doors would easily be damaged.

Thickness of door 2⅝-in.; weight about 5 lb. per sq. ft.



R-W No. 447 "FyeR-Wall" Sheet Metal Doors

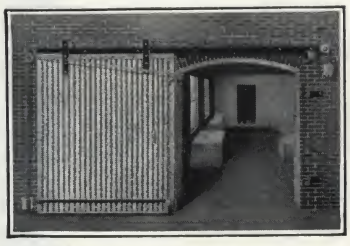




R-W Monarch Two Link Flat Track Fire Door Fixtures

We recommend these fixtures where headroom exceeds 3 ft.

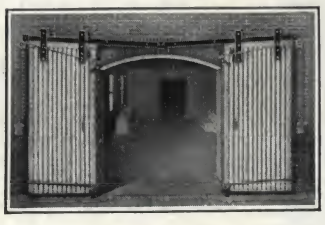
This arrangement of automatic device provides two fusible links—one constantly in opening and exposed from both sides and one link near ceiling. If either link fuses, door is released and closes by gravity



R-W Single Link Flat Track Fire Door Fixtures

This fixture is used for openings where there is not enough headroom to place track on an incline of ¾ in. to the foot. Two sets of weights are used to balance the door. The back weights are held in position by a fusible link. In case of fire, this link fuses and allows back weights to drop, and the front weights then pull the door shut.

Same style as No. 201 except that it operates on level track. Has one fusible link which is exposed in the opening



R-W Single Link Flat Track Fire Door Fixtures

This fixture is the same as No. 201 except that it is applied to pairs of doors. Designed to meet special conditions, such as not sufficient space on one side to slide a large door, or if an overhead carrier system track passes through the opening.

This type has one fusible link on each door, and both are exposed in the opening



R-W Automatic Fire Door Fixtures

The automatic link and cord arrangement on this fixture extends above the opening of ceiling, and when used with doors on both sides of wall same extends through, so that the fusing of link on either side will cause the doors to close. No. 643 Door Closer and Check may be substituted for weight closing device if desired. Fixtures furnished for either flush or lap doors

VULCAN RAIL & CONSTRUCTION COMPANY

Manufacturers of Underwriters' Fire Doors

MAIN OFFICE AND WORKS
Grand Street and Garrison Avenue, MASPETH, N. Y.
BRANCH OFFICE AND SHOPS: 39th Street and A. V. R. R., PITTSBURGH, PA.

Products

VULCAN "ALL-STEEL" FIRE DOORS.

For our pages on Pipe, Stair and Bridge Railings, Steel Gratings, Pipe Bends, etc., see Manufacturers' Index.

Underwriters' Approval

The steel fire doors and frames manufactured by this company are made in accordance with the specifications of Underwriters' Laboratories, Inc., are inspected by them and carry their Class "C" label.

TRADE-MARK

Vulcan "All-Steel" Fire Doors

Use—These doors are designed for the protection of corridor and partition openings. They are especially suitable for installation in compartment openings in furniture storage warehouses.

Equipment—This type door is furnished with buck and hardware complete, except padlock.

Construction—The entire door, frame and hardware is of steel construction, and all material is painted one shop coat before shipping.

The door sheet is made of blue annealed steel, securely fastened to an angle iron frame, suitable provision being made for expansion in case of fire. This angle frame is braced at intervals of not over 20 in. by cross angles riveted to the door sheet.

Hardware consists of four strap hinges and a three-point latch with spring to hold latches in their keepers. Latch handles extend through the door to permit opening from both sides.

Buck is made of standard rolled steel channel and is furnished 1 in. wider than partition. It runs from the finished floor to the ceiling and is securely fastened to both. Hinge pintles and latch keepers are riveted to channel jambs in the shop. Doors are usually made 3 ft. x 8 ft. 4 in. or 3 ft. 4 in. x 8 ft. 4 in. but can be furnished any size up to 4 ft. x 10 ft.

Further Information

Complete detailed drawings, together with further information and prices will be gladly sent on request.



Two Standard Vulcan Doors
One closed and the other partly open



Typical Installation of Vulcan Doors
On both sides of corridor in a furniture storage warehouse

Some Typical Installations

Metropolitan Fireproof Warehouse, New York, N. Y.
Knickerbocker Storage Warehouse Co., New York, N. Y.
Manhattan Storage & Warehouse Co., New York, N. Y.
Job De Camp, Inc., Newark, N. J.
Security Storage Co., Washington, D. C.
Thomas F. Healey & Son, Inc., Brooklyn, N. Y.
Neal Fireproof Storage Co., Cleveland, Ohio
Long Island Storage Warehouse, Brooklyn, N. Y.
Lansing Storage Co., Lansing, Mich.
George B. Holman & Co., Inc., Hackensack, N. J.
W. H. Strang Storage Warehouse, Brooklyn, N. Y.
Flushing Storage Warehouse Co., Flushing, L. I., N. Y.
Neptune Storage Warehouse Co., New Rochelle, N. Y.
O'Brien Express Co., New Rochelle, N. Y.
Eldredge Express & Storage Warehouse Co., Atlantic City, N. J.
Rochester Carting Co., Rochester, N. Y.
Estate of Orrin E. Jones, Providence, R. I.
King-Parker, Inc., New York, N. Y.
Interstate Warehouse Co., Philadelphia, Pa.
Hempstead Storage Corporation, Hempstead, N. Y.
Santini Warehouse, New York, N. Y.
Wm. H. Schaefer & Son, Inc., Stamford, Conn.
J. Kindermann & Sons, Inc., New York, N. Y.
Federal Storage Company, Washington, D. C.
Lehigh & New England Terminal Warehouse, Bethlehem, Pa.
Lincoln Safe Deposit Company, New York, N. Y.
Allport Storage Warehouse Company, Asheville, N. C.
Morgan & Brother Warehouse, New York, N. Y.

THE RICHMOND FIREPROOF DOOR CO.

RICHMOND, IND.

Branch Offices and Agents with Sales, Erection and Service Facilities in 70 Principal Cities Throughout the United States, including

ATLANTA, GA.
BALTIMORE, MD.
BOSTON, MASS.
BUFFALO, N. Y.
CHICAGO, ILL.
CINCINNATI, OHIO
CLEVELAND, OHIO
DALLAS, TEX.
DETROIT, MICH.
GREENSBORO, N. C.
HARRISBURG, PA.
KANSAS CITY, MO.
LOS ANGELES, CAL.
LOUISVILLE, KY.
MILWAUKEE, WIS.
MINNEAPOLIS, MINN.
NEWARK, N. J.
NEW YORK, N. Y.
PHILADELPHIA, PA.
PITTSBURGH, PA.
RICHMOND, VA.
ST. LOUIS, MO.
SAN FRANCISCO, CAL.
SEATTLE, WASH.
SYRACUSE, N. Y.
TAMPA, FLA.
WASHINGTON, D. C.

Products

TRADE Fyrgard MARK
RICHMOND FIREPROOF DOOR CO.
RICHMOND, IND.

THE RICHMOND FIREPROOF DOOR CO. has been engaged continuously since 1891 in the manufacture, sale and erection of the following products:

FIRE DOORS: Tin Clad, Corrugated Iron, Kalamein and Steel Plate.

COUNTERBALANCED FREIGHT ELEVATOR DOORS: Tin Clad, Corrugated Iron, Kalamein, Wood and Steel Plate.

BI-FOLDING, SINGLE SLIDE-UP, TELESCOPING, TURN-OVER, DOUBLE and SINGLE SWINGING and SLIDING Doors made of all the preceding materials for industrial purposes.

STORAGE ROOM UNITS.

KALAMEIN FRAMES, TRIM, CASINGS, MOULDINGS and SMOKE SCREENS.

RICHMOND FORMED STEEL FRAMES and ROLLED STEEL COMBINATION BUCKS and TRIM.

Also Electric Interlocks.

All of the preceding products are labeled when permissible under the regulations of the Underwriters' Laboratories, Inc., Chicago.

This Company manufactures every type of Fire Retardant Door except hollow metal and rolling steel curtains.

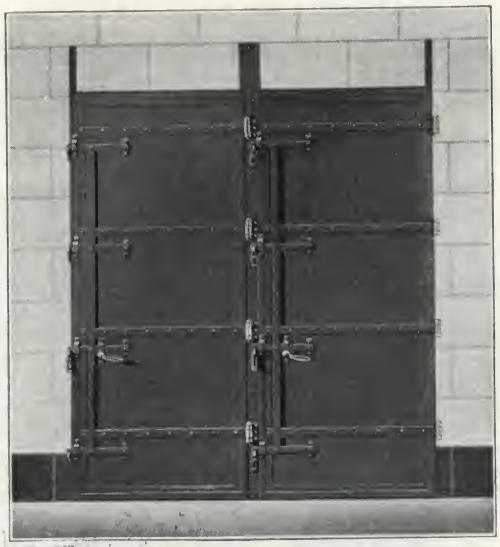
Kalamein doors may be finished shop coat or durable baked enamel, plain color or wood grained. We use the term "kalamein" in its modern sense—metal covered. The metal used is patent leveled stock and especially prepared in accordance with our specifications, its rust-resisting qualities being unsurpassed. This metal is subject to forming without flaking, thus assuring a smooth painting surface.

Fire Doors

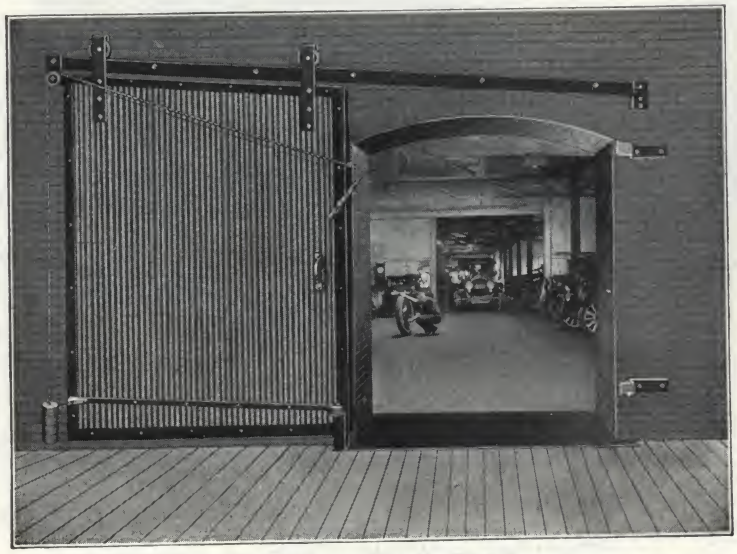
The three illustrations show swinging and sliding corrugated iron fire doors and storage room steel plate door, all being labeled by the Underwriters' Laboratories, Inc. The relative appearance of the doors is clearly shown.

The swinging type may be single or in pairs, to lap the openings or to close into wall frames, to suit all conditions and openings, and may be labeled for all situations similar to tin clad doors. They may have glass panels for Class C and D openings. The steel plate doors are labeled for storage room openings only.

Write for catalogue—it contains a full description of the various types with useful information regarding layout and clearances.



Steel Plate Storage Room Door



Corrugated Iron Sliding Fire Door



Corrugated Iron Swinging Fire Door

Continued on next page

Elevator and Dumbwaiter Doors

TRADE Fyrgard MARK
RICHMOND FIREPROOF DOOR CO.
RICHMOND, IND.

Counterbalanced elevator doors are now universally preferred for freight elevator shafts because they are installed entirely on the inside of the shaft and do not encroach either on floor space or car platform. They provide maximum clear opening.

The door is divided into two equal sections, one half sliding up and the other half sliding down. The guides are bolted to the wall or opening frame.

Vertical telescoping doors are similar in design except that both halves slide upwards, the lower section traveling twice as fast as the upper.

For these types, regular installation requires a distance from floor to floor of one and one-half times the opening height, plus 9 in. for counterbalanced, and 24 in. for vertical telescoping doors, respectively. For limited floor heights the counterbalanced door may be furnished in pass type construction.

Corrugated iron vertical telescoping and counterbalanced doors of the tin clad, kalamein or corrugated iron construction may be labeled by the Underwriters. Both types may also be made of wood for exterior openings or shipping platforms, but are not labeled.

Operation may be manual, semi-automatic closing or electric interlocking.

Vertical telescoping doors are especially adapted to use for shipping platforms or garage and similar openings.

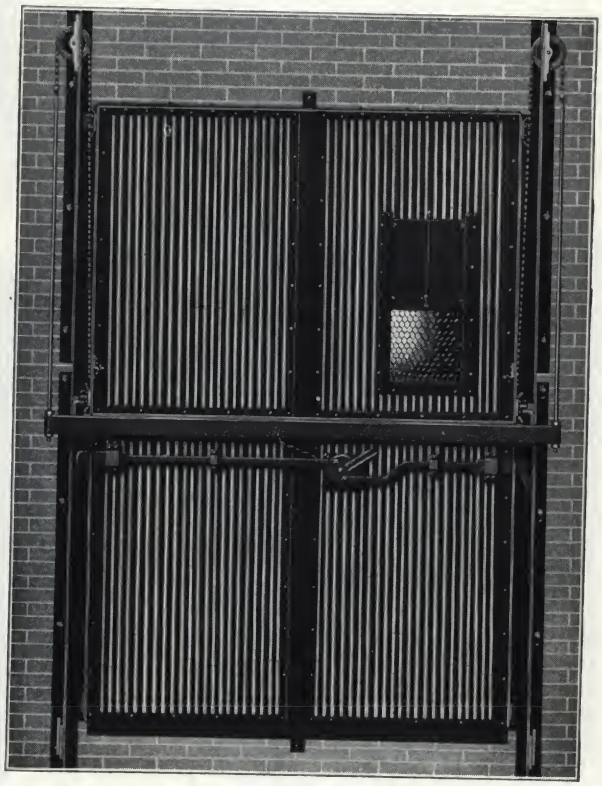
Both types require approximately 8 in. side room each side, but the telescoping door, being counterweighted, needs in addition space at both sides for 8x8-in. weight box.

Richmond counterbalanced doors are furnished with roller or ball bearing sheaves as may be desired, vision panels of labeled construction, if specified, and all modern improvements.

The upper rail of the lower section of the door is so reinforced and constructed that when the door is open a "bridge" is formed between the car and the building sill and, like a bridge, the span is supported at each end by substantial parts of the door assembly. This "bridge" provides a smooth trucking surface over the door.

Richmond counterbalanced dumbwaiter doors, kalamein, tin clad or steel plate, are similar in design and operation, but adapted to dumbwaiter shaft use. They require only 3 in. at each side.

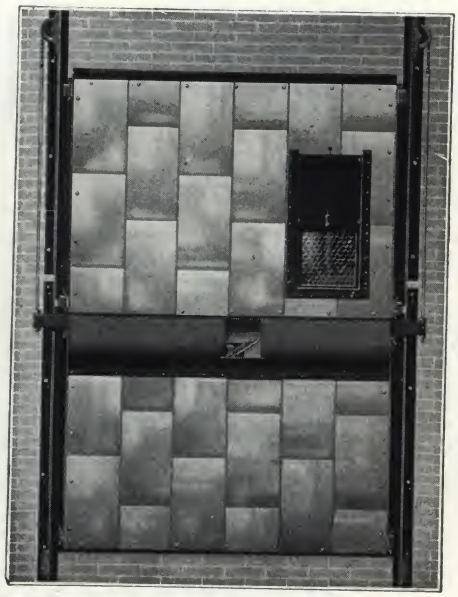
Our catalogue gives all details of construction including shaft space requirements. Let us place a copy in your files.



Corrugated Steel Counterbalanced Elevator Door—Shaft Side Elevation



Kalamein Faced Counterbalanced Door



Tin Clad Counterbalanced Elevator Door—Shaft Side (Pass Type)

Continued on next page

Industrial or Warehouse Doors



Richmond horizontal bi-folding doors are widely used for driveways and shipping platforms. Built in two sections, this door folds along horizontal meeting rails at the center, in jack-knife form, and rises upward, leaving a clear opening. The turnover door, made in one piece and adapted to the smaller size openings, operates in somewhat similar fashion, turning up inward overhead. For the two types, a space of 6 in. is required inside of one jamb and 16 in. inside the other jamb, with clear headroom varying according to weight and size of door. While the latter may be as little as 12 to 15 in., the efficient operating minimum is 24 in.

The telescoping or two-piece slide-up door, also in wide use for driveway and shipping platform openings, was described in connection with counterbalanced doors on the preceding page.

All types of doors may be had in wood, kalamein, tin clad, corrugated iron or steel plate, and all may be paneled for glass to permit the access of light, irrespective of material. In addition, we manufacture single and double swinging, sliding, side-folding and single-piece slide-up doors, for industrial purposes, of all the materials mentioned. Hardware for all these doors, as well as that for fire doors and counterbalanced doors, is manufactured by us in our own factory, being of exceptionally sturdy and attractive design.

Industrial doors are described, together with suggestions as to the appropriate use of the different types, in a special pamphlet which we will be pleased to mail you.

The new Richmond patented *fire-panic* type handles for application to regular triple latches operate with direct, easy, horizontal push and pull, speeding up use of openings in congested factories. Sure locking and easy opening, they are a truly modern type of fire-door hardware operating handles. Specify them exclusively.



Wood Telescoping Doors



Wood Turnover Door



Kalamein Bi-folding Door (Outside Construction)

Continued on next page

Kalamein Doors

Richmond kalamein doors are covered with No. 24 gauge patent leveled special rust-resisting door stock prepared to our specifications—the highest grade material in use in the trade. All work is die drawn in accordance with the usual architectural specifications. Grades heavier than No. 24 gauge are practically always brake formed.

All wood used is thoroughly dried in our own kilns.

We have dies for an unusually large variety of casings and mouldings. Kalamein frames and trim, or combination pressed steel bucks, can be provided with doors. Doors are available with a wide range of panel arrangement and may be labeled within limitations set by the Underwriters.

Our catalogue contains illustrations of paneling types, mouldings shapes, standard specifications, details of construction and other valuable information.

Richmond kalamein frames are formed upon cores rabbetted from one solid piece of wood, and casings, mouldings, etc., are of solid wood lengths up to standard sizes. No piecing or patching is permitted.

For elevator enclosures, our doors are specially reinforced at the head to receive hardware when appropriate.

Durable baked enamel, plain color or wood grained, is applied in our own ovens, when desired.

The Richmond Fireproof Door Co. is prepared to furnish when desired, special Underwriters' labeled finished hardware completely installed in doors.



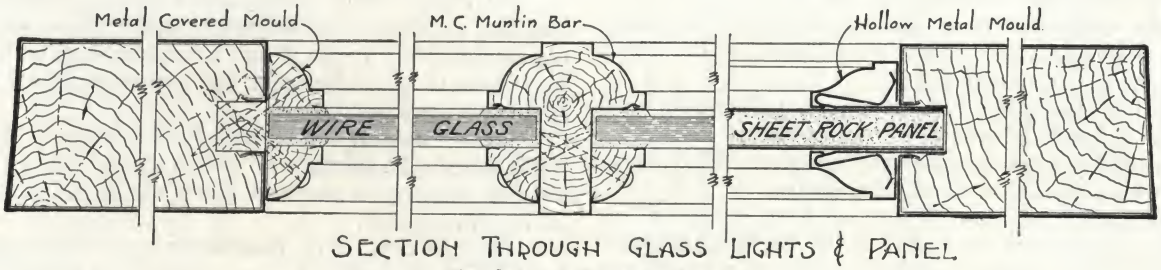
Type M-2 Kalamein Door with Richmond Rolled Steel Buck and Trim



Kalamein Smoke Screen (Partition) Unit
Furnished in all kalamein or with rolled steel skeleton

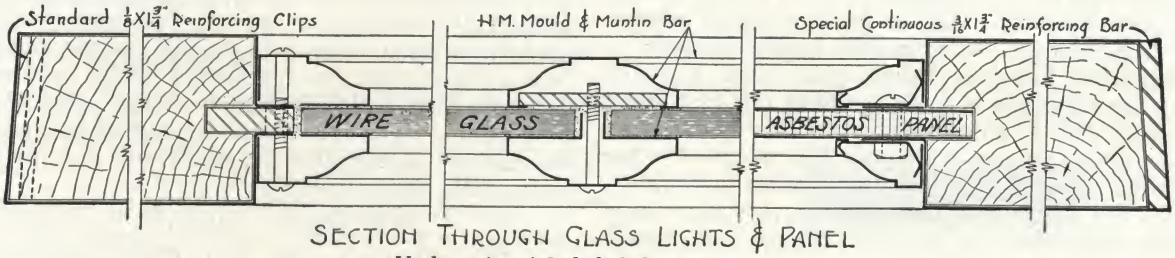


Passenger Elevator Door—Swing Type—Richmond Type GM-7



SECTION THROUGH GLASS LIGHTS & PANEL

Non-labeled Construction



SECTION THROUGH GLASS LIGHTS & PANEL

Underwriters' Labeled Construction

Richmond Standard Details

Continued on next page

Richmond Rolled Steel Combination Bucks and Trim

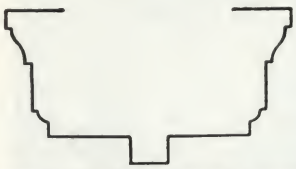
Richmond rolled steel combination bucks and trim are distinguished by a new beauty and sharpness of line, made possible through the use of rolled steel from our recently installed, specially designed machinery. They can be furnished in handsome imitation natural wood baked enamel finishes, either oak, walnut or mahogany.

TRADE Fyrgard MARK
RICHMOND FIREPROOF DOOR CO.
RICHMOND, IND.

The three standard types—A, B and C—shown on the following page, provide for most interior door openings. Combinations of Types B and C frames are readily utilized for sliding elevator door openings.

Richmond rolled steel combination bucks and trim are easily and neatly prepared at the factory to accommodate transoms; side or borrowed light frames, attached to the Richmond rolled steel combination bucks and trim, can be furnished when desired.

An angle iron strip may be attached across the bottoms of frames to keep the frames from spreading or buckling. These spreader stays save installing time, for the frames are held firmly, square and plumb, requiring little or no leveling after setting up. Doors are more easily hung and fit more perfectly on frames thus set.



Note the Clean Sharp Lines



Frame Profile for 2-in. Partitions

Underwriters' Label—Label service may be furnished on No. 16 gauge rolled steel frames for openings up to 3 ft. 6 in. x 7 ft. 6 in. for single doors and 5 ft. 0 in. x 7 ft. 6 in. for doors in pairs; or No. 14 gauge steel formed frames (plain trim) for openings up to 4 ft. x 10 ft. for single doors, and 8 ft. x 10 ft. for doors in pairs.

Richmond formed steel frames with plain trim may be furnished in No. 12, 14 or 16 gauge.

Richmond Construction Features—At all hinge and striker plate locations steel reinforcements are spot-welded to the inner surfaces of the jambs. Holes are accurately drilled with templates through these reinforcing plates at the factory, providing for the rapid attachment of the hardware.

Plaster guards of No. 24 gauge galvanized steel are welded inside of the reinforcing plates to protect the screwholes from mortar and plaster. This saves time in the attachment of the hardware.

Adjustable T-shaped sliding anchors, made of No. 16 gauge stock, are furnished with Richmond rolled steel combination bucks and trim. These anchors can be set wherever desired between courses of a masonry wall as the wall is built. The anchors require no adaptation of plan, yet bond frames solidly to finished wall.

Richmond Service—When your plans call for special frames you are invited to consult our engineers; they will be glad to co-operate in working out the designs for special frames or shapes. Our years of experience in this special field may be of value to you.

With the recent installation of the very latest type of rolling machinery we are now equipped to handle large contracts very efficiently.

We also maintain facilities for erecting Richmond rolled steel combination bucks and trim on any job where desired.

The branch offices and agents, with sales, erection and other service facilities, which we maintain in 50 principal cities throughout the United States, will be pleased to co-operate with you in every way; they have samples of Richmond rolled steel combination bucks and trim ready for your inspection.

Specifications for Rolled Steel Combination Bucks and Trim

The contractor shall furnish and install Richmond Rolled Steel Combination Bucks and Trim, as manufactured by The Richmond Fireproof Door Co., of Richmond, Ind., for all interior door openings (excepting those door openings otherwise noted on drawings or specifically mentioned hereinafter).

Note: The types of Richmond rolled steel combination bucks and trim are designated on the drawings by the symbols A, B and C, corresponding to similar symbols used by the manufacturer to identify the three basic types of frames.

Types and Sizes—***Openings Trimmed Both Sides***—For openings which are to be trimmed on both sides, Type A frames shall be used in 2½, 3½, 4½, 5½, 6½, 7½, and 8½-in. widths for 2, 3, 4, 5, 6, 7, and 8-in. partitions, respectively. The plaster returns shall be of proper dimensions to meet the particular building conditions. The rebates shall be of uniform width for all frames but with variations, as required, in the widths of the rebate stops. Richmond rolled steel combination bucks and trim may be used in Simplex partitions.

Openings Trimmed One Side, No Rebates—For openings which are to be trimmed on one side only, and for which no rebates are necessary, Type B frames shall be used in 3½, 4¾, 5¾ and 6¾-in. widths, as the respective openings may require. The plaster returns shall be of proper dimensions to meet the particular building conditions.

Openings Trimmed One Side, with Rebates—For openings which are to be trimmed on one side only, and for which rebates are necessary, Type C frames shall be used in 6¾, 7¾, 8¾, 9¾ and 10¾-in. widths, as the respective openings may require. The plaster returns shall be of proper dimensions to meet the particular building conditions.

Elevator Door Openings, etc.—For sliding door elevator openings, and elsewhere as noted on drawings, combinations of Types B and C frames shall be installed in widths to properly meet the requirements of the respective openings.

Construction—***Material***—All frames shall be made of No. 16 gauge cold rolled steel, with all angles, moulds, returns and miters neatly made and maintained in true alignment.

Reinforcing for Hardware—At the hinge and lock locations ⅛x1¾x12-in. reinforcing plates shall be spot-welded to the inner surfaces of the jambs; No. 26 gauge galvanized plaster guards shall be welded to the jambs in such manner as to prevent mortar and plaster from contact with the reinforcing plates, and to keep the screwholes free and clean for hinge and strike plate connections. The holes shall be drilled and tapped at the factory, making the frames ready for the attachment of the finish hardware.

Note: Templates for this purpose to be furnished to this contractor by the hardware contractor promptly upon request.

Slip Anchors and Sill Clips—Sufficient slip anchors shall be provided with each frame to permit anchoring each jamb (including head if desired) at intervals not to exceed 2 ft. The base of each jamb

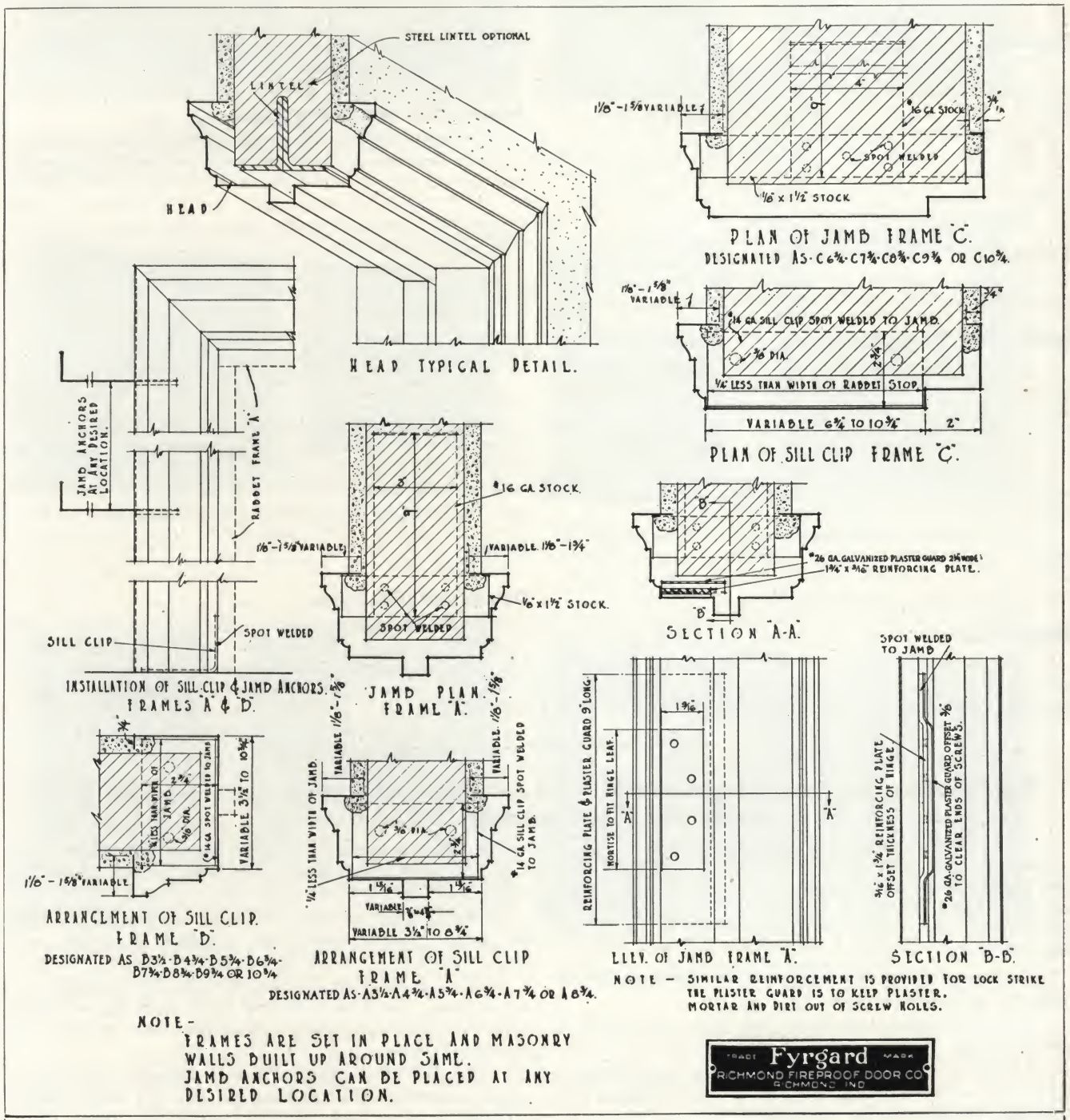
Continued on next page

shall be provided with a sill clip, welded to the jamb and punched with two 3/8-in. holes to facilitate anchoring to the floor construction. The form and construction of these anchors and sill clips shall be as shown and described by the manufacturer for the respective types of frames included in this specification.

Painting—All concealed and exposed surfaces of frames shall be given a good prime coat of rust-resisting paint at the factory prior to shipment.

Trim and jamb surfaces which are to remain permanently exposed shall have applied at the factory [oak] [walnut] [mahogany] imitation natural wood baked enamel finish.

Erection—All frames shall be set in their proper places in the building prior to the erection of the adjacent partition work; frames shall be securely anchored to the floor construction by means of screws or expansion bolts through the sill clips, as the nature of the floor construction may require. Each frame shall be set true and plumb and shall be securely braced and so maintained by this contractor during building operations. The slip anchors shall be inserted in the frames at proper intervals and built into the adjacent partition work during construction. At completion each frame shall be plumb, in true alignment, clean and rigid, ready for the attachment of hardware.



Construction Details, Types A, B and C, Richmond Rolled Steel Combination Bucks and Trim

ST. LOUIS FIRE DOOR COMPANY

Manufacturers of Fire Doors for Freight Elevator and Dumbwaiter Openings, Warehouse and Shipping Platform Doors, Electric Operators for All Types of Doors

1134-1142 South Sixth Street

ST. LOUIS, MO.

Representatives Everywhere; Home Office Will Inform You of Nearest Agent

Products

"St. Louis" Sill Leveling Truckable Counterbalanced Freight Elevator Doors for push button or car switch control elevators with *electric* and *mechanical interlocking systems.*

Electric Door Operators for all types of doors.

Two-speed Vertical "Slide-up-Dors," "Fold-up-Dors" and Canopy Doors with Electric Operation.

Dumbwaiter and Fire Doors.

Types

Kalamein paneled, metal covered, flush paneled and corrugated steel freight elevator and dumbwaiter doors.

Service and Facilities

More than twenty-five years of constant contact with architects, contractors and building owners, have conclusively convinced them of our superb products and unfailing service, resulting in their specifying "St. Louis" Doors, to be installed by the manufacturer.

Their complete knowledge of "St. Louis" modern methods used in the manufacture and erection of their doors, assures them of the best obtainable.

Remarkable, unsurpassed progress in development by our Safety and Appliance Engineers, places them in an exceptional advisory capacity to solve the most difficult and intricate door problems.

Maintenance

"St. Louis" objective in the design, construction and erection of doors, is primarily to minimize maintenance, or if possible, eliminate it, thereby having succeeded in establishing the highest standard of quality, durability and economical performance.

Adaptability and Performance

Constant solving of freight elevator door problems of every description, has convinced us that there is only one correct way to build doors to withstand the abuses to which they are subjected; and by virtue of that accumulated knowledge, we have produced a door to meet every condition.

Permanency, indefinite service and performance, with indestructible qualities, are the keynotes of our achievements.

Fire Protection and Labels

"St. Louis" Doors have fulfilled the most modern exacting demands, because the requirements for daily use have been incorporated in their construction. That assures the owner of the lowest fire insurance rates on building and contents, including lowest liability insurance rates obtainable. Every "St. Louis" Door is labeled and approved by the Underwriters' Laboratories, Inc., Factory Mutuals', State and Local Inspection Departments.

Details and Catalogues

We have endeavored to illustrate the design and construction of our doors and devices in these pages, but would consider it a privilege to send you our fully illustrated catalogue upon request. Quotations cheerfully submitted.

The Distinctive and Outstanding Feature of "St. Louis" Doors Is the Sill Leveling Truckable Device Incorporated in the Construction of Each Door

The *sill leveling device* is indispensable and solely responsible for keeping the door, when open, in perfect alignment with the elevator platform and the building sill. The trucking sill of the door is also level with the building floor, thus completely filling in the space between them.

In this position, the *sill leveling device* performs its most important service.

(1) It prevents the door from going down below the floor line.

(2) The load being trucked over the door is transferred on to the building sill, which structurally is the strongest portion of the opening.

(3) It removes all weight of the door and the loads being trucked over it, from the chains and sheaves, and simultaneously binds the door to the building sill.

(4) It gives perfect and rigid alignment between the door, building floor and elevator platform, and always remains so while in use and in an open position.

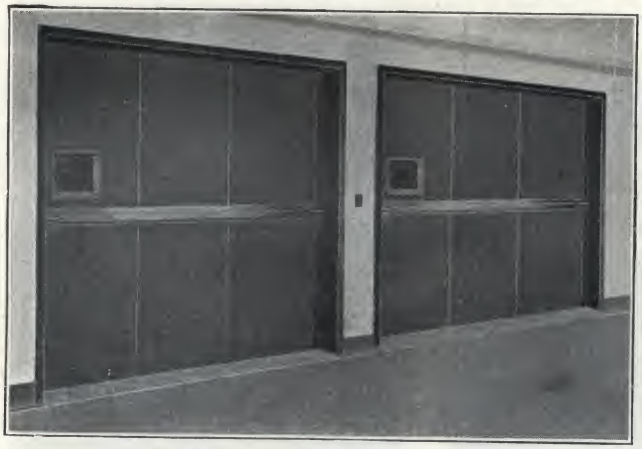
(5) Irrespective of whether the sill is uneven or out of level, the door will level itself with the car platform and floor, providing a perfectly even surface for smooth trucking.

(6) The *sill leveling device* is securely and permanently riveted to the trucking sill and the angle frame around the door, substantially reinforcing those component parts.

Note: *The sill leveling devices are placed at the extreme side edges of the door at the jambs not interfering with trucking being carried on through the opening.*

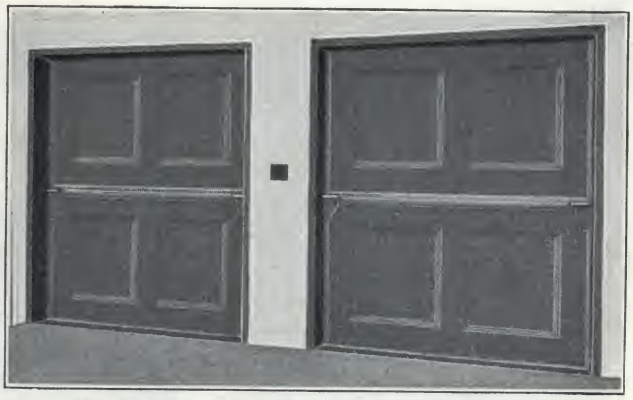
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ILLUSTRATIONS OF TYPICAL "ST. LOUIS" DOOR INSTALLATIONS



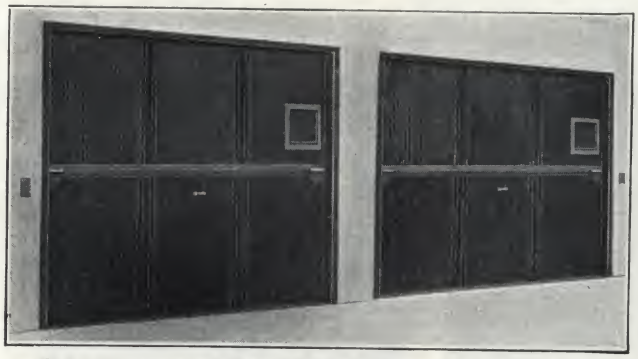
G-1v Flush Paneled Ti-Co-Dor

This type is generally used in factories, warehouses and storage buildings to withstand severe abuses. They are built to render exceptionally heavy duty service, and guaranteed to support any specified loads without distortion



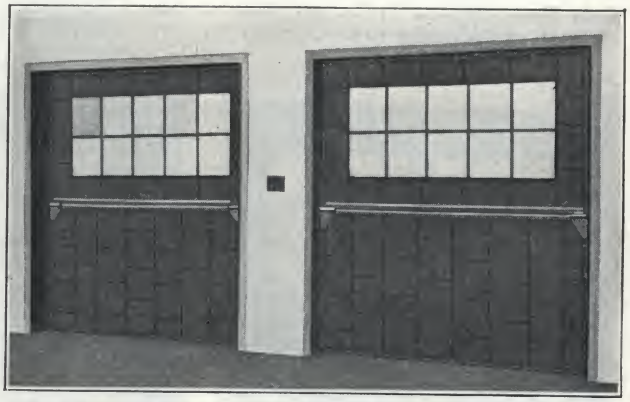
K-2 Kalamein Paneled Ti-Co-Dor

Generally used on combination service and freight elevators in department stores, hotels, hospitals and office buildings, where conformity of design to harmonize with the surrounding architectural details is essential



C-1v Corrugated Steel Co-Bal-Dors on Push Button Elevator

Equipped with clear wire glass vision panel and room side latch handle. The doors can only be opened when the elevator is stopped at the floor where opening is to be used. Note the *sill leveling device* arrangement



T-3 Tinclad Ti-Co-Dor with Steel Sash in Upper Half

Very desirable for a cheerful and bright installation



T-1 Tinclad Ti-Co-Dors on Push Button or Car Switch Control Elevators

Note the exterior door with steel sash to admit light into the shaft. An exceptionally good view of the *sill leveling device* in use. Notice the perfect trucking surface to the elevator platform



Corrugated Steel Counterbalanced Freight Elevator Doors in Large Dry Goods House

Elevator operator is handling an 8-ft. wide door with ease, using only one hand

These photographs were taken at various installations throughout the country of different types of doors in order to give readers an opportunity of seeing the general effect of the details, as well as the adaptability of "St. Louis" Doors.

Our doors can be made to meet any design required, and we will be glad to make up details for approval, without any obligation.

Specify "St. Louis" Doors to be installed by manufacturer, to assure prolonged service.

Continued on next page

A SELECTION OF DOOR DESIGNS FOR YOUR REQUIREMENTS



G-1v Flush Paneled Ti-Co-Dor, Galvanized or Kalamein Metal Covered
Labeled construction



K-3g Kalamein Paneled Ti-Co-Dor
Three glass panels in upper section. Three solid panels in lower section. Not labeled



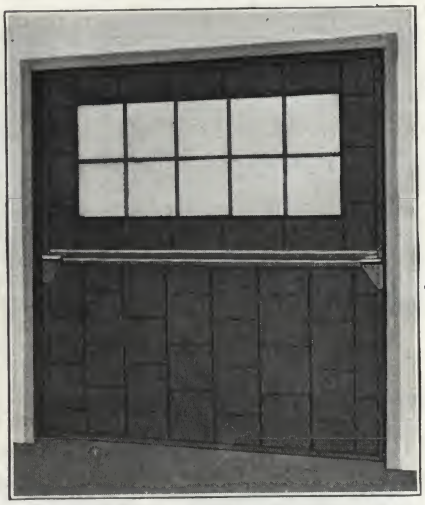
K-2 Kalamein Paneled Ti-Co-Dor
Two solid panels in each section. Labeled construction



K-24g Kalamein Paneled Ti-Co-Dor
Standard steel sash in upper section. Two solid panels in lower section. Not labeled



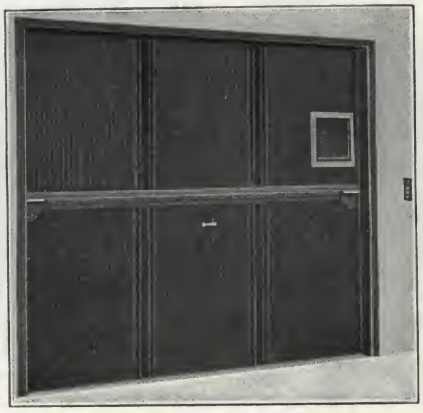
T-2 Tinclad Ti-Co-Dor with 12x12-in. Wire Glass Vision Panel
Labeled construction



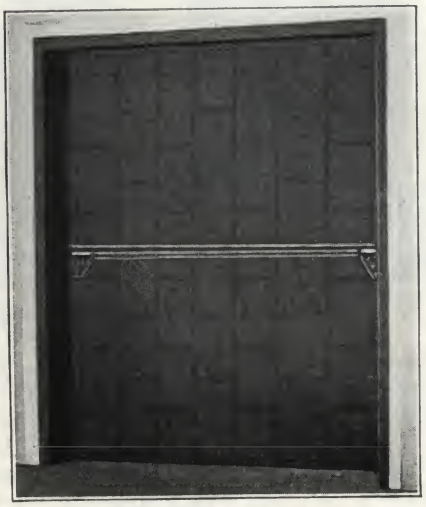
T-3 Tinclad Ti-Co-Dor with Standard Steel Sash in Upper Section
Not labeled



K-3 Kalamein Paneled Ti-Co-Dor
Three solid panels in each section. Labeled construction



C-1v Corrugated Steel Co-Bal-Dor in Heavy Steel Angle Frames with Channel Shaped Stiffeners Through Sections
12x12-in. wire glass vision panel and roomside latch handle for push button elevators.
Labeled construction



T-1 Tinclad Ti-Co-Dor
Metal covered wood core in heavy steel angle frames. Labeled construction

See General Details on Following Page

Any of these doors can be equipped with our electric door operators

Continued on next page

"ST. LOUIS" DOOR DETAILS

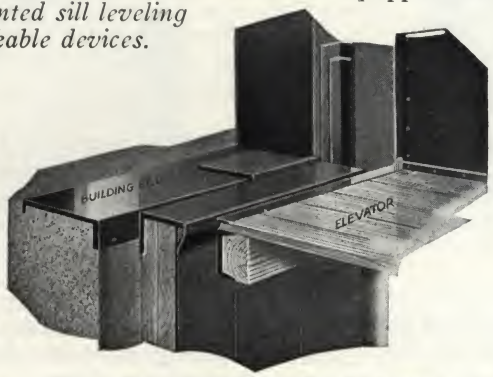
Accurate clearances are given for each type of door.

Specifications of their construction and full size details will be sent upon request. Latest illustrated catalogue available.

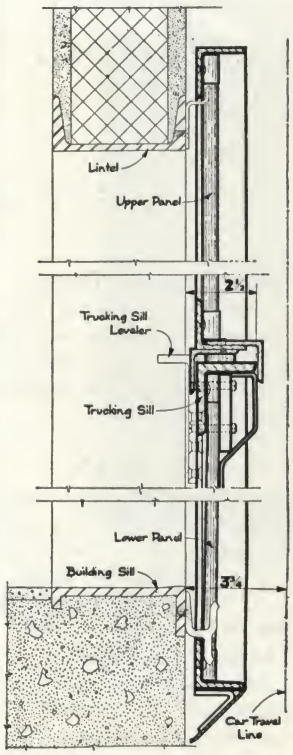
Specify "St. Louis" Doors, to be installed by the manufacturer, to assure indefinite service and performance.

An unconditional two-year guarantee is given with every "St. Louis" Door installed by us.

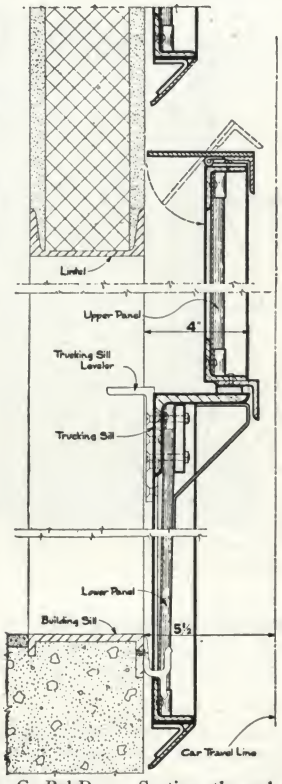
Each "St. Louis" Door is equipped with our *patented sill leveling truckable devices.*



"St. Louis" *Sill Leveling Device,* engaged with the building sill at each jamb. It transfers loads being trucked over the door, onto the sill

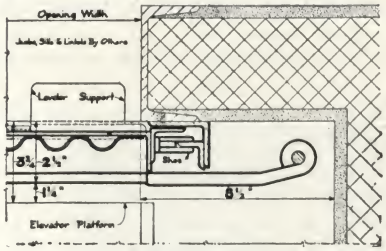


Co-Bal-Dor. Section through "St. Louis" Regular Corrugated Steel Door. Underwriters' labeled

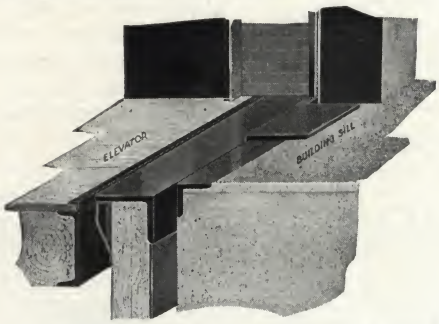


Pass Co-Bal-Dor. Section through "St. Louis" Pass Type Corrugated Steel Door. Underwriters' labeled

Note simple, positive movable lintel construction and exceptionally heavy trucking sill arrangement

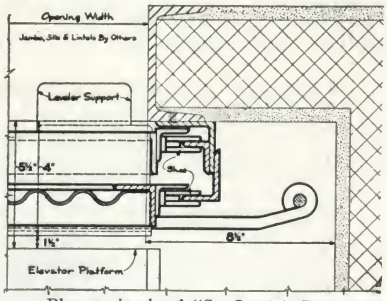


Plan at jamb of "St. Louis" Regular Corrugated Steel Door, showing clearances

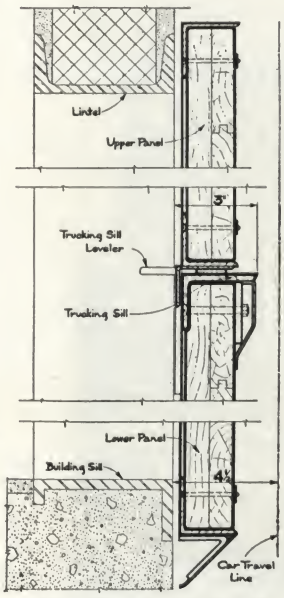


"St. Louis" *Sill Leveling Device* in contact with the building sill

Note perfect alignment of door with elevator platform and building floor



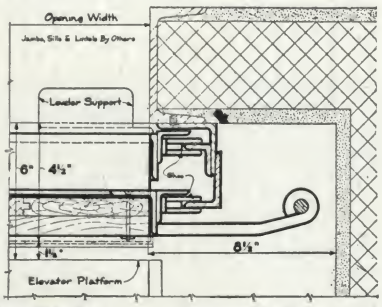
Plan at jamb of "St. Louis" Pass Type Corrugated Steel Door, showing clearances



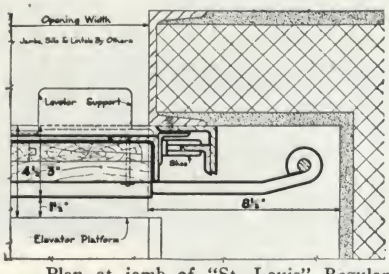
Ti-Co-Dor. Section through "St. Louis" Regular Metal Clad Door. Underwriters' labeled

SCHEDULE OF FLOOR HEIGHTS REQUIRED FOR VARIOUS OPENING HEIGHTS

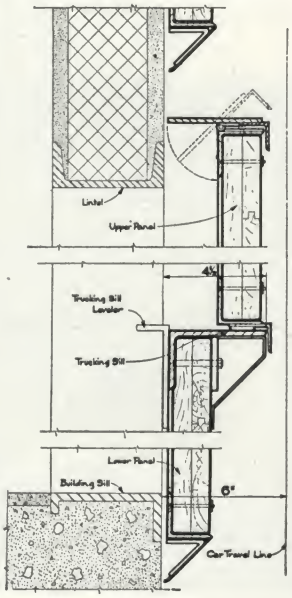
Opening heights, ft. in.		Floor heights: Regular doors, ft. in.		Floor heights: Pass type doors, ft. in.	
6	0	9	9	7	6
6	6	10	6	8	0
7	0	11	3	8	6
7	6	12	0	9	0
8	0	12	9	9	6
8	6	13	6	10	0
9	0	14	3	10	6
9	6	15	0	11	0
10	0	15	9	11	6



Plan at jamb of "St. Louis" Pass Type Metal Clad Door, showing clearances



Plan at jamb of "St. Louis" Regular Metal Clad Door, showing clearances



Pass Ti-Co-Dor. Section through "St. Louis" Pass Type Metal Clad Door, Underwriters' labeled

Note simple, positive movable lintel construction and exceptionally heavy trucking sill arrangement

SECURITY FIRE DOOR CO.

Counterbalanced Truckable and Other Fireproof Freight Elevator Doors

3036-3048 Lambdin Avenue, ST. LOUIS, MO.

REPRESENTATIVES IN ALL PRINCIPAL CITIES

Products

"Seco" Metal Clad, Corrugated, Kalamein and Steel Plate Counterbalanced Freight Elevator Door.

"Sec-Tel" Metal Clad, Corrugated, and Kalamein Two-section Slide-up Freight Elevator Door.

"Horifold" Warehouse, Freight House Shipping Platform and Garage Door.

"Vertel" Corrugated Warehouse, Freight House and Shipping Platform Two-section Slide-up Door.

Electric Interlocks.

For our page on Dumbwaiter Doors, see Manufacturers' Index.

Underwriters' Approval

All "Seco" and "Sec-Tel" freight elevator doors are inspected and labeled by the Underwriters' Laboratories, Inc., and the Factory Mutuals, when so desired, provided they are within the size limits that permit labeling: viz., 8x10 ft.

The services of our Engineering Department, as well as those of our representatives in all the leading cities of the United States are at your disposal in solving door problems.

Write for Catalogue "D-2" covering our "Seco," "Sec-Tel" and Dumbwaiter Doors, or for Catalogue "C," giving complete information about our "Horifold" and "Vertel" Doors.

"Seco" Counterbalanced Freight Elevator Doors

"Seco" doors are of the *truckable* counterbalanced type, being made in two sections, which slide in opposite directions on the shaft face of the wall. The sections are of equal weight, evenly counterbalancing each other, eliminating all counterweights.

"Seco" doors can be furnished with metal clad, kalamein, corrugated steel or steel plate panels.

"Seco" doors are provided with heavy steel *angle trucking bars.* The *trucking bars* form the top edge of the lower section and are supported in *perfect alignment* with the opening or floor sill when the door is in the open position by means of heavy *angle trucking bar supports* at each end of the trucking bar.

These sill or trucking bar supports rest on the solid opening sill and when once set, remain in the same permanent position. The supports are designed to act as gusset plates in the upper corners of the lower section, reinforcing it and securely joining the section frame to the trucking bar.

"Seco" doors are hung with heavy adjustable chain rods and cable chain operating over large double race ball bearing sheaves.

No safety gates required when "Seco" doors are used.



Merchandise Mart, Chicago, Ill.

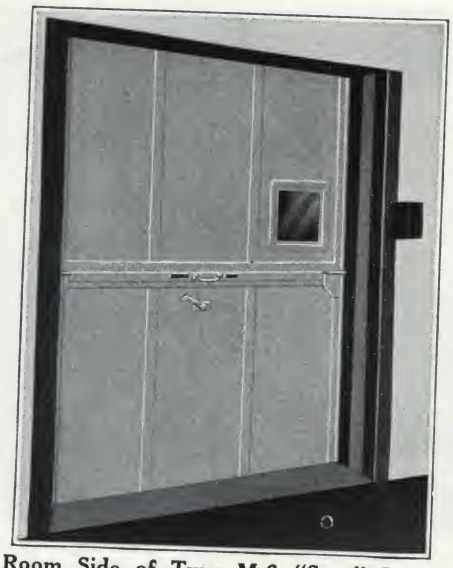
Graham, Anderson, Probst & White, Architects — John Griffiths & Sons Co., Contractors

Equipped with 241 Metal Clad "Seco" Doors

Continued on next page



Kalamein "Seco" Door Installation



Room Side of Type M-6 "Seco" Door
Arranged for room side operation in connection with double button elevator

"Seco" Door Construction

Metal Clad Panels—These doors are constructed of two thicknesses of white pine, and covered on both sides with fire door terne plate or flat galvanized sheets, and securely bolted into heavy angle frames.

Kalamein Panels—These doors are constructed of white pine cores, paneled on the room side, flush on the shaft side. Room side of panels is covered with smooth kalamein iron, glued to the core, and has drawn steel mouldings around panels fastened in place so that no nail or screw heads show.

The shaft side of doors is covered with flat galvanized steel sheets. All seams between stiles and rails are clipped, filled with solder and ground smooth.

Corrugated Steel Panels—These doors are made of corrugated steel sheets riveted into angle frames forming door sections, and are stiffened vertically with flat steel reinforcing bars.

Adjustable Shoes (Patented)—"Seco" doors are equipped with patented adjustable shoes. These eliminate friction and permit adjustment to reduce side play between the doors and guides caused by wear and spreading of guides.

"Seco" Door Interlocks (Patented)

"Seco" doors when equipped with Security Patented Electric Interlocks provide maximum protection against fire and accident.

Security Electric Interlocks are especially designed for vertically sliding doors and have been approved by the Underwriters and various State and municipal departments, assuring low casualty insurance rates.

Security Electric Interlocks are used with electric elevators, are attached to each door and are connected in series to the elevator control board, so that the elevator can not be operated until all doors in the shaft are closed and contact is made in the door interlocks.

Specify Type "C" or Type "D" Interlocks for Car Switch controlled elevators, Type "DL" Interlocks for Push Button or Double Button operated elevators.

Send for a copy of Catalogue "D2."

"Seco" Door Outline Specifications

For all openings to freight elevator shaft, except as noted, furnish and install metal clad "Seco" Doors as manufactured by the Security Fire Door Co., St. Louis, Mo. Door panels to be Type M-6, covered with flat galvanized steel sheets (or kalamein paneled as shown on plans).

Furnish trucking bars to sustain a load of .... pounds and designed to transfer trucking load to opening sill.

Doors to be provided with adjustable shoes and are to be hung on ⅝-in. adjustable rods and heavy Security steel chains operating over 5-in. double race ball bearing sheaves. Doors to work in heavy angle guides securely fastened to opening frames and walls.

Doors to be manually opened and closed (unless power operated) and provided with web strap closers. Equip doors with electro mechanical interlocks operated by door latches, with the necessary wiring for same.

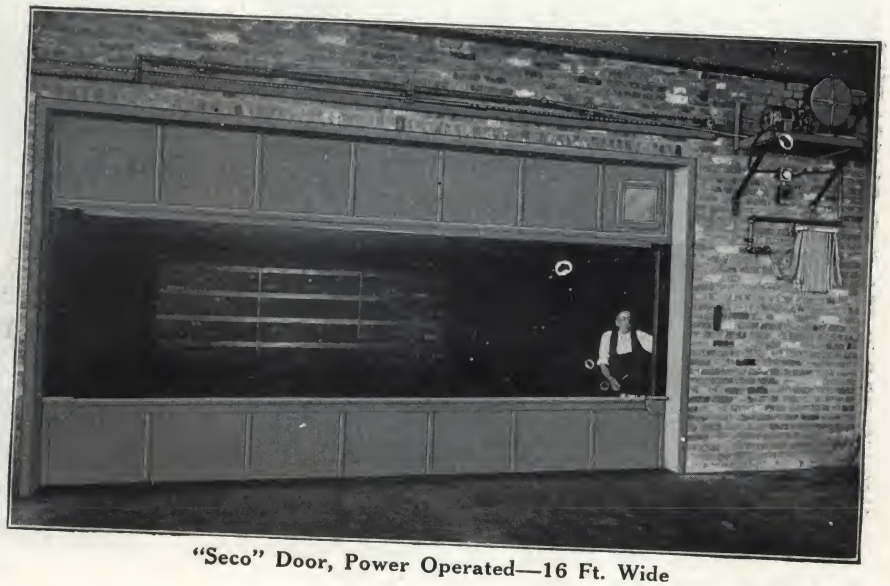
In lower corner of upper door provide 12x12-in. glass vision panel.

All to receive priming coat of paint at shop.

Door contractor to have the free and uninterrupted use of the running elevator when installing the doors.

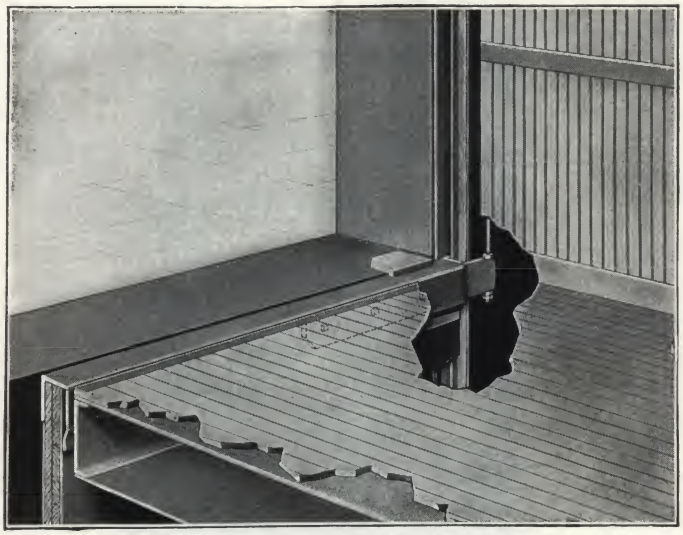
Doors to be guaranteed against defects in material and workmanship for two years.

Steel frames and sills to be furnished under Miscellaneous Iron Work.



"Seco" Door, Power Operated—16 Ft. Wide

Continued on next page



"Seco" Door with "Stay-set" Trucking Bar Support
Note that trucking load is supported by opening sill

Space Requirements for "Seco" Doors

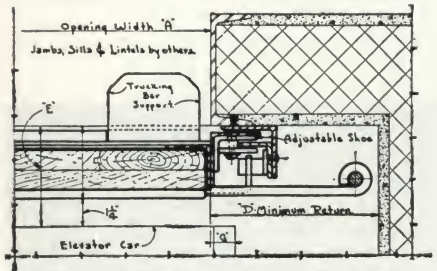
Schedule below should be consulted in order to determine highest opening obtainable in certain story heights for Regular and Pass Type "Seco" doors.

Also note other space requirements to insure a perfect installation.

SCHEDULE OF MAXIMUM OPENING HEIGHTS "SECO" DOORS
For Various Floor Heights

Opening height "B" ft.	in.	Minimum "C" for regular type ft.	in.	Minimum "C" for pass type ft.	in.
6	0	9	9	7	6
6	6	10	6	8	0
6	8	10	9	8	2
6	10	11	0	8	4
7	0	11	3	8	6
7	6	12	0	9	0
8	0	12	9	9	6
8	6	13	6	10	0
9	0	14	3	10	6
9	6	15	0	11	0
10	0	15	9	11	6

Note: Minimum "C" for Regular Type doors can be slightly decreased in special cases. Consult factory.

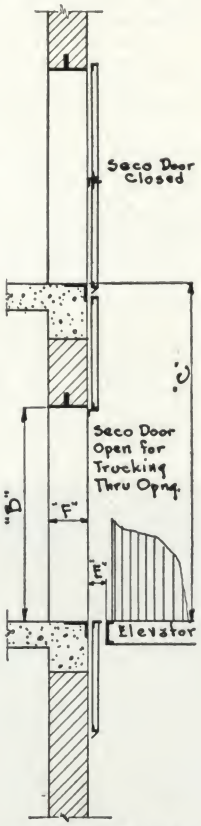


Plan of Shaft at Jamb—Regular Type "Seco" Door

CLEARANCE REQUIRED FOR "SECO" DOOR

"Seco" Door	D, in.	E, in.
Regular type	7½	*4½
Pass type	8	6½

*Minimum.
Note: For wide openings or for heavy trucking loads, regular type doors, both metal clad and corrugated, may require 5 or 5½ in. for clearance E.

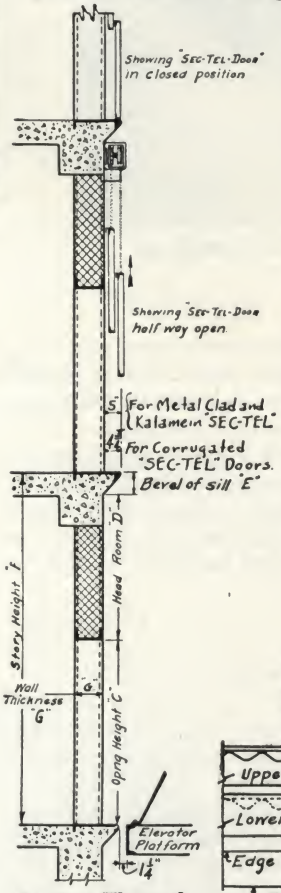


Section Through Opening Showing Regular Type "Seco" Door

When story heights are such that Regular Type "Seco" doors can not be used for opening heights desired, Pass Type "Seco" doors should be used.

"Sec-Tel" Door

The "Sec-Tel" door is a two-section slide-up or vertical telescoping elevator door with corrugated steel, metal clad or kalamein panels. It permits the use of the permanent building sill for trucking over onto the elevator car. It operates in double guides, the lower half traveling twice as fast as the upper, so that as the lower section is raised, both sections are simultaneously set in motion and reach the lintel of the opening at the same time, giving a perfectly clear opening. The use of double race ball bearing sheaves and antifriction door guides assures ease of operation.

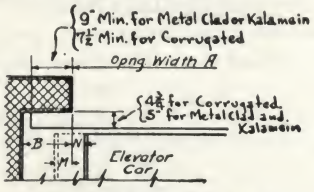


Section Through Opening Showing "Sec-Tel" Door Space Requirements

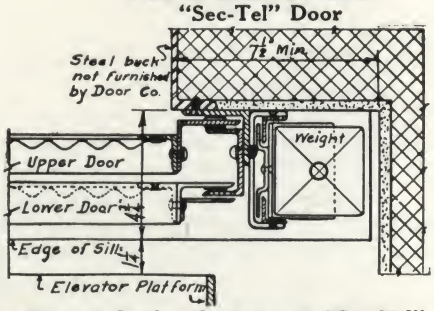
SCHEDULE OF OPENING HEIGHTS "SEC-TEL" DOORS
For Various Floor Heights Allowing 4 in. for Bevel "E" of Sill

Opening height "C" ft.	in.	Minimum headroom "D" ft.	in.	Story height "F" ft.	in.
6	0	3	5	9	9
6	6	3	8	10	6
6	8	3	9	10	9
6	10	3	10	11	0
7	0	3	11	11	3
7	6	4	2	12	0
8	0	4	5	12	9
8	6	4	8	13	6
9	0	4	11	14	3
9	6	5	2	15	0
10	0	5	5	15	9

Note: Space "D" for metal clad or kalamein "Sec-Tel" doors should be increased 6 in. if possible.



Plan of Shaft at Jamb—"Sec-Tel" Door

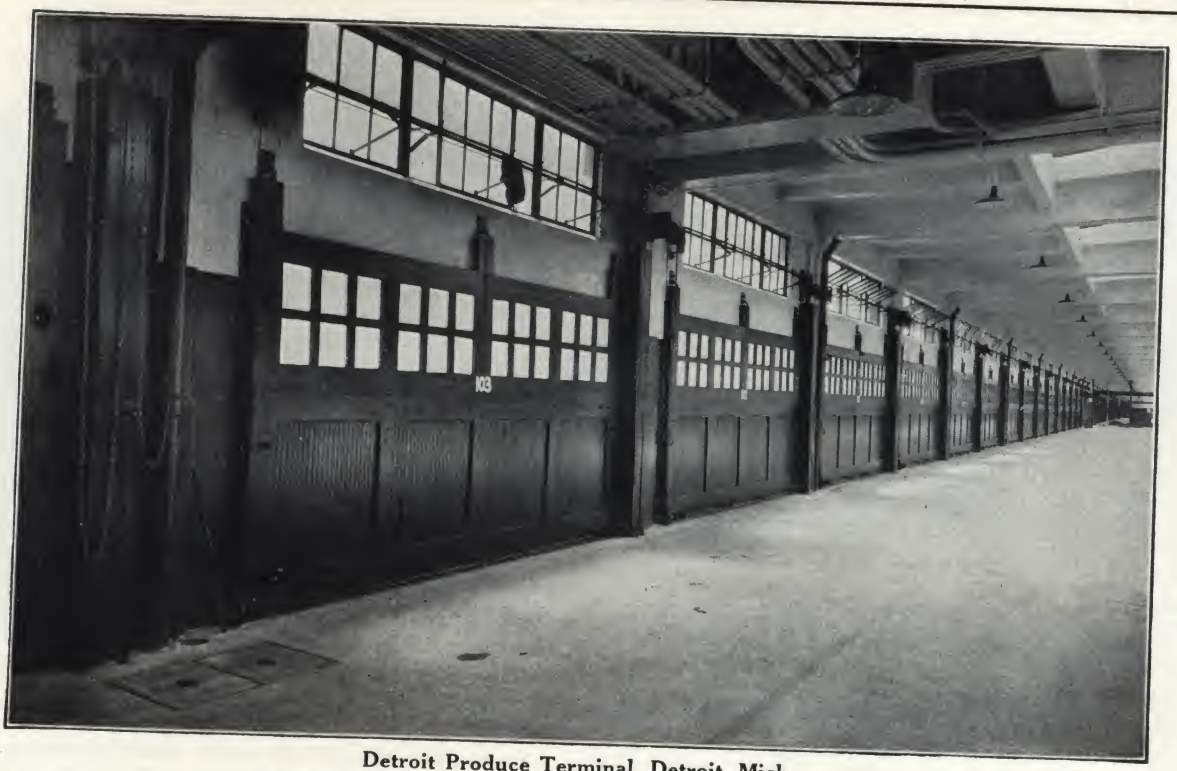


Plan at Jamb—Corrugated "Sec-Tel" Door
Kalamein and metal clad doors require 9-in. space at sides and 5-in. projecting sills



Corrugated "Sec-Tel" Door

Continued on next page



Detroit Produce Terminal, Detroit, Mich.
UNITED ENGINEERS AND CONSTRUCTORS, INC., Engineers and Contractors
171 Wood "Horifold" Doors installed in this building. Doors are 14x8 ft.

"Horifold" Door

The "Horifold" door is a horizontal folding-up door, and can be made of wood, corrugated steel, tin clad or paneled wood metal covered sections.

"Horifold" doors are suited for shipping platforms of warehouses, factory buildings, freight houses and garages.

"Horifold" doors are of rigid construction, operate with ease, and are unexcelled for withstanding severe weather conditions.

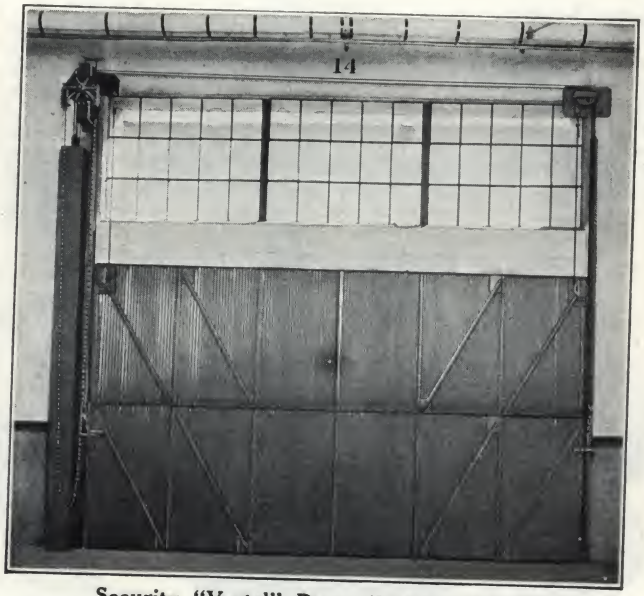
"Vertel" Door

"Vertel" doors are made of corrugated steel sheets riveted into angle frames. They can be arranged for glass in upper half to admit light, and with a wicket door in lower section. They are made in two sections, both of which travel upwards; the lower section traveling twice as fast as the upper section, reaching the lintel of the opening at the same time.

"Vertel" doors permit storage of material within a few inches of the door without affecting its operation.



"Horifold" Doors to Shipping or Garage Space



Security "Vertel" Door (Interior View)
Used for shipping platform and freight house openings. Above door is used on opening 16x9 ft. showing both door sections solid

TRUSCON STEEL COMPANY

Manufacturers of a Complete Line of Steel Doors

YOUNGSTOWN, OHIO

Offices and Warehouses in Principal Cities—For list see our pages on Steel Windows

Products

STEEL DOORS.

For other Truscon Products, see pages in this edition on Concrete Reinforcing Steel, Steel Joists, Steeldeck Roofs, Standardized Buildings and Structural Steel, Steel Windows, Metal Lath, Steel Channels and Plasterers' Specialties, as listed in Manufacturers' Index.

General

Truscon Steel Doors provide permanent, fireproof protection for industrial, commercial and other buildings. The complete line includes all types and sizes so as to meet efficiently the exact requirements of each installation.

Truscon Steel Doors are designed and built for maximum strength, enduring service, and easy operation. The highest grade commercial steel is used throughout. The frame is of tubular construction with corners mitered, welded and internally reinforced. The hardware conforms to the high quality of the doors and aids their easy operation. Truscon Steel Doors resist fire, withstand hard usage, are long-lived and never warp, stick or need repairs.

Services

Truscon specialists co-operate fully with architects in developing steel doors which will promote the efficiency of buildings. Recommendations are made from a wide experience in door installations and an intimate knowledge of manufacturing possibilities. Truscon will gladly study building conditions and offer suggestions for the type of door which will give the greatest satisfaction at economical cost.

Truscon supplements its large manufacturing facilities by stocking Standard Steel Doors for immediate delivery from Truscon warehouses in principal distributing centers throughout the country. Doors which are made to order are shipped promptly from our factories.

Catalog

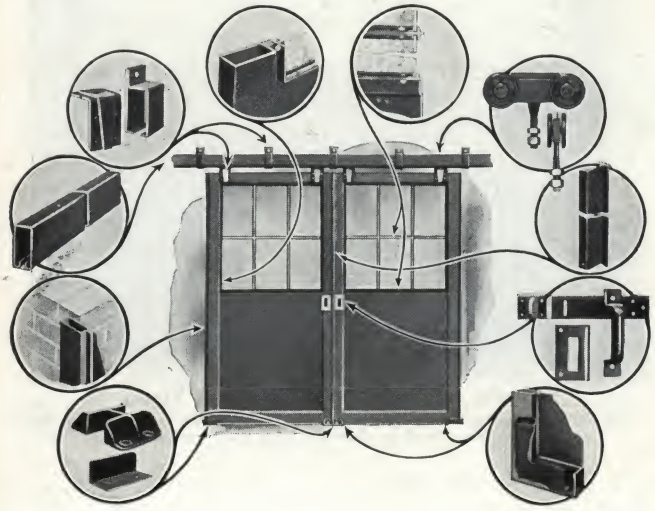
Complete catalog, 8½x11 in., 60 pages, containing full information about all types of Truscon Steel Doors, with details of their application, will be furnished to architects on request.

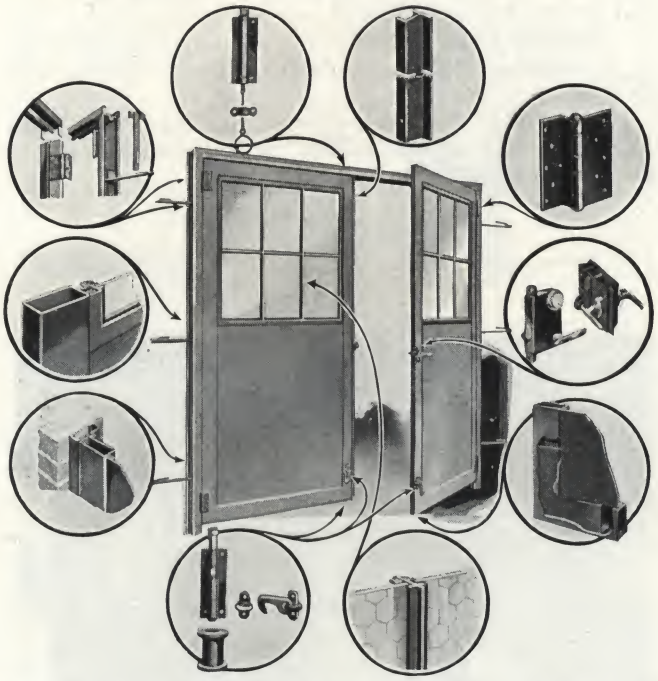
TRUSCON STANDARD STEEL DOORS

Truscon Standard Steel Doors, stocked in Truscon Warehouses throughout the country, are ideal for service entrances, furnace rooms, fire exits, pent houses, garages, service and filling stations, freight and power houses, and industrial and commercial buildings. Stiles and rails are of heavy tubular construction, corners are mitered, internally reinforced and welded to provide strength where strength is needed. They are furnished in swing or slide types in sizes from 3x7 ft. to 5x10 ft. for single doors and from 6x7 ft. to 10x10 ft. for double doors.

Slide Type

Truscon Stock Type Standard Steel Doors, Slide Units, are mounted on four-wheel trolleys equipped with extra heavy duty roller bearing hangers and run on a sag-proof heavy duty channel track. Trolley brackets are attached to the door leaves where reinforcing occurs, thus insuring against local stresses in the steel of the door leaves. They are equipped with center stop and bottom guides to prevent prying the doors open when locked. Handles for opening and closing are of rigid construction. Hasp and staple are attached with through bolts to prevent burglary.





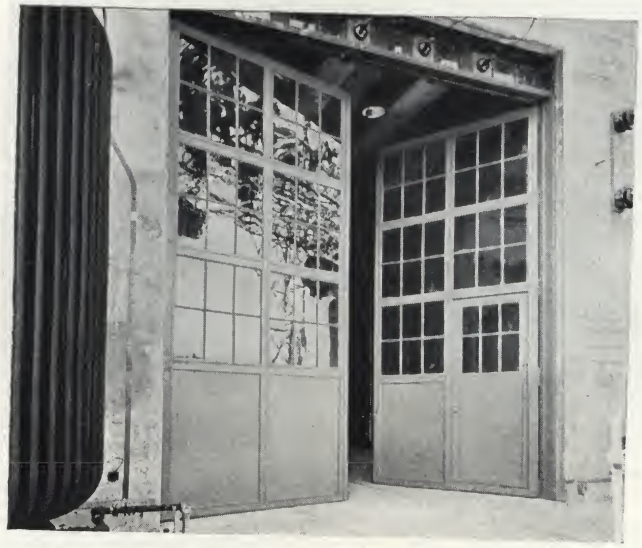
Swing Type

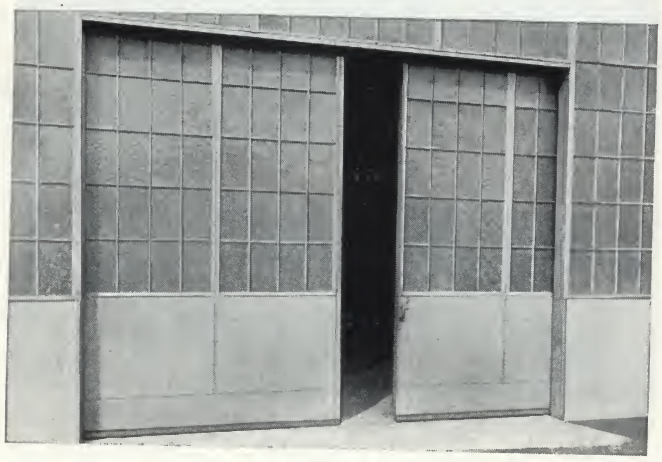
The door frames for Truscon Stock Type Standard Steel Doors, Swing Units, are of heavy pressed steel construction with door stop pressed into the frame. They are heavily reinforced at corners and at hinges. Double doors are equipped with lock bolt and socket for locking one leaf of double doors as well as a hook back and ring for holding doors open. A chain bolt for inside locking at the top is supplied for other leaf. Extra heavy duty hinges are always attached to door leaves where corner reinforcing occurs.

Continued on next page

TRUSCON INDUSTRIAL STEEL DOORS FOR LARGE OPENINGS

Swing Type—Slide Type





Fireproof, durable, permanent and serviceable, Truscon Industrial Steel Doors for large openings are furnished in practically any size and arrangement, to meet every requirement where swing and slide doors are practical.

These Truscon Industrial Steel Doors are suitable for openings more than 10 ft. high and 10 ft. wide, and their durable efficiency has been tested through extensive use in industrial buildings of every description.

Truscon Steel Doors are made of best grade commercial steel. Stiles and rails are of tubular steel, mitered, internally reinforced and solidly welded at all corners, giving maximum strength. Size of tube and gauge of steel depend upon type, size and weight of door.

Harmonizing with the design of the building with which they are used, Truscon Industrial Steel Doors allow maximum daylight to enter the plant without sacrificing their sturdiness or rigidity.

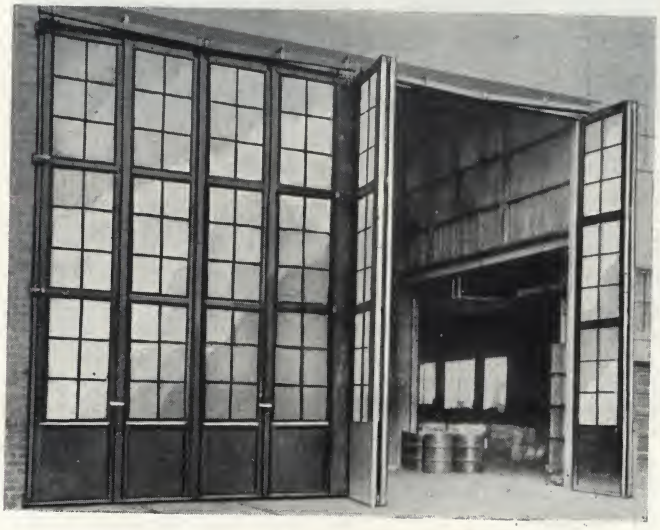
TRUSCON VERTICAL FOLDING STEEL DOORS

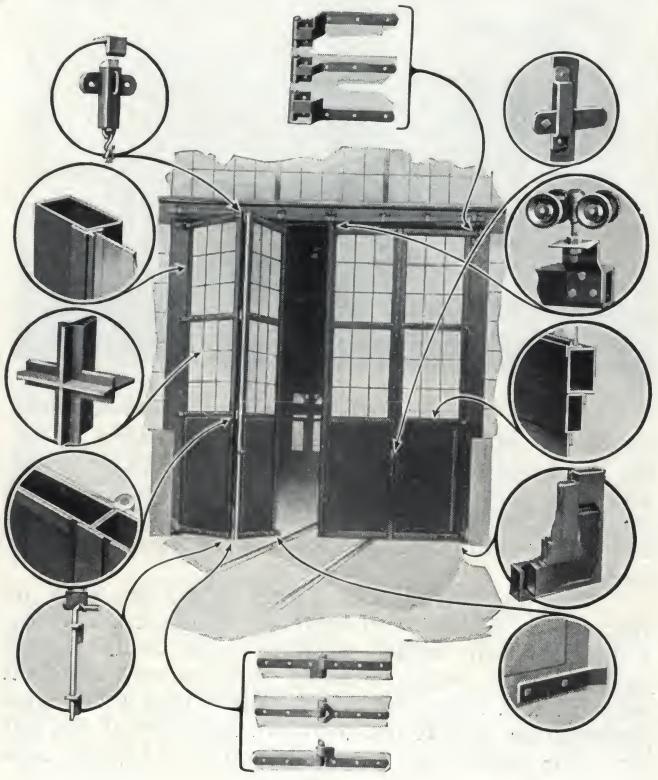
Truscon Vertical Folding Steel Doors are suitable for car and engine shops, warehouse buildings and other steam and electric railroad buildings requiring maximum height of door opening with minimum obstruction.

In operation the leaves fold like a jack-knife against each other and lie flat against the jamb when fully open. They are hung from Truscon Standard Roller Bearing Double Trolleys running on a heavy channel track and are equipped with flange guides, back stops, binders and complete hardware.

Stiles and rails are of heavy tubing with internal reinforcing at the corners to make sagging or twisting impossible. In operation they do not jamb or bind and one person can operate them with ease and speed.

Truscon Standardized Steel Sash are incorporated into the upper portion of these doors, and the lower portions comprise panels rigidly attached to stiles and rails to give added strength.





Continued on next page

TRUSCON VERTICAL LIFT STEEL DOORS FOR HEAVY DUTY





On the shipping platforms of warehouses, at freight houses, wholesale and storage buildings, garages, etc., where it is desirable to have the full width of the door opening without any obstruction from the doors, Truscon Vertical Lift Steel Doors are recommended.

The Truscon Vertical Lift Door consists of two leaves which slide against each other when raised and which clear the door opening when fully open. In providing clearance, the distance from the top of the door frame to the ceiling or roof must be one-half the height of the door opening plus 1 ft. 8 in., which is the space necessary for housing the operating mechanism.

The upper leaf of the Truscon Vertical Lift Door is fitted with Truscon Steel Sash, allowing adequate daylight to penetrate to the interior of the building. The lower leaf has heavy 12-gauge steel panels.

The doors can be easily raised and lowered by hand, but they may be fitted for electric power operation if desired.

Their rugged construction and the heavy plate used on the lower leaf of the door makes these doors an effective barrier against trespassers.

TRUSCON VERTICAL LIFT-SWING STEEL DOORS





Truscon Vertical Lift-Swing Steel Doors meet the conditions in pier buildings and warehouses where the door opening must have maximum clear height and unobstructed width. These doors are built to stand much punishment, daylight the interior, open and close easily and protect the warehouse against thievery.

Truscon Vertical Lift-Swing Doors are built of rectangular tubing reinforced at all corners and intersections and welded together with welds ground smooth. This makes a solid, crackless unit of great strength that keeps out water. Their high grade steel construction retards the corrosive influence of the salt air. The panels are a combination of 12-gauge steel plates and Truscon Standard Steel Windows glazed with wire glass.

Each Truscon Vertical Lift-Swing Door is divided horizontally into two equal sections. The upper section contains the glass and provides daylighting for the interior. The lower solid section slides vertically in guides on the door jamb into guides on the upper section, which is hinged at the top. The nested sections can then be swung inward to any angle up to a horizontal position, so the door is completely out of the way.

The raising and swinging movements are accomplished by operators with hand or power control. If desired, pilot doors can be provided in the lower leaf of the door.

Continued on next page

TRUSCON BIFOLD STEEL DOORS





Truscon Bifold Steel Doors are designed for freight houses, warehouses, shipping and loading platforms where the distance between the lintel and the roof or ceiling is too scanty for Truscon Vertical Lift Type Doors. The hardware used for these doors has been designed to insure permanent efficient operation of the doors. The upper leaf is attached to the lintel by means of specially designed wrought forged steel hinges. Similar hinges attach the lower leaf to the upper and the lower corners of the bottom leaf are equipped with rollers to which a chain is attached.

These doors are counterweighted to balance in any position between complete opening and closing. They operate easily by means of hand chains, using a mechanical unit which will give years of carefree service. Individual doors or batteries of doors may also be equipped with electrical operating units, if desired.

When closed and locked Truscon Bifold Steel Doors make excellent protection against weather, and their uniform, neat design adds to the appearance of the building where they are used.

Each upper leaf may carry a Truscon Standard Steel Sash for daylighting the interior of the building or both panels may be of solid steel, as desired. Lighted sections, however, are especially desirable when a continuous line of doors is installed.

Bottom panels are heavy gauge steel plates, rigidly attached to the tubular frame with drive screws. Guides are constructed to allow free movement of the doors. Doors may be operated by hand or power.

TRUSCON FIRE DEPARTMENT STEEL DOORS





Truscon Fire Department Steel Doors operate automatically to permit the rapid exit of fire apparatus. The opening device has been rigidly tested to insure dependable service at all times. It can be furnished to operate with either heavy coiled spring or counterweights.

On account of the positive action and the resulting strain, a door frame of heavy structural steel should be provided. Truscon does not furnish frames for these doors.

The hot drawn steel tubing used in Truscon Fire Department Steel Doors is unusually wide, insuring added strength and durability. The upper portion of the door is fitted with a Truscon Steel Window which floods the interior with a maximum amount of daylight. The lower portion is a heavy steel panel rigidly attached to the stiles and rails, and made an integral part of the door.

The special corner reinforcing and welded construction give Truscon Fire Department Steel Doors a rugged strength which eliminates door trouble.

Truscon Fire Department Steel Doors can be furnished in either double swing or vertical folding types, conforming in either case to the architectural design of the building in which they are used.

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TRUSCON AIRPLANE HANGAR DOORS—STRAIGHT SLIDE TYPE



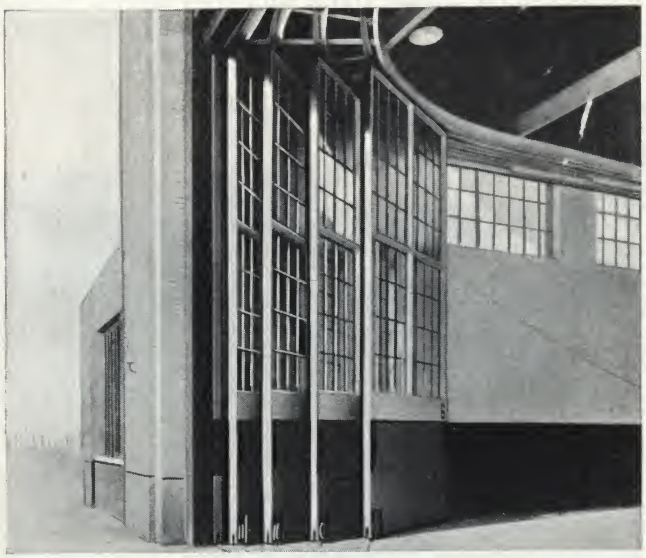


Truscon Airplane Hangar Steel Doors meet the specialized requirements of the aviation industry. They permit the unobstructed entrance and exit of airplanes and provide ample daylighting for the interior. They are easily opened and closed either by hand or with power operators.

Truscon Airplane Hangar Doors—Straight Slide Type, are made of units which run on tracks embedded in the floor to relieve the overhead construction from supporting their weight. They are as light in weight as is consistent with proper strength and durability. The rollers have ball and thrust bearings, so that the doors open and close easily. When open they occupy a minimum of space at the end of the hangar. Two-thirds of the door area contains glass. The doors are weathertight at all points.

Truscon Hangar Doors—Straight Slide Type, are furnished in sizes to fit individual installations. The materials, construction and workmanship are of the highest quality of modern steel fabrication.

TRUSCON AIRPLANE HANGAR STEEL DOORS—CURVED TRACK TYPE



The Truscon Airplane Hangar Door—Curved Track Type, was developed by Truscon to meet the requirement of a door to close the entire side of a hangar where several planes were housed. The door units operate on separate curved tracks which parallel each other, and when open, the doors lie flat against the inside wall of the hangar to allow a maximum opening.

Each door is mounted on heavy cast steel wheels encased in the door itself. Bronze bushed rollers at the doorhead act as guides for the door moving on the track.

Two-thirds of the Area of Truscon Airplane Hangar Doors—Curved Track Type, is devoted to glass, which admits the maximum amount of daylight into the hangar when the doors are closed. The lower panels are of 12-gauge steel, rigidly attached to stiles and rails by drive screws. If desired, a Truscon standard pilot door can be inserted in the lower portion of one unit of each set of doors.

Truscon Hangar Doors—Curved Track Type, may be operated either manually or by motor, one motor handling as many doors as move in one direction from the center of the opening.

Construction Details—Curved Track Type

(1) Dovetail Miter Joints—Give added rigidity and small muntin bars offer minimum obstruction to light.

(2) Glazing Angles—Hold glass firmly in the sash panels.

(3) Steel Panels—Give a plane smooth surface without any openings or recesses.

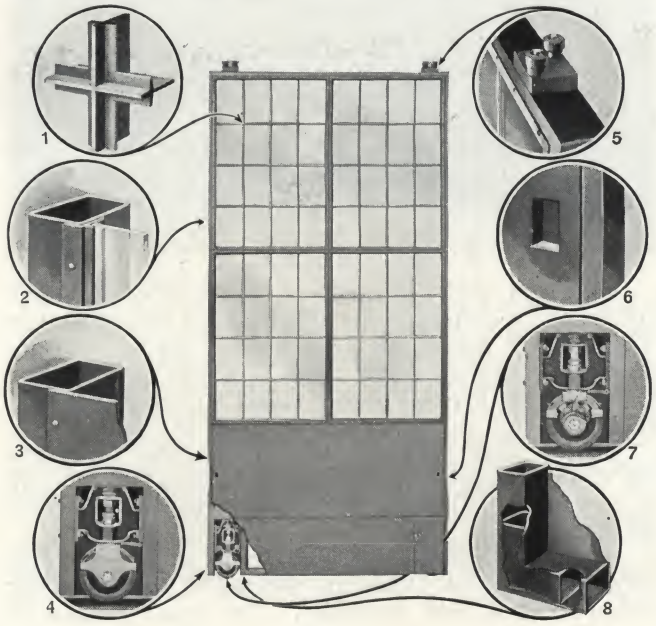
(4) Malleable Iron Wheels—Mounted in malleable iron housing with roller swivel and Timken roller bearing on vertical shaft, are equipped for Zerk system of lubrication.

(5) Steel Rollers—Attached to head of doors to run along overhead guide tracks with minimum friction.

(6) Flush Type Handle—In door panel.

(7) Lock Type Bottom Roller—Each door unit may be equipped with an Allith Prouty lock type bottom roller or with a heavy wrought iron double-acting cane bolt for locking door to floor when in closed position.

(8) Stiles and Rails—Are mitered and internally reinforced 12 in. in each direction at the corners.



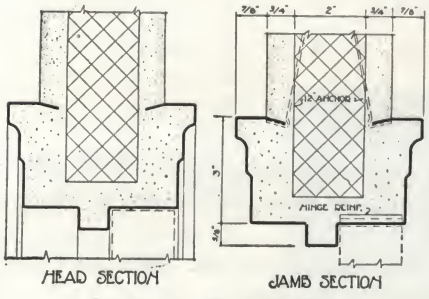
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TRUSCON INTEGRAL DOOR FRAME AND TRIM

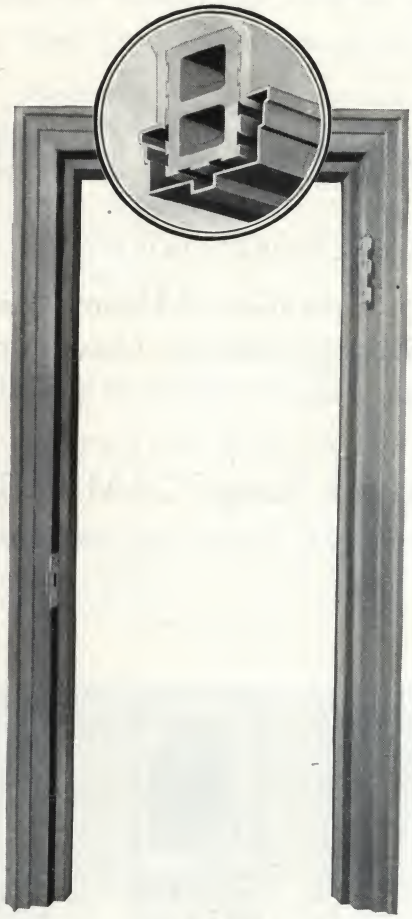
Architects and contractors especially favor Truscon Integral Door Frame and Trim because it simplifies the interior construction of a building. Made to fit any size of opening, it arrives on the job in one piece, ready to be set in place immediately. It is firmly anchored to the wall during construction so that the finished trim becomes an integral part of the wall construction. No door bucks or plaster grounds are required.

Truscon Integral Door Frames and Trim are of high quality throughout, and adapted to the finest buildings.

They are fireproof and permanent. Being welded and firmly anchored, unsightly shrinkage cracks in casings and plaster are eliminated.



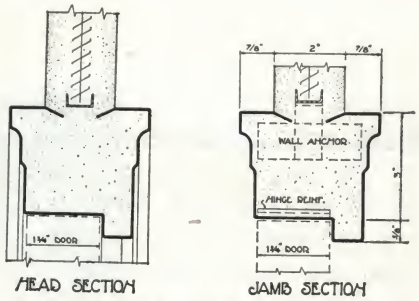
For 3½-in. Block Partition



Owing to its one-piece construction of 16-gauge furniture stock steel, it is perfectly sanitary.

Truscon Integral Door Frame and Trim are made to exact size. All cut-outs, mortising and reinforcing for hardware are taken care of at the factory, thus doing away with the costly item of field labor such as is necessary in the fitting of wood doors to individual openings.

The product is furnished in standard sizes for single doors from 2 to 4 ft. wide and for double doors 4 to 8 ft. wide, both in heights from 6 ft. 6 in. to 7 ft. 6 in. It is available for 2 in. solid metal lath and plaster partitions and other partitions up to 9½ in. in thickness. Made with or without transom bar as integral part of frame.



For 2-in. Solid Partition

Specifications for Truscon Integral Door Frame and Trim

General—

(1) All openings so designated and specified shall have Truscon Integral Door Frames and Trim as manufactured by the TRUSCON STEEL COMPANY of Youngstown, Ohio.

Gauge of Metal—

(2) Door Frame and Trim and Transom Bars shall be of 16-gauge furniture stock steel.

Construction—

(3) All corners and other joints shall be mitered and firmly joined by continuous weld on the inside of the frame and all welds shall be ground smooth.

(4) Adjustable spring wire anchors shall be provided for holding the frames solidly to the partition, and a ½x1½ in. channel spreader shall be used at the bottom of the frame to keep the members in alignment.

(5) Provisions for the attaching of butts and strike plates shall be made at the factory from information and hardware templets to be furnished by the contractor. Provisions for any other hardware to be made by the erector. All reinforcing plates for the attachment of hardware shall be welded in place and drilled and tapped.

Sizes—

(6) All frame and trim shall be made to the exact size as noted on the door schedule. Transoms and side lights, frames for access doors, and borrowed lights shall be made to sizes noted in schedule or as detailed. The width of all frames shall be determined by the thickness of the wall as indicated on the plans.

Swing of Doors—

(7) Provisions for hardware shall be placed according to the swing of the doors as indicated on the plans.

Finish—

(8) All frame and trim shall have shop coat of special primer paint which will allow sandpapering and rubbing necessary for applying finishing coat.

Erection—

(9) Integral frame and trim shall be erected by the contractor. It shall be placed on the floor before the walls are built; plumbed and temporarily braced. The walls shall be built directly into the frames and the anchors applied as the wall is built.

(All frames should be grouted solid.)

Hardware—

(10) Templets for all hardware and complete information regarding the attachment of hardware must be furnished to the manufacturer.

ALLEN-DREW COMPANY

DIVISION OF
BABCOCK-DAVIS CORPORATION

Specialists in the Motor Operation of Doors, Windows, Walls, Ceilings, Floors, Roofs, Stages, Platforms, Gates, Draw Bridges, and Other Engineering Problems of a Similar Nature

MAIN OFFICE AND FACTORY
43-45 Brookford Street, CAMBRIDGE, MASS.

BRANCH OFFICE: 136 Liberty Street, NEW YORK, N. Y.

Products Shown in Other Sections

For pages see Manufacturers' Index.

Motor Operated Vertical Sliding Walls and Partitions for such services as stage curtains, gymnasium, auditorium and convention hall divisions.



Motor Operated Proscenium Walls, Curtains, Entire Stage, Stage Ceiling and Orchestra Pit.

Motor Operated Gates for Jails, Industrial plants, private estates, etc.

ALLEN-DREW ENGINEERING SERVICE

Our Engineering Department is at the service at all times of those who desire estimates, preliminary layouts and specifications where the motor operation of doors, gates, windows, and other work of this nature is involved.

We also operate as consultants on major operations involving the moving by electricity large sections involving soundproof, fireproof or other special features of similar nature, and we are prepared to compile complete calculations, specifications, detailed plans and other engineering work necessary.

It is essential that we be advised of a project in its early stages as our work involves problems in electrical control, structural framing, mechanics, acoustics and fireproof construction which make it absolutely essential that each detail be incorporated in such a way as to co-ordinate the balance of the construction.

Continued on next page

ALLEN-DREW MOTOR DRIVEN UNITS

We Manufacture Six Sizes of Motor Units to Meet All Conditions

In order to fully cover the power requirements of every type of door and other parts of a building, we make six different sizes of machines. These have motors ranging from ¼ to 20 hp. Doors of practically any size and type can be operated by these machines. We are operating doors for openings 90 ft. wide and some weighing up to 15 tons; walls covering openings 128 ft. wide by 42 ft. high; floors of 6400 sq. ft. in area; ceilings of 5000 sq. ft. in area; and heavy parts of buildings of other natures.

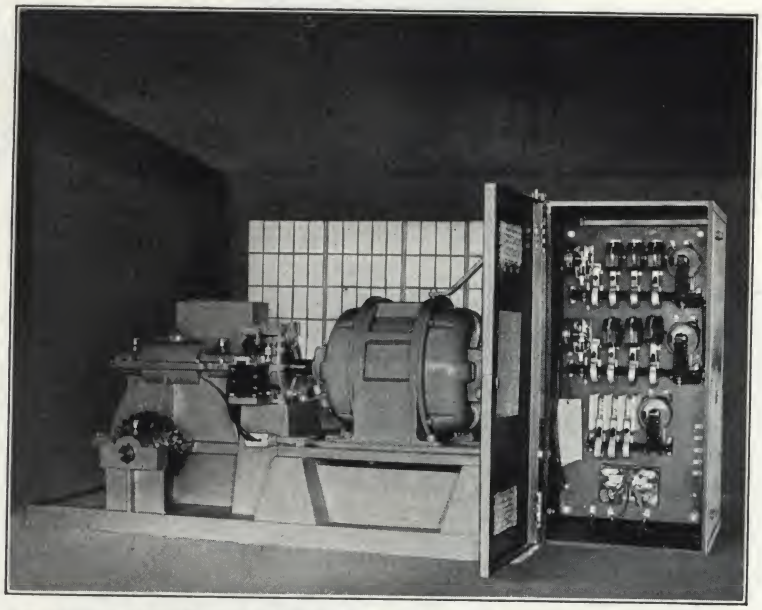
No. 100 powered by ¼ to ½ hp. motor.
No. 200 powered by ¾ to 1½ hp. motor.
No. 300 powered by 1½ to 3 hp. motor.
No. 400 powered by 3 to 7½ hp. motor.
No. 500 powered by 7½ to 12 hp. motor.
No. 600 powered by 12 to 20 hp. motor.

Traction Machines (Patents Applied For)

In addition to six standard sizes of motor drive equipments, we manufacture three sizes of traction drive equipments (See following page for specification and illustration):

No. 700 powered by ½ hp. motor
No. 800 powered by ¾ to 5 hp. motor.
No. 900 powered by 1½ to 7½ hp. motor.

No. 700 Monowheel Drive Unit (Patent Applied For)—Powered by a ½ hp. motor and equipped with a rubber tired traction wheel is used on horizontal sliding and horizontal folding swinging doors on openings up to 30 ft. in width. The doors may be either one or several sections in the case of horizontal sliding doors and each half of the sliding or folding doors may be one to three sections hinged together.



An Allen-Drew Motor Unit, Including Motor Drive and Control Panel

No. 800 Monowheel Drive Unit—A heavier duty machine than the No. 700 and is equipped with a steel tired wheel acting as a driver on a steel track. This monowheel drive unit is essentially to operate airplane hangar doors running up to 200 ft. in width and no limitations as to height.

No. 900 Operator—A duplex drive having two driving wheels. It is designed to operate an unlimited number of sliding doors which are coupled together, or, by means of our special control attachments to operate the door sections with an unlimited number of speeds.

Guaranteed for One Year

Each installation is guaranteed for one year after completion and acceptance.

Special Sizes for Special Conditions

Our standard size units generally answer most requirements but where special conditions require a special motor we will build the unit to fit the condition. We are prepared to undertake motor operation of movable parts of any size or condition.

Specifications Motor Drive Units—No. 100 to No. 600

Motor drive units shall be equal to No. (100) as manufactured by Allen-Drew Company. To be powered by a high torque motor not less than (¼) hp. and not over (½) hp. Speed reduction is to be obtained by use of a worm drive. The worm to be constructed of high-grade steel hardened and polished. The worm gear is to be of phosphor bronze and the entire gear reduction to be housed in an oil tight housing which is cast integral with the motor base. The connection between the worm shaft and motor to be by means of a friction plate clutch allowing smooth starting and stopping of the operation.

An electric solenoid brake shall be applied acting on the housing or the plate clutch. Brake to have a rating per foot pounds equal to that of the motor. The worm shall be held in position by hardened steel ball thrust bearings. The shaft will be made of a high-grade steel and of a size that will give sufficient factor of safety and allow for the shock loads which the equipment may be called upon to carry.

The low speed shaft shall carry a directly connected limit switch with easily adjustable contacts allowing accurate setting for all stopping points. The low speed shaft is also to be mechanically connected to a sprocket, drum or gear which in turn drives the load. This shall be of the proper size and construction to allow the proper operation without undue strain.

A remote control contact panel shall be mounted on the machine and shall be equipped with overload and under-voltage relay contacts of the proper size to carry the motor current and the brake current and shall be completely wired, with all of the electric apparatus on the equipment tested both as to electric connections and power development and marked for the necessary connections to be made in the field before the equipment can be operated.

Complete information shall be furnished to the user of this equipment regarding the oiling, adjusting and care of this equipment.

Each equipment shall be covered by our unqualified guarantee of the proper performance of the equipment. This guarantee is warranted not only to cover the defects in workmanship and material, but to operate satisfactorily in every way if the application is in full accord with our understanding of the conditions of our contract or agreement as it is written.

AUTOMATIC FLOOR TRIPS AND SIGNAL LIGHTS

Automatic Electric Floor Trips

When so desired the doors can be operated automatically by the movement of motor vehicles entering or leaving the building. This is accomplished by our standard floor trip which will function when a car passes over it, opening the door and closing it when the car has passed over the trip on the other side of the building.

Signal Lights

In conjunction with the operation of the doors, it is desirable, especially where floor trips are used, to have signal light equipment for checking the operation of the doors and also warning the operators of the motor vehicles in order that they will not enter until the doors are fully open, otherwise damage may result to the door and car.

Continued on next page

ALLEN-DREW TRACTION DRIVE UNITS
MONOWHEEL DRIVE

General Description

Under the general classification of traction drive equipment we furnish the monowheel drive which is a single wheel traction unit driven by electric motor through special clutch mechanism which allows the easy starting of the load and equipped with full automatic electric control.

The monowheel drive can be applied to a variety of structures or parts to be moved wherever a track is permissible. Its widest application is in the moving of airplane hangar doors, for which, because of their great size and weight and the necessity for fast operation, it is essential to have a flexible means of locomotion.

When used in connection with airplane hangar doors in multiple sections, auxiliary equipment is necessary for the moving of the multiple panels.

SPECIFICATIONS OF MONOWHEEL TRACTION DRIVE UNITS (Patent Applied For)

Specifications No. 700 Monowheel Drive

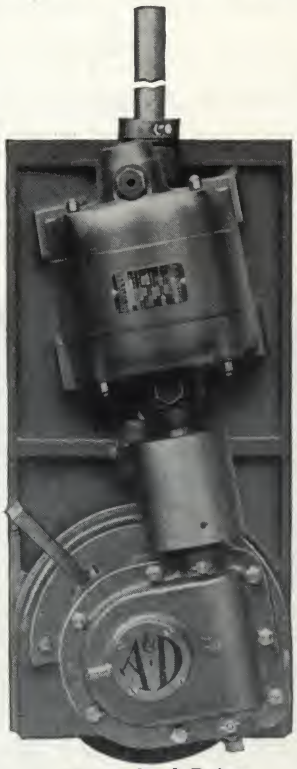
Monowheel drive unit shall be equal to No. 700 as manufactured by ALLEN-DREW COMPANY. It shall be powered by a high torque motor of ½ hp. Motor shall be placed in a vertical position. Reduction shall be secured through: first, a fibre spur gear driving the cast iron spur gear; and secondly, through a worm gear drive having a hardened steel worm and a phosphor bronze worm gear. All thrust and radial loads to be taken by ball bearings of the proper size.

Worm gear shaft shall be of nichrome steel and shall have the rubber tired wheel keyed to same. All gears shall be completely enclosed in welded steel housings.

Unit shall be carried by a spring tension mounting device which shall be bolted to the door panel.

Specifications No. 800 Monowheel Drive

Motor drive unit shall be equipped with No. 800 Monowheel Drive Unit as manufactured by ALLEN-DREW COMPANY. It shall be powered by a ¾ to 5 hp. special high torque ball bearing motor. Motor shall drive through a friction plate clutch to a worm gear reduction which will consist of hardened steel worm and phosphor bronze worm gear. All thrust and radial loads to be carried on ball bearings of the proper size.



Monowheel Drive

Steel driving wheel shall be connected by hand operation release clutch to the nichrome steel work gear shaft. Motor mountings and gear cases shall be of cast iron.

Unit shall be bolted to door panel with means of adjusting to the proper height.

Specifications No. 900 Monowheel Drive

Motor drive unit shall be equipped with No. 900 Monowheel Drive Unit as manufactured by ALLEN-DREW COMPANY. It shall be powered by a 1½ to 7½-hp. special high torque ball bearing motor. Motor shall drive through a friction plate clutch to a worm gear reduction which will consist of hardened steel worm and phosphor bronze worm gear. All thrust and radial loads to be carried on ball bearings of the proper size.

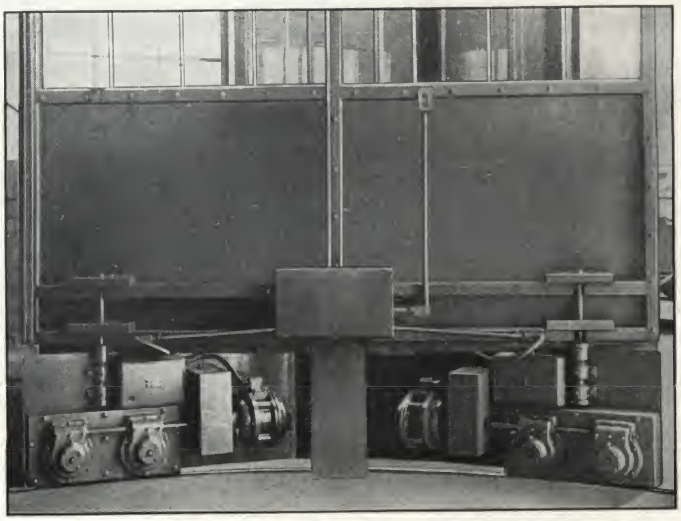
Twin steel driving wheels shall be connected by hand operation release clutch to the nichrome steel worm gear shaft. Motor mountings and gear cases shall be of cast iron.

Unit shall be bolted to door panel with means of adjusting to the proper height.

DUPLEX DRIVE TRACTION UNITS

Description of Duplex Drive

The duplex drive is of the same construction essentially as the monowheel drive with the exception that an additional traction wheel is available to give added tractive effort for a heavier job, or in some cases where a greater speed is desired without wheel slippage.



Application of Two Duplex Drives on an Unusually Heavy Door

Specification of Duplex Drive

The duplex drive is essentially the same construction as the monowheel drive with the exception that two traction wheels are available.

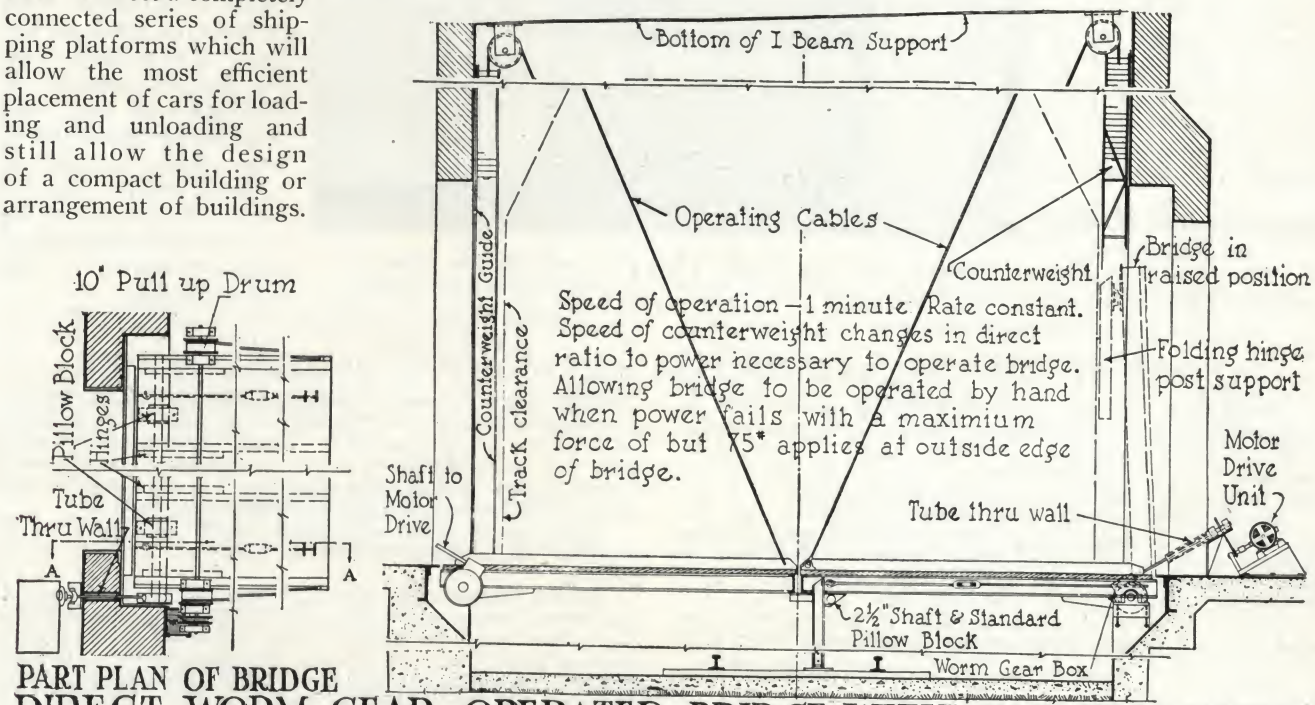
Continued on next page

MOTOR OPERATED DRAWBRIDGES

We make a specialty of installing motor operated trucking drawbridges for use in connecting loading platforms on opposite sides of railroad tracks.

By the use of these draw bridges it is possible to have in effect a completely connected series of shipping platforms which will allow the most efficient placement of cars for loading and unloading and still allow the design of a compact building or arrangement of buildings.

We show one means of operating this type of bridge, but where conditions have required, we have used other methods of operation. We show this particular construction for its simplicity.



DIRECT WORM GEAR OPERATED BRIDGE WITH COUNTERWEIGHT



Motor Operated Drawbridge Being Lowered into Position Over Railroad Siding Tracks



Motor Operated Drawbridge Lowered to Make Trucking Communication Between Buildings

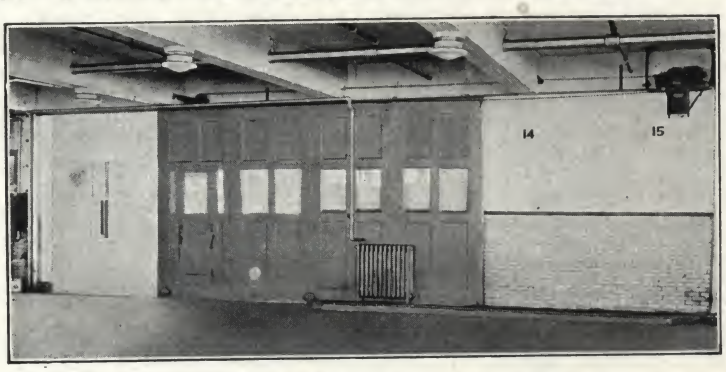
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SINGLE PIECE HORIZONTAL SLIDING DOORS

One piece horizontal sliding doors of this type should be limited in width to 20 ft. and in height to 16 ft. We have operated larger doors than of the above dimensions but in all such cases they should receive special attention in regard to construction.

Recommended Method of Support

Throughout our experience we have found that doors of this type stand up better and are operated more satisfactorily when carried on proper hardware supported on a track on the floor. It is possible with the bottom support to eliminate all sag and twist in the doors and to keep them in perfect running order. The details of hardware of this type are described below and are shown on the opposite page.



Interior Showing Single Sliding Door with Bottom Support
Practically no headroom is necessary as operating chains run through the girders

GENERAL SPECIFICATIONS FOR HORIZONTAL SLIDING DOORS

Scope—All one-piece horizontal sliding doors shall be operated by electric drive unit as manufactured and installed by ALLEN-DREW COMPANY, Cambridge, Mass. Unit shall be controlled from push button stations as located on plans. Door shall operate at a speed of over 1 ft. per second.

Doors—Shall be made to special detail. (Here state size and thickness of door, stiles, rails, panels, material, glazing, wickets) as made by ALLEN-DREW COMPANY. Joints shall be made with hardwood dowels and glued with waterproof glue. For size see detail drawings (or elevation).

Note: If doors are to be supplied in the millwork contract give full requirements for door construction under millwork.

Hardware

Track—Shall be 12 lb. industrial rail, new stock free from rust or pits, furnished by (.....). Rail shall be set in floor construction by General Contractor, properly anchored and supported. Rail shall be set level and plumb with the top, ¾ in. above the floor and in accordance with the details and instructions from ALLEN-DREW COMPANY.

Bearing Wheels—These shall be of the number required to properly carry the weight of each door. They shall be machined truly round and grooved for running on track and hung on ball bearings. The shaft pins supporting the bearings shall be eccentric, allowing for adjustment of the space between the door and the rail. Bearings shall be greased through alemite greasing nipples fastened to the shaft.

Note: State whether the wheels are to be concealed type in the thickness of the door or on the face of the door.

Top Guide Tracks, Roller and Guides—These shall be of structural shapes, so constructed and installed as to guide the door, but to take no load. Totally enclosed ball bearing roller fastened to the upper portion of the doors are to operate in these guides. Oiling holes shall be left in the track in order that the ball bearing rollers may be properly oiled.

Guide tracks shall be secured to the wall or lintel by wrought iron brackets constructed to fit the conditions at the building.

Motor Connection—The door shall be operated by endless chain, directly connected by sprocket with the driving unit. Chain drive shall be arranged for disconnection from door, allowing hand operation of door if current fails. All other mechanism necessary to make a complete installation such as idler, etc., shall be furnished and installed by ALLEN-DREW COMPANY.

Motor Unit—Shall be a remote controlled unit, having specially wound high torque reversible motor with solenoid brake and shall include limit switches, as located on plan, which are actuated by worm screw directly connected with the motor drive. All parts are to have a factor of safety of six and the motor to be operated at 50% of its capacity under normal conditions.

Electric Control—Remote control panel shall be enclosed in a surface type steel box, and shall contain the switches, overload and under voltage relays, which shall protect the motor in the case of overload or an abnormal drop in voltage.

Guarantee—The complete installation shall be guaranteed and serviced by the manufacturer for the period of one year from time of completion.

TWO OR MORE PIECE, ONE OR TWO WAY, TWO OR MORE SPEED HORIZONTAL SLIDING DOORS

For Openings Up to 25 Ft. Wide, 16 Ft. High

Door openings to which this type of door is to be applied should be limited to not more than 25 ft. wide and 16 ft. high for use with standard units.

The two or more piece door operating in either two or more speeds is very adaptable to the modern garage. It takes up less side room than the single door and the opening can be cleared more quickly. The same type of hardware is used as on the single sliding doors with the exception of supports for the ball bearing roller wheels which must be flush on the parallel doors.



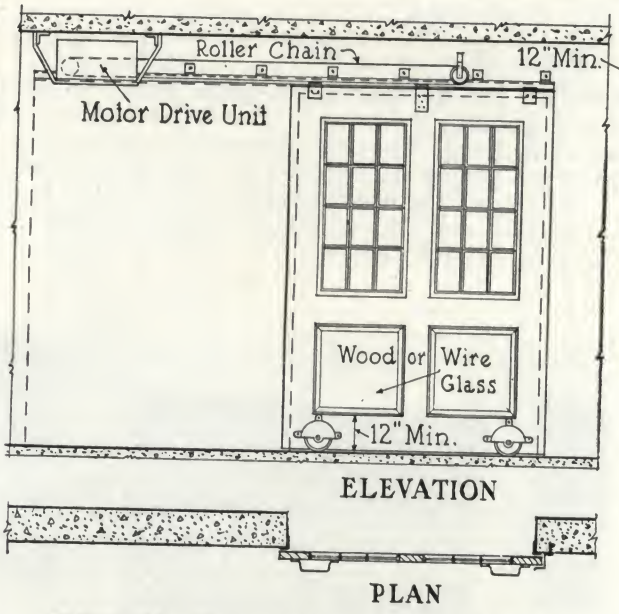
Two-piece, Two-speed, One-way Horizontal Sliding Door

The Construction—The construction of the panels, hardware and driving equipment is the same as for the single sliding door, except that additional endless chain drives are used for each additional speed of door panel.

Speed of Doors—Doors of two piece type sliding parallel are controlled so that one section will move at double the speed of that section nearest the opening jamb.

The door against the opening jamb moves at a rate better than 1 ft. per second.

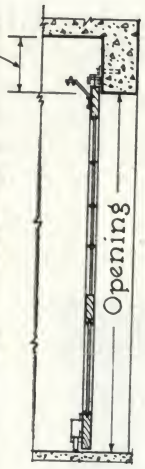
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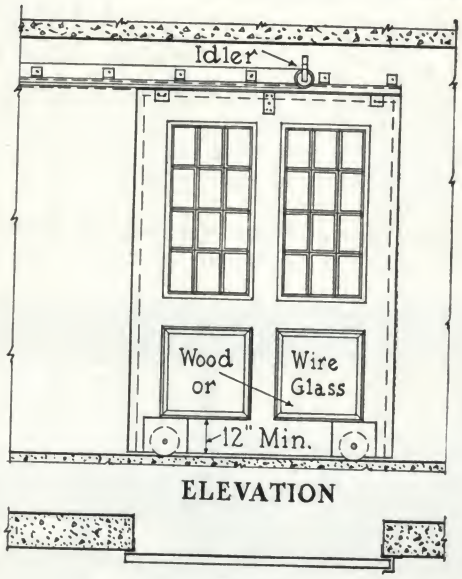
ELEVATION

PLAN

DETAIL SHOWING ROLL WHEEL MOUNTED ON FACE OF DOOR



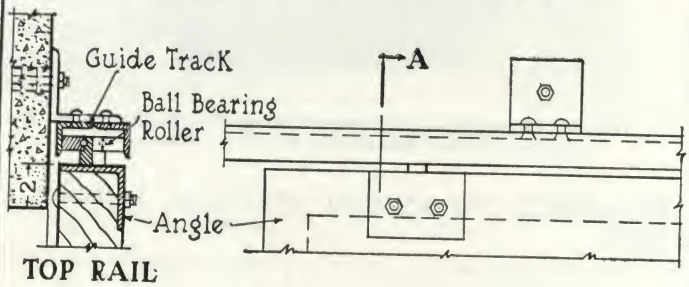
SECTION
Scale, 3/16"=1'-0"



ELEVATION

PLAN

DETAIL SHOWING ROLL WHEEL MOUNTED IN THE THICKNESS OF THE DOOR, IN ORDER TO SAVE SPACE



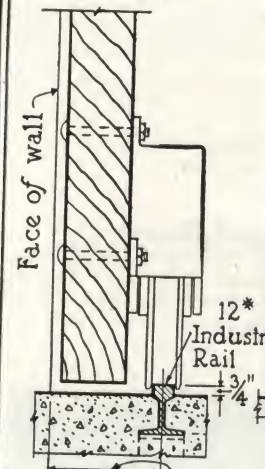
TOP RAIL

NOTES REGARDING DOORS

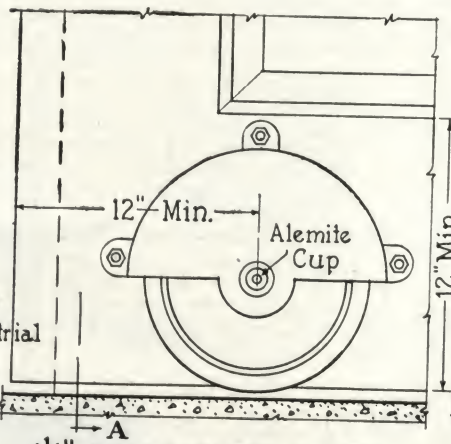
Steel Plate Doors: End Rails exposed to damages should be made easily removable for repairs

Metal Covered Doors: Exposed Rails should be capped on edges with steel members.

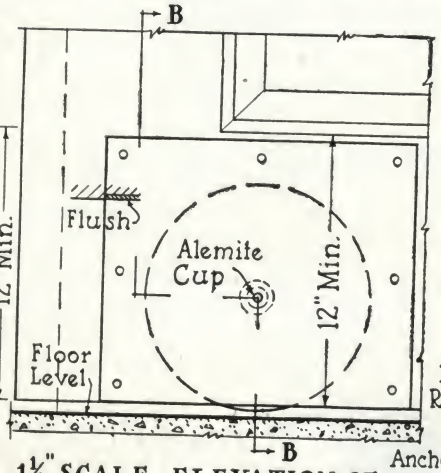
Bottom Rails: Should be of sufficient strength to support door at two points, one foot from each end



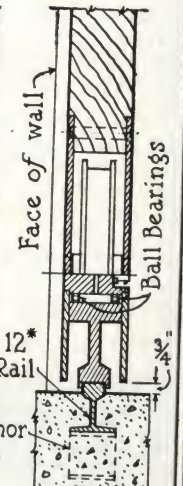
SECTION "A-A"



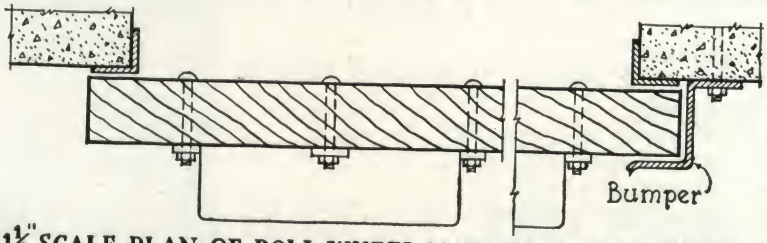
1½" SCALE ELEVATION OF BALL BEARING ROLLER WHEEL ON FACE OF DOOR



1½" SCALE ELEVATION OF WHEEL IN THICKNESS OF DOOR
Also used in Parallel Sliding Doors



SECTION "B-B"



1½" SCALE PLAN OF ROLL WHEEL MOUNTED ON FACE OF DOOR

½ Door thickness plus ½"

DETAILS OF ONE PIECE ONE WAY HORIZONTAL SLIDING DOORS

Continued on next page

ONE AND TWO OR MORE PIECE, TWO OR MORE SPEED VERTICAL LIFT DOORS

Especially Adapted to Doors for Garages, Warehouses, etc.

These types of doors are for similar uses as the single piece doors. They have the advantage of taking up less headroom and when made in two or more speed they clear the opening more quickly.

The Two-Piece or More Vertical Lift Door

This type of door can be made in two ways, in two-piece, one-speed or in two-piece, two-speed doors. It requires only half the headroom taken up by the single lift doors. The only difference in the operator is that extra drums are required on the operating shaft.

The doors are made in two sections of equal height and require one-half the height of the opening plus 1 ft. 6 in. minimum.



A Special Construction Showing Interior of a Double Two-piece, Two-speed Vertical Sliding Door Without Dividing Mullion



Glazed Two-piece, Two-speed Vertical Lift Doors in the Garage of the Malden Electric Co., Malden, Mass.

GENERAL SPECIFICATIONS FOR ONE OR TWO-PIECE, TWO-SPEED VERTICAL SLIDING DOORS

Scope—All two-piece, two-speed vertical sliding doors shall be operated by electric drive unit as manufactured and installed by ALLEN-DREW COMPANY, Cambridge, Mass. The units shall be remote controlled from push button stations as located on plans. Lower section of door shall travel at the rate of approximately 2 ft. per second or double the speed of the upper section.

Door—See specification, page 5. Flexible rubber tubing shall be secured to bottom of the door to take up any inequalities and make it tight.

Tracks—Double steel tracks shall be placed at sides of opening to guide the door sections throughout their full travel. Roller guides to fit the track shall be installed on the door.

Equalizing Shaft and Motor Connection—Each section of the door shall be supported on an equalizing shaft to which the supporting cable or chain, at each end of the door sections, shall be attached. Door sections shall be evenly counterbalanced by weights running either at one side or both as required. Counterweights shall be guided in light iron guides completely enclosed in sheet metal box.

There shall be at least three shaft hangers with self-aligning bearings to each equalizing shaft to distribute the load on the shaft.

Shaft shall be directly connected to the operating unit and so arranged that the electric machine may be released and the door hand operated when required.

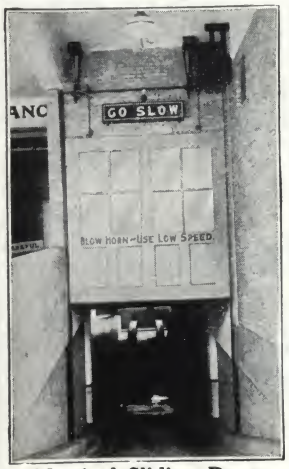
Motor Unit—See specification, page 5.

Electric Control—See specification, page 5.

Guarantee—See specification, page 5.

Note for Three-Piece, Three-Speed Doors

The same specification applies to the three-speed, three-piece as to the two-piece, two-speed doors except that it should be changed to take care of the extra piece and extra speed. The same size of operating units apply as for single piece vertical sliding doors according to area of openings.



Vertical Sliding Door

ONE-PIECE VERTICAL LIFT DOOR

For Piers, Warehouses, Garages, etc.
Openings from 144 Sq. Ft. to 2500 Sq. Ft.

Size of Operators

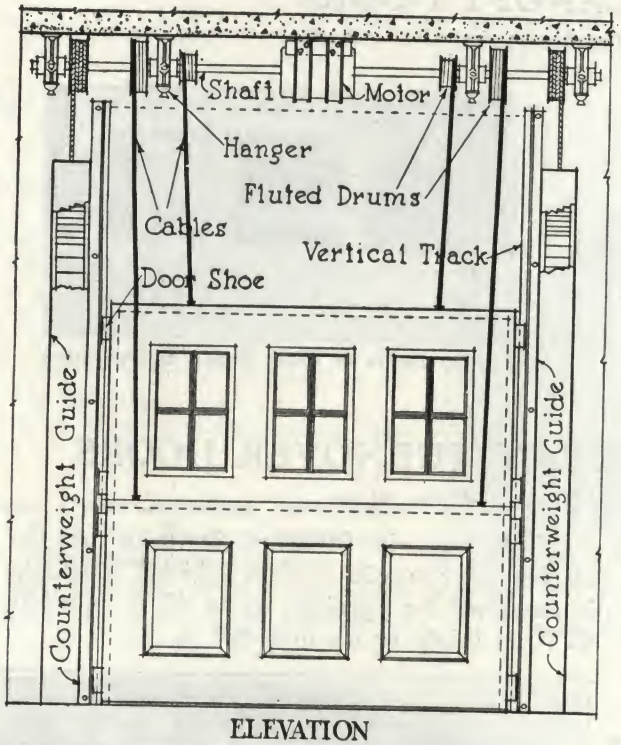
The following schedule of operators apply to this type of door:

No. 100 unit up to 144 sq. ft.
No. 200 unit up to 250 sq. ft.
No. 300 unit up to 475 sq. ft.
No. 400 unit up to 600 sq. ft.
No. 500 unit up to 1000 sq. ft.
No. 600 unit from 1000 sq. ft. to 2500 sq. ft.

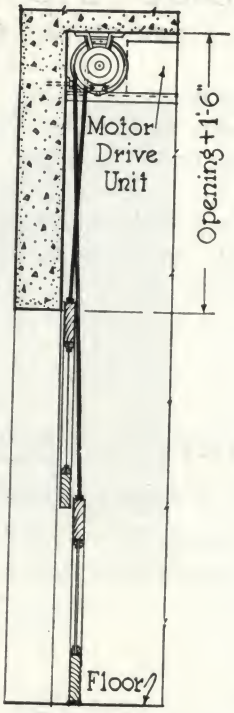


Vertical Sliding Doors Passing into Second Story

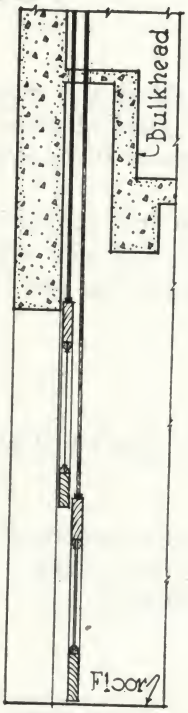
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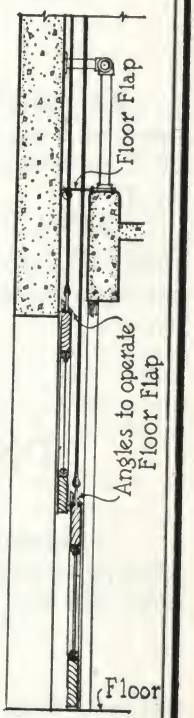
ELEVATION



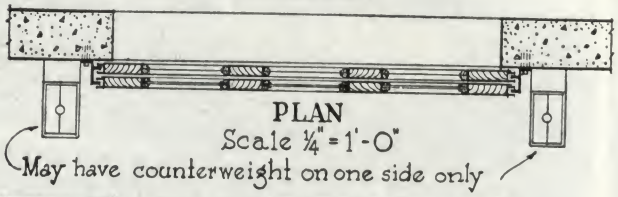
SECTION



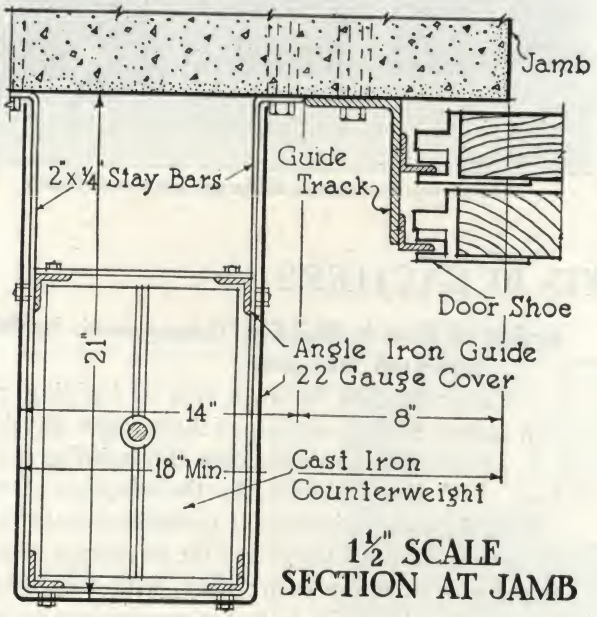
SECTION



SECTION

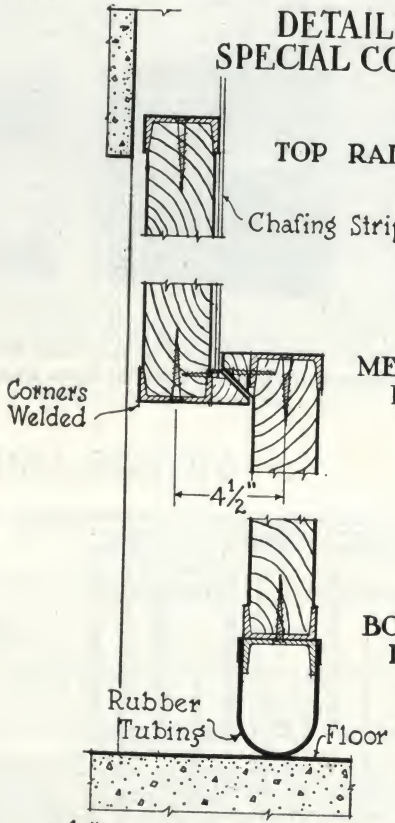


PLAN
Scale ¼" = 1'-0"



1½" SCALE
SECTION AT JAMB

DETAILS OF
SPECIAL CONDITIONS



1½" SCALE VERTICAL
SECTION THRU DOOR

DETAILS OF TWO PIECE, TWO SPEED VERTICAL LIFT DOORS

Continued on next page

FOLD-UP AND CANOPY DOORS

For Garages, Warehouses, etc.

We furnish fold-up and canopy doors electrically operated with our standard drive units in sizes up to 30 ft. in width and 20 ft. in height, or not over 450 sq. ft.

These doors are fully automatic and can be remotely controlled and will lock and unlock by means of a positive mechanical locking and braking device.



Fold-up Doors in Three Stages of Operation

ONE AND TWO-PIECE SLIDE-UP TURNOVER DOORS

For Warehouses, Industrial Plants and Pier Sheds

We manufacture and install electrically operated slide-up turnover doors of heavy construction covering wide and high openings.

This door is furnished in from one to any number of multiple sections divided vertically and is furnished for openings up to 40 ft. in width and 40 ft. in height or not over 800 sq. ft.

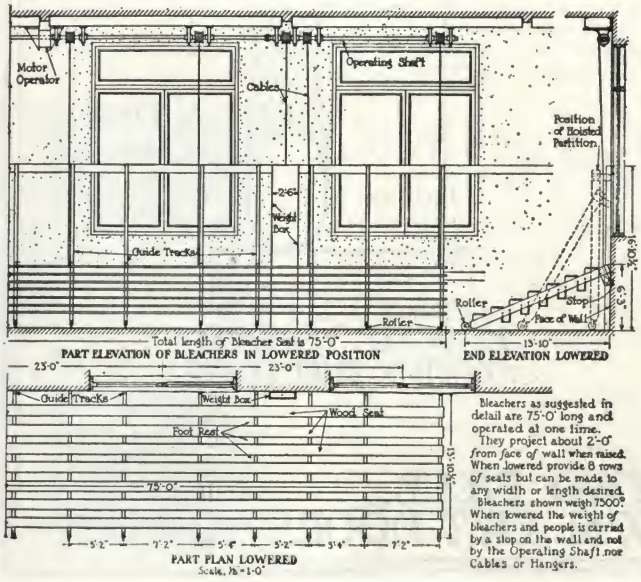


One-piece Slide-up Turnover Doors in Three Positions



Two-piece, Two-speed Slide-up Turnover Doors

MOTOR OPERATED BLEACHERS



Saving of Cost in Building Gymnasiums by Motor Operated Bleachers

On account of the high cost of building, many new space saving appliances have been developed.

In the case of gymnasiums, this building cost has been reduced considerably by the adoption of motor operated bleachers instead of permanent seats and expensive balconies. They have the advantage of allowing free use of the entire floor, with the exception of two feet from the wall, for gymnasium purposes.

The bleachers can be made in any size desired. When not required they are pulled up close against the wall out of the way. When required the front edge is rolled out on the floor while the back remains against the wall. The pushing of a button raises or lowers the bleachers in about half a minute. The detail at left shows the general construction and method of operation.

Continued on next page

MOTOR OPERATED DOORS FOR AIRPLANE HANGARS

By A-D Monowheel Drive and A-D Duplex Drive Units
(Patents Applied For)

Motor Operation of Hangar Doors Essential for Quick Service

On account of the intense and growing interest throughout the country in the development of airports, we have developed what we believe to be the solution of motor operation for the doors of hangars. Time is an important factor in the operation of hangar doors and will be much more important in the future as the development of air travel progresses.

Three of our installations are illustrated.

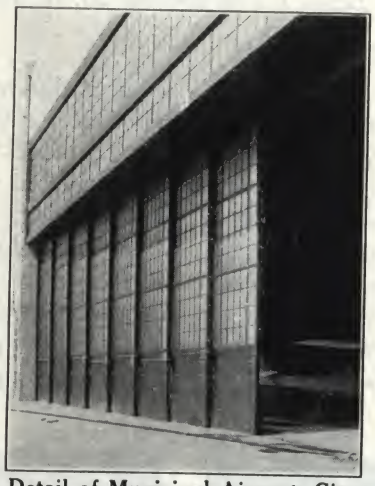
Hangar Doors Introduce New Problems in Door Construction, Operation and Control

The minimum height and width of doors necessary for the entrance to hangars, as well as flexibility in operation are factors that have led to new construction features in doors as well as in operators.

The use of steel for these doors seems a logical solution. They can be made in sufficiently large and strong units, and yet occupy little room and are comparatively light. The outstanding steel sash and door manufacturers are standardizing on this type of door construction, using standard construction methods, especially as to bottom roll hardware used.

The ALLEN-DREW Monowheel Drive is designed to fit the opening used for supporting wheel assembly.

The use of duplex drives necessitates special construction of the lower part of the traction panel.



Detail of Municipal Airport, City of Detroit Showing 8-speed Door Operators



Hangar at Municipal Airport, Pontiac, Mich.

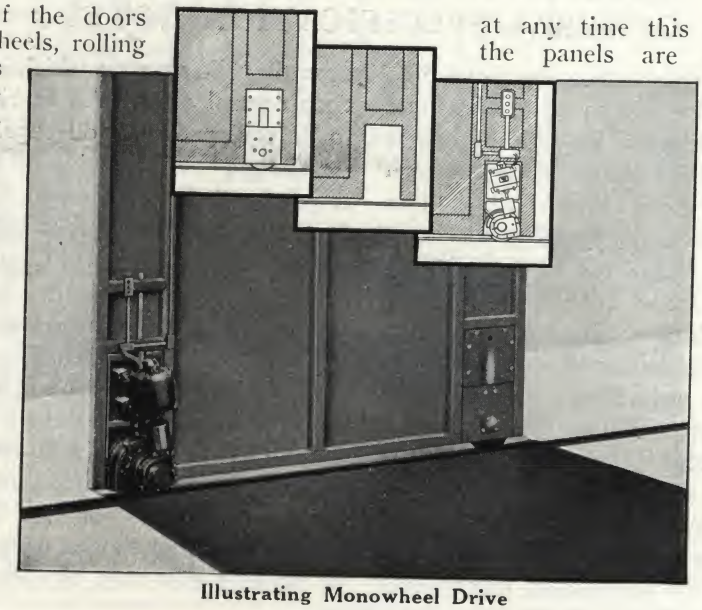


General View of Door of Municipal Airport, City of Detroit. Opening, 150 Ft. Wide x 25 Ft. High

PRINCIPLE OF DOOR OPERATORS

Since the weight of the doors rests upon the flanged wheels, rolling on the track or rail, it is merely necessary to drive the wheels in order to move the door. Any door so driven becomes a monorail locomotive capable of moving itself and pulling or pushing other doors on the same track or on parallel tracks.

As shown in the illustration the motor unit occupies the same size panel space as the bearing wheel on the opposite end. This allows the changing of the position of the motor unit from one door to another if at any time this is deemed necessary. All the panels are made in standard sizes, making it possible to use them interchangeably.



Illustrating Monowheel Drive

The absence of racks and pinions, chains, cables and heavy overhead structures, as well as the fact that the units are of standard sizes, makes the installation a simple and inexpensive matter. It also reduces upkeep, as not only are there less parts than in overhead operation, but being within reach of mechanics they will be oiled and generally given more attention than operation out of reach.

Continued on next page

TWO AND FOUR PIECE SWINGING AND FOLDING DOORS

For Doors Up to 450 Sq. Ft. in Area

Notes Regarding Two and Four-piece Swing Doors

This type of door has fulfilled a service where it was not desirable to use other types of doors. The pair of single swinging doors open either inward or outward at each side of the opening. The doors are hinged with heavy strap hinges which are in turn pivoted by heavy steel shafts placed in a vertical position at each side of the door opening. The entire mechanism requires only 8 in. at each side of the opening and 1 ft. 6 in. above the opening. Doors may be arranged to swing at different angles if required, as at 90° for one and 180° for the other.

The doors operate very rapidly and on account of the manner in which they are hung they are prevented from sagging.

The four-piece swing doors are a combination of the hinged swinging door and the overhead trolley type. The jamb section swings and the middle section slides and swings as it is hinged to the jamb section and hung at the inside upper corner from an overhead track.



Exterior View



Interior View

Four-piece Swinging and Folding Doors

GENERAL SPECIFICATION NOTES

Door Construction—See specifications page 5.

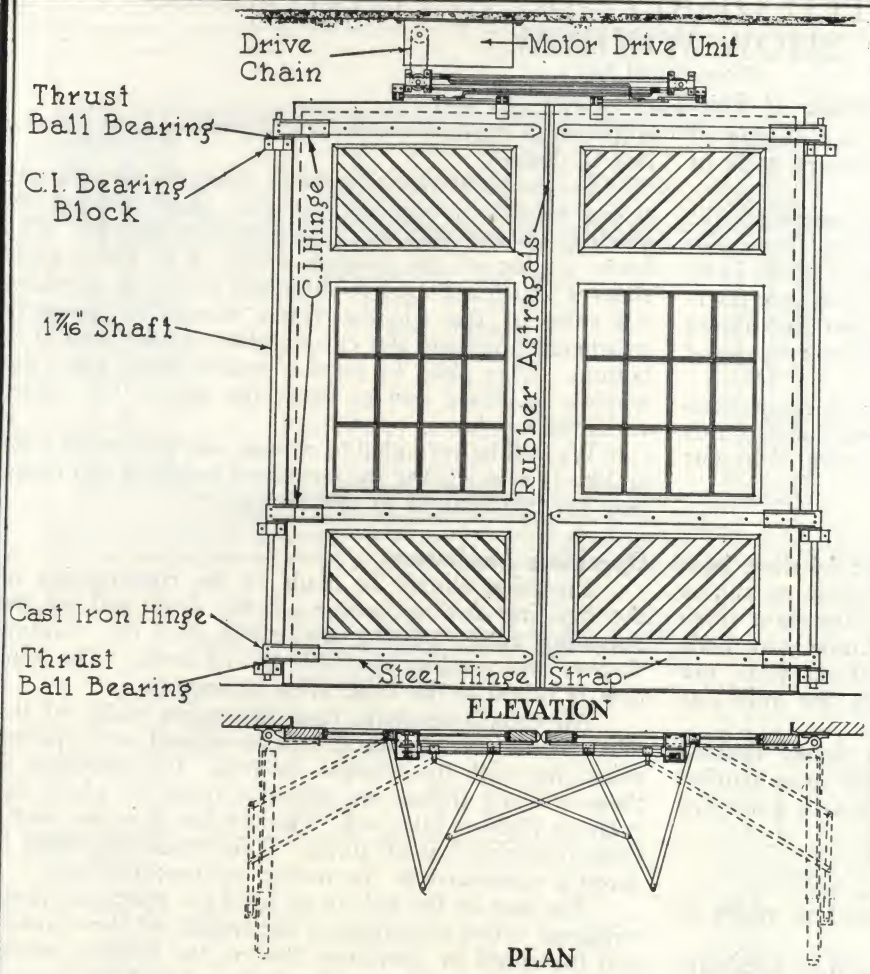
Hardware—Doors of over 144 sq. ft. in area must be equipped with specially designed heavy strap hinges pivoted on vertically supported shafts placed at each side of the door opening. Each pivot shaft shall in turn be supported by brackets equipped with thrust bearings. Hinges for the fly leaves of our folding doors are to be pivoted on thrust bearings and solidly attached to the main panel hinges. The hardware is to carry the entire weight of the door panels and all loads and thrusts incurred by the operations of the doors.

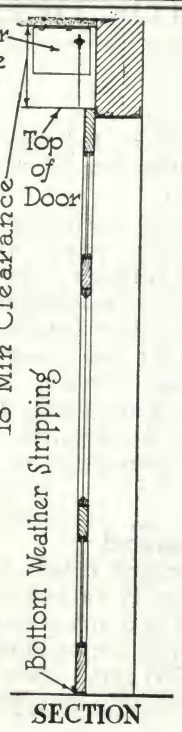
Motor Units—Doors up to 200 sq. ft. in area shall be controlled by a standard Allen-Drew No. 100 Operator. Doors over 200 sq. ft. up to 400 sq. ft. in area shall be controlled by a standard Allen-Drew No. 200 Operator. The operator is to be connected to the door panel by means of an endless chain drive operating sliding arms which in turn is connected to the door control arms. All bearings and pivot points are to be equipped with oil cups.

Scope—All swinging or folding doors as noted on drawings shall be operated by one electric drive unit for each set of doors as manufactured and installed by Allen-Drew Company, Cambridge, Mass. Each unit shall be remotely controlled by push button stations as located on plans. The doors shall operate at a speed of at least 2 ft. per second.

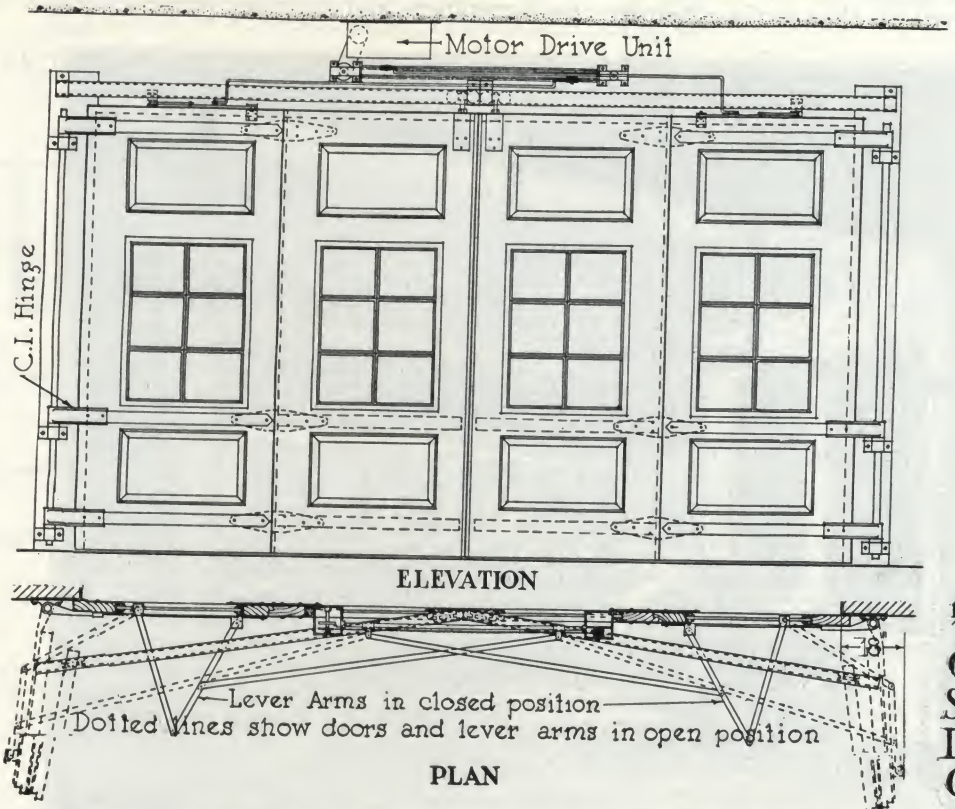
For doors over 400 sq. ft. in area the pivot shafts should be extended at their upper end and equipped with bevel gear boxes to which the two shafts are directly geared by means of a horizontal equalizing shaft. A No. 200 or No. 300 standard unit is then direct connected to the equalizing shaft and any size of opening may then be controlled.

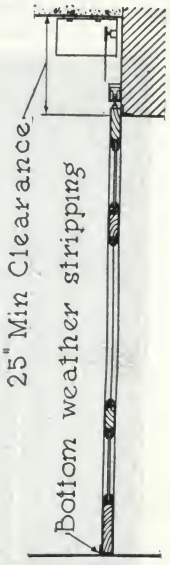
Continued on next page





½" SCALE DETAILS OF MOTOR OPERATED TWO PIECE SWING DOORS





½" SCALE DETAILS OF FOUR PIECE SWINGING FOLD DOORS, MOTOR OPERATED.

DETAILS OF SWINGING & SWINGING FOLDING DOORS

Continued on next page

MOTOR OPERATED DISAPPEARING PLATE GLASS SHOW WINDOW

(Patent Applied For)

Possibilities of This Type of Show Window

The example illustrated and described is one of several of our installations of a disappearing type of salesroom windows.

One of our most interesting developments is the electric operation of the whole street front show window including front entrance doors. This is about 75 ft. long and the several bays, together with entrance doorway, disappear below the sidewalk. Its operation allows practically an open air show room which can be closed up at night or in bad weather.

These conditions are simply offered as suggestions of possible further development of conditions of this nature. Any size opening can be taken care of by our mechanism.

The Example Illustrated

The illustration and details on page 14 show how an unusual condition in an automobile show room was handled. The only exit and entrance to the show room was from the front of the building. Ordinary methods sometimes used for small show windows were not practical or satisfactory in appearance for this size window.

A disappearing type window was finally decided upon. The details show how the window was handled and the following description will serve as a guide for other problems of a similar nature.

The Construction of the Frame

The plate glass sections are limited in width to 20 ft.

If a larger opening is desired, it will be necessary to introduce mullions between the glass sections, but the entire front opening can be constructed as a single section if desired.

The window frame must be designed structurally strong enough to support the plate glass without depending on the glass in any way for support. The lower section of the window frame is to carry cable sheaves which are used to raise and lower the window. All sides of the window frame should be properly weatherstripped and slot closing plate should be used at bottom. This plate to form a weatherstrip when the window is closed and to cover the slot in the frame when the window is open.

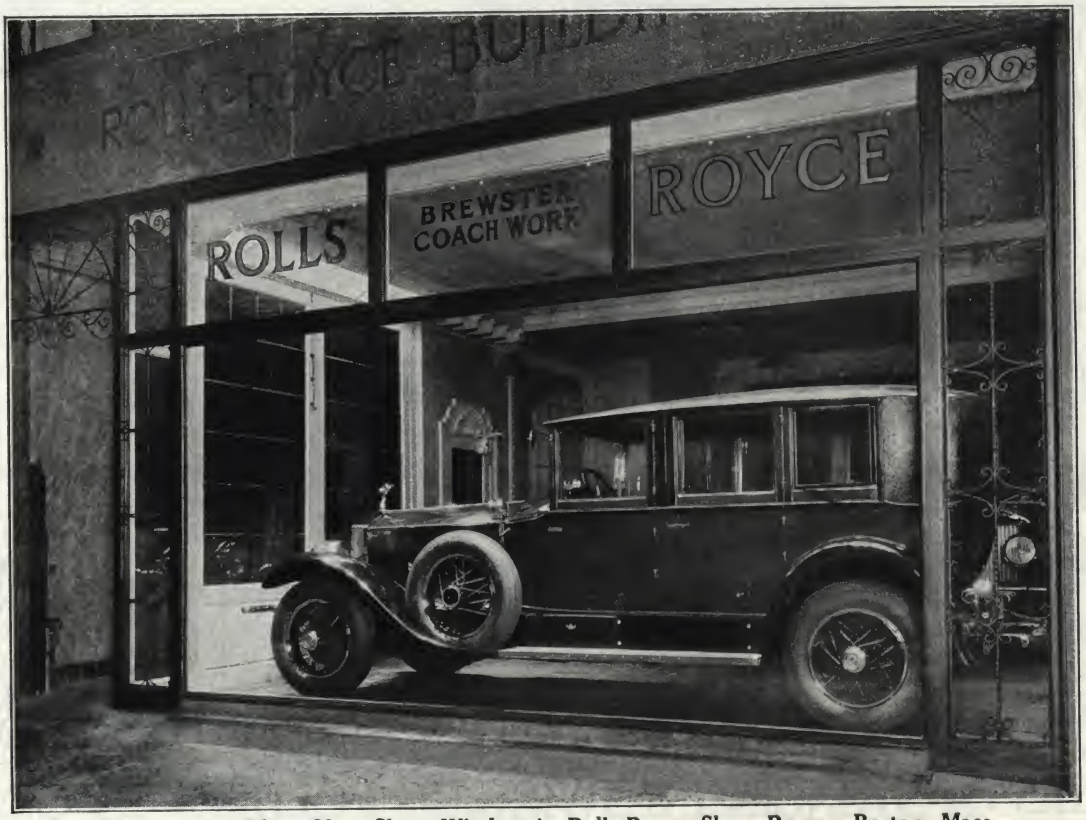
We will be very glad to consult and co-operate with architects in designing the structural supports and members for installations of this character.

Operating Mechanism

Provision should be made in the construction of the building for anchorage of the dead end of the operating cable, passing the cable over the window sheaves and winding the cable on the drum. The window is raised in the cable sling so formed.

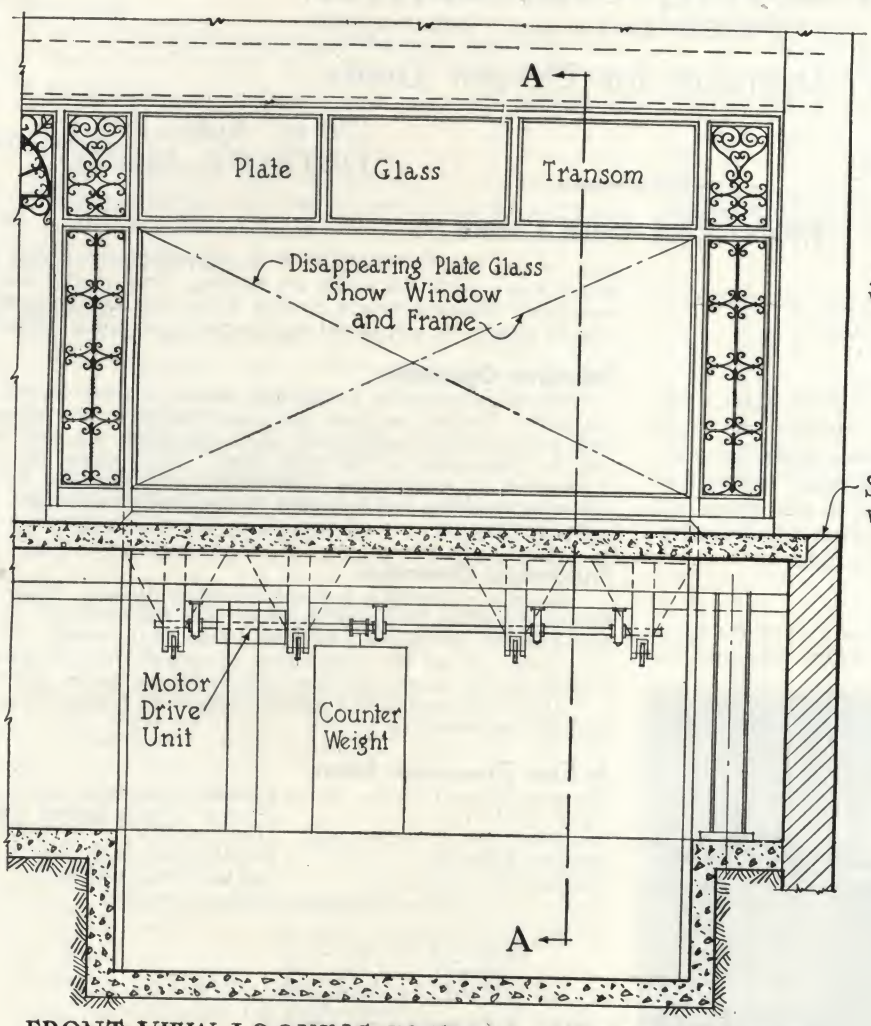
An equalizing shaft runs the entire width of the window and the winding drums are placed at the points coinciding with the window sheaves. In opposition to these winding drums are placed a drum to which the cable or chain is attached. The window is to be evenly counterweighted at all times. This equalizing shaft is directly connected to the motor equipment.

The size of the unit to be used for operating these windows varies according to the weight of the window and the speed of operation desired, the existing structural conditions and any other items of variable nature.

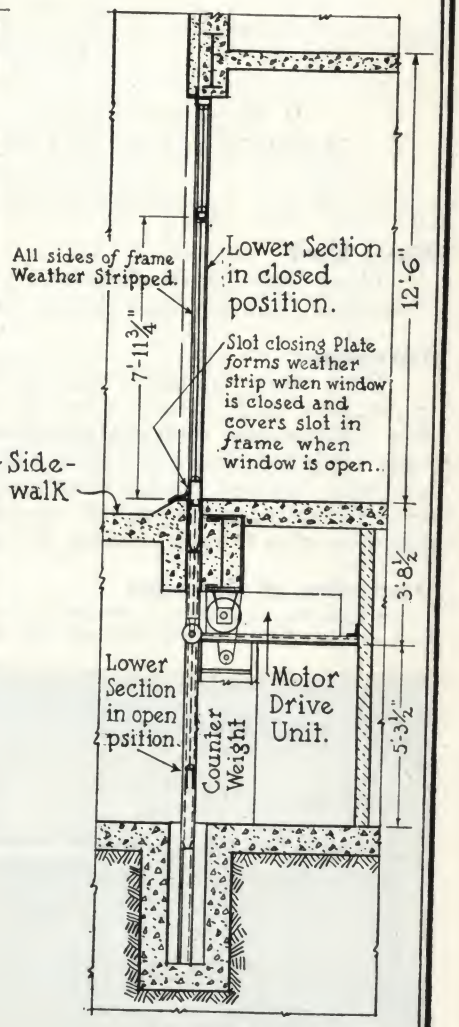


Disappearing Plate Glass Show Window in Rolls-Royce Show Rooms, Boston, Mass.

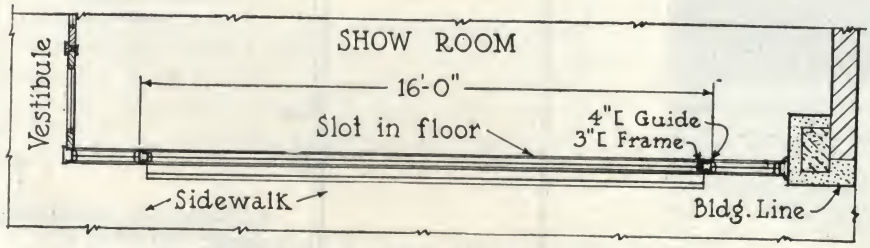
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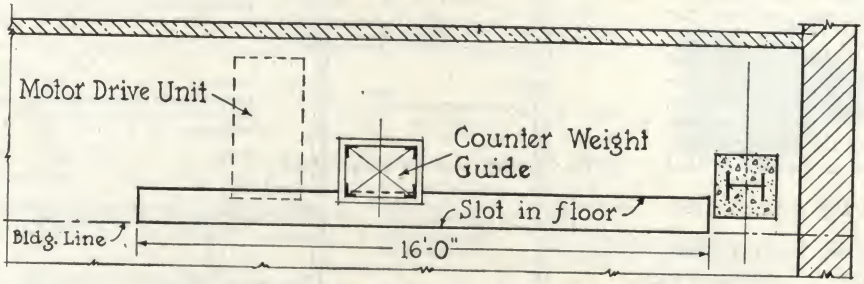
FRONT VIEW LOOKING IN FROM OUTSIDE OF BLDG.



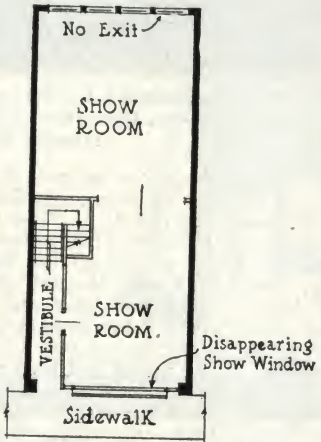
SECTION A-A



PLAN SHOWING SLOT IN FLOOR



PLAN SHOWING COUNTER WEIGHT IN BASEMENT FLOOR



PLAN SHOWING CONDITIONS AT BUILDING

DETAILS SHOWING DISAPPEARING SHOW WINDOW FOR AUTO-MOBILE SHOW ROOM

DOOR-MOTIVE CORPORATION

SUBSIDIARY OF THE RILEY STOKER CORPORATION

Power Operators for Elevator Doors

9 Neponset Street
WORCESTER, MASS.

270 St. Aubin Street
DETROIT, MICH.

INDIVIDUAL OPERATORS

Where Used

These Door-Motive Operators may be applied to all types of popularly used elevator doors.

Advantages

Free, easy, harmonic motion—slow start, fast travel, slow stop, cannot slam, no cushion required, door maintenance reduced, individual doors economically equipped, easily installed, minimum amount of headroom required, quickly disconnected and doors left perfectly balanced for manual operation, swift operation, 3 seconds to open or close 10-ft. door.

Description of Operation

A push button switch conveniently located starts the operation of the motor, which through the worm reduction unit



17-ft. Counterbalanced Center-parting Door Equipped with Door-Motive Operator in Hupp Motor Car Co., Detroit, Mich.

(B) rotates the operating arm (A). The angular motion of the arm through the connecting link (D), gives a linear motion to the operating rod (C). The motion of the operating rod transmitted through the chain, operates the sprockets (E). These sprockets being assembled on the same shafts as sprockets (F), rotate them and through the supporting chains operate the doors. When the doors are in a fully open position, the limit switch cuts off the current to the motor. When the current to the motor is cut off, a brake (H), which during the operation of the motor has been released by a solenoid, immediately operates and prevents any possibility of the operating arm going beyond the dead center position. To close the doors, the closing button is pressed, which operates the motor in the opposite direction. The rest of the operation is similar to that of opening the doors.

The doors may be stopped instantly in any position from which they may be either closed or opened.

All this is accomplished from only two push buttons through a specially designed reversing switch.

Push Button Regularly Supplied

Push button operation is regularly supplied. A two-button station on the car which operates all doors and one station equipped with a lock located outside of one door, usually the ground floor, which will serve to lock the entire hatch. Momentary contact only is required; it is not necessary to hold the button down while the doors are moving. Our special reversing panel allows complete control from two buttons; doors may be stopped in mid travel and started up in either direction.

Selective Operation

Selective operation is supplied wherever rear doors are operated. Toggle switches are incorporated in the elevator push button station which will allow operating the rear door with or independent of the front door. When riding car gate is required a Door-Motive Gate Operator is mounted on the elevator crosshead and operated in conjunction with the rear door operator.

Automatic Operation

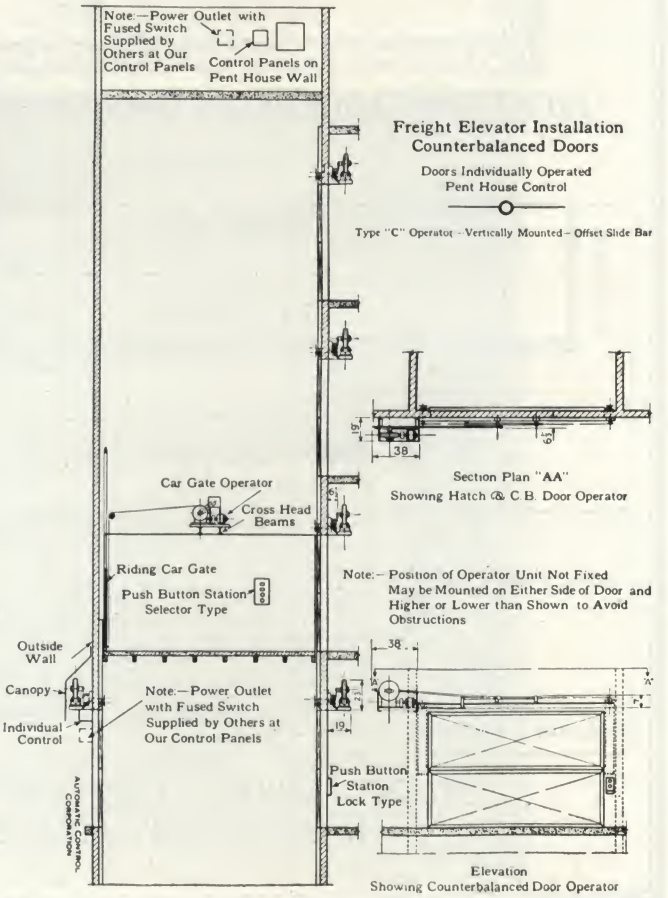
Automatic operation is furnished when desired. When the car comes within 10 in. of the floor with the controller in the stop position the doors will open automatically while the car is leveling. When the controller is thrown to the first position to start up the doors will close before the car leaves the floor.

Automatic closing is furnished only with self-leveling and push button elevators.

A Few Prominent Users

Chrysler Motor Car Co.	Packard Motor Car Co.
Fisher Body Corp.	General Tire & Rubber Co.
Goodyear Tire & Rubber Co.	Hupp motors
Atwater Kent Co.	Norton Company
Cadillac Motor Car Co.	Oakland Motor Car Co.

Union Terminals Station, Cleveland



Continued on next page

DOOR-MOTIVE MASTER OPERATOR

Where Used

Counterbalanced center-parting and pass type elevator doors where more than three or four floors are to be equipped.

Installation

Master operator may be mounted on penthouse floor, wall or ceiling, underneath penthouse floor or on hatch wall. It takes a minimum of space and may be arranged conveniently to miss obstructions.

Advantages

Harmonic motion—slow start, fast travel, slow stop. Doors cannot slam—door maintenance lower. Doors positively driven open and closed and positively brought to a stop at end of travel.

Fastest operation—three seconds to open 14-ft. doors and without slamming.

Since doors are positively stopped without depending on hitting sill, friction grips do not slide off operating rods, consequently long life of friction grips is assured.

Use of rigid continuous rod driven through heavy roller chain does not permit overtravel caused by stretching of cables.

Newly developed positive friction grip locks the door to operating rod before rod moves and is released when rod has made complete travel. Grips do not slip on rods but will slip in case it meets with an obstruction in closing, thereby preventing injury to mechanism or to the obstruction.

Retiring cam used on elevator for selecting door and for setting friction grips is electrically interlocked with the operating mechanism and has a hydraulic check which reduces noise to a minimum, insures long life to moving parts.

Minimum of electric equipment and all located in one place in penthouse for easy inspection and maintenance.

Doors left on original hanging without change. Doors can be quickly detached from operating rods to allow manual operation.

All apparatus out of sight and absolutely quiet.

Adaptable to practically every elevator installation because but little space is required for installation.

Doors are mechanically locked and electrically interlocked in accordance with safety codes of all States.

Description of Operation

When the car slows down to make a landing under automatic operation, a solenoid switch in the penthouse is energized, which starts the retiring cam torque motor. The cams are pushed out, engaging latch rollers, setting friction grips on operation rods and disengaging door latches.

When last operation is complete and retiring cam has reached full extended position, contacts are made starting master operator in penthouse. Operation of operator is same as for individual operators on preceding page. When doors are full open, cam goes back to its retired position.

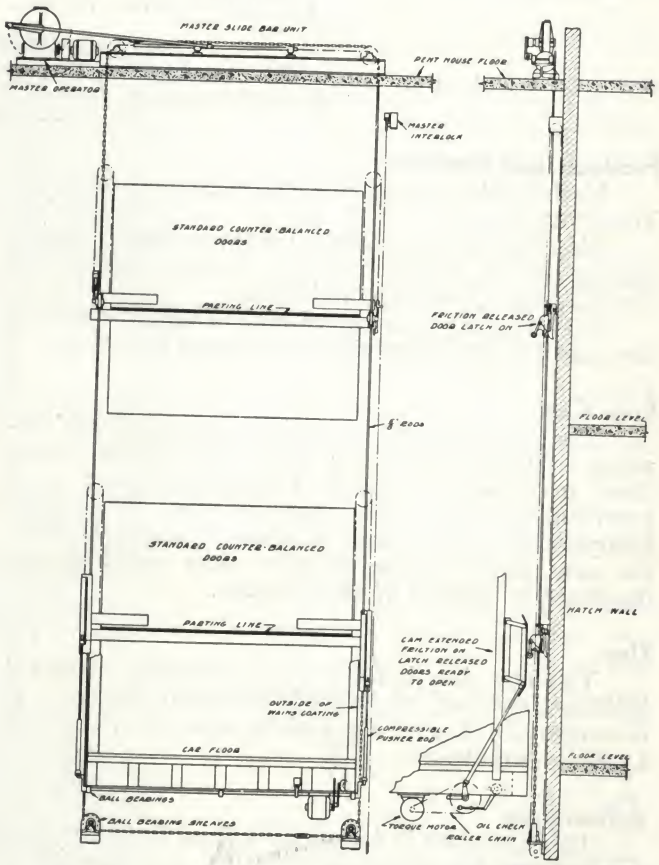
To close doors push button control is ordinarily used. When the button is pushed, operator makes return stroke closing doors. When doors reach closed position latches hook over trucking bar and the spring behind the latch is sufficient to disengage friction grip.

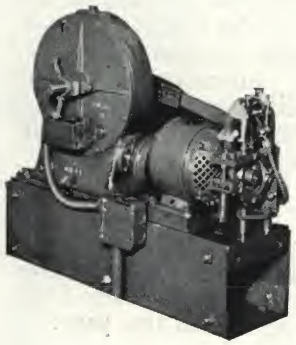
Construction

(1) Door-Motive operator consists of power unit, motor brake and worm gear.

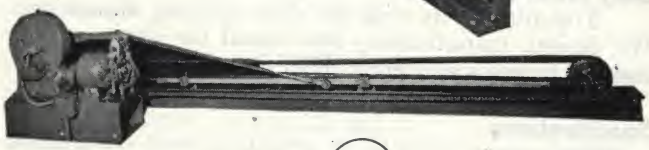
(2) Door operating unit, with operating rods.

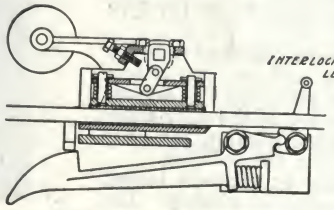
(3) Control panel.



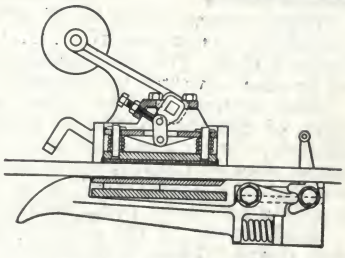








FRICTION ON LATCH RELEASED



FRICTION RELEASED. LATCH ON

J. EDWARD OGDEN COMPANY, INC.

Doors for Pier Sheds, Freight Warehouses, Industrial Buildings, Garages and Airplane Hangars

TELEPHONE
RECTOR 4655

WORKS: BAYONNE, N. J

147-149 Cedar Street, NEW YORK, N. Y.

AGENCIES

NEW ORLEANS, LA., OLE K. OLESON, 822 Perdido Street

SAN FRANCISCO, CAL., ROMAN & Co., 55 New Montgomery Street

MONTREAL, QUE., F. BACON & Co., LTD., 131 St. Paul Street W.

Products and Services

Mechanically operated OGDEN SINGLE SECTION TURNOVER DOORS.

Also Ogden Two-section Turnover Doors, Ogden Canopy Doors, Ogden Airplane Hangar Doors, and Ferry Bridge Operating Mechanism.

This company is interested in the Design, Manufacture, and Erection, of all the above named specialties.

Low Cost

You are interested in saving money and maintenance troubles, and at the same time always having doors in working condition, without paying an extra premium, in first cost, to accomplish this. The Ogden Company, therefore, asks you to see its engineers about the new single section turnover door which it has developed to give all of these results.

Use

This new door is for use in warehouses, industrial buildings, railroad freight sheds and public garages. It is comparable in price (and often lower in price) than a rolling steel door.

Advantages

This new door is forever free from rattles, rusting out between slats, trouble with hinges and deflection in high winds. It lends itself to the use of glass in the upper portion and a pass door in the lower portion—two things highly valuable in large warehouses.

This single section door is automatic in locking when closed, thus making it positive in closing, a thing that is seldom accomplished in the so-called jack-knife door. Unlocking is a manual operation.

A Prominent Installation

We have installed 136 of these doors in the large new warehouse of the Seaboard Terminal & Refrigeration Co., at Eleventh and Coles Streets, Jersey City, N. J. Cuts of these doors are shown on this page.

Only Data Necessary

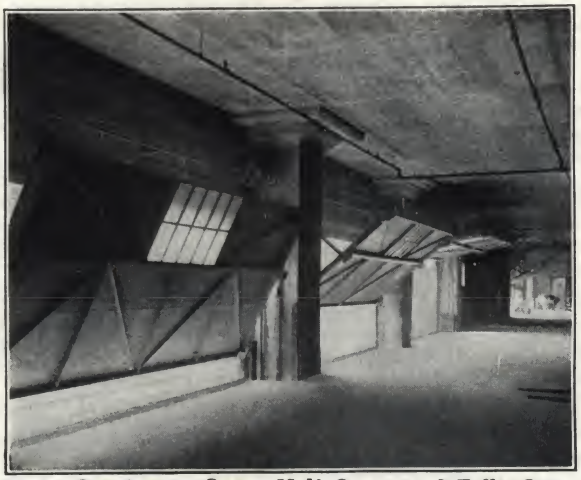
You furnish us with the door opening dimensions. We design, manufacture, and install the doors, guides and mechanisms and erect them completely.

Specifications

Door sections shall be of a skeleton steel construction, covered on outside with No. .... (black or galvanized, flat or crimped) steel. The door shall be of the slotted link bar type and be easily operated by one man.

Door sections shall be supported by links attached near the center of gravity so that a continuous pull on the chains attached to lower corner of door section will raise the bottom edge of door vertically and will swing the top of the door away from the door header, until, in its final open position, the door assumes a horizontal position extending into the building.

Each corner of the door section shall be securely locked when closed. These locks shall be automatic in closing. The top locks shall be manually operated in opening.



Doors Starting to Open, Half Open, and Fully Open



Door Half Open—Doors at Left Side of Illustration Fully Closed



Door Fully Open

QUINCY ELEVATOR GATE COMPANY

Manufacturers of Power Operators for Freight Elevator Doors and Gates

TIFFIN, OHIO

Quincy Door Operator (Friction Grip System)

The annunciator informs the elevator operator of the stop to be made. When reaching that floor he releases his elevator control switch handle and the doors open automatically. The operator can at all times instantly stop the doors while opening or closing by pressing "Stop" button.

In addition to automatic opening devices, there is a three-button station on the car marked "Open," "Close" and "Stop" and a duplicate station in a locked box at outside of hatch wall at any one designated floor.

The Quincy Friction Grip System has two round rods (one on each end of the door) connected to chains which pass over sprockets in the penthouse. Doors remain evenly balanced.

To each side of the door a friction block is attached by means of a flat bracket.

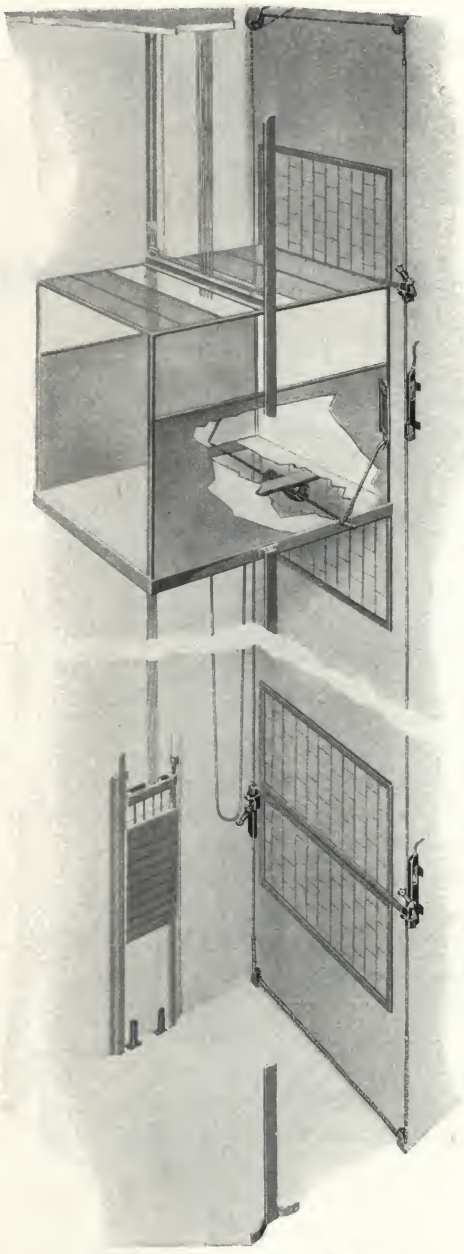
A friction block can only engage with a vertical rod when the car is at its landing; thus the vertical rods slip through the open friction blocks on the other doors.

The combination lock and interlock is mechanical in operation and positively prevents operation of the elevator when any door is opened or unlocked.

Power Unit

Standard make motor. Worm gear reducer with Timken roller bearings. Cutler-Hammer control.

Slow start and slow stop is simple, rugged and permanently adjusted at time of installation.



Quincy Friction Grip System

Field Test

Friction Grip Systems have been in service for nearly ten years.

Hundreds of doors so equipped have been operating more than five years and continue to operate in first class manner.

Power Operated Riding Car Gates

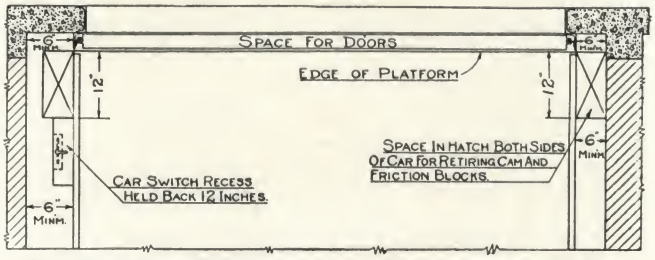
It is customary, when openings occur at both front and rear of the hatchway, to equip one end of the elevator car with some type of gate.

Quincy Electro-Manual Type Power Operated Gates combine easy manual operation with perfectly cushioned power operation.

Gate Operator furnished in combination with Quincy Gate or to operate similar gate furnished and installed by others.

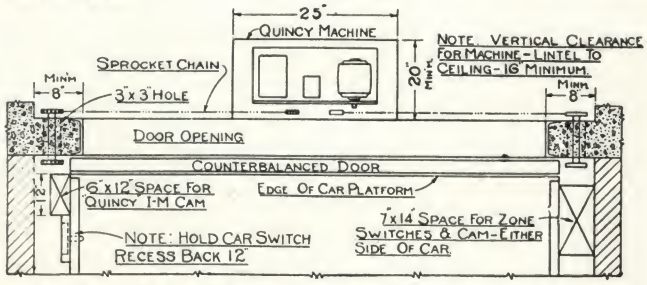
Individual Machine System, Power Operators

The Individual Machine System is an alternate for the Quincy Friction Grip System, "Penthouse Type," for elevators having three or less openings in a single line.



Showing Space Requirements in Hatch for Friction Grip System, "Penthouse Type"

When the elevator has a line of doors at the rear, it is necessary to provide the same size spaces as shown for front of car



Showing Space Requirements in Hatch for Individual Machine System

When the elevator has a line of doors at the rear, it is necessary to provide the same size spaces as shown for front of door



ORNAMENTAL METAL WORK

Aluminum Co. of America....A1531–1535
American Brass Co. A1528–1530
American Bronze Co. A1538
American Mast & Spar Corp....A1608–1609
Art Metal Construction Co....A1536–1537
Babcock-Davis Corp. A1610–1619
Bayer, A. J., Co....A1539
Buck, C. H., & Co., Inc....A1540
Carr, Elmer E. A1607
Cincinnati Mfg. Co. A1541
Coleman, Adelbert, Co....A1542–1543
Copper and Brass Research Assn....A1546
Crown Iron Works Co....A1544–1545
Detroit Mausoleum Equipment Works....A1547
Ellison Bronze Co., Inc....A1548
Etched Products Corp....A1549
General Bronze Corp....A1550–1553
Gorham Co. A1554–1555
Gwathmay, J. H....A1556
Harsch, John, Bronze & Foundry Co....A1557–1559
Hasselman & Salterini, Inc....A1560–1561
Haven-Busch Co. A1562–1563
Heath, J. S., Co....A1564–1565
Illinois Bronze & Iron Works....A1566–1567
International Nickel Co., Inc....A1568–1569
Jackson, Wm. H., Co....A1570
Lingo, John E., & Son, Inc....A1599–1606
Logan Co. A1571
Matthews, Jas. H., & Co....A1572–1573
McGann, T. F., & Sons Co....A1574–1575
McKinney, James, & Son....A1576
Michaels Art Bronze Co., Inc....A1577
Midwest Metal Art Div., The Newman Mfg. Co..A1578
Newman Mfg. Co....A1579–1581
North American Iron Works, Inc....A1582
Overly, W. F., & Sons....A1583
Penn Brass & Bronze Works....A1584
Pole and Tube Works, Inc....A1620–1627
Price–Evans Foundry Corp....A1585
Reliance Bronze & Steel Corp....A1586–1587
Revere Copper and Brass Inc....A1588
Schreiber, L., & Sons Co....A1589
Sexauer & Lemke, Inc....A1590–1591
Smith, F. P., Wire and Iron Works....A1592–1593
Smyser-Royer Co. A1594–1595
Superb Bronze & Iron Co., Inc....A1596
Tyler Co. A1597
Williams, Jno., Inc....A1598

THE AMERICAN BRASS COMPANY

Manufacturers of Extruded Bronze, Brass, Copper and Nickel Silver for Ornamental and Structural Purposes; Wire, Rods and Tubes

GENERAL OFFICES
WATERBURY, CONNECTICUT

MILLS AND FACTORIES

ANSONIA, CONNECTICUT
BUFFALO, NEW YORK
TORRINGTON, CONNECTICUT
DETROIT, MICHIGAN
WATERBURY, CONNECTICUT
KENOSHA, WISCONSIN

Canadian Mill: Anaconda American Brass Limited, New Toronto, Ont.

Products

ANACONDA ARCHITECTURAL BRONZE, BRASS, COPPER and NICKEL SILVER for ornamental and structural purposes, furnished in Extruded and Drawn Shapes, Sheets, Rods and Tubes to leading fabricators of ornamental and structural metal work, including cornices, pilasters, grilles, wickets, counters, door and window trim, screens, hand rails, etc.

For pages on Anaconda Sheet, Roll and Strip Copper, Brass and Copper Pipe and Deoxidized Copper Tubes, and Everdur Metal, see Manufacturers' Index.

Extruded Architectural Shapes

Copper alloys which can be hot worked are successfully wrought into finished shapes by the extrusion process. This consists of forcing a bar of metal by hydraulic pressure through a hardened steel die of the proper cross-section. The resulting product is of a homogeneous texture, strong and durable, and in every way superior to castings. Extruded shapes are characterized by their dense structure and unusually smooth surface. They are entirely free from the pocked surfaces and porosities found in sand castings. The edges are sharp and clean, making possible detailed execution of the original design.

Strength — The tensile strength of Anaconda Extruded Architectural Bronze is at least 45,000 lb. per sq. in.

Dies—A large number of dies, made up during the past twenty-seven years for the production of extruded bronze shapes from designs by many leading American architects, have been released for general use. The availability of these dies often eliminates the expense of special die-making, reducing the cost of the finished metal work.

An example of the design possibilities that lie in the use of Anaconda Shapes extruded from these standard dies is illustrated on the following page.

Available Shapes

The catalogue, "Anaconda Architectural Bronze Extruded Shapes," illustrating full-size cross-sections of the several thousand shapes for which dies are available, will be sent upon request. The book is supplemented with a set of plates in full color, one of which is reproduced at the right. Complete sets of these plates may be had for the asking.



Entrance of Park Square Building, Boston, Mass.
DENSMORE, MCCLEAR & ROBBINS, Architects
Bronze castings used in conjunction with Anaconda Extruded Bronze Shapes

Color of Extruded Bronze

Anaconda Architectural Extruded Bronze Shapes possess a natural golden color. After exposure the metal darkens and assumes the characteristic color of bronze. For interior use, the metal can be artificially colored to obtain any desired effect. Extruded bronze is successfully matched in color with bronze sheets and castings.

Production Facilities

THE AMERICAN BRASS COMPANY is equipped for extensive production of Anaconda Architectural Extruded Shapes. The Company has complete facilities for serving the East from its mill at Ansonia, Conn., and the West from its mill at Kenosha, Wis. Inquiries or orders should be sent to the nearest mill.

Cold Drawn Architectural Shapes

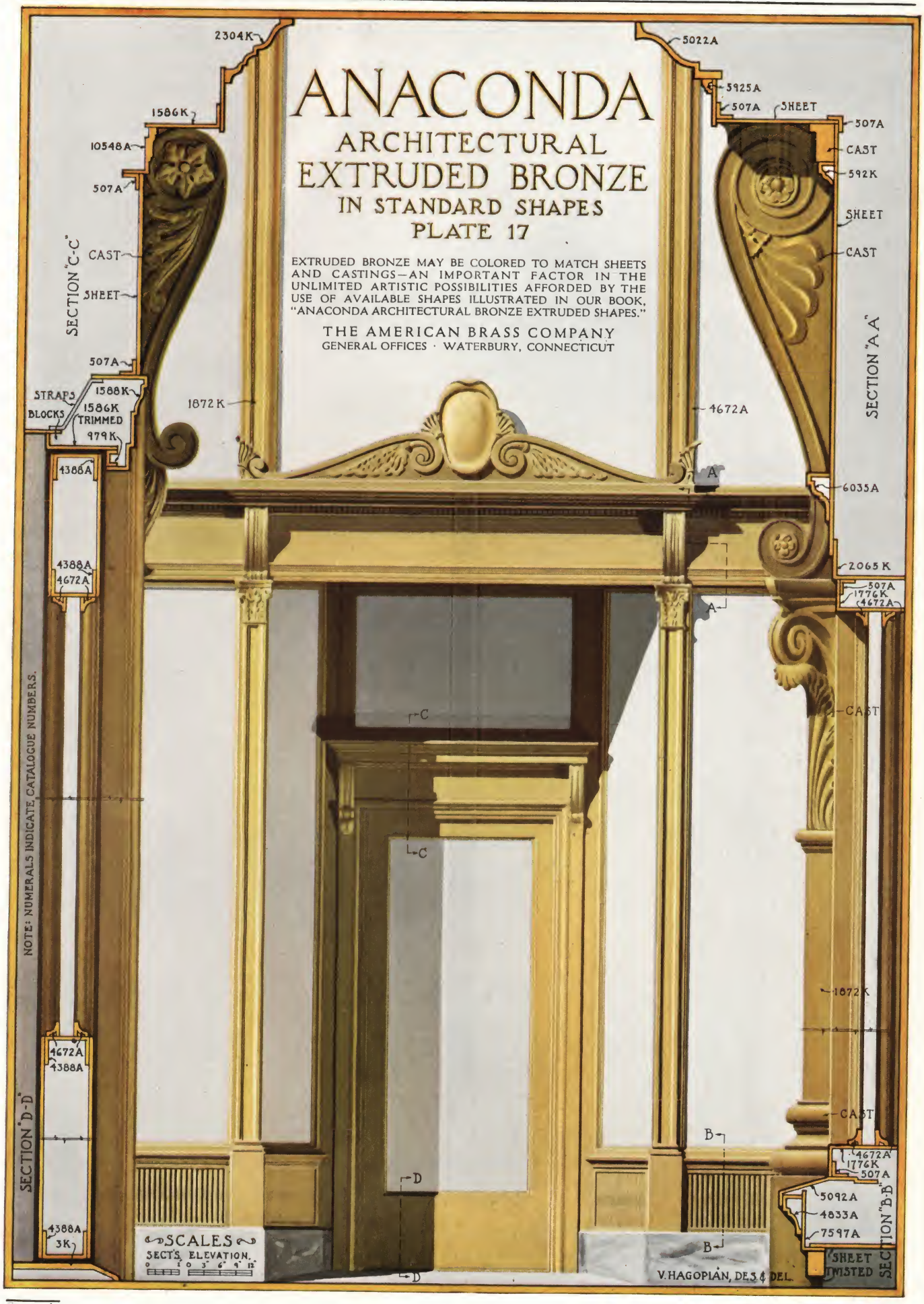
When light mouldings and shapes are required with walls ⅛ in. or less in thickness, the drawn process is used to produce Anaconda Architectural Bronze, Copper and Nickel Silver Shapes.

A wide range of alloys can be worked by this method, offering color combinations not possible with extruded shapes.

These cold drawn shapes are used for numerous architectural purposes, such as interior trim, window frames, showcases, store fronts, etc.

A catalogue illustrating the dimensional cross-sections of the thousands of cold drawn shapes for which dies are available, is in course of preparation. This will be ready about January 1, 1931, for distribution to architects and draftsmen.

Continued on next page



Continued on next page

Anaconda Forging Bronze

Anaconda Forging Bronze possesses a permanent richness of appearance comparable to that of statuary bronze. In this metal the craftsman finds excellent working properties that permit reduction to the thinnest section without cracking. Anaconda Forging Bronze is well suited to the execution of the most simple or most intricate designs, as the metal is equally well adapted to heavy bar work and to the delicate work in flowers, leaves, rosettes and other ornaments hammered from sheet.

The illustration at the foot of this page is a photographic reproduction of a section of a radiator grille fabricated in Anaconda Forging Bronze from designs by Graham, Anderson, Probst & White, Architects. In this instance no finish was applied to the grilles. They were installed just as they came from the fire.

White Forging Metal

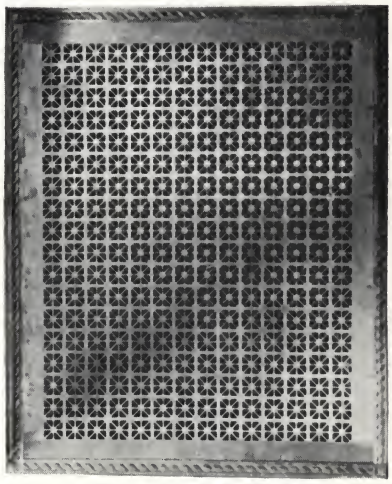
Ambrac Metal is successfully hot forged in the same manner as is iron and steel. This alloy, composed principally of copper and nickel, is white clear through and combines great strength with unusually high resistance to corrosion. Unlike other high strength white metals, Ambrac is not refractory, but can be worked almost as easily as brass.

Metal Grilles

Fabricators are producing Anaconda Brass, Bronze and Nickel Silver grilles of all types, in both cast and perforated form. The use of the perforated grille, stamped from a heavy sheet of metal, has increased greatly, since this type of grille has an attractive appearance and is produced at considerably lower cost. The products of leading grille manufacturers are available in Anaconda Brass, Bronze and Nickel Silver, the basic materials being supplied by The American Brass Company in ingot and sheet form. The accompanying illustrations show both the cast and perforated type of grille.



Typical Grille of Cast Anaconda Bronze, Heresford Apartments, New York, N. Y.
Emery Roth, Architect



Typical Grille of Perforated Anaconda Bronze, Chevrolet Building, Flint, Mich.
Wright & Nice, Architects

Terrazzo Dividing Strips

With the increased popularity of terrazzo work, considerable attention has been given the development of strips that would serve well the double function of setting off the terrazzo design and of minimizing the danger of cracking from expansion and contraction. Leading strip manufacturers are fabricating their product from Anaconda Brass and Nickel Silver.

Manufactured Forms

Anaconda Architectural Bronze, Brass and Nickel Silver are produced in the form of rods, bars, sheets, drawn and extruded shapes, and casting ingots, fully meeting the requirements of designers and fabricators of fine ornamental metal work.

Estimates and Co-operative Service

The American Brass Company offers full co-operation in furnishing estimates and in determining the suitability of Anaconda Metals for various building uses. While estimates can usually be prepared from detailed blue prints and specifications, a representative of The American Brass Company will be sent at any time to consult with architects or fabricators wherever such consultation is requested.

Architects Samples Corporation Exhibit

The permanent exhibit of The American Brass Company with the Architects Samples Corporation in New York City consists of Architectural Extruded Shapes, Brass and Bronze Grilles, Anaconda "67" Brass Pipe, and Anaconda "85" Red-Brass Pipe, copper sheet metal work, etc.



Section of Grille of Forged Anaconda Bronze
Graham, Anderson, Probst & White, Architects

ALUMINUM COMPANY OF AMERICA

Manufacturers of Alcoa Aluminum and Its Alloys

PITTSBURGH, PA.

SALES OFFICES

ALBANY, N. Y., 90 State Street
ATLANTA, GA., 1818 Rhodes-Haverty Building
BIRMINGHAM, ALA., 1112 Martin Building
BOSTON, MASS., 20 Providence Street, Park Square
BUFFALO, N. Y., 1880 Elmwood Avenue
CHICAGO, ILL., 360 No. Michigan Boulevard
CINCINNATI, OHIO, 910 Dixie Terminal Building
CLEVELAND, OHIO, 910 Hanna Building
DETROIT, MICH., 3311 Dunn Road
FAIRFIELD, CONN., 965 Boston Post Road
INDIANAPOLIS, IND., 714 Merchants National Bank Building
KANSAS CITY, MO., 804 Land Bank Building
LOS ANGELES, CALIF., 1031 South Broadway
MILWAUKEE, WIS., 425 East Water Street
MINNEAPOLIS, MINN., 1345 Northwestern Bank Building
NEWARK, N. J., 1111 Academy Building
NEW YORK, N. Y., 2511 New York Central Building
PHILADELPHIA, PA., 2307 Fidelity-Philadelphia Trust Building
PITTSBURGH, PA., 2400 Oliver Building
ST. LOUIS, MO., 1825 Boatmen's Bank Building
SAN FRANCISCO, CALIF., 709 Rialto Building
TOLEDO, OHIO, 825 Nicholas Building
TULSA, OKLA., 327 Exchange National Bank Building
WASHINGTON, D. C., 606 Southern Building

Products

ALCOA ALUMINUM and ALCOA ALUMINUM ALLOYS for all architectural and ornamental metal work for exterior and interior purposes—Wrought, Cast, Extruded, Rolled, Drawn, etc.

For our pages on Aluminum Roofing and Aluminum Paint, see Manufacturers' Index.

Alcoa Aluminum and Its Alloys

Aluminum and its various alloys have been used for nearly half a century by architects and engineers in the building field. In the past decade the use of aluminum has increased tremendously, due to the fact that architects are coming to appreciate the many unusual characteristics and valuable properties of aluminum and because the forms in which these alloys are available have had a recent marked increase. Furthermore the cost has been materially decreased. Designers and builders in all fields are continually finding new uses for aluminum alloys for structural and decorative purposes. In the construction of airplanes and dirigibles, where strength and lightness are essential, the light strong alloys of Alcoa Aluminum are employed extensively for frame members, for pistons, crankcases, and many other motor parts. These alloys are used to reduce the weight of trucks, buses, railroad and street railway cars. Engineers have also made use of them for the reciprocating parts on locomotives. Finally, in the building trade the alloys of Alcoa Aluminum are used because of their resistance to corrosion, because of their decorative possibilities, and because they reduce weight and erection costs.

Aluminum Foil is being used to replace paint and other materials for interior decoration.

Will Not Rust—The fact that aluminum will not rust and has excellent resistance to the action of the elements is well demonstrated by the pyramid on the Washington Monument in Washington, D. C. This casting has been in place since 1884 and still retains its clean non-corroded surface. Other architectural aluminum castings, that have been exposed for years to the most unfavorable climatic conditions, show no appreciable deterioration when subjected to metallographic examination.



Cast Aluminum Ornaments with Deplated and High-lighted Finishes



This Spandrel Illustrates the Minuteness of Detail and Clean-cut Lines Possible in Castings of Alcoa Aluminum—Finish Is "As Cast"

Continued on next page

Will Not Discolor Adjoining Materials—Alcoa Aluminum overcomes one of the most important difficulties attending the use of metals for exterior construction—namely, the danger of discoloration to surrounding materials due to rust and colored salts washing onto the brick or stone work.

Alcoa Aluminum and its alloys will not rust and their salts are colorless.

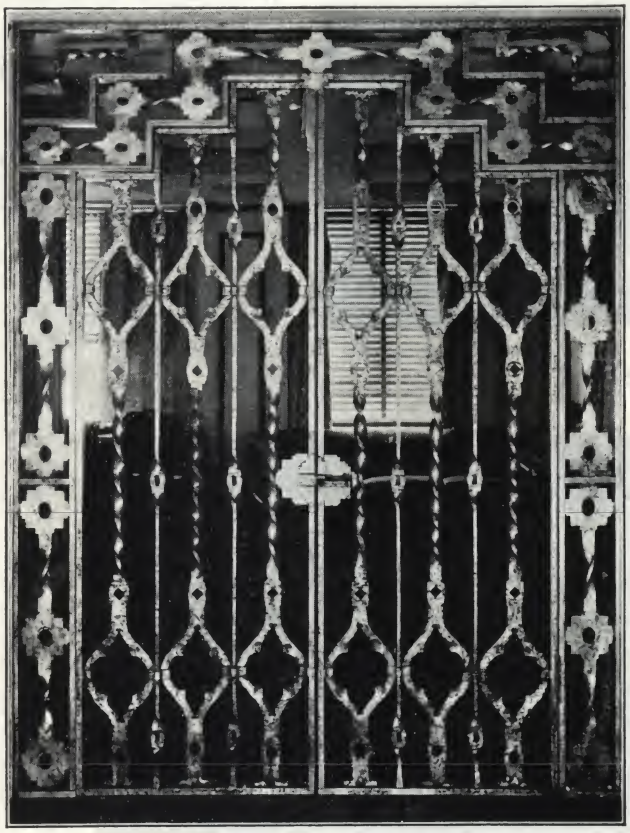
No Coating to Come Off—Alcoa Aluminum building products do not require the protective coatings so often applied to other materials. Such coatings gradually wear off and leave the base metal exposed, spoiling the architectural effect and reducing the life of the part.

Workability—The ductility of Alcoa Aluminum makes erection easier. It eliminates a number of difficulties encountered in working with ornamental pieces made of other metals. Alcoa Aluminum spandrels, for example, are easily fitted into the little irregularities in stone work, whereas more brittle metals are apt to crack or break.

Strength—The strength of the light strong alloys of Alcoa Aluminum may not be fully appreciated by every one.

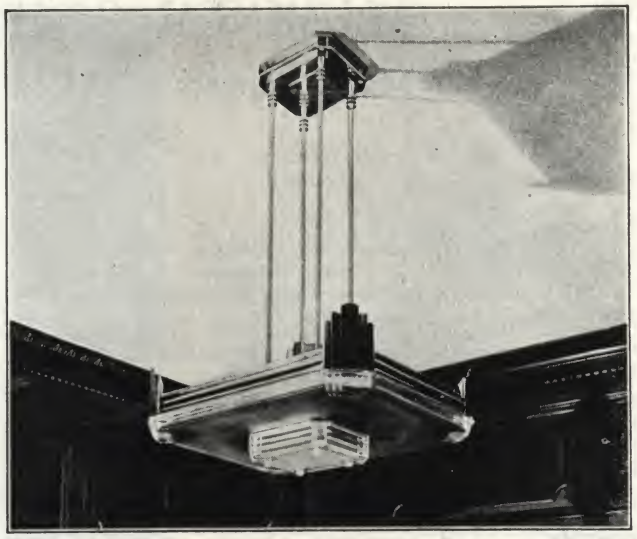
Some may, therefore, be surprised to learn that a wide variety in strength, elongation, and hardness for particular uses may be obtained.

Fully annealed pure Alcoa Aluminum known as 2SO and, which is ordinarily used for stamped cooking utensils, has a tensile strength of 12,000 lb. per sq. in., 25% elongation in 2 in., and a Brinell hardness of 22. The other extreme is Alcoa Alloys 17ST and 25ST which have a tensile strength of 58,000 lb. per sq. in., 20% elongation in 2 in., and a Brinell hardness of 100.



Wrought Aluminum Gates

Work of this kind done in aluminum may be used for both interior and exterior purposes



An Interior Lighting Fixture of Fabricated Alcoa Aluminum, Highly Polished

It should be noted, however, that while a wide variety of characteristics are available for specifications, the material as furnished is always uniformly as specified because of the strict technical control exercised over its manufacture.

Light Weight—Probably the best known characteristic of Alcoa Aluminum and its alloys is their light weight.

Pure aluminum has a specific gravity of approximately 2.7. This is about one-third the weight of other metals commonly used in building construction. The builder will readily appreciate the erection economies possible where aluminum is used. Aluminum is cheaper to haul and is easier to handle on the job than most architectural metals. Also, due to its light weight, quite often larger castings are possible which eliminates troublesome joints and seams that must be waterproofed.

Two men can handle, without difficulty, a 5x6 ft. aluminum cast spandrel, whereas an identical spandrel cast in other metals would necessitate additional men and hoisting rigging.

The saving in weight becomes even more valuable in the construction of drawbridges, elevator cages, and for all moving structures in which metals are used. An interesting example is that of the bascule span of the Arlington Memorial Bridge on which the use of Alcoa Aluminum saved approximately 100,000 lb. of dead weight.

Furthermore, the use of aluminum on buildings of certain designs may possibly reduce the size required for supporting members.

Uses of Alcoa Aluminum

The many forms in which Alcoa Aluminum and its alloys are offered to the building field make possible an infinite number of uses.

This metal may be cast in sand, in permanent moulds or in dies. It may be rolled, extruded, drawn, or fabricated from sheet strictly in accordance with the architect's designs and specifications.

Wrought aluminum is being used more and more for grilles, gates, fixtures, and wherever beautiful handmade effects are desired.

Today a large number of leading manufacturers regularly fabricate Alcoa Aluminum building products and specialties. The following list gives an idea of the

Continued on next page



A Street Lighting Fixture Made of Cast and Spun Alcoa Aluminum

many uses to which this metal has been put in the building trade:

Balustrades	Grille work	Saddles
Columns	Gratings	Sash
Conduit	Lamp standards	Screens
Coping tiles	Lighting fixtures	Scuppers
Cornices	Mail chutes	Sheet roofing
Cresting	Marquises	Shingles
Doors	Newels	Sills
Door hardware	Ornamental fences	Skylight frames
Down spouts	Panels	Spandrels
Gutters	Partitions	Stair railings
Entrances	Pilasters	Statuary
Window frames	Radiators	Store front work
Fasciæ	Radiator covers	Store facing
Frames	Risers	Ventilators
Pendants	Treads	Weatherstrip

Color and Finishes

Every one is familiar with the bright metallic color of polished aluminum. Special finishes, however, have been developed which at first glance seem to have little relation to the common polished aluminum surface.

Deplated—A very dark bluish-gray matte finish produced by an electro-chemical process which exposes the metallic silicon in Alcoa No. 43 Alloy.

Carborundum Blasted—A dark gray finish that has a sparkling effect resembling that of newly cut sandstone.

Sand Blasted—A light gray coarse matte finish. This may also have a sparkling effect similar to the carborundum blasted surface.

As Cast—The finish of the casting just as it comes from the mould. It is light gray in color, has somewhat of a matte appearance, but is a bit lighter and brighter than the sand blasted finish.

Wire Brushed—A light gray roughened surface produced by a rotating soft steel wire brush.

Satin Finish—A surface made up of fine parallel scratches produced by a very fine wire brush. The surface has a satiny sheen very "rich" in appearance.

Highly Polished—The well-known mirrorlike finish that is characteristic to aluminum.

Combinations and Etching—By combining two or more of the above finishes on a single piece or design, it is possible to produce exceedingly beautiful effects. For example, deplating and then high-lighting certain portions of a surface, produces a finish resembling the finest of hand craftsmanship.

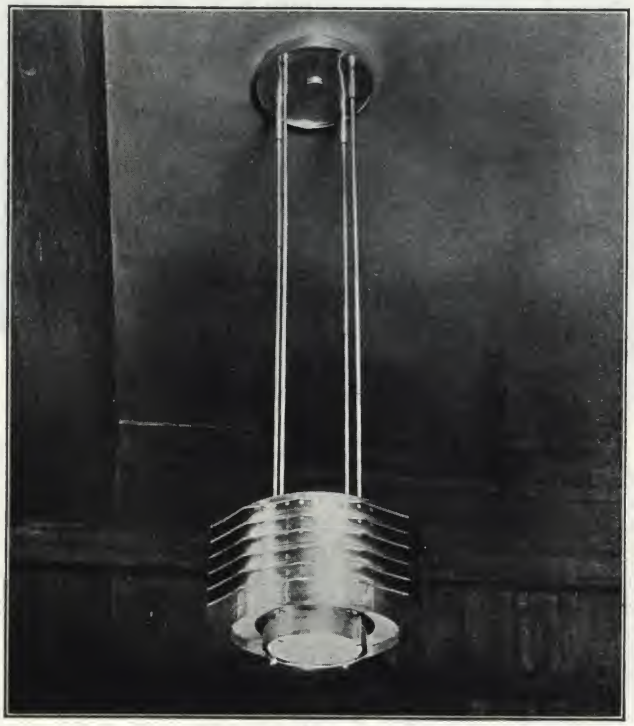
Aluminum surfaces may also be etched with any desired design.

Elaborate Designs

Besides blending into modern architectural color schemes, Alcoa Aluminum is adaptable to all designs, no matter how intricate or elaborate. It is a metal that lends itself admirably to ornamentation. The architect, who searches for practical materials, in which to render his artistic visualization, finds in Alcoa Aluminum the metal that meets his needs. The ductility of aluminum makes it ideal for handwork—grilles, railings—and other decorative work of the most intricate design.

For Best Results Right Alloy Must Be Specified—The importance of specifying the correct alloy cannot be overemphasized. Much research and experimentation preceded the adoption of the two alloys given.

The technical staff of ALUMINUM COMPANY OF AMERICA exercises the most rigid scientific control over every process in the production of Alcoa Aluminum and



Lighting Fixture That Illustrates the Adaptability of Alcoa Aluminum to Modern Designs

Continued on next page

its alloys—from the mining of bauxite ore in the company's own mines to the production of strong alloys and fabricated shapes. Because of this, "Alcoa" has come to be the symbol of the highest metallurgical excellence. The services of the company's technical staff are avaliable to architects for determining the right alloy for any particular set of conditions. The assistance of these experts may be obtained through any of our sales offices or by addressing the home office.

Alcoa Aluminum Alloy No. 43—In order to meet architectural casting requirements, Alcoa No. 43 Alloy was developed. This has a silicon content of 5%, an average tensile strength of 19,000 lb. per sq. in., 5% elongation in 2 in., and a Brinell hardness of 40. This alloy has an exceedingly good resistance to corrosion and may be cast accurately with fine detail.

Alcoa Aluminum Alloy No. 195-4—For castings where higher strength is required, Alcoa No. 195-4 Alloy is recommended. This has a tensile strength of 31,000 lb. per sq. in., 8% elongation in 2 in., and a Brinell hardness of 65. This alloy also has high resistance to corrosion.

Comparative Cost of Alcoa Aluminum

The cost of Alcoa Aluminum castings and other architectural products compares most favorably with that of any other high grade material. As an additional factor the light weight of Alcoa Aluminum alloys, with the resulting reduction in erection costs and in the size and cost of supporting members, should be given due consideration.

Since the weight of aluminum is approximately one-third that of other metals commonly used, when taken in equal volume, the actual cost of aluminum is divisible by three when comparative costs by weight are being figured.

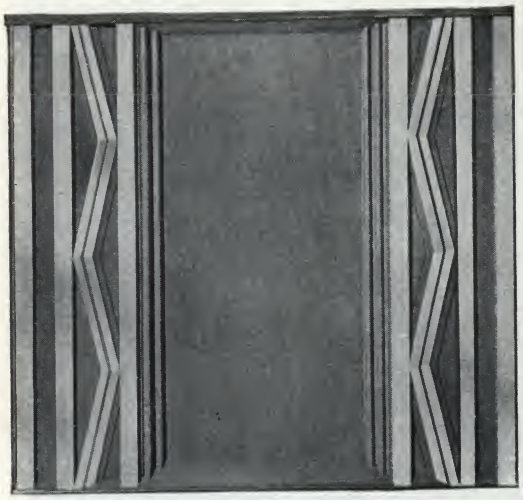
ALCOA ALUMINUM SPANDRELS

Center:
This spandrel and grille 6 ft. 11 in., 4 ft. 11¾ in. wide at the top was beautifully finished by sand blasting, deplating, wire brushing, and high-lighting. See preceding pages for explanation of these finishes



Lower left:
This sand cast aluminum spandrel, 4 ft. 4 in. wide, 4 ft. 8 in. high was finished by deplating and high-lighting

Lower right:
A vent in the center of this sand cast aluminum spandrel was hidden by a cast aluminum ornament which was deplated and high-lighted





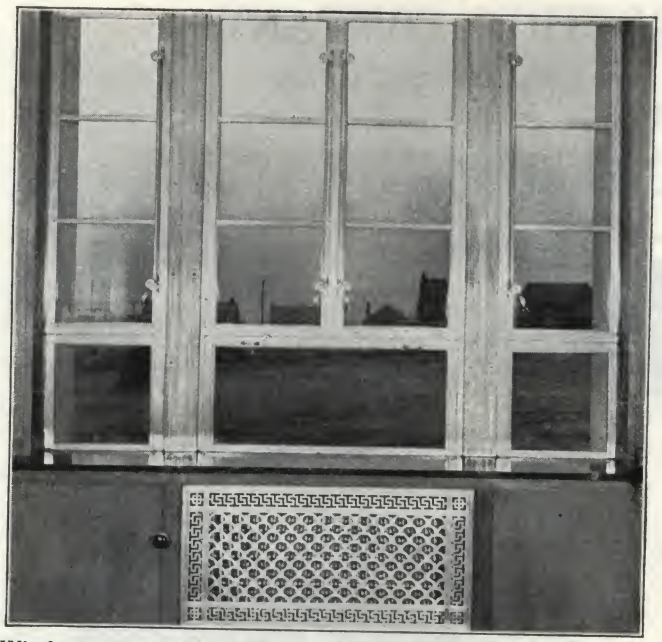
Perhaps a greater tonnage of Alcoa Aluminum is used for spandrels than for any other one building product or specialty. Hundreds of thousands of pounds of this non-rusting, light-weight metal are now being used annually for this purpose. Sand-cast Alcoa Aluminum spandrels adorn buildings that rank among the world's largest and tallest. Their beauty, economy, durability, and ease of handling appeal to the architects of metropolitan buildings as well as to architects who appreciate good design in buildings of lesser size.

Save Painting Costs—It is not uncommon for large buildings to require a budget of several thousand dollars per year for painting and protecting metal spandrels. This money is saved through the use of Alcoa Aluminum spandrels.

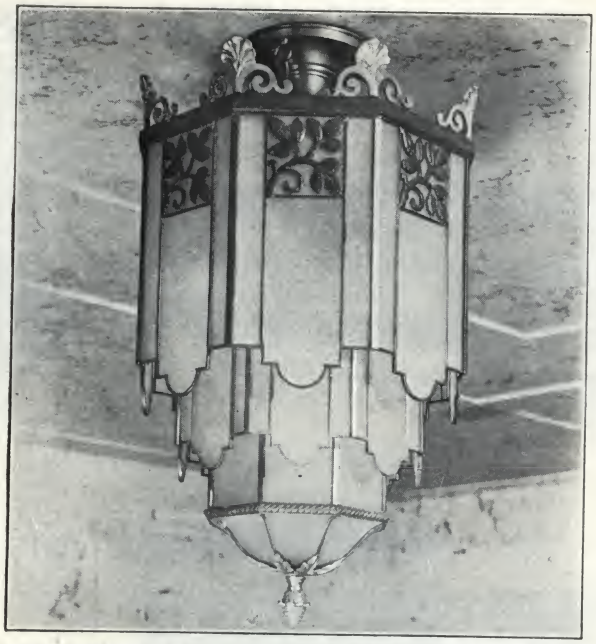
Will Not Stain—Besides having a high resistance to corrosion and needing no protection, Alcoa Aluminum spandrels will not stain adjoining surfaces because they form no colored salts with smoke, rain, or gases that might be found in the atmosphere, even in industrial districts.

Erection Easier and Costs Less—Alcoa Aluminum spandrels are very ductile and are readily fitted into the little irregularities of construction. Their light weight makes possible easier handling and lowers the costs of erection, as well as the cost of hauling.

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Windows, Frames and Fittings Made of Extruded and Fabricated Alcoa Aluminum. Radiator Grille is Cast Alcoa Aluminum

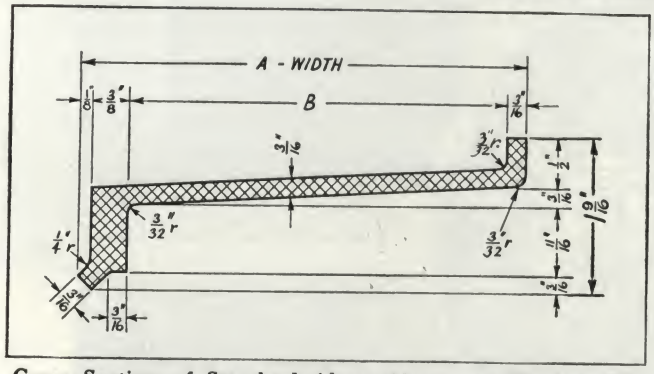


A Lobby Lighting Fixture in which All of the Metal Parts are Alcoa Aluminum

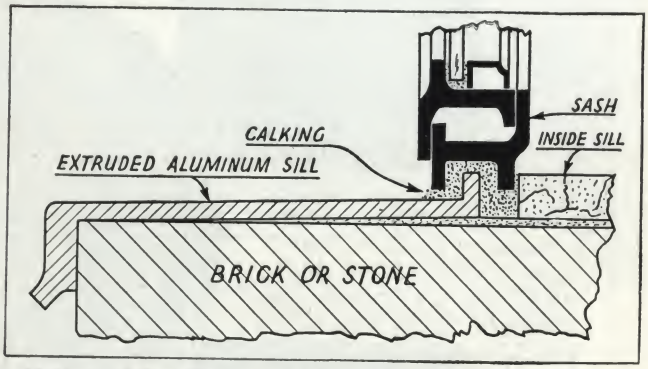
Ordinary size Alcoa Aluminum spandrels are generally handled readily by two men, which eliminates the necessity of rigging.

Elaborate Designs Possible—As shown by the illustrations, there is practically no limit to the designs possible for Alcoa Aluminum spandrels. Beautiful effects are obtained by combining various finishes, as suggested under the heading "Finishes."

Alcoa Aluminum Window Sills



Cross Section of Standard Alcoa Aluminum Window Sill



Method of Installation of Alcoa Aluminum Window Sill

Like other building materials made of aluminum, Alcoa Aluminum window sills will not streak adjoining surfaces and need not be painted, due to their resistance to corrosion.

They fit readily into practically any type of masonry, and due to their workability, are readily made waterproof at the joints. Due to their thinness, they occupy no more space than a masonry joint which permits a lug on either end to pass into the masonry jamb.

Their extreme lightness permits easy handling. They can be fully bedded-in by the bricklayer prior to the setting of the window frame.

Alcoa Aluminum window sills are furnished in any desired length. This eliminates troublesome vertical joints and speeds up erection. Finally the price of these sills, extruded or cast, is generally lower than sills of any other material offered to the building industry.

Extruded Sill—Dies are now available for four sizes of the type of sill illustrated. Other designs and other sizes up to 9 in. in width can readily be made.

Cast Sill—While extruded sill meets the requirements of most architectural designs, sills of special shape or extra widths may be cast of Alcoa Aluminum No. 43 Alloy.

STANDARD EXTRUDED ALCOA ALUMINUM WINDOW SILL DATA

Dimensions,* in.		Est. area, sq. in.	Est. wt./ft.
A	B		
3 5/8	2 1/16	1.000	1.200
4 1/16	4	1.169	1.403
5 1/8	4 7/16	1.287	1.540
5 3/4	5 1/16	1.460	1.750

*All other dimensions constant.

For the Specifications Writer

Extruded Sill—Window Sills shall be extruded from Alcoa No. 43S Alloy by ALUMINUM COMPANY OF AMERICA. (Note: If a size not shown here is desired, specify any width up to 9 in.) The average tensile strength shall be 19,000 lb. per sq. in. and the average elongation in 2 in. 20%. The weight shall not exceed 0.097 lb. per cu. in. The surface shall be free from imperfections and in all respects equal to sample submitted.

Cast Sill—Window sills shall be cast of Alcoa No. 43 Alloy having a silicon content of 5%. The average tensile strength shall be 19,000 lb. per sq. in. and the average elongation in 2 in., 5%. The weight shall not exceed 0.097 lb. per cu. in. The surface shall be free from imperfections and in all respects equal to sample submitted.

ART METAL CONSTRUCTION COMPANY

Distinctive Architectural and Decorative Bronze

JAMESTOWN, N. Y.

For Branch Offices, see Bank, Office and Library Equipment Section

For Sectional Metal Office Partition: For Hollow Metal Doors and Trim: For Bank, Office and Library Equipment, see Art Metal Construction Company in Manufacturers' Index

For centuries bronze has been used for decorative effects in architecture. Today Art Metal Construction Company has unsurpassed facilities for producing bronze work of the highest quality. Skillful artisans faithfully model the architect's details to produce beautiful and lasting effects. No other metal lends itself so well to the artistry of perfect craftsmanship. Details can be delicately wrought, sharply incised, or crisply undercut.

Art Metal Jamestown New York U.S.A.
TRADE-MARK

Typical examples of Art Metal cast bronze work are illustrated on these pages.



BRONZE DOORS AND TRANSOM
Scottish Rite Cathedral, San Antonio, Tex.
HERBERT M. GREEN AND RALPH H. CAMERON, Architects



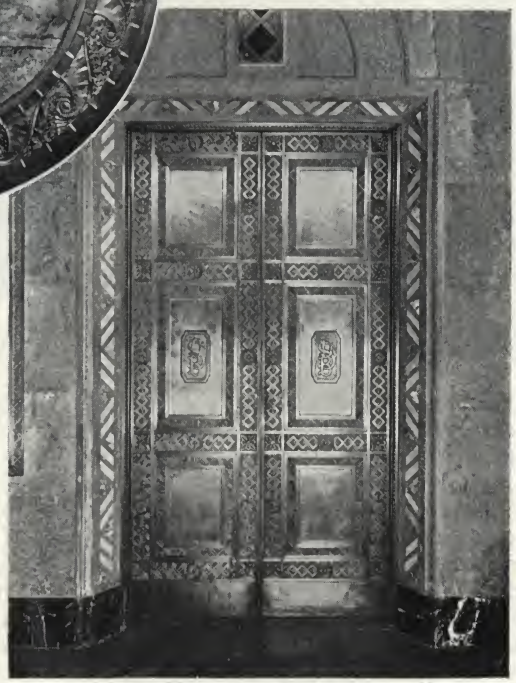
BRONZE ENTRANCE DOORS
First National Bank, Fort Wayne, Ind.
THOMAS M. JAMES CO., Architects



CAST BRONZE FLOOR PLAQUE
Camden County Court House, Camden, N. J.
Diameter 5 ft.
Weight 1200 lb.
EDWARDS & GREEN, Architects



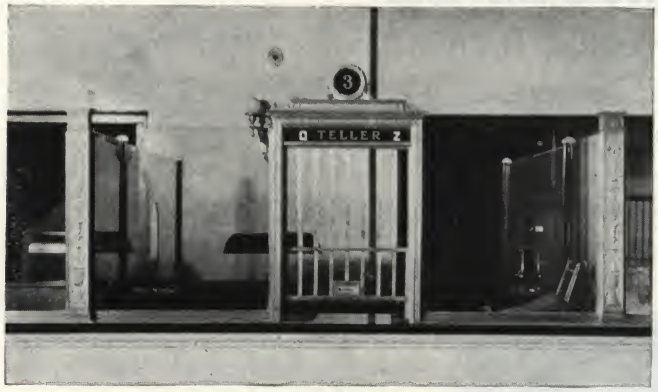
ELEVATOR ENTRANCE
Buckeye Savings & Loan Association, Columbus, Ohio
HOPKINS & DENTZ, Architects



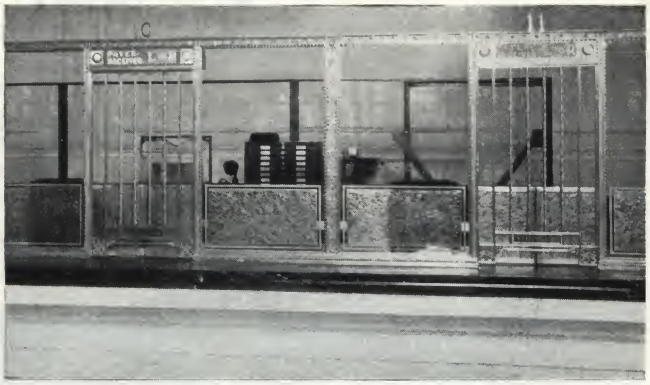
ELEVATOR ENTRANCE
David Stott Building, Detroit, Mich.
DONALDSON & MEIRER, Architects

Continued on next page

DISTINCTIVE COUNTER SCREENS



CAST BRONZE WICKET AND PILASTERS
Monongahela Trust Co., Homestead, Pa.
HOPKINS & DENTZ, Architects



BRONZE SCREEN AND WICKETS
Northern Trust Co., Chicago, Ill.
FROST & HENDERSON, Architects

BRONZE VESTIBULES AND ENTRANCE DOORS



VESTIBULE WITH DOORS BUILT ON AN ANGLE
Monongahela National Bank, Pittsburgh, Pa.
EDWARD STOTZ, Architect

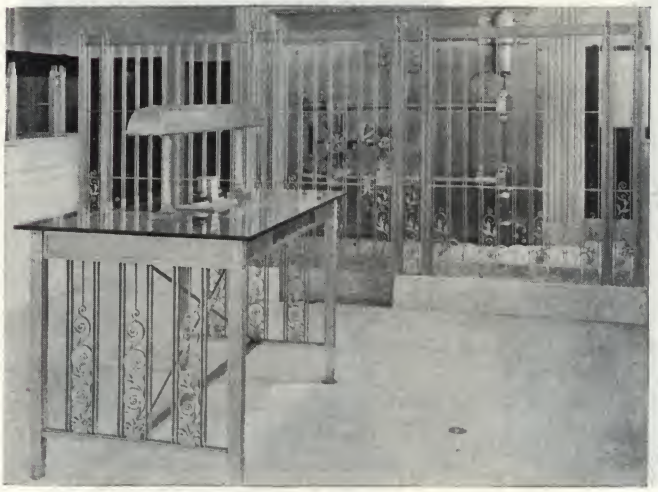


BRONZE VESTIBULE
Monongahela Trust Co., Homestead, Pa.
HOPKINS & DENTZ, Architects

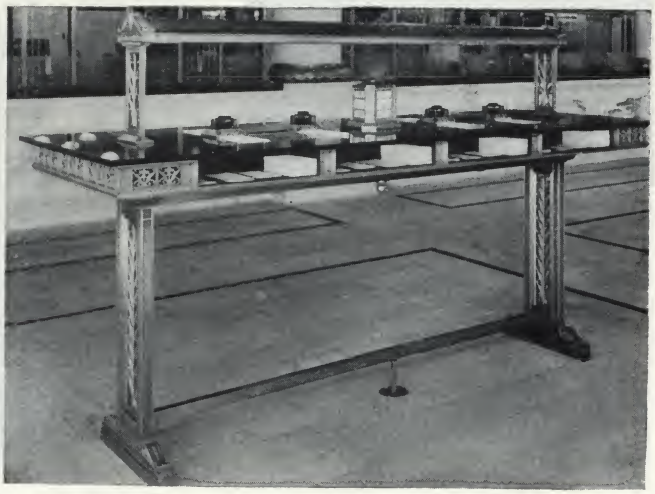


MAIN ENTRANCE IN BRONZE
City Hall, Atlanta, Ga.
G. LLOYD PREACHER & Co., Architects

CHECK DESKS AND VAULT SCREEN



CHECK DESK AND VAULT GRILLE
First National Bank, Salem, Ohio
THE OWSLEY Co., Architects



BRONZE CHECK DESK
Northern Trust Co., Chicago, Ill.
FROST & HENDERSON, Architects

AMERICAN BRONZE CO.

Ornamental and Architectural Bronze Work

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ORNAMENTAL and ARCHITECTURAL BRONZE WORK, which includes: Monumental Bronze Work; Doors; Memorial and Commercial Tablets; Cast Bronze Letters, Numerals and Signs for buildings; Stair Rails; Brackets, Grilles and Wickets; Thresholds; Flagpole Bases; Fountains; Clocks; Check Desks; Bronze Inkwell Stands combined with Reflectors; Name Plates, or anything in Ornamental and Architectural Bronze.

ILLUMINATED SIGNS made in cast bronze and drawn metal.

Service

All work is made to order, in any size, or shape. Architects' special designs and ideas will be carefully followed.

Work made and shipped complete, ready for erection, to any part of the country.

Prices

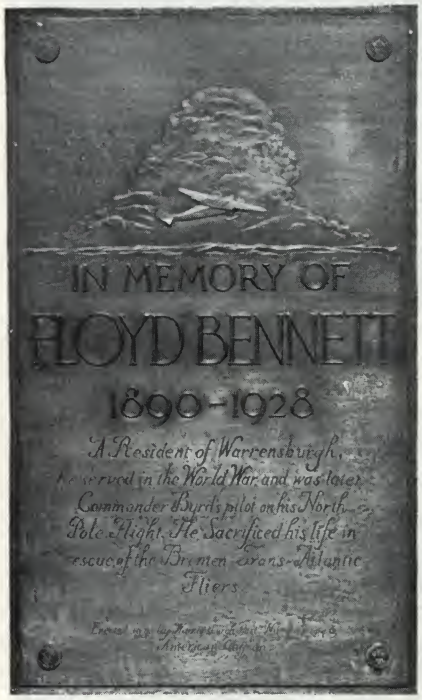
Quotations submitted promptly upon receipt of specifications.

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Obtained on application.



One of 12 Plaques—Signs of the Zodiac, Erected on the Exterior of the Adler Planetarium, Grant Park, Chicago, Ill.





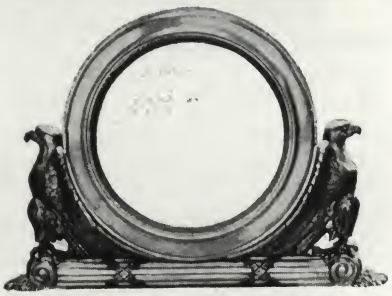


Cast Bronze Illuminated Sign with Glass Face

May be had in either ornamental or plain design, and in any size



Flagpole Base Erected Internal Revenue Building, Washington, D. C.



Solid Cast Bronze Clock Frame

Erected in the Bank of Harvey, Ill., and the Farmers State Bank, Valparaiso, Ind. 30x24 in.

A. J. BAYER COMPANY

INCORPORATED

Ornamental Iron and Bronze

LOS ANGELES, CALIF.

For our page on Hollow Metal Doors, see Manufacturers' Index

Experience

This company has served the building industries since 1900 in the manufacture and installation of ornamental metal and hollow metal in monumental and commercial buildings.

Facilities

A complete manufacturing plant and foundry is maintained for the execution of work ranging from miscellaneous iron work to the highest grade of architectural bronze and iron.

Recent Installations

City Hall, Los Angeles, Calif.
Austin, Martin & Parkinson

Hunter-Dulin Building, San Francisco, Calif.
Schultze & Weaver, New York, N. Y.

Breakers Hotel, Palm Beach, Fla.
Schultze & Weaver, New York, N. Y.

National Bank of Commerce, Houston, Tex.
A. C. Finn and Kenneth Franzheim, New York, N. Y.

Smith-Young Tower, San Antonio, Tex.
Atlee B. and Robert Ayres

Bullock's, Los Angeles, Calif.
John and Donald B. Parkinson

Title Insurance & Trust Building, Los Angeles, Calif.
John and Donald B. Parkinson

Publix Theatre, Portland, Ore.
Rapp and Rapp, Chicago, Ill.

Publix Theatre, Seattle, Wash.
Rapp and Rapp, Chicago, Ill.

Biltmore Hotel, Los Angeles, Calif.
Schultze & Weaver, New York, N. Y.

Richfield Oil Building, Los Angeles, Calif.
Morgan, Walls & Clements

Alamo National Bank, San Antonio, Tex.
Anderson, Graham, Probst & White, Chicago, Ill.



Bronze Seat, Bank of America, Los Angeles, Calif.
SCHULTZE & WEAVER, Architects



Cast Bronze Door, Title Insurance and Trust Building, Los Angeles, Calif.
JOHN AND DONALD B. PARKINSON, Architects

ESTABLISHED 1878 INCORPORATED 1899

C. H. BUCK & CO., INC.

Cast Bronze Letters and Tablets

BOSTON, MASS.

Products

STOCK CAST BRONZE LETTERS in Architectural, Gothic and Scotia Styles.

TABLETS, Cast or Fabricated, for banks, churches and memorials.

METAL SIGNS, NAME PLATES and DESK SIGNS.

Cast Bronze Letters

Style "A" is carried in more than 20 sizes, from 1 to 15 inches high and in condensed, regular and extended widths. Included in the various fonts are the long-tail "R" and broad "C," "G," "O" and "Q."

All letters are drilled and tapped on the back, ready for immediate shipment. Face and edges of letters larger than 5 inches are sand finish.

We carry what is probably the largest stock of letters in this country and are in a position to make immediate shipments. All letters are drilled and tapped to receive machine screws or spugs.

Customers

Users of special and stock cast bronze letters and tablets:

Union League Club, San Francisco, Cal.
National Shawmut Bank, Boston, Mass.
Old Colony Trust Company, Boston, Mass.
Atlantic National Bank, Boston, Mass.
Federal National Bank, Boston, Mass.
First National Bank, Boston, Mass.
City Departments, Boston, Mass.
Boston & Maine R. R.
Bethlehem Ship Building Corp.
Besse System Stores, New England and other States
Liggett Drug Co., New England and other States
United Shoe Machinery Corp., New England and other States
Andrew J. Lloyd Co., Boston and Worcester, Mass., and Providence, R. I.
The Outlet Department Store, Providence, R. I.
Hawaiian Trust Co., Honolulu, T. H.
Chase & Sanborn, United States and Canada.
F. W. Woolworth Co., Boston, Mass., and other cities
National Biscuit Co., New York, N. Y., and other cities



ESTABLISHED 1844

THE CINCINNATI MFG. CO.

Ornamental Bronze and Iron Work

MAIN OFFICE AND FACTORY

Corner Evans and Gest Streets, CINCINNATI, OHIO

Products

High grade ARCHITECTURAL and ORNAMENTAL WORK in BRONZE, BRASS and IRON, including:

Metal Work for Banks; Mausoleum Bronze; Memorial Tablets and Bronze Signs; Wire and Iron Work; Railings; Wickets and Grilles; Tubular Railings; Window Guards; Machinery Guards; Collapsing Gates; Wire Partitions.

For our page on Kalamein and Hollow Metal Doors, see Manufacturers' Index.

Experience

This company, organized in 1844, has had extensive experience in ornamental bronze and iron work. We are in position to handle any proposition regardless of the size or the requirements of speed in delivery.

Facilities

Our plant and equipment is entirely modern and complete in every detail. It consists of foundry, machine shop, pattern shop, blacksmith shop, plating and polishing plants, baking and japanning ovens, drafting department, modeling and sculpture department, iron and wire working department, and chasing department.

Also compressed air and air brush equipment, sandblast, spot and acetylene welding, wood finishing on steel, draw bench work, heavy press work and heavy brakes and shears. In addition, there is a large stock of materials, ample capital and skilled workmen at your service.



Bronze Wicket, Houston Post-Dispatch, Houston, Tex.

SANGUINET, STAATS & HEDRICK, Architects
Executed by THE CINCINNATI MFG. CO.

Bank Work

This is a big department with us. We can furnish everything in the way of bronze and iron ornamental work that is used in bank construction. Some of the work executed from architects' drawings and our designs is as follows: bronze doors and transoms, counter screens, grilles, railings, counter rails, deposit rails and grilles, vault rails, gates, wickets, hand rails and railings, guard rails, clock faces, calendars and check racks, desks and tables, directory boards, desk guards, teller cages, name plates, cast bronze signs and tablets and window guards.

Our illustrated Bank Catalogue No. 50 gladly sent on request.

Mausoleum and Memorial Bronze

This company designs, models and casts bronze mausoleum doors, window grilles, gates, catacomb handles and rosettes, tee handles, floor lifts, ceiling hangers, frames for glass panels, vent grilles, memorial tablets, insignia, wreaths, urns and vases.

Estimates, Designs and Co-operation

We are glad at all times to furnish estimates from architects plans and specifications.

We will also submit original or stock designs, plans and suggestions and co-operate in every way to assure the best type of work for the particular job.



Bronze and Glass Counter Screen, Fifth-third Union Trust Co., Cincinnati, Ohio

WERNER & ADKINS, Architects
Executed by THE CINCINNATI MFG. CO.
Hinged shutters behind wickets act as money guards when open



Cast Bronze Tablet

FOUNDED 1893

ADELBERT COLEMAN CO.

DIVISION OF THE KAWNEER COMPANY

Fine Sculptural and Architectural Metal Work

336 West 37th Street
CHICAGO, ILLINOIS

The Company

The ADELBERT COLEMAN COMPANY was founded in 1893 for the purpose of producing high quality architectural cast bronze and other ornamental metal products. We have established an enviable record in this field, having furnished the complete metal ornamentation for many of the country's foremost buildings.

Products

The range of our work in ARCHITECTURAL METALS is unlimited—the quality unsurpassed. We wish to welcome and serve our old customers and new friends in their requirements for Architectural Castings of bronze, aluminum, nickel silver and iron; also, Wrought Iron Work, Stairs, Grilles; Bronze or Steel Windows, Bronze Doors; Custom-made Store Fronts of cast or rolled metal; Extruded Work of all kinds; Cold Rolled Mouldings of rustless metal or steel; Casement Windows; special Showcases and other metal products.



Ornamental Bronze Elevator Doors, State Bank Building, Chicago, Ill.



Ornamental Bronze Elevator Doors, Burnham Building, Chicago, Ill.



Ornamental Bronze Elevator Doors, Blum Building, Chicago, Ill.

Some Coleman Installations

The most convincing evidence of our ability is exemplified by this representative list of buildings and architects using Coleman ornamental metal work.

First National Bank, Chicago, Ill., Graham, Anderson, Probst & White, Architects
Smith Memorial Hall, University of Illinois, Champaign, Ill., Prof. Jas. White, Supervising Architect
Union League Club, Chicago, Ill., Mundie & Jensen, Architects
Chicago Union Station, Chicago, Ill., Graham, Anderson, Probst & White, Architects
Stevens Hotel, Chicago, Ill., Holabird & Root, Architects
Blum Building, Chicago, Ill., Alfred S. Alschuler, Architect
Marshall Field Retail Stores, Chicago, Ill., Graham, Anderson, Probst & White, Architects
Sherman Hotel, Chicago, Ill., Holabird & Root, Architects
Field Museum, Chicago, Ill., Graham, Anderson, Probst & White, Architects
Federal Reserve Bank, Chicago, Ill., Graham, Anderson, Probst & White, Architects
Michigan Union Building, University of Michigan, Ann Arbor, Mich., Pond & Pond, Architects
General Motors Building, Detroit, Mich., Albert Kahn, Architect
S. S. Kresge Administration Building, Detroit, Mich., Albert Kahn, Architect
Detroit Free Press, Detroit, Mich., Albert Kahn, Architect
Fyfe Building, Detroit, Mich., Smith-Hinchman & Grylls, Architects
Temple Building, Chicago, Ill., Holabird & Root, Architects
Union Passenger Station, Washington, D. C., Graham, Anderson, Probst & White, Architects

Continued on next page



Iron Stair Railing and Grilles, Stevens Hotel, Chicago



Complete Bronze Entrance, Wrigley Building, Chicago



Bank Screen of Bronze, Continental Illinois Bank Building, Chicago



Bronze Pedestal, State Bank Building, Chicago



Cast Bronze Gates, State Bank Building, Chicago



Directory in Bronze, State Bank Building, Chicago



Bronze Lobby Doors, State Bank Building, Chicago



Bronze Stair Rail and Newel, Temple Building, Chicago



Custom-made Bronze Store Front, O'Connor & Goldberg, Chicago

ESTABLISHED 1878

CROWN IRON WORKS COMPANY

Manufacturers of Ornamental Iron and Bronze Work

MINNEAPOLIS, MINN.

Products

ORNAMENTAL IRON and BRONZE WORK of every description for buildings.

Facilities

Our plant consists of modern equipped shops and departments: such as modeling, pattern shop, foundry, machine and finishing shops.

Territory

We are prepared to furnish and erect our work in the United States and Canada.

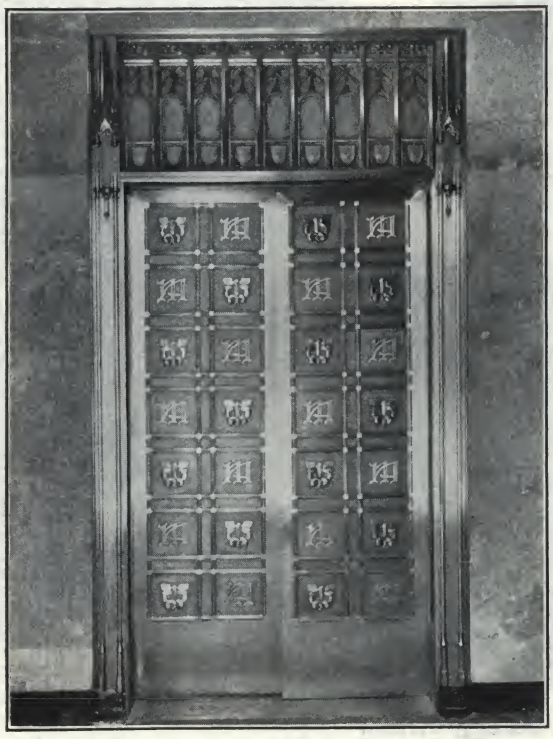
Service

The Engineering and Estimating Departments are always at the service of architects and contractors.

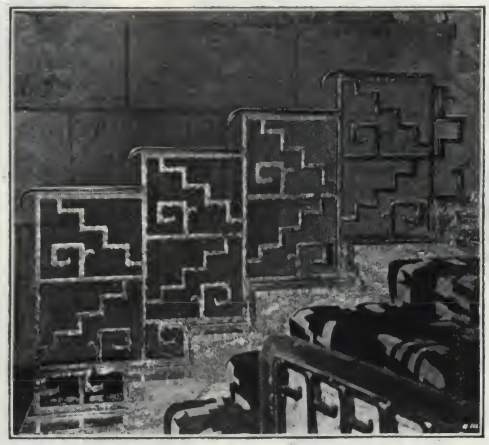
References

Half a century of uninterrupted business progress, with a reputation for fair dealing and high class craftsmanship.

On the following page are given a few of the many buildings and architects for which we have furnished ornamental iron, and additional references will be furnished on request.



Bronze Elevator Doors, Medical Arts Building, Minneapolis, Minn.



Ornamental Iron Railing, Fisher Building Theater, Detroit, Mich.

Specialties

We specialize in the manufacture of Artistic Bronze, Iron, and Aluminum.



Bronze Counter Railing for Farmers & Mechanics Savings Bank, Minneapolis, Minn.

Continued on next page

SOME REPRESENTATIVE INSTALLATIONS

General Hospital for State University of Iowa, Iowa City, Iowa; Memorial Union Building, Iowa State College, Ames, Iowa—Proudfoot, Rawson & Souers, Architects

Mines Building, Music Building, Engineering Building, Millard Hall, Anatomy Building, Library Building, Administration Building, Physics Building and the Cyrus Northrop Memorial Auditorium, University of Minnesota—C. H. Johnston, Architect

Valley National Bank and Liberty Building, Des Moines, Iowa—Proudfoot, Bird & Rawson, Architects

Republic Bank Building, Dallas, Tex.—C. D. Hill & Co., Architects

Baker Hotel, Dallas, Tex.—Preston J. Bradsnaw, Architect

Hilton Hotel, Dallas, Tex.—Lang & Witchell, Architects

Allen Building, Dallas, Tex.—J. N. McCammon, Inc., Architects

Dallas National Bank, Dallas, Tex.—Coburn, Smith & Evans, Architects

Harris County Criminal Court Building, Houston, Tex., Federal Land Bank, Houston, Tex.—Hedrick & Gottlieb, Architects

Baker Building, Baker Arcade Building and Roanoke Building, Minneapolis, Minn.—Larson & McLaren, Architects

Woodbury County Courthouse, Sioux City, Iowa—William L. Steele and Purcell & Elmslie, Associated Architects

World Herald Building, Omaha, Neb.—Thos. R. Kimball, Architect

Liberal Arts Building and Residence Hall, Marygrove College, Detroit, Mich.—D. A. Bohlen & Son, Indianapolis, Ind., Architects

Hotel Pere Marquette, Peoria, Ill.—Horace Trumbauer and Hewitt & Emerson, Associated Architects

Bismarck Hotel, Chicago, Ill. (Cast Bronze Elevator Doors)—C. W. and Geo. L. Rapp, Architects

Francis Palms Building and State Theater, Film Exchange Building and Fox Theater, Detroit, Mich.; Fox Theater, St. Louis, Mo.—C. Howard Crane, Architect

Electric Refrigerator Co. Building, Detroit, Mich.—Smith, Hinchman & Grylls, Architects

Minnesota Theater, Minneapolis, Minn.; Fisher Theater, Detroit, Mich.—Craven & Mayger, Architects

Maccabees Building, Detroit Trust Co. Addition, First National Bank Addition, Fisher Building, Detroit Times Building, General Motors Laboratories Building, Detroit, Mich.—Albert Kahn, Inc., Architect

Krupp & Tuffly Building, Houston, Tex.—Alfred C. Finn, Architect

Majestic Theater, San Antonio, Tex.—John Eberson, Architect

Express News Building, San Antonio, Tex.—Herbert S. Green, Architect

Foshay Tower, Minneapolis, Minn.—Magney & Tusler, Inc., Architects

Medical Arts Building, Minneapolis, Minn.—Long & Thorshov, Inc., Architects

Titche Goettinger Building, Dallas, Tex.—Herbert M. Greene, Laroche & Dahl, Architects

Store Building for Jesse H. Jones and Company, Houston, Tex.—Joseph Finger, Architect

Plaza Hotel, Corpus Christi, Tex.—Adams & Adams, Architects

Shreveport Municipal Auditorium, Shreveport, La.—Jones, Roessle, Olschner and Wiener, Architects

Kresge Building, Minneapolis, Minn.—Kresge & Company, Architects

Michigan Telephone Building, Saginaw, Mich.—Smith-Hinchman & Grylls, Architects

Farmers & Mechanics Savings Bank, Minneapolis, Minn.—Larson & McLaren, Architects



Bronze Entrance, Kresge Store Building, Minneapolis, Minn.



Bronze Ticket Booth, Northrop Memorial, University of Minnesota, Minneapolis

ORNAMENTAL BRASS AND BRONZE

COPPER AND BRASS RESEARCH ASSOCIATION

25 Broadway, NEW YORK, N. Y.

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Architects Building
LOS ANGELES, CAL.

Ornamental Uses

Brass and bronze are the standard metals for ornamental uses. They can be finished in various colors and require no painting or maintenance.

The scientific knowledge and practical experience of our Research and Building Service Departments are at your disposal. We will be glad to consult with you on all problems pertaining to the uses and applications of Copper, Brass and Bronze.

Literature

"Ornamental Bronze in Banking Rooms"—Ninety-five pages showing good examples of bank interiors. 8½ by 11 in.

"Die Stahl Kirche"—Twenty plates illustrating a thoroughly radical departure in ecclesiastical architecture, with a discussion by the architect, Professor Dr. Otto Bartning, Berlin. Sent free. 8½ by 11 in.

"Coloring Copper and Brass"—Pamphlet-size booklet giving formulae for cleaning and coloring copper, brass and bronze. Sent free.



Bronze Clock
WILLIAM ZORACK, Sculptor
Over the entrance to the Schwarzenbach Building, Fourth Avenue at 32nd Street, New York, N. Y.



Decorative Figure
Over the entrance to the Burroughs Wellcome Building, 9 East 41st Street, New York, N. Y.

Why Ornamental Bronze

The art of display is being employed to great advantage in modern American architecture, especially for commercial or semi-commercial buildings. Bronze grilles, decorative doorways, arches and figures are factors in determining the appeal of a building to prospective buyers and renters. The simplest elevation may be given great distinction by fine bronze work. In stores or shops a skillfully designed bronze entrance feature, such as the two illustrated here, will attract many shoppers.

For balustrades, bank cages, grilles, mail boxes, railings—in fact, for all ornamental features—solid bronze is the logical metal to use. Nothing else lends itself so well to the artistry of perfect craftsmanship—witness the fact that it was the metal chosen by the fine Italian workmen for those exquisite works whose beauty has never been even approximated until the present generation of American craftsmen. In bronze, details can be delicately wrought, sharply incised or crisply undercut. It is strong and permanent.

With no other metal is it possible to get the range of color that is possible in ornamental bronze. It remains beautiful after years of exposure and need not be painted for it does not rust.

In the last few years bronze craftsmanship in the United States has taken great strides. Today our work is the finest in the world. Architects have found it distinctly to their advantage to make use of this art wherever possible in the buildings they design.

We are constantly in touch with the newest developments in ornamental bronze work and have particularly valuable data on its finishing and maintenance. For full information consult the technical staff of the COPPER AND BRASS RESEARCH ASSOCIATION.

ESTABLISHED 1902

DETROIT MAUSOLEUM EQUIPMENT WORKS

CHARLES BOVENSIEP, PROPRIETOR

Fine Bronze Work for Mausoleums and Memorials, Bronze Tablets and Signs, Honor Rolls, and Bronze Letters

Fourteenth Avenue and Baker Street
(Post Office Box 574)
DETROIT, MICH.

Products

GENUINE BRONZE DOORS for Public and Private Mausoleums.

GENUINE CAST BRONZE TABLETS and HONOR ROLLS.

GENUINE CAST BRONZE LETTERS for Buildings.

Also manufacturers of Bronze Window Grilles and Frames for Mausoleums; Catacomb Fittings; Ceiling Hangers; Ventilators; Decorative Bronze Work; Plaques; Bas-reliefs.

Cast Bronze Tablets (Commercial and Memorial)

A specialty. These are furnished in stock patterns or are made from architects' details.



Illustration No. SW122

Cast Bronze Memorial Tablet

Raised bevel edge border and raised stock style letters. Size was 36x22 in.

Bronze Mausoleum Doors (90% Copper Bronze)

Built-up heavy sheet construction. Standard thickness 1 in., also made 1⅛, 1¼, 1⅜ in. thick. Equipped with all hardware, hinges or pivots, threshold, plate glass shutters at rear of grilles, to open for ventilation.



Illustration No. SW1401



Illustration No. SW1403

Usually finished in light statuary bronze finish. All doors made to order, in any size or shape. Architects' special designs and ideas will be carefully followed. The usual time required for execution is 4 to 6 weeks. All material throughout genuine U. S. Standard Bronze (90% copper).

Cast Bronze Letters

The style letter illustrated is most generally used and we have adopted it as our standard.

When writing for prices send a scaled sketch showing size of letters desired and length of space where the letters are to be set.



Letters can be made flat face, rounded face, incised face, convex or with any other section.

Usually bronze letters are fitted with bronze washers on the rear, so the backs of letters set ¼ to ½ in. from surface of wall.

Architects' details for special designs and shapes will be carefully followed.

General Specifications for Architects—Letters to be cast of best U. S. Standard Bronze of size indicated on plans. To be finished in fine sanded statuary bronze and fitted with substantial detachable bronze anchors on rear for cementing to brick, stone, tile, etc.

Spacing of letters to be approved by architect before setting.

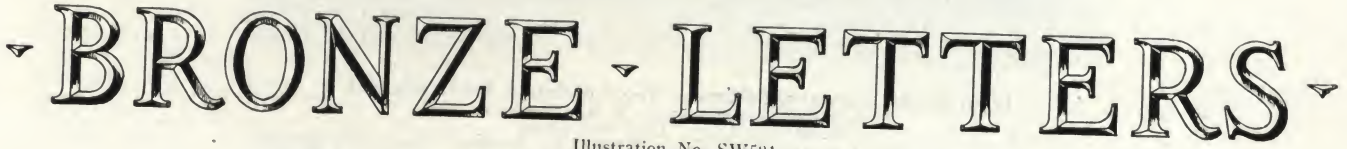


Illustration No. SW581

Individual Cast Bronze Letters for Buildings

Standard Roman architectural style. Pyramid section

ESTABLISHED 1911

ELLISON BRONZE COMPANY, INC.

Architectural and Decorative Products in Cast and Hollow Bronze and Aluminum

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ORNAMENTAL BRONZE and ALUMINUM WORK, which includes:

Architectural and Decorative Castings.
Bank Screens and Fitments.
Bulletin and Directory Cases.
Check Desks.
Doors and Entrances.
Elevator Fronts.
Grilles and Guards.
Hollow Bronze and Aluminum Doors and Partitions.
Letters and Figures.
Mausoleum Equipment.
Memorial Tablets and Plaques.
Seats.
Signs.
Store Fronts.
Ventilators.
Window Frames and Casements.
Special Hardware.

For our pages on Welded Bronze Doors and Louvre Ventilators, see Manufacturers' Index.

Equipment

Our equipment comprises a most complete establishment, devoted exclusively to the manufacture of bronze and aluminum products.

Facilities

These include designing, engineering and drafting departments, modeling and pattern departments for plaster, wood and metal patterns. We have also a completely equipped foundry, machine shop, chasing and finishing departments, and a special hardware department.

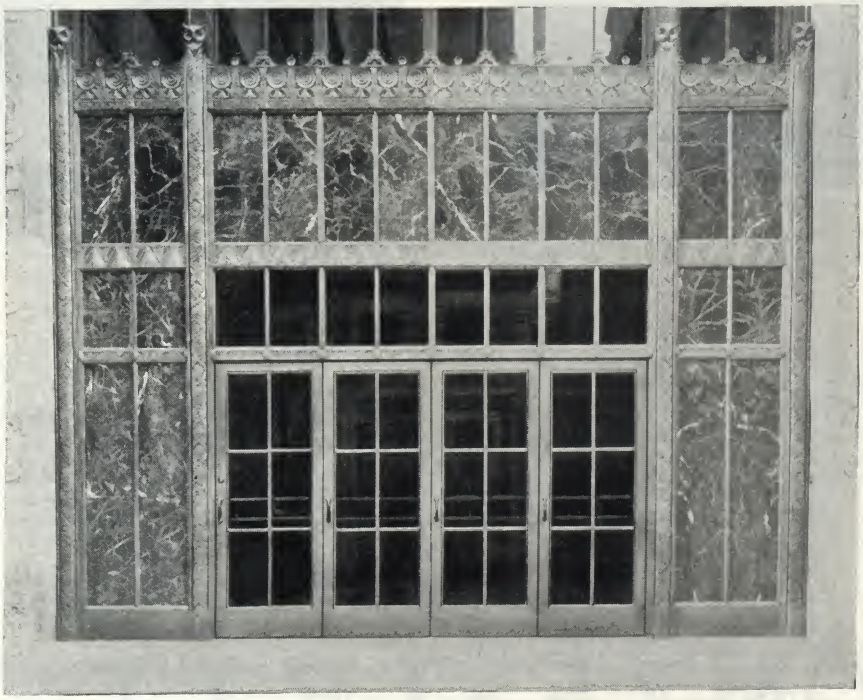
This complete organization, covering a lifetime of experience and personal supervision, offers expert engineering and drafting service requiring a minimum of supervision on the part of the architect.

References

Any bank or banker in Jamestown, N. Y. Dun or Bradstreet Mercantile Agency, New York, N. Y.

Literature

Gladly mailed on application. Send for a list of our installations.



Light Street Entrance, Baltimore Trust Building, Baltimore, Md.
TAYLOR & FISHER and SMITH & MAY, Architects
J. HENRY MILLER, INC., Contractors

We made and installed the Ornamental Bronze Work in this building. The architects write: *"There are few workers in this difficult medium who can be trusted to execute work of the character that was involved in this building, and we are pleased to place your name high up in the list of those whom this office would approve for such work."*

ETCHED PRODUCTS CORP.

Manufacturers of Etched Panels

Queens Boulevard and 39th Street, LONG ISLAND CITY, N. Y.

BRANCH OFFICES

BOSTON, MASS., 44 Bromfield Street

CLEVELAND, OHIO, 3221 Carnegie Avenue

"Masters of the Etching Process"

The Company and Its Services

The ETCHED PRODUCTS CORP. are manufacturing specialists of etched panels for elevator and corridor doors as well as hollow metal doors.

The Company is completely staffed to handle drawings, photographic work, etching and all finishing, including enameling and toned effects.

Flexibility of Panels

Panels are constructed flat for doors, or can be made satisfactorily to form the entire front by bending after etching.

Etching

Panels can be etched in one piece up to 3x8 ft., thereby eliminating the old method of joining together several small sections.

Etching done on bronze, brass, Muntz metal, nickel silver, Benedict metal, steel and aluminum.

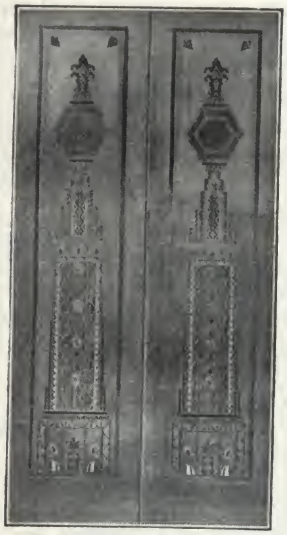
Advantages

Etched panels are outstanding due to their many uses, simplicity of installation and low cost. The price and decorative effect of etched panel doors compare favorably with alternates.

Designs and Samples

Write for complete information regarding stock designs.

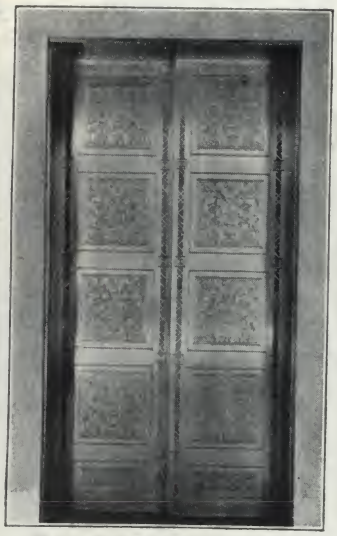
A miniature etched sample panel gladly furnished on request.



Etched and Enameled Bronze Panels
Central National Bank, Richmond, Va.



Etched Steel Paneled Elevator Doors in Main Lobby
Richfield Oil Building, Los Angeles, Calif.



Etched Bronze Panels in Statuary Finish
270 Broadway, New York, N. Y.



Etched and Enameled Bronze Panels, Spandrels, Jambs, Soffits and Directory Board
75 Federal Street, Boston, Mass.

Partial List of Installations

Richfield Oil Building, Los Angeles, Calif.
Oliver Cromwell Hotel, New York, N. Y.
Cleveland Town and Country Club, Cleveland, Ohio
Central National Bank, Richmond, Va.
Westchester Apartments, Washington, D. C.
St. Moritz Hotel, New York, N. Y.
270 Broadway, New York, N. Y.
Bank of Philadelphia Trust Co., Philadelphia, Pa.
Eldorado Towers, New York, N. Y.
San Remo Towers, New York, N. Y.
Buffalo Courier Express, Buffalo, N. Y.
1 Cedar Street, New York, N. Y.
Beresford Apartments, New York, N. Y.
Ohio Bell Telephone Building, Dayton, Ohio
Fort Worth National Bank, Fort Worth, Tex.
National Bank of Commerce, Houston, Tex.
Broadway National Bank, New York, N. Y.
Waggoner Building, Fort Worth, Tex.
Reno County Courthouse, Hutchinson, Kan.
75 Federal Street, Boston, Mass.
Hotel Dixie, New York, N. Y.
Association of Commerce Building, Grand Rapids, Mich.
Aviation Building, Fort Worth, Tex.
Nordic Hotel, Minneapolis, Minn.
Lever Bros. Warehouse, Hammond, Ind.
Penthouse Hotel, New York, N. Y.

GENERAL BRONZE CORPORATION

Distinctive Metal Work

LONG ISLAND CITY, N. Y.

WESTERN SALES OFFICE: Builders Building, La Salle Street and Wacker Drive, CHICAGO, ILL.
MINNEAPOLIS OFFICE: 27th Avenue and 27th Street, So.

FACTORIES

JOHN POLACHEK BRONZE & IRON PLANT
TIFFANY-CORONA BRONZE & IRON PLANT
RENAISSANCE BRONZE & IRON PLANT
ROMAN BRONZE WORKS STATUARY FOUNDRY
FLOUR CITY ORNAMENTAL IRON PLANT
WISCONSIN ORNAMENTAL BRONZE PLANT
GUARANTY IRON & STEEL PLANT
DOMINION BRONZE & IRON PLANT

Products

All types of ARCHITECTURAL ORNAMENTAL METAL in aluminum, bronze, iron, monel, nickel.

SCULPTURAL CASTING in either the lost wax or French sand process.

A partial list of products includes:

Balustrades	Elevator Doors	Mausoleum Doors
Bank Screens	Entrances	Railings
Check Desks	Gates	Signs
Counter Screens	Grilles	Spandrels
Directory Boards	Lamp Standards	Store Fronts
Doors	Marquises	Tablets

For Casement and "Polachek" Patented Double Hung Windows, see Manufacturers' Index, or write for catalogue.

Experience

For thirty-seven years, General Bronze, through its predecessor companies, has been working in architectural ornamental metals. We have acquired a wealth of experience in the manufacture of the finest work.

Improvements

While retaining all the good points of the traditional methods of bronze working, we have inaugurated improvements in casting and finishing. On the newer metals we are working in close contact with the producers, seeking the very best alloys and methods of handling for each and every type of product.

Engineering Service

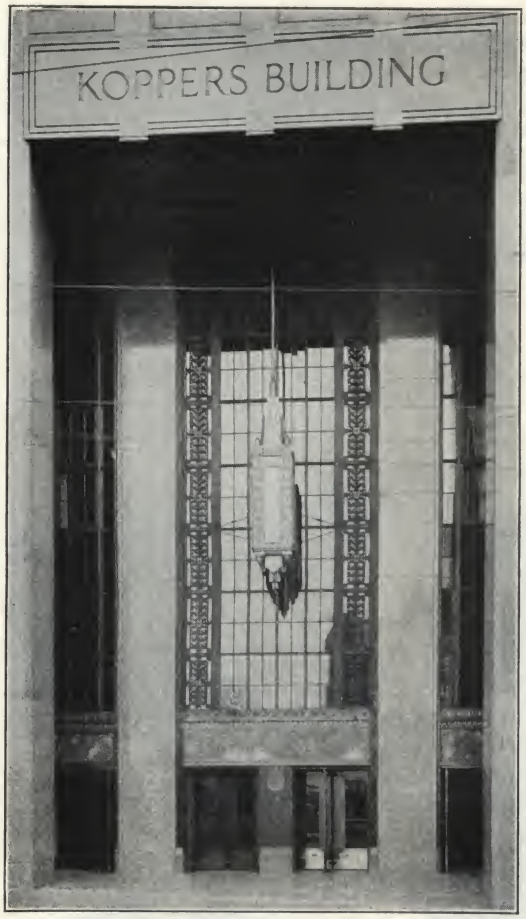
We want architects to take advantage of our experience and research. It may be that on the engineering problems involved in presenting designs to the best advantage that we can offer suggestions making for lower costs and even better quality.

This service is available without obligation by personal service from either our New York or Minneapolis offices.



Iron Grille
Cleveland Federal Reserve Bank
WALKER & WEEKS, Architects

Continued on next page



Bronze Entrance, Koppers Building, Pittsburgh, Pa.
GRAHAM, ANDERSON, PROBST & WHITE, Architects

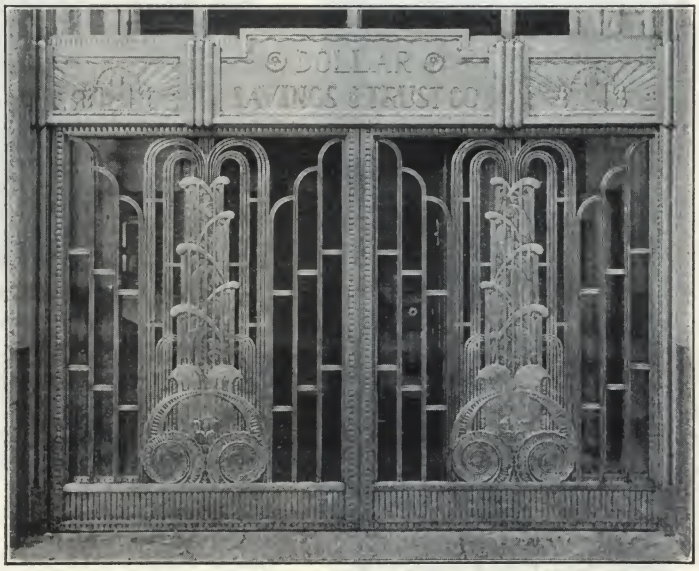


Bronze Entrance, American Bank & Trust Co., New Orleans, La.
MOISE H. GOLDSTEIN, Architect





Entrance to Fidelity-Philadelphia Trust Co. Building, Philadelphia, Pa.
SIMON & SIMON, Architects



Bronze Entrance, Dollar Savings Bank, Pittsburgh, Pa.
PRESS C. DOWLER, Architect

Continued on next page



Elevator Doors, Medical Arts Building, Akron, Ohio
GRAHAM, ANDERSON, PROBST & WHITE, Architects

A Partial List of Prominent General Bronze Corporation Installations and Architects for Whom We Executed the Work

Building, 101 Madison Ave., D. H. Burnham & Co.
Central Hanover Bank, Cross & Cross
Wall & Hanover Bldg., Delano & Aldrich
Dollar Savings Bank, Press C. Dowler
Mutual Benefit Life Insurance Bldg., J. H. & W. C. Ely
Nebraska State Capitol, Bertram Goodhue Associciates
Northwestern National Bank, Graham, Anderson, Probst & White
Cleveland Union Terminal, Graham, Anderson, Probst & White
Broad Street Station, Graham, Anderson, Probst & White
Koppers Bldg., Graham, Anderson, Probst & White
LaSalle-Wacker Bldg., Holabird & Root
Palmolive Bldg., Holabird & Root



Cast Bronze Mail Box, No. 1 La Salle Street Building, Chicago, Ill.
K. M. VITZTHUM & Co., Architects



Nickel Silver Mail Box, Round Tower, Minneapolis, Minn.
HOLABIRD & ROOT, Architects

Daily News Bldg., Holabird & Root
Northwestern Life Insurance Bldg., Holabird & Root
First National Bank, Holmes & Winslow
Grant Office Bldg., Henry Hornbostel
Title Guaranty & Trust Co., J. M. Howells
Kaufman Store, Janssen & Cocken
Liberty National Bank, A. Kahn and H. Craig Severance
Temple Emanu-El, Kohn, Butler & Stein
Warner Bros. Theatre, Thomas W. Lamb
Hoboken Savings Bank, Ludlow & Peabody



Elevator Doors, No. 1 La Salle Street Building, Chicago, Ill.
K. M. VITZTHUM & Co., Architects



Elevator Doors, American Bank & Trust Co., New Orleans, La.
MOISE H. GOLDSTEIN, Architect



Elevator Doors, Pershing Square Buildings, New York, N. Y.
YORK & SAWYER and JOHN SLOAN, Architects

Continued on next page



Wrought Screen Door in Dr. H. H. Hill Residence, Detroit, Mich.

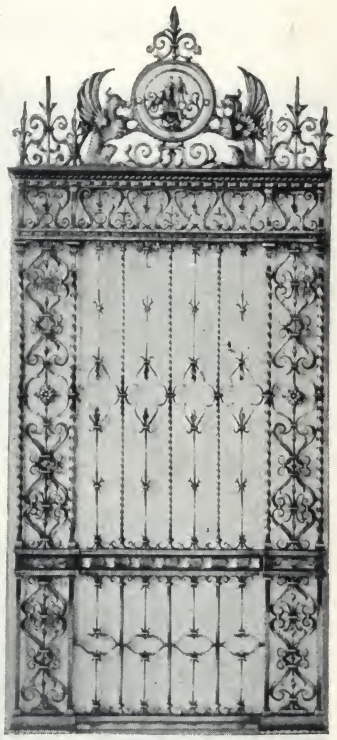
Art Showrooms—56th Street Galleries, 6 E. 56th Street New York, N. Y.

Primarily, but not exclusively, the 56th Street Galleries are interested in the presentation of sculptural art, its reproduction in metal and outstanding examples of metal craft.

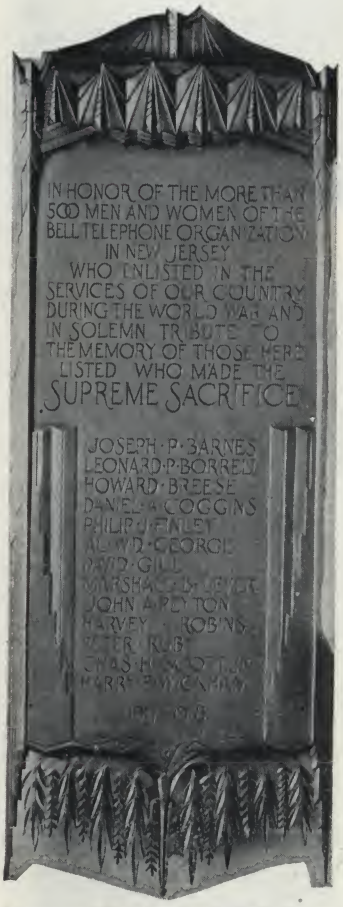
In this age of increasing use of metal, the galleries aim to bring to the discriminating public a new appreciation of the values and potentialities of the various metals.



Pioneer Woman
Located in Prairie Park, Ponca City, Okla.
BRYANT BAKER, Sculptor



Wrought Iron Grille in Tea Garden, Apartment of Geo. Woodruff, Chicago, Ill.
McNALLY & QUINN, Architects



Memorial Tablet, N. J. Bell Telephone Co., Newark, N. J.
VOORHEES, GMELIN & WALKER, Architects



Wrought Iron Stair Rail in Louis Kirchner Residence, St. Paul, Minn.



Ecclesiastical Tablet

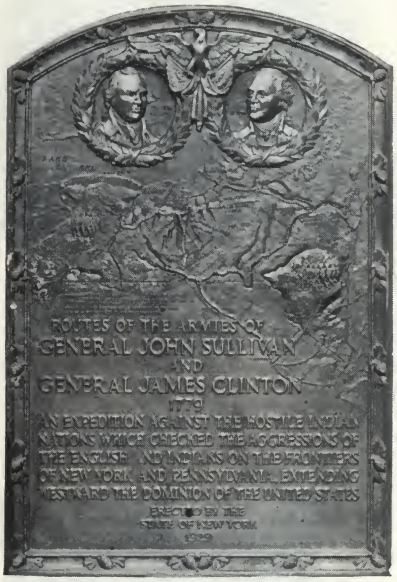
THE GORHAM COMPANY

BRONZE DIVISION

Fine Architectural Metal Work
Designers of Tablets and Memorials
Statuary Founders

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SALES OFFICE
576 Fifth Avenue (Room 904), NEW YORK, N. Y.
GENERAL FABRICATION WORKS: PROVIDENCE, R. I.
FOUNDRIES: PROVIDENCE AND NEW YORK



Bronze Historical Marker



Bronze Trophy Tablet



Bronze Commemorative Tablet



Bronze Memorial Tablet

Products

ARCHITECTURAL AND ORNAMENTAL METAL WORK executed in bronze, brass, nickel bronze, aluminum, monel, stainless steel, silver and gold.

STATUARY CASTINGS of any size produced by French Sand or Ciré Perdue (lost wax) processes.

BRONZE TABLETS AND MEMORIALS, a complete service in the designing, modelling, casting and erection of tablets, memorials and monumental sculpture.

MAUSOLEUM EQUIPMENT, complete installations of metal work for mausoleums, a wide variety of designs and patterns are available, suitable for small private mausoleums, as well as for community mausoleums.

A partial list of products:

Altars	Gates
Altar Rails	Grilles
Balustrades	Guards (Window)
Bank Screens	Lamps, Sanctuary
Bulletin Boards	Lamp Standards
Candlesticks	Lecterns
Candelabra	Letters
Canopies	Marquise
Check Desks	Mausoleum Doors
Counterscreens	Pulpits
Crosses	Railings
Directories	Signs
Doors	Store Fronts
Ecclesiastical Wares	Tablets
Elevator Cabs	Ticket Booths
Elevator Doors	Windows (Casement)
	Windows (Double Hung)

For our page on Ecclesiastical Work, see Manufacturers' Index.

Information and Service

The book of *Gorham Bronze Tablets and Memorials,* containing information helpful to designers, will be sent upon request.

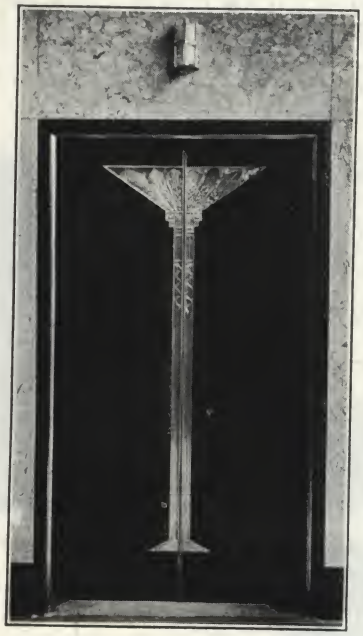
We offer a complete service, based on over forty years' experience in the designing and casting of fine memorials and tablets in bronze.

Continued on next page

All Ornamental Metal Work in Nickel and Monel Executed by The Gorham Company for the New Board of Trade Building, Chicago, Ill.



Interior of Sherman Street Entrance



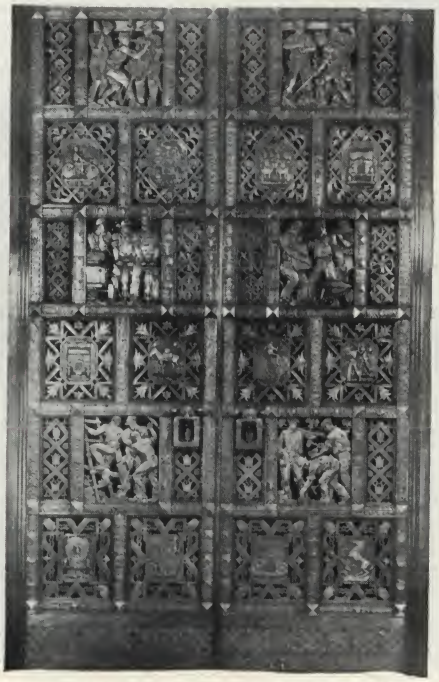
Left:
Elevator Door of Steel with Nickel Applique



Main Lobby

Recent Gorham Bronze Installations

Building	Location	Architect
Board of Trade Building	Chicago, Ill.	Holabird & Root
Lincoln Building	New York, N. Y.	J. E. R. Carpenter
Industrial Trust Company	Providence, R. I.	Walker & Gillette
Pennsylvania Railroad New Suburban Station	Philadelphia, Pa.	Graham, Anderson, Probst & White
State Office Building, North	Harrisburg, Pa.	Gehron & Ross
C. D. Peacock Co.	Chicago, Ill.	Holabird & Roche
Union Trust Company	Detroit, Mich.	Smith, Hinchman & Grylls
N. W. Ayer Building	Philadelphia, Pa.	Ralph B. Bencker
Alexander-Baldwin Building	Honolulu, T. H.	Dickey & Wood
Holland Tunnel	New York and New Jersey	Harvey Wiley Corbett
First National Bank	Stamford, Conn.	Benjamin W. Morris
R. I. Hospital Trust Company	Woonsocket, R. I.	Thomas M. James Company
Fairmount Mausoleum	Newark, N. J.	Henry Deacy
Ferncliff Mausoleum	Ardsley, N. Y.	Gregory B. Webb
White Chapel Mausoleum	Detroit, Mich.	Alvin E. Harley



Bronze Doors, State Office Building, North, Harrisburg, Pa.
William Gehron and Sidney F. Ross, Architects



Bronze Doors, Greenwich Savings Bank, New York, N. Y.
York & Sawyer, Architects

J. H. GWATHMAY

Cast Bronze Letters and Tablets

TELEPHONE
BEEKMAN 3634

10 Spruce Street
NEW YORK, N. Y.

Facilities and Information

We are in a position to manufacture cast bronze letters and tablets on very short notice. The fact that we have been in business since 1901 is your assurance of getting the proper kind of work and deliveries on time. Installations made anywhere.

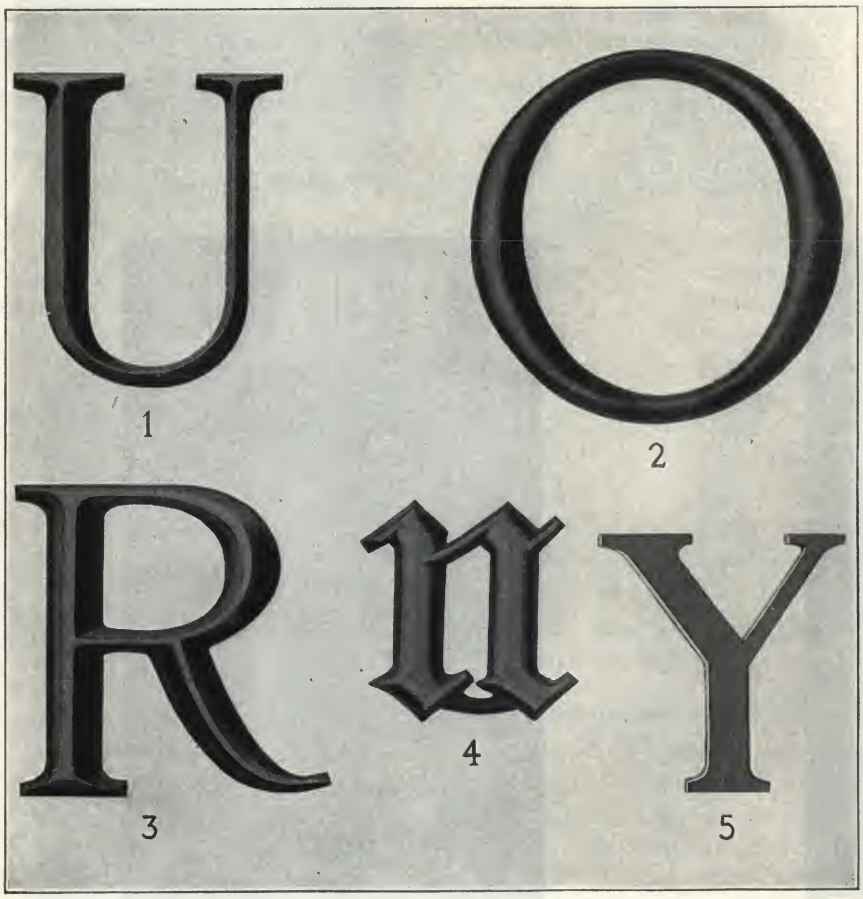
We also make Antivision window screens and do gold lettering on glass.

Estimates or drawings gladly furnished on request.









(1) Bevel Face (4) Old English Face (2) Round Face
(3) Cove Face (5) Flat Face

Five Types of Bronze Letters in Sizes ½ to 30 In.



THE JOHN HARSCH BRONZE & FOUNDRY CO.

Manufacturers of Distinctive Architectural and Memorial Bronze, Aluminum and Iron Work

Madison Avenue (West 116th to 117th Streets)
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Products

ARCHITECTURAL BRONZE, ALUMINUM and IRON WORK of every description.

Facilities and Services

Our plant is fully equipped with modern machinery for fabricating architectural bronze, iron and aluminum work of the *better quality*. We have made a specialty of cast and wrought aluminum work for the past ten years. It has been our experience that aluminum can be substituted for cast iron, in a great many instances, at little or no difference in price over iron.

At the present time we are installing all the architectural metal work, consisting of store fronts, entrances, stair railings, bank screen, grilles, etc., for the Central Tower Building of Akron, Ohio, entirely of aluminum. The architects of this building are Walker & Weeks of Cleveland, the general contractor, Carmichael Construction Co. of Akron, Ohio. This is a 28-story building.

Competent designing, drafting and estimating departments are always at the service of the architect.

Recent Installations

BUILDING AND LOCATION	ARCHITECT
Strouss-Hirschberg Dept. Store, Youngstown, Ohio	Starrett & Van Vleck
Union Trust Co., Cleveland, Ohio	L. Kent Moatz
Broad Street Trust Co., Philadelphia, Pa.	Ritter & Shay
L. K. Liggett Building, Dayton, Ohio	Schenck & Williams
Public Auditorium Building, Cleveland, Ohio	Herman Kregelius
Farmers Bank, Mansfield, Ohio	Althouse & Jones
First National Bank of New Castle, New Castle, Pa.	Simons, Brittain & English, Inc.
Allen Memorial Medical Library, Cleveland, Ohio	Walker & Weeks
First National Bank of Lansdale, Lansdale, Pa.	Tilghman-Moyer Co.
Richland Savings Bank, Mansfield, Ohio	Althouse & Jones
Detroit Savings Bank, Detroit, Mich.	C. L. Phelps
Colonial Arcade Building, Cleveland, Ohio	Walker & Weeks
Bing Realty Co. Building, Cleveland, Ohio	Lehman-Schmitt Co.
Institute of Pathology, Cleveland, Ohio	Abram Garfield
Gallery of Fine Arts, Columbus, Ohio	Richard, McCarty & Bulford
Dollar Savings Bank, Wheeling, W. Va.	Albert Kahn
Akron Central Tower Building, Akron, Ohio	Walker & Weeks
Cuyahoga County Jail and Court House, Cleveland, Ohio	Warner & Mitchell
Warner Bros. Film Exchange, Cleveland, Ohio	J. Milton Dyer
Wheeling Hospital, Wheeling, W. Va.	Crowe, Lewis & Wick
Abraham Lincoln Hotel, Reading, Pa.	W. L. Stoddart
Detroit Stock Exchange Bldg., Detroit, Mich.	O'Dell & Diehl
Electrograph Building, Detroit, Mich.	Weston & Ellington
Mayfield Mausoleum, Cleveland, Ohio	Lovell & Lovell
Central United National Bank, Cleveland, Ohio	Walker & Weeks
Severance Music Hall, Cleveland, Ohio	Walker & Weeks
First Church of Christ Scientist, Cleveland, Ohio	Walker & Weeks



Banking Room Central Depositors Bank, Akron, Ohio
WALKER & WEEKS, Architects
Mezzanine railing, window grilles, counter railing and stair railing of cast and wrought aluminum



Central Depositors Bank, Akron, Ohio
WALKER & WEEKS, Architects
Aluminum Stair Railing and Check Desk



Cast Aluminum Entrance
WALKER & WEEKS, Architects



Main Stair Railing, Bronze, Public Auditorium, Cleveland, Ohio
HERMAN N. KREGELIUS, Architect

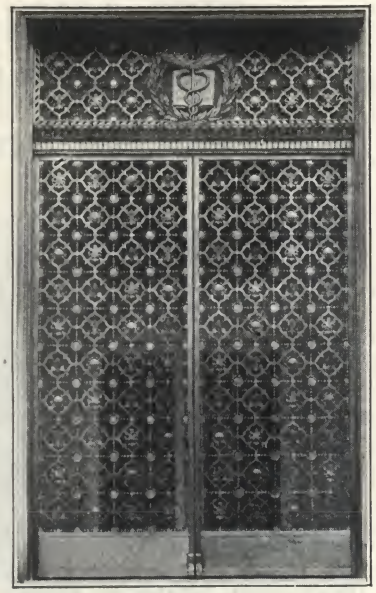
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Cast Bronze Entrance Doors, United Artists Building, Detroit, Mich.
HOWARD CRANE, Architect



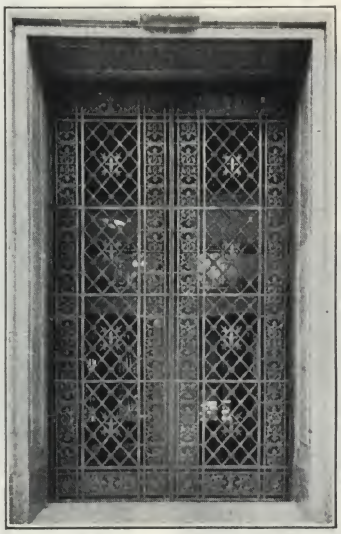
Cast Aluminum Front
ROWLAND JOHNSON, Architect



Cast Bronze Grille Door, Institute of Pathology, Cleveland, Ohio
ABRAM GARFIELD, Architect



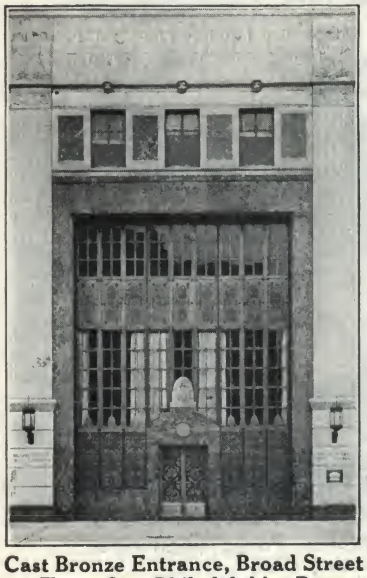
Aluminum Gate
WALKER & WEEKS, Architects



Bronze Entrance Doors, United Bank, Cleveland, Ohio
WALKER & WEEKS, Architects
Size, 8 ft. 6 in. x 15 ft.



Aluminum Entrance, Warner Bros. Building, Cleveland, Ohio
J. MILTON DYER, Architect



Cast Bronze Entrance, Broad Street Trust Co., Philadelphia, Pa.

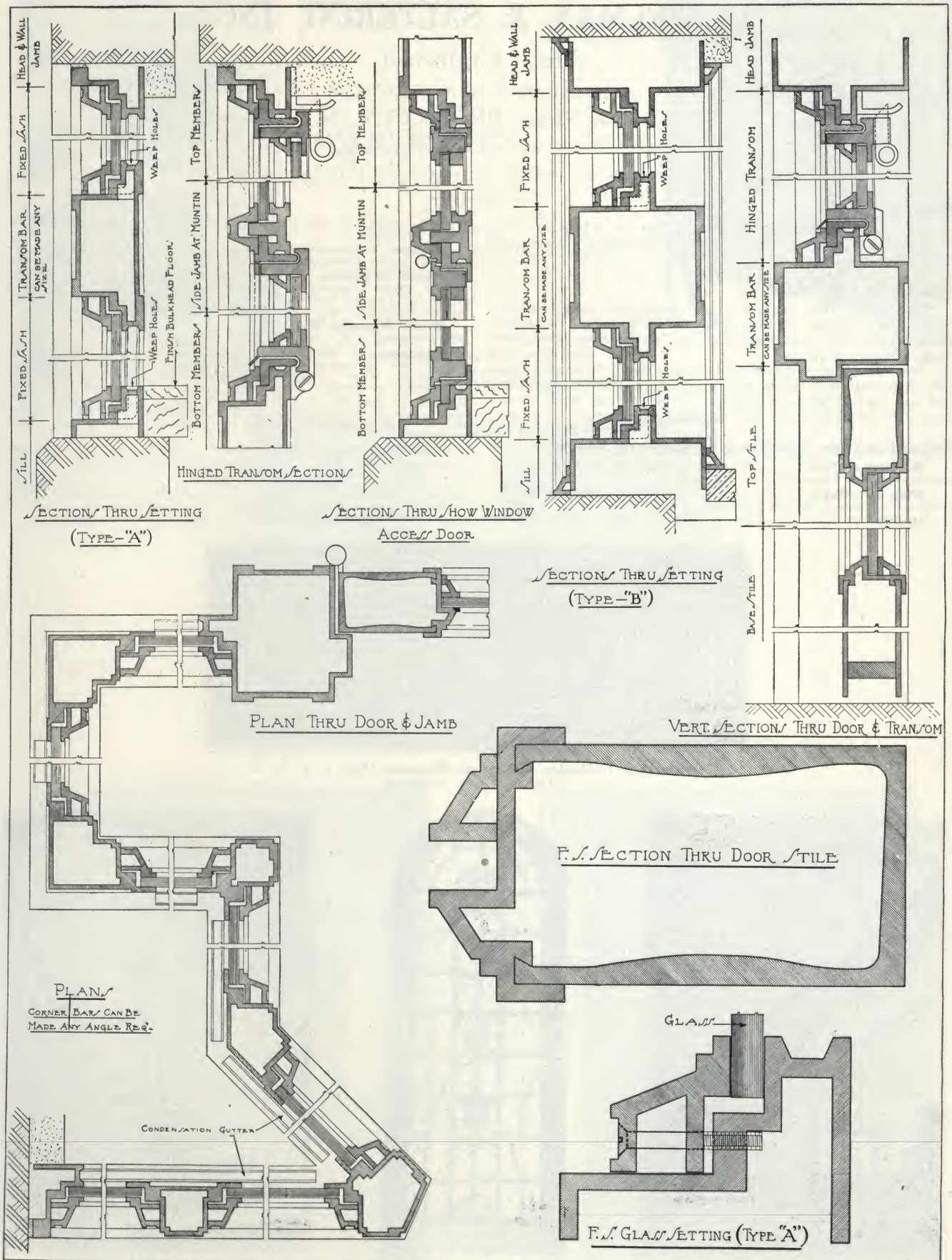


Bronze Safe Deposit Grille, Broad Street Trust Co., Philadelphia, Pa.
RITTER & SHAY, Architects



Bronze Entrance, Union Trust Co., Cleveland, Ohio
L. KENT MOATZ, Architect

Continued on next page



SCALE FULL SIZE & 3-IN.	TYPICAL DETAILS OF THE "HARSCH" STANDARD BRONZE & ALUMINUM STORE FRONTS MANUFACTURED BY THE JOHN HARSCH BRONZE & FOUNDRY CO. — CLEVELAND, OHIO	DRAWING No. 136

HASSELMAN & SALTERINI, INC.

Metal Craftsmen

TELEPHONE:
CUMberland 5068

GENERAL OFFICES AND FACTORY
151 King Street, BROOKLYN, N. Y.

SHOWROOM: 35 West 23rd Street, NEW YORK, N. Y.

Our Work on Display at Architects' Samples Corporation, 101 Park Avenue, NEW YORK, N. Y.

Products

Bank Screens, Balconies, Doors, Grilles, Lighting Fixtures, Architectural Aluminum, Decorative Hardware, Stair Rails, etc.

Hand Wrought Metal

We supply the ornamental and decorative metal element for homes, churches, banks, public buildings, etc. Architects consult us on their metal problems and we estimate from their plans and specifications.

Our Designing Department is always ready to submit original ideas and make special sketches to meet specified allotments and suit individual requirements. *No job is too small or too large for our best service and attention.*

Suggestions for Specifying Ornamental Metal

Material—If iron, to be best grade American or Swedish Iron, sample of iron to be approved by Architect.

Shop Drawings—To be submitted in triplicate either directly to Architect or through General Contractor.

Models—To be furnished by the Architect at the owner's expense or to be included by the Metal Craftsmen at their expense as directed by the Architect.

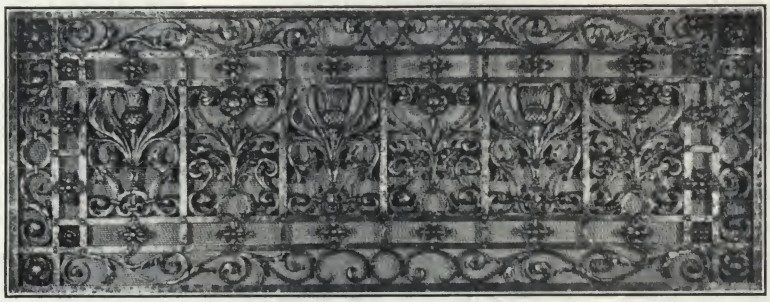
Sample—When work indicated on details is to be executed in special finish, a sample section of work to be furnished is to be submitted.

Notice to Bidder—The owner and Architect are expecting and will pay for artistic execution of the metal work to be carried out according to best tradition and methods of the craft. No substitution of metal, nor inferior metal, nor any but the best of craftmanship will be accepted.

Hand Wrought Metal—Where required, wrought metal is to be hand-hammered in the best traditional manner.

Finishes—All wrought iron not to have "special" finish to be painted with one coat of red lead and two coats approved flat black rust-proof paint. When "special" natural half-polished finish is required, the metal should be scraped, cleaned, and pickled to remove all foreign substances; the iron then covered with a coating of linseed oil and heated over a charcoal fire to absorb the oil. After again cleaning, the entire surface is to be protected with a combination of beeswax and boiled linseed oil.

Regarding Rust—Rust can not be entirely prevented. Different climatic conditions have varying effects on both bronze and iron. The only remedy is constant care either by paint or application of wax or varnish. Cadmium and chromium plating are recommended for interior purposes only—for exterior purposes this method of rustproofing is still in the experimental stage. All polished or half-polished iron must be treated with wax and oil at intervals to insure prevention of rust.



Grille at E. F. Hutton Residence, Wheatley Hills, L. I., N. Y.
Hart and Shape, Architects



Stair Rail
Fifth Avenue Residence
New York, N. Y.
Lafayette H. Goldstone, Architect



Bronze and Wrought Iron Door
730 Park Avenue
New York, N. Y.
F. B. Hoffman, Architect
G. Richard Davis, Gen. Contractor



Hand Wrought Iron Rail
Park Avenue Residence
New York, N. Y.
Designed by Hasselman & Salterini, Inc.

Continued on next page



Literature on Request

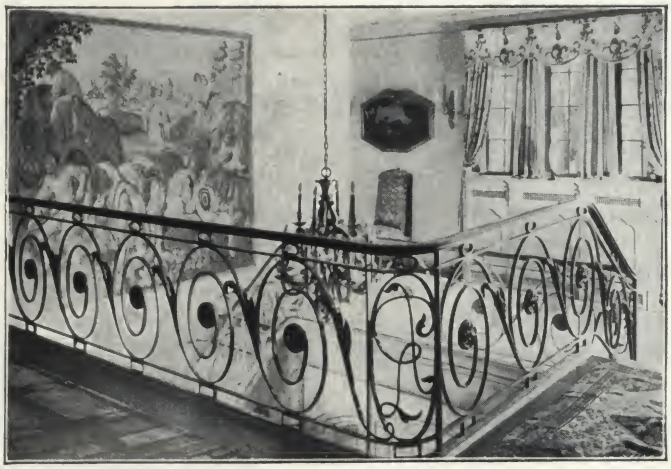
Write for a copy of our current brochure A.I.A. 15d for your file reference.

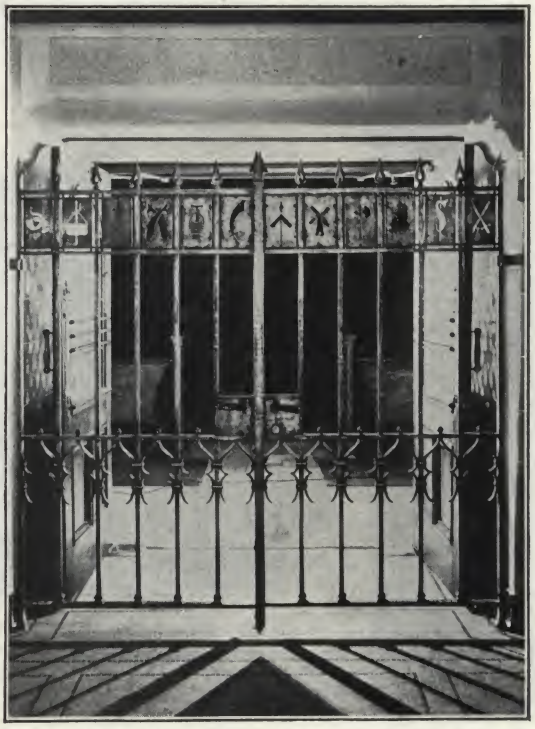
At Left:
Balcony and Window Grille, Residence, Fieldstone, N. Y.
DWIGHT JAMES BAUM, Architect



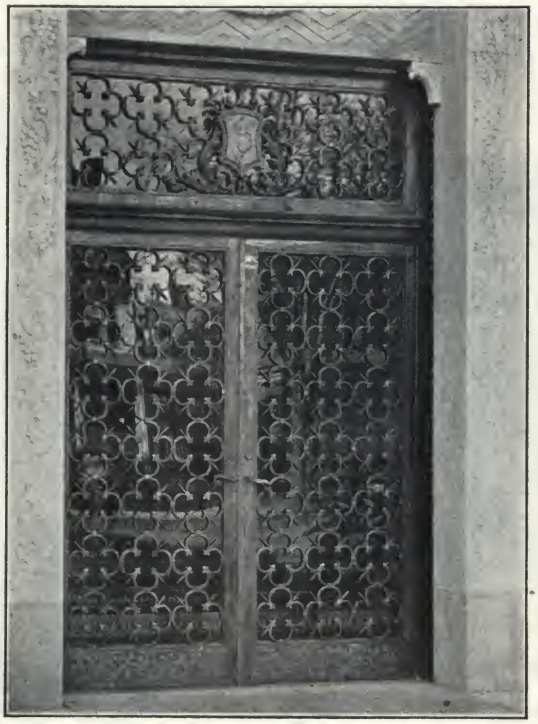
At Right:
Grille Console Table
R. ANTHONY COURT, Decorator

Below:
Wrought Iron Rail in French Chateau
LE ROY P. WARD, Architect





Gate for Manhattan Towers Church, New York, N. Y.
TILLION & TILLION, Architects



East Orange Apartment House
JOHN B. PETERKIN, INC., Architect

ESTABLISHED SINCE 1889

HAVEN-BUSCH CO.

Manufacturers of Passenger Elevator Entrances

509-519 Front Avenue, N.W.
GRAND RAPIDS, MICH.

Products

PASSENGER ELEVATOR ENTRANCES.
PASSENGER ELEVATOR DOORS.
PASSENGER ELEVATOR CABS.
Also Ornamental Iron and Ornamental Bronze.

Facilities and Service

Equipment of the very latest for producing the finest elevator entrances. Elevator entrances can be readily and promptly handled. Designs and engineer's service free to builders, engineers and architects. Complete erection and maintenance departments.

Elevator Entrances

Elevator entrances should be completed in every detail under one contract to insure perfect operation and to simplify responsibility.

Materials—Steel or bronze is used as desired. The bronze is high grade commercial stock. The steel is high class furniture steel, stubs gauge.

Safety Feature—Flush hatch should be used wherever possible for safety feature.

Special Designs and Construction—Any design or construction can be had as required, in iron or bronze, wrought or cast. Etched paneling also executed to your design.

Sills—Cast iron; non-slip ridges in doorways; machine-planed grooves; secured to structural members of building.

Jambs—Formed steel construction of No. 12 gauge, rabbeted to receive the doors; hardware housing of $\frac{3}{16}$ in. steel with hinged and latched cover plate, concealed hinges, for access to hardware. Frames are welded into one-piece construction—no bolts or screws on face of jamb.

Trim—Drawn steel of No. 16 gauge, held in place by concealed fastenings with cast iron plinth blocks.

Facias—Steel facias of No. 14 gauge. From hardware housing to sill of floor above made 12 in. wider than door opening.

(The above is used when hatch is not plastered.)

Doors—Hollow metal construction; stiles and bases of No. 14 gauge, cork-filled; double section moulding for glass or solid panel (see detail other page); interlocked and welded into one-piece construction, reinforced for hardware.

Glass—If used, may be clear polished wired glass or any obscure pattern of wired glass.

We suggest using hammered wired glass.

Struts—Angle struts from sill to ceiling to make each entrance independent of the wall.

Hardware—Ball bearing hangers, bumpers at all striking points, bronze handles on car side.

Finish—May be had in any solid color enamels, stippled enamels, or grained enamels. All work receives primer, filler, body coats, two coats clear varnish, baked and rubbed between each coat; final finish eggshell gloss.



Herpolsheimer Store, Grand Rapids, Mich.
100 entrances, four-fold full automatic
ROBINSON & CAMPEAU, Architects

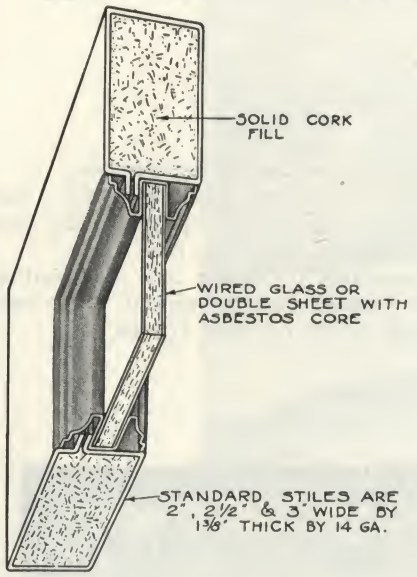


Grand Rapids Trust Co.
SMITH, HINCHMAN & GRYLLS, Architects

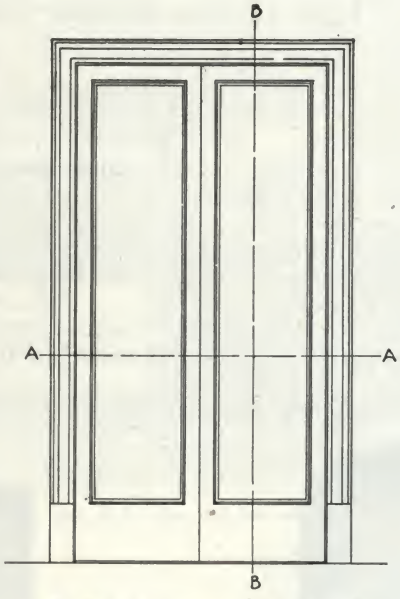


St. Mary's Hospital, Grand Rapids, Mich.
32 entrances, center opening, semi-automatic
HARRY L. MEAD, Architect

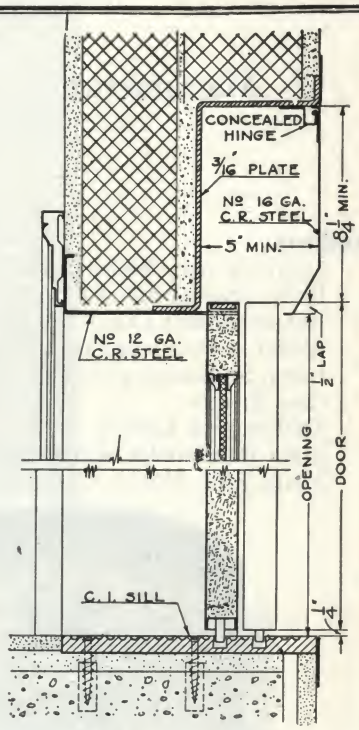
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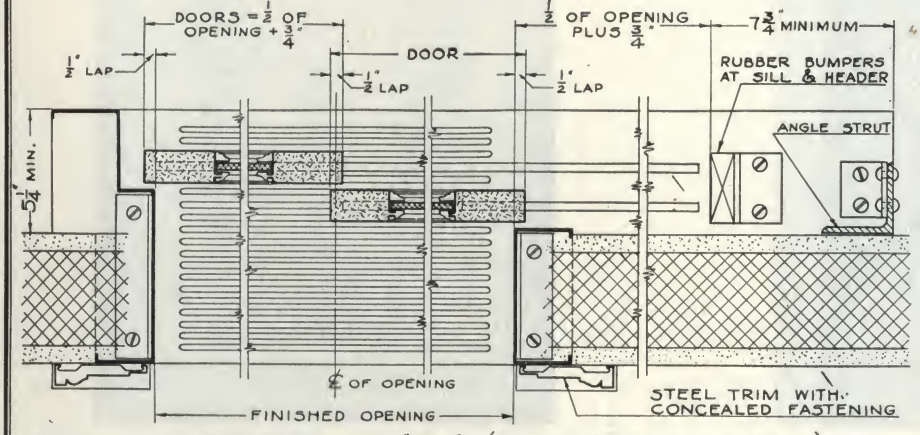
DETAIL of DOOR CONSTRUCTION



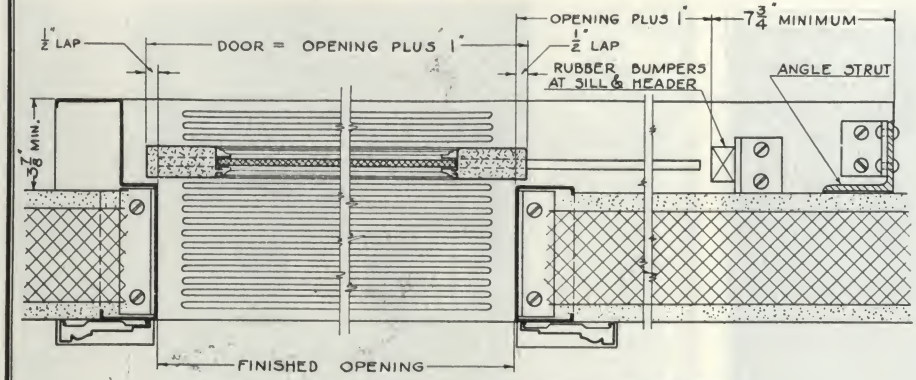
ELEVATION of DOORS
SCALE $\frac{3}{8}$" = 1'-0"



SECTION AT "B-B"
SCALE 1½" = 1'-0"



SECTION AT "A-A" (TWO SPEED DOORS)
SCALE 1½" = 1'-0"



PLAN OF SINGLE SLIDING DOOR



SUGGESTIONS OF DOOR DESIGNS

DRAWN BY HAVEN-BUSCH CO. JULY 12, 1929	**ELEVATOR DOOR DETAILS BY HAVEN-BUSCH CO.**	DRAWING NO. **10**

J. S. HEATH COMPANY

Manufacturers of High Grade Bronze and Wrought Iron Work

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Lamp Standards and Fixtures in bronze
Cast Bronze
Tablets and Letters
Stair Balustrades and Railings
Mausoleum Doors, Gates and Equipment complete

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We operate the following departments:

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We are equipped to handle any size contract and special work in bronze, iron, aluminum, white metal and monel pertaining to the building trades.



Cast Tablet
FREDERICK C. HIBBARD, Sculptor



Entrance Doors, Oak Grove Mausoleum, St. Louis, Mo.
LOVELL & LOVELL and T. P. BARNETT, Architects



Bronze Exterior Tablet



Cast Bronze Elevator Doors

Continued on next page



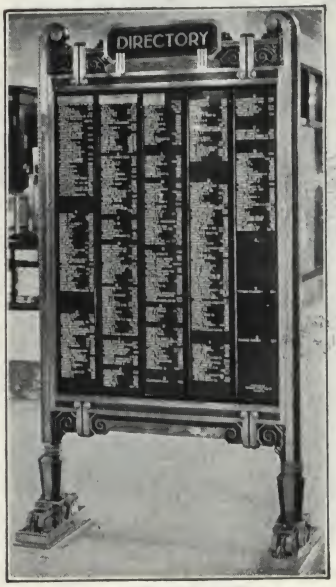
Cast Bronze Safe Deposit Screen



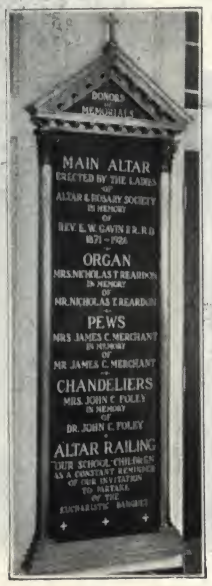
Bronze Building Entrance



Cast Bronze Grilles and Rail, Central Mfg. District Bank, Chicago, Ill.



Cast Bronze Building Directory



Cast Bronze Memorial Tablet



Cast Bronze Mausoleum Doors

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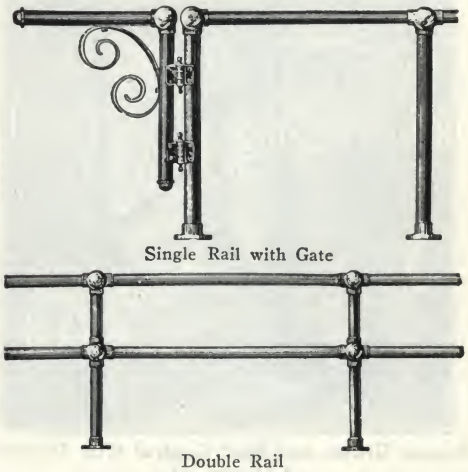
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Cast Bronze Letters and Tablets
Hand Wrought Iron Work
Cast Iron Work of all kinds
Steel Stairs of all types

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Double Rail

Brass, Bronze, White Metal and Chromium Plated Railings
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Mausoleum Doors
We have many different designs. Write for catalogue



Bronze Tubing Door
Standard stiles 1½x3 in. and 2x3 in.

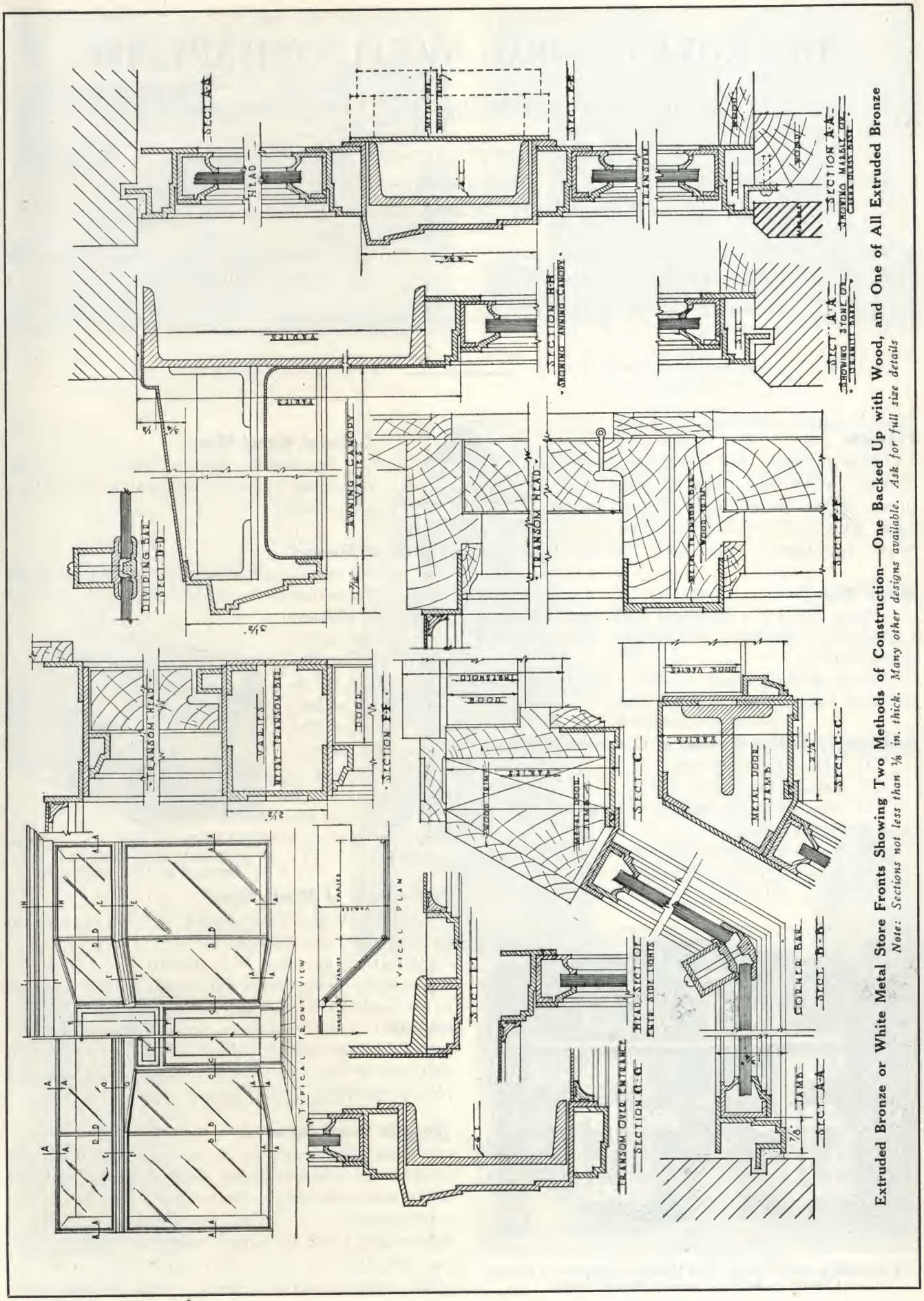


Des Plaines State Bank Building, Des Plaines, Ill.
Bank interiors of bronze, white metal and iron



Blackstone Shop, Chicago, Ill.
Modern entrance of black and white treatment

Continued on next page



Extruded Bronze or White Metal Store Fronts Showing Two Methods of Construction—One Backed Up with Wood, and One of All Extruded Bronze

Note: Sections not less than ⅛ in. thick. Many other designs available. Ask for full size details

THE INTERNATIONAL NICKEL COMPANY, INC.

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For Our Other Products, see Manufacturers' Index

Products

MONEL METAL for architectural uses is available in the mill forms of sheets, rods, tubes, angles, strips, wire, castings and in many fabricated forms such as kalamein and rolled mouldings, rivets, nails, screws, bolts, etc.

INCO MONEL METAL
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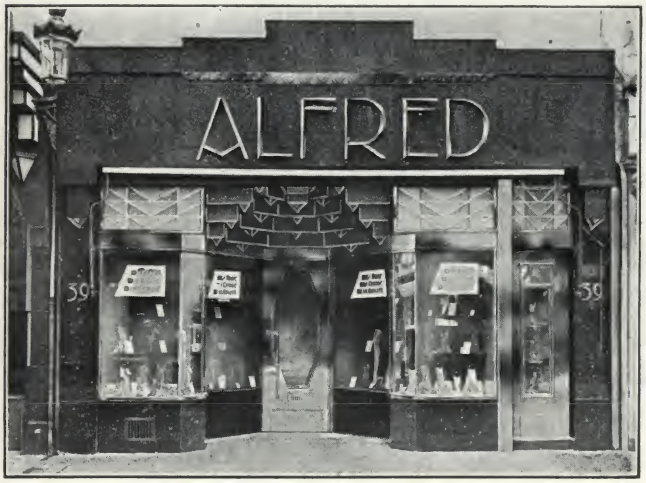
Monel Metal

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content.

Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

Advantages of Monel Metal in Ornamental Work

(1) Absolutely rustproof.
(2) Resists corrosion.
(3) Strong as steel; tougher than steel.
(4) Easy to clean.
(5) Beautiful in appearance; has color of platinum.
(6) Durable; proven by over 20 years of service.
(7) Easily fabricated.



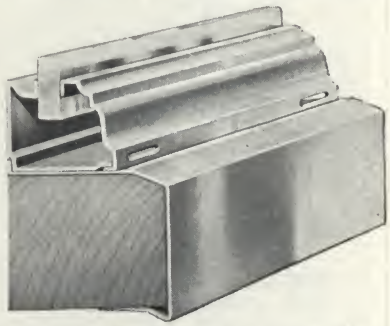
The Letters and Trim of This Modern Store Front in the Capital of Belgium Are of Monel Metal

Color of Monel Metal

As Monel Metal contains two-thirds nickel and one-third copper it is essentially a white metal.

Variety of Finishes

Various surface treatments are applied to Monel Metal. The metal may be brightly polished to a mirror finish, or different satin finishes are obtained by grinding. Duller effects are secured; such as light grays resembling pewter in appearance. If oxidized by high temperature or chemical treatment a deep black surface is obtained.



Standard Store Front Construction in Monel Metal, Supplied by Brasco Mfg. Co., Harvey, Ill.

Permanence of Monel Metal

Monel Metal is exceptionally resistant to corrosion and will resist deterioration for many times the life of the structure to which it is applied. If exposed to atmosphere, Monel Metal will in time be darkened due to accumulation of dirt and surface tarnish. This discoloration is on the surface only; corrosive action is retarded. The virtue of Monel Metal for architectural uses lies in the fact that its original appearance is retained permanently with proper care.

Wrought Monel Metal

Monel Metal may be forged and is used for the execution of hardware, gates, grilles and other wrought metal work, insuring permanence of the design and craftsmanship. At forging temperature Monel Metal accumulates a thin tight black oxide coating. By grinding high lights of work a two-toned effect is secured which closely resembles wrought iron in appearance.

Continued on next page



Check Desks and Counter Screens in the Banking Rooms of the Union Trust Building, Detroit, Mich.
Executed in Monel Metal by The Gorham Company
Smith, Hinchman & Grylls, Architects



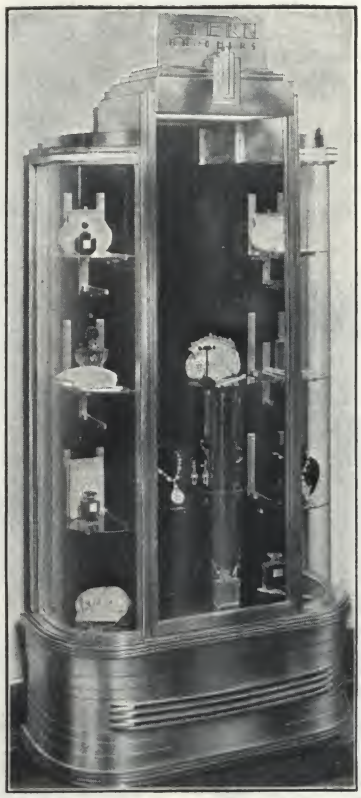
Monel Metal Is Used Effectively in Combination with Bronze in the Doors and Other Metal Work in The Integrity Trust Co., Philadelphia, Pa.
Paul Philippe Cret, Architect

Fabrication

Monel Metal is readily worked and may be subjected to most fabricating operations. Monel Metal may be machined, forged, etched, welded, soldered, brazed, spun, stamped and drawn. Architectural castings may be produced in any bronze foundry equipped with proper furnace facilities for attaining the high temperature necessary to melt Monel Metal. Being excessively strong and tough, Monel Metal cannot be extruded. Rolled and drawn shapes are produced. The working properties of Monel Metal permit any properly equipped iron or bronze shop to satisfactorily execute the architects' design.

Modern Architectural Uses

The execution of modern design is associated with white metal. The increased use of color in architecture necessitates that the metal work be in harmony with the surroundings. The whiteness of Monel Metal is particularly suited for the execution of metal work of modern design. It can also be used effectively in combination with bronze to obtain color contrasts.



Modern Showcase Entirely of Monel Metal
Designed by Eugene Schoen Inc., New York, N. Y.
Executed by Wm. O. Chapman & Co., New York, N. Y.

Some Suitable Uses of Monel Metal

Balustrades	Hardware
Bank fixtures	Lamp standards
Check desks	Lighting fixtures
Counter screens	Marquises
Display window trim	Memorials
Doors	Ornamental fences
Entrances	Pilasters
Etched panels	Radiator covers
Flagpole fittings	Safe deposit vault trim
Furniture	Show cases
Gates	Stair railings
Grilles	Store fronts

Wrought rails

Working Instructions

A complete set of instructions in the form of bulletins recommending methods of working Monel Metal in such operations as machining, forging, casting, welding, soldering, brazing, drawing, stamping and polishing, are available and will be forwarded on request.



Elevator Door in Lobby of The Union Trust Building, Detroit, Mich.
Favrille glass of various colors are inset in the background of Monel Metal
Smith, Hinchman & Grylls, Architects



Door Wrought Entirely of Monel Metal

Available Publications

"Monel Metal in Modern Architecture"—Illustrative brochure on architectural application of Monel Metal.

"Breaking Away from Tradition in Ornamental Work" — Illustrated folder of Union Trust Building, Detroit, Mich.

Architectural Service

The International Nickel Company, Inc., offers the co-operation of its engineering and research facilities in determining the suitability of Monel Metal for various uses.



Our engineers are available for consultation in reference to the adaptation of Monel Metal to the architects' requirements and will be glad to assist the fabricator with recommendations for working of Monel Metal.

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For Jackson Windows, Stone Mantels, Tile and Swimming Pools, see Manufacturers' Index.

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To the architect, WM. H. JACKSON COMPANY offers more than 100 years' experience combined with unlimited manufacturing facilities.

WM. H. JACKSON COMPANY has executed some of the largest bronze contracts and has installed bronze work in the best types of buildings.

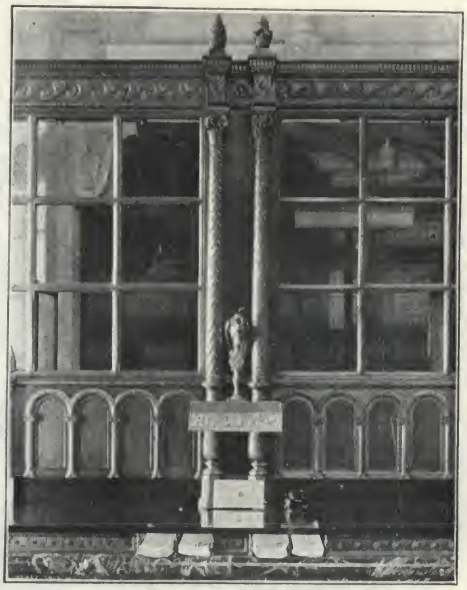
The factory is equipped to handle every operation connected with fabrication of ornamental metal work and also maintains a designing department which is working in collaboration with many architects on the design of ornamental metal work.



Wrought Iron and Bronze Entrance Doors, Ridgewood Savings Bank, Brooklyn, N. Y.
HALSEY, MCCORMACK & HELMER, INC., Architects

Recent Installations

Fisher Building, Detroit, Mich., Albert Kahn, Inc., Architect
New York Life Insurance Building, New York, N. Y., Cass Gilbert, Inc., Architect
Bank of the Manhattan Co., New York, N. Y., H. Craig Severance (Yasuo Matsui), Architects
Strawbridge & Clothier, Philadelphia, Pa., Simon & Simon, Architects
N. Y. Times Building, Brooklyn, N. Y., Albert Kahn, Inc., Architect
Folger Shakespeare Memorial Library, Washington, D. C., Paul Phillipe Cret, Architect
Empire State Building, New York, N. Y., Shreve, Lamb & Harmon, Architects
First Mechanics National Bank, Trenton, N. J., York & Sawyer, Architects
Brooklyn Central Courthouse, Brooklyn, N. Y., Collins & Collins, Architects
Lee-Higginson & Co., Boston, Mass., Coolidge, Shepley, Bulfinch & Abbott, Architects
Second National Bank, Boston, Mass., Thomas M. James Company, Architect
Architects Building, Philadelphia, Pa., Architects Group, Architects
Hubert T. Parsons Residence, West End, N. J., Horace Trumbauer, Architect
Kings County Savings Bank, Brooklyn, N. Y., Halsey, McCormack & Helmer, Inc., Architects



Bronze Counter Screen, Wilkes-Barre Deposit & Savings Bank, Wilkes-Barre, Pa.
MCCORMICK & FRENCH, Architects
BERTRAM CUNNYNGHAM, Associate Architect



Wrought Iron Vault Grille, Bank of The Manhattan Co., 40 Wall Street, New York, N. Y.
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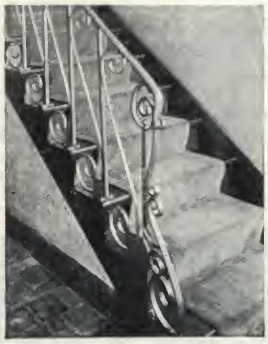
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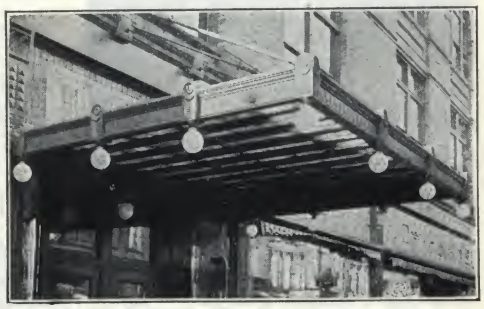
Separate catalogues on different items furnished on request. Advise as to requirements.



Steel Stairs



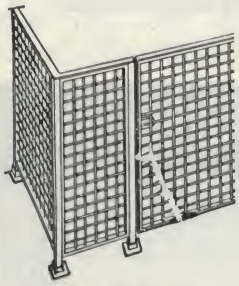
Iron Stair Railing



Cast Iron Marquise



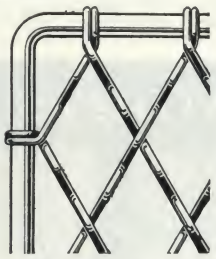
Cast Iron Front



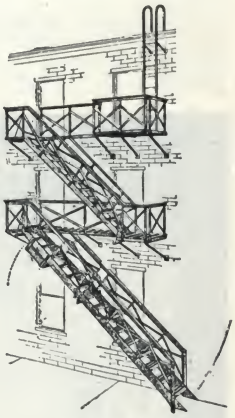
Wire Partitions



Iron Fencing



Wire Guard



Fire Escape



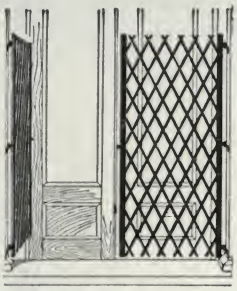
Cast Iron Work



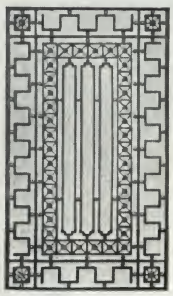
Porch Railing



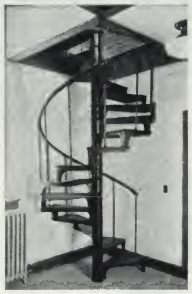
Ornamental Gates



Folding Gates



Ornamental Grille



Spiral Stair



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Pipe Railings

Made up either level or for stairs—of steel pipe or brass tubing.

Logan Spiral Slide Fire Escapes

Full detail drawings and specification shown in another section. See Manufacturers' Index.

JAS. H. MATTHEWS & CO.

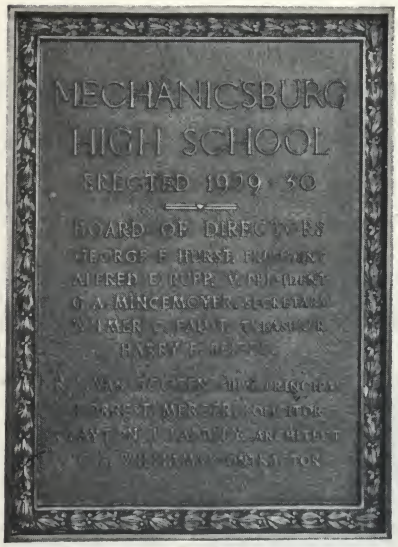
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Designs below are selected for their correctness and beauty of form. Economical because of our metal patterns.

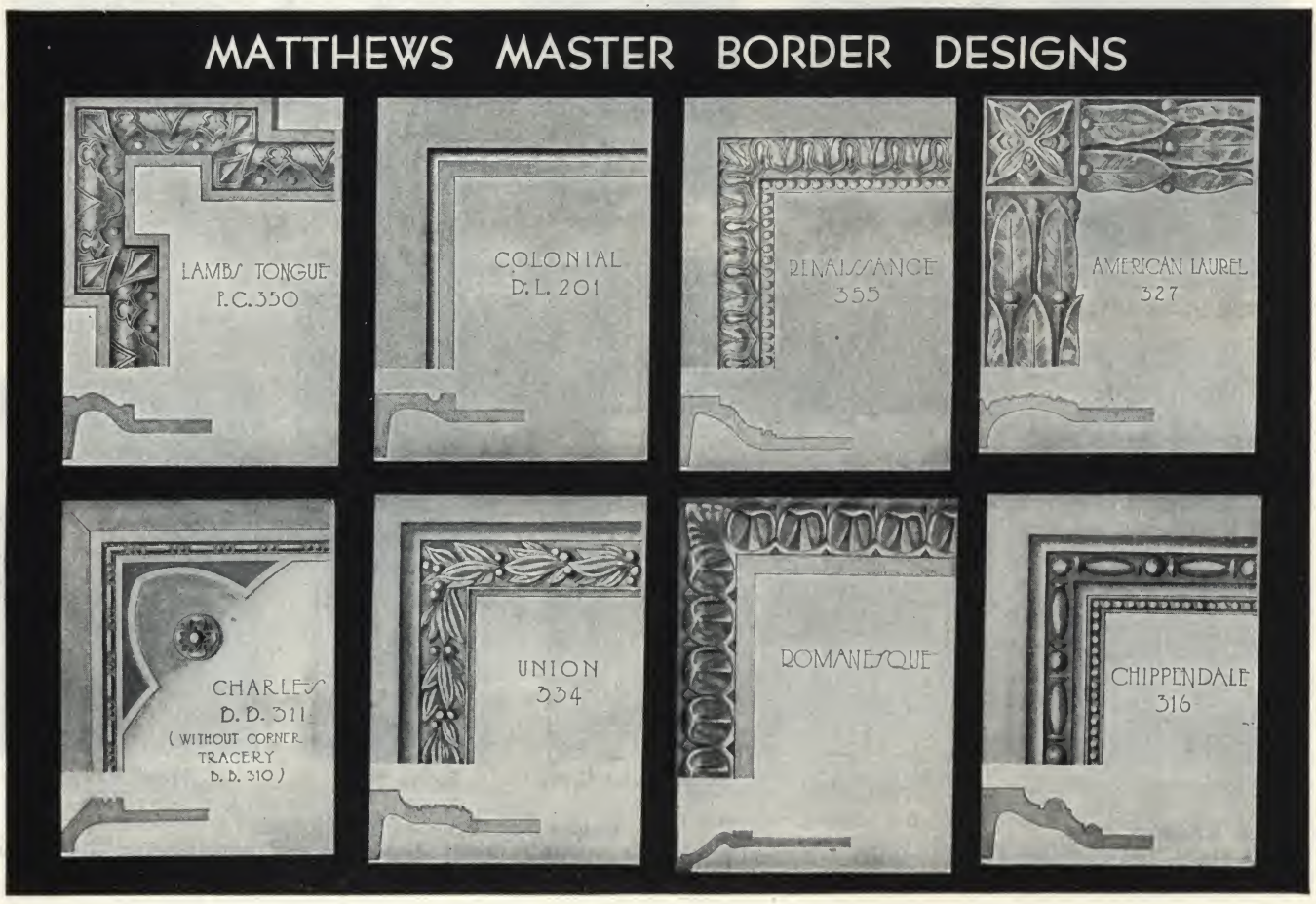
Letters either modeled oval face or flat face roman.



Bodoni Design
Illustration 33" by 10". Made any size

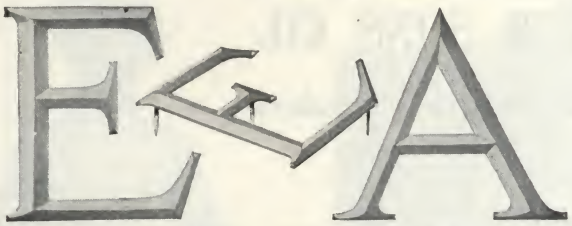


Architect's Design
Using our "Keystone" border.
Illustration 18" by 36"



Continued on next page

STATUARY BRONZE OVERHEAD LETTERS



Roman Style

Bevel face architectural roman letters for overhead or eye level signs. Sizes: 2″, 3″, 4″, 5″, 6″, 7″, 8″, 9″, 10″, 12″ and 15″.

Finishes—Dark oxidized statuary bronze for light background. Natural golden bronze for dark background.

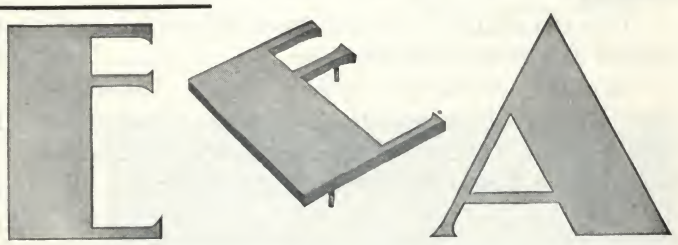
Sanded finish usual. Special finishes on request.

ABCDEFGHIJKLMNOPQR
STUVWXYZ & 1234567890

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For modern exteriors. Overhead or eye level. Made any size. We can also duplicate any special letter style.

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Our works embrace modeling rooms and studio, complete foundry for handling plain and difficult "process" castings, finishing and chasing departments, and coloring rooms.



18-ft. High, Bronze Baptistry Screen Placed at the Cathedral of St. John the Divine, New York, N. Y.
CRAM & FERGUSON, Architects



One of Four Pair of Bronze Doors, St. Cecilia's Cathedral, Omaha, Neb.
THOMAS R. KIMBALL, Architect

Continued on next page



Bronze Fountain Piece
PHILIP SEARS, Sculptor



Cemetery Memorial Panel



Baptismal Font Cover, Christ Church, Indianapolis, Ind.
CRAM & FERGUSON, Architects



Memorial Tablet Placed at Brattleboro Hospital, Brattleboro, Vt.
KENDALL TAYLOR CO., Architects



Statue of St. Francis Assisi
EARNEST PELLEGRINI, Sculptor



Spanish War Memorial Placed at Somerville, Mass.
RAYMOND A. PORTER, Sculptor



12-ft. Statue of Lincoln Placed at Springfield, Ill.
ANDREW O'CONNOR, Sculptor

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Fairmount Mausoleum, Denver, Col.
Groos National Bank, San Antonio, Tex.
Hyde Park-Kenwood National Bank, Chicago, Ill.
E. L. King's Residence, Daytona Beach, Fla.
Masonic Temple, Dayton, Ohio
Montgomery County Court House, Norristown, Pa.
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Rand Building, Buffalo, N. Y.
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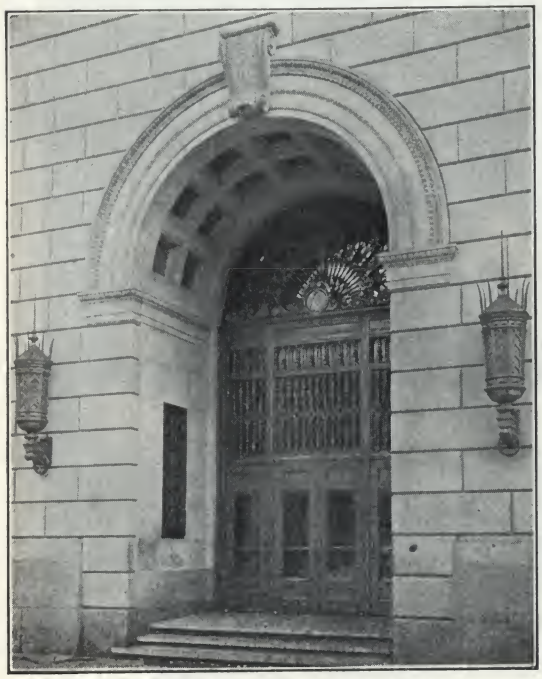
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City Hall, Gary, Ind.
Marshall Field, Chicago, Ill.
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Fine Arts Building, Tulsa, Okla.
Art Museum, Dayton, Ohio
Hillcrest Country Club, Cincinnati, Ohio
Morris Plan Bank, Evansville, Ind.
Bankhead Hotel, Birmingham, Ala.
Irwin Cobb Hotel, Paducah, Ky.
De Plaza Hotel, San Antonio, Tex.
James Robertson Hotel, Nashville, Tenn.
Fountain Square Theatre, Indianapolis, Ind.
Tivoli Theatre and Hotel, Downers Grove, Ill.
Regent Theatre, Beaver Falls, Pa.
Grand Opera House, Cincinnati, Ohio
Lyric Theatre, Covington, Ky.
Methodist Church, Muncie, Ind.
St. Boniface Church, Cincinnati, Ohio
Madisonville M. E. Church, Cincinnati, Ohio
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Masonic Temple, Cincinnati, Ohio
HARRY HAKE, Architect





Belvedere Apartments, Cincinnati, Ohio
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Building Directories	Mouldings
Bulletin Boards	Nameplates
Cabs (elevator)	Nosings
Cafeteria Fixtures	Pool Stairs
Canopies	Push and Pull Plates
Check Desks	Railings
Chromium Plating	Registers
Collapsible Gates	Rope Rails
Counter Screens	Sills
Desks (check)	Slide Poles
Directories	Standards
Door and Window Guards	Storefronts
Door Pulls	Tablets
Doors	Thresholds
Elevator Enclosures	Ticket Booths
Entrances	Treads
Fittings (all kinds)	Tubing (all kinds)
Foot Rails	Turnstiles
Frames	Velour Ropes
Gates	Ventilators
Guards	Wickets
Kick Plates	Windows

For our pages on Doors, Windows, Storefronts and Grilles, see Manufacturers' Index.

For Iron Work and Lighting Fixtures, see our Midwest Metal Art Division in Manufacturers' Index.

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(2) Doors and Entrances. (Details of jambs, etc.)
(3) Bank Screens, Check Desks, etc.
(4) Cast and Perforated Grilles.
(5) Theatre Fixtures.
(6) Cafeteria Fixtures.
(7) Bronze Tablets and Letters.
(8) Building Directories.

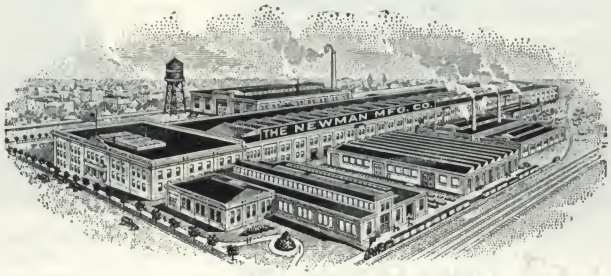
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Industrial Bank, Detroit, Mich.
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Cass Avenue Bank, St. Louis, Mo.
Bremen Bank, St. Louis, Mo.
Sussex & Merchants National Bank, Newton, N. J.
Jackson Trust Co., Jersey City, N. J.
First Camden Trust Co., Camden, N. J.
Security Savings & Loan Co., Cincinnati, Ohio
Pearl Market Bank, Cincinnati, Ohio
Federal Reserve Bank, Cincinnati, Ohio
Security National Bank, Tulsa, Okla.
First National Bank, Latrobe, Pa.
National Bank, Catasauqua, Pa.
Gettysburg National Bank, Gettysburg, Pa.
Citizens Trust Co., Canonsburg, Pa.
First National Bank, York, Pa.
Gosztonyi Bank, Bethlehem, Pa.
Austin National Bank, Austin, Tex.
Commercial Loan & Trust Co., San Antonio, Tex.
Richmond Trust Co., Richmond, Va.
Union National Bank, Eau Claire, Wis.
First National Bank, Racine, Wis.



226,000 Square Feet

Continued on next page



Union Gas & Electric Building, Cincinnati, Ohio
GARBER & WOODWARD and JOHN RUSSELL POPE, Associated Architects



Jefferson Hotel, St. Louis, Mo.
TEICH & SULLIVAN, Architects

Partial List of Installations—(Continued)

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Fox Theatre, Atlanta, Ga.
Capitol Theatre, Chicago, Ill.
Avalon Theatre, Chicago, Ill.
Uptown Theatre, Chicago, Ill.
Chicago Theatre, Chicago, Ill.
Oriental Theatre, Chicago, Ill.
Sheridan Theatre, Chicago, Ill.
Tower Theatre, Chicago, Ill.
Harding Theatre, Chicago, Ill.
Congress Theatre, Chicago, Ill.
Keith's Maryland Theatre, Baltimore, Md.
Grand Victory Theatre, Detroit, Mich.
Rialto Theatre, Omaha, Neb.
Shea's Theatre, Buffalo, N. Y.
B. F. Keith Theatre, Cleveland, Ohio
E. F. Albee Theatre, Cincinnati, Ohio
Palace Theatre, Youngstown, Ohio
Warner Bros. Theatre, Erie, Pa.
Logan Theatre, Philadelphia, Pa.
Stanley Theatre, Philadelphia, Pa.
Enright Theatre, Pittsburgh, Pa.
Grand & Sixth Theatre, Milwaukee, Wis.
Loew's Circuit (7 theatres)
Ascher Bros. Circuit
Lubliner & Trinz Circuit
Balaban & Katz Circuit
Jones, Linick & Schaefer Circuit

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Chamber of Commerce Building, Cincinnati, Ohio
Starrett Building, Cincinnati, Ohio
Beggs Building, Columbus, Ohio
Atlas Life Insurance Building, Tulsa, Okla.
Milwaukee Gas & Light Building, Milwaukee, Wis.
Ramsey-McCormack Building, Ensley, Ala.
Telephone Building, Bridgeport, Conn.
Shorham Building, Washington, D. C.
Willoughby Tower, Chicago, Ill.
Woolworth Building, Chicago, Ill.
Book Tower Annex, Detroit, Mich.
Louderman Building, St. Louis, Mo.
American Insurance Building, Newark, N. J.
Brooklyn Daily Eagle Building, Brooklyn, N. Y.
Telephone Building, Jamestown, N. Y.

Hotels

Lord Baltimore Hotel, Baltimore, Md.
Savoy Hotel, Detroit, Mich.
Jefferson Hotel, St. Louis, Mo.
Lexington Hotel, New York, N. Y.
Sinton Hotel, Cincinnati, Ohio
Fountain Hotel, Cincinnati, Ohio
Hotel Cleveland, Cleveland, Ohio
Fort Hayes Hotel, Columbus, Ohio



B. F. Keith Theatre, Cleveland, Ohio
RAPP & RAPP, Architects



Bronze Lantern, University Bridge, Philadelphia, Pa.
PAUL P. CRET, Architect
Height 14 feet



Albee Theatre, Cincinnati, Ohio
THOMAS W. LAMB, Architect

Continued on next page



Commonwealth Bank, Baltimore, Md.
JOSEPH EVANS SPERRY, Architect



Chicago City Bank & Trust Co., Chicago, Ill.
A. EPSTEIN, Engineer

Partial List of Installations—(Continued)

Masonic Buildings

Yaarab Temple, Atlanta, Ga.
Masonic Temple, Chicago, Ill.
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Crescent Temple, Trenton, N. J.
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Youngstown Hospital, Youngstown, Ohio
Memorial Hospital, Madison, Wis.

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Harrington Store, Columbus, Ohio
Fintex Store, Pittsburgh, Pa.
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Broad Grace Arcade, Richmond, Va.

Miscellaneous

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Art Museum, Baltimore, Md.
City Hall, Atlanta, Ga.
Police Headquarters, St. Louis, Mo.
Midland Club, Chicago, Ill.
Y. W. C. A., Cincinnati, Ohio
School of Fine and Industrial Arts, Newark, N. J.
Navy Central Y. M. C. A., Philadelphia, Pa.
Wm. Sloane Memorial Building, New York, N. Y.
Municipal Building, Denver, Colo.
Church of the Immaculate Conception, New Orleans, La.
Traffic Tower, Newark, N. J.
Pylon Lamps, Wacker Drive, Chicago, Ill.
University Bridge, Philadelphia, Pa.
Convention Hall, Asbury Park, N. J.
Department of Agriculture Administration Building, Washington, D. C.



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APPLETON P. CLARK, JR., Architect



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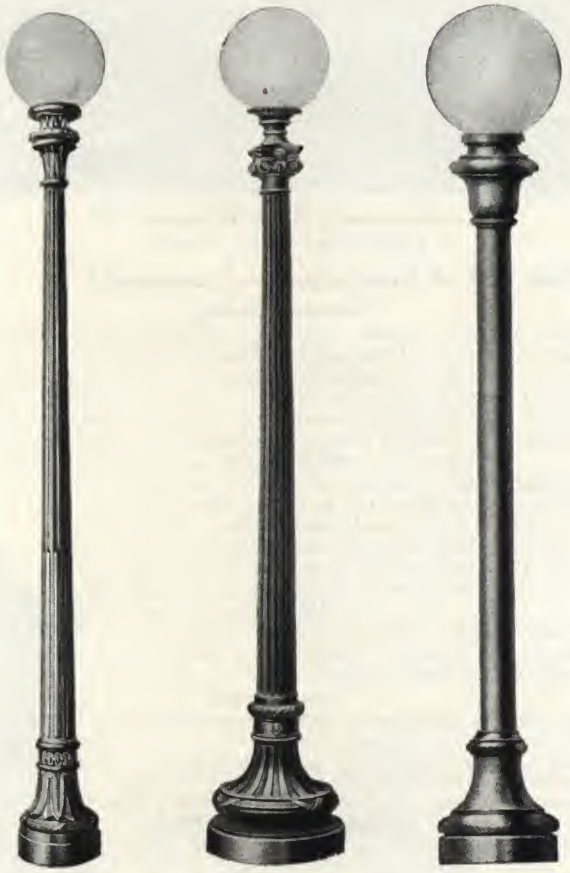
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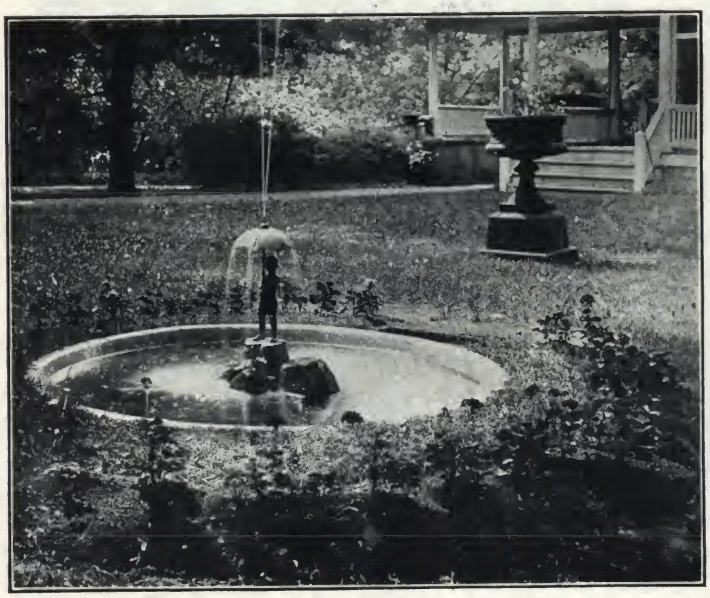
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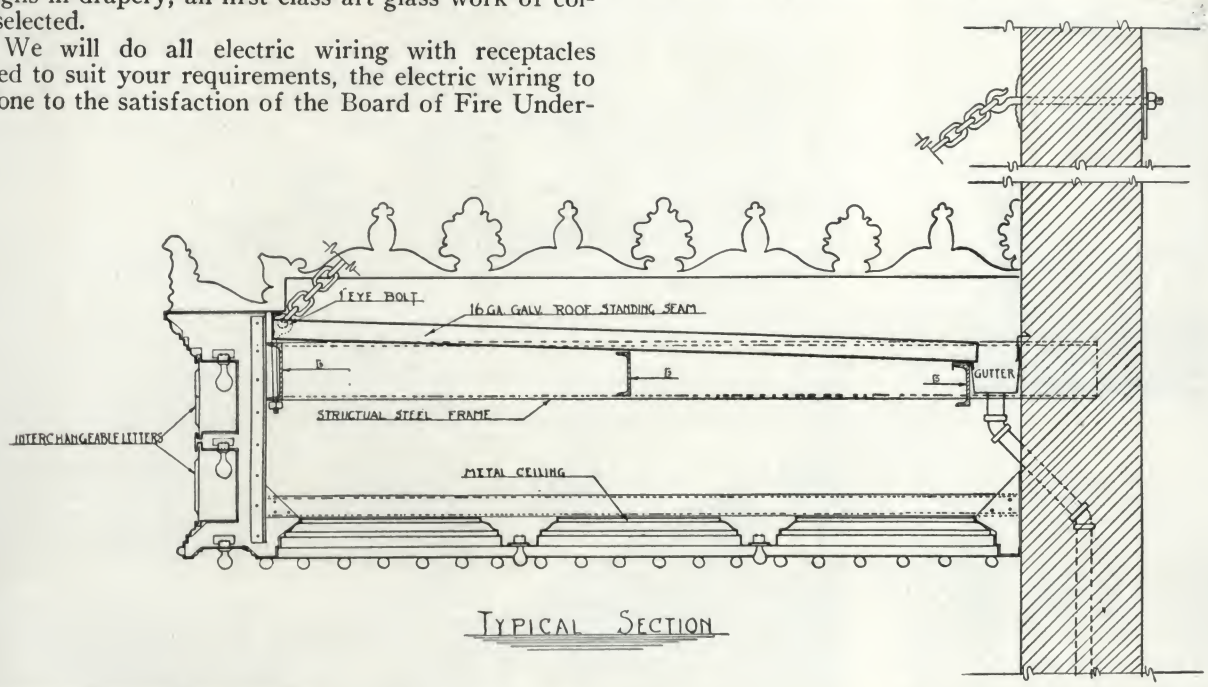
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TYPICAL SECTION





Left:
Bellevue Savings and Trust Co., Bellevue, Pa.

Right:
Logan Valley Trust Co., New Kensington, Pa.



Manos Theatre, Greensburg, Pa.

Left:
Penn Albert Hotel, Greensburg, Pa.

Right:
Trexler Department Store, Dayton, Ohio





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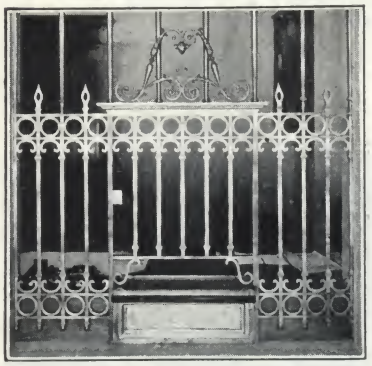
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Bronze Windows, Barclay Apartments, Philadelphia, Pa.
J. E. R. CARPENTER, Architect



Bronze Grille, Barclay Apartments, Philadelphia, Pa.
J. E. R. CARPENTER, Architect



Main Banking Room, National City Bank, 34th Street and Seventh Avenue, New York, N. Y.
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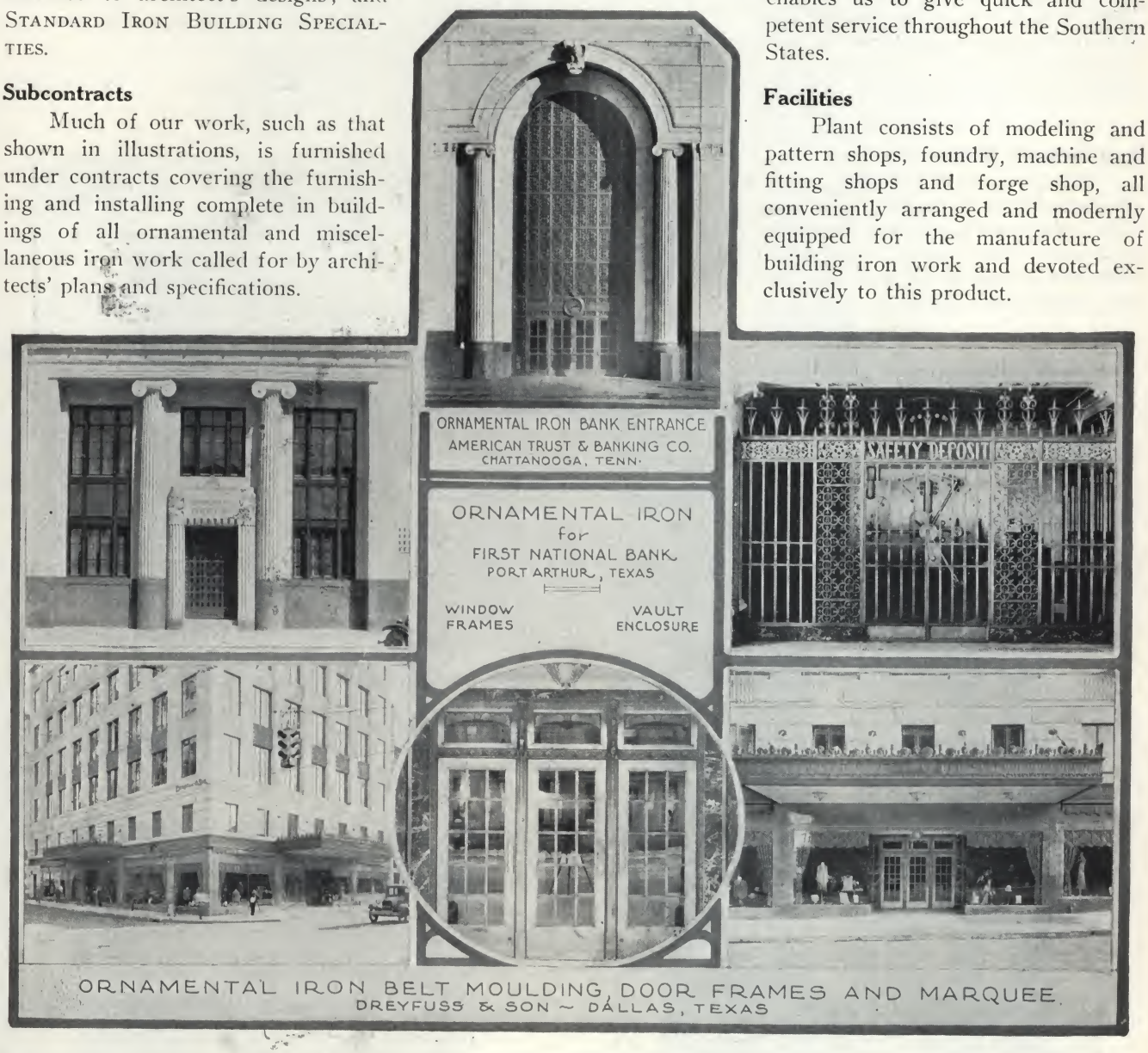
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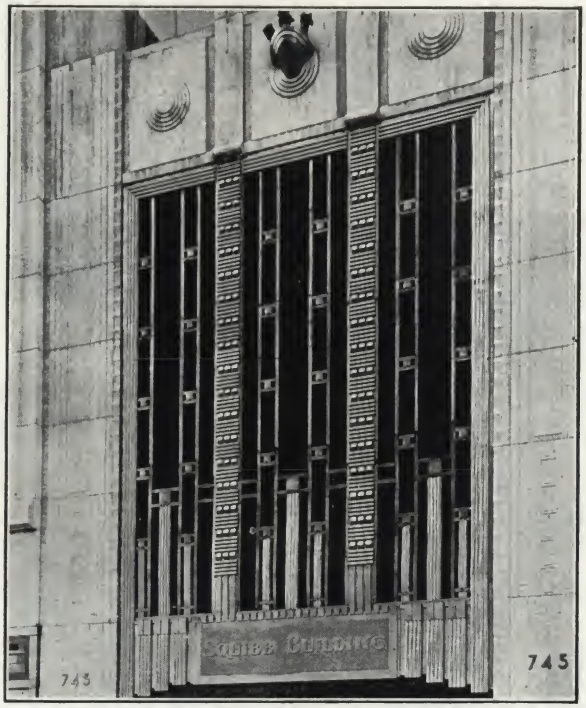
For Metal Doors, see Manufacturers' Index

Architectural Bronze Products

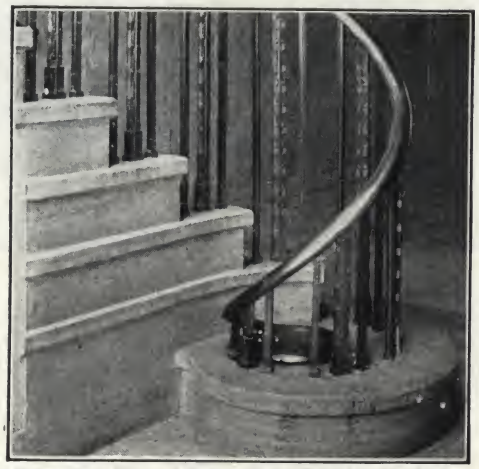
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Bronze Elevator Doors, Goldman-Sachs Building
A. F. Gilbert, Architect
Thompson Starrett, General Contractor

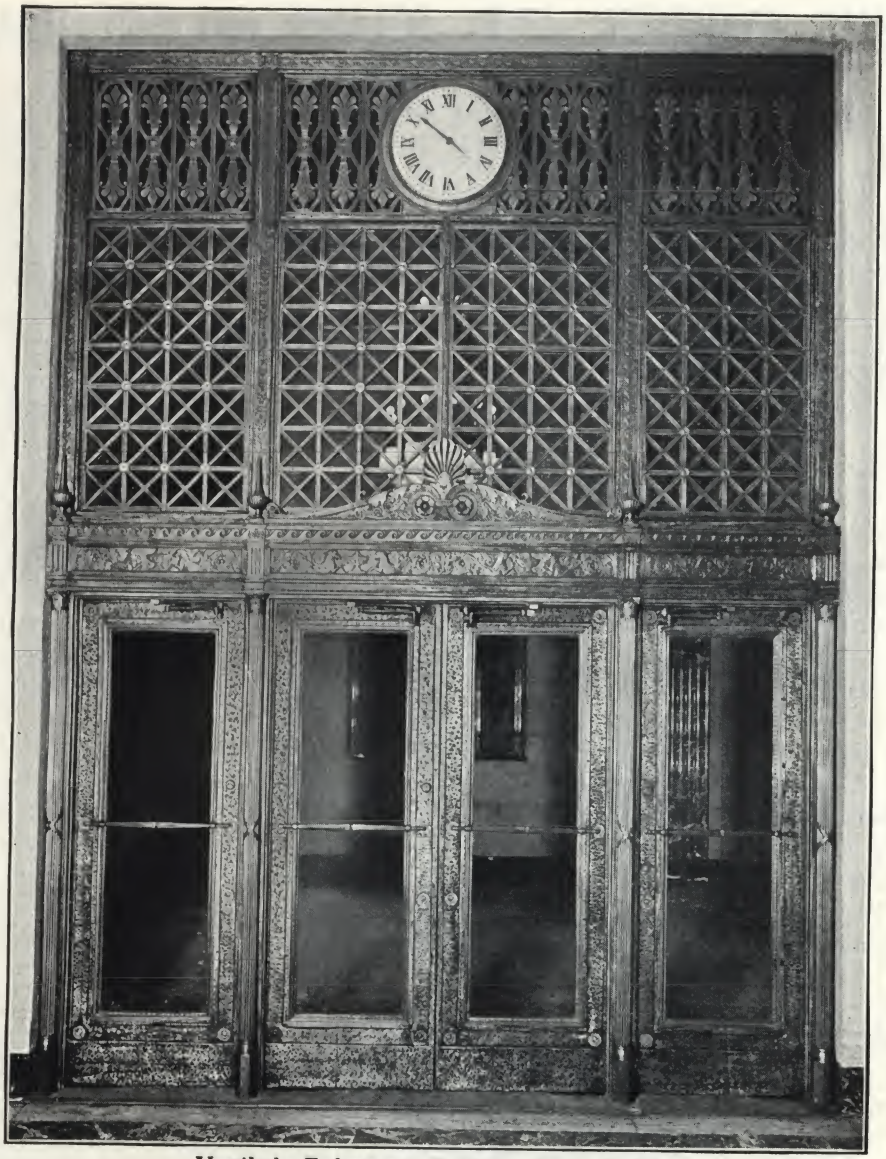


Benedict Nickel Screen Over Main Entrance, Squibb Building
Ely Jacques Kahn, Architect
Schroeder & Koppel, General Contractors



Benedict Nickel Stair Rail, Squibb Building
Ely Jacques Kahn, Architect
Schroeder & Koppel, General Contractors

Continued on next page



Vestibule Enframent, Goldman-Sachs Building

A. F. GILBERT, Architect THOMPSON & STARRETT, General Contractors

List of Representative Bronze Installations Executed by Reliance Bronze & Steel Corporation

Bank Buildings

OPERATION AND LOCATION	ARCHITECTS
New York Trust Co., Fifth Ave. and 57th St., New York, N. Y. (Aluminum)	Cross & Cross
Goldman-Sachs Bldg., Pine St., New York	A. F. Gilbert
Lee Higginson Bldg., Broad St., New York	Cross & Cross
Cliffside Park Title Guarantee & Trust Co., Cliffside Park, N. J.	Lucht & Anderson
Equitable Trust Co., 79th St. and 149th St. Branches, New York, N. Y.	A. F. Gilbert
Industrial National Bank, New York, N. Y.	Sugarman & Berger
Manufacturers Trust Co., Westchester Ave. and Essex St. Branches, New York, N. Y.	A. Witschard
Harriman Bldg., 39 Broadway, New York	Cross & Cross
Integrity Trust Co., Philadelphia, Pa.	Green & Lavelle

Commercial Buildings

International Tel. & Tel. Bldg., Broad and William Sts., New York, N. Y.	L. S. Weeks
Chanin Bldg. 42nd St., New York, N. Y.	Sloane & Robertson
Squibb Building, Fifth Ave. and 58th St., New York, N. Y. (Nickel Silver)	Buchman & Kahn
501 Madison Ave. Bldg., New York, N. Y.	Kohn & Vitolo
Garment Center Capitol, 38th St. and 7th Ave., New York, N. Y.	J. E. Gilbert, Inc.
Bldg., 500 Fifth Ave., New York, N. Y.	Shreve, Lamb & Harmon
Canadian National Railways Bldg., 673 Fifth Ave., New York, N. Y.	Warren & Wetmore
Binghamton Telephone Bldg., Binghamton	Voorhees, Gmelin & Walker
Johnson & Faulkner Bldg., 53rd St., New York, N. Y.	Robt. F. Smallwood
41st St. and Lexington Ave. Bldg., N. Y. C.	Moore & Landseidel
Bldg., 625 Madison Ave., New York, N. Y.	Sloane & Robertson
Franklin Square Bldg., Washington, D. C.	R. F. Beresford
400 Madison Ave. Bldg., New York, N. Y.	H. Craig Severance
1 Cedar St. Bldg., New York, N. Y.	Clinton & Russell
401 Broadway Bldg., New York, N. Y.	Jardine, Hill & Murdock

Hotels and Apartment Buildings

OPERATION AND LOCATION	ARCHITECTS
New Yorker Hotel, 34th St. and 8th Ave., New York, N. Y.	Sugarman & Berger
Barbizon Plaza, 58th St. and 6th Ave., N. Y. C.	Laurence Emmons, Inc.
Hotel Pierre, 5th Ave. and 61st St., N. Y. C.	Schultze & Weaver
Hotel Bldg., Indiana Ave., Atlantic City, N. J.	Chas. H. Roberts
George Washington Hotel, New York, N. Y.	Andrews & Peterkin
Apartment House, 84th St. and Riverside Drive, New York, N. Y.	Gronenberg & Leuchtag
Beresford Apartments, Central Park West, New York, N. Y.	Emery Roth
Granada Hotel, Brooklyn, N. Y.	Wm. I. Hohauser
Hotel Lincoln, New York, N. Y.	Schwartz & Gross

Municipal Buildings

Administration Bldg.-Post Office, Cristobal, Panama	
North Station Development, Boston, Mass.	Funk & Wilcox Co.
Fire Association of Philadelphia, Pa.	E. J. Matthewson
Rockland County Courthouse, New York, N. Y.	Dennison & Hirons
D. A. R. Constitution Hall, Washington, D. C.	John Russell Pope
Essex County Courthouse, Newark, N. J.	Guilbert & Betelle
Free Library, Philadelphia, Pa.	Horace Trumbauer
Convention Hall, Atlantic City, N. J.	Lockwood, Greene & Co., Inc.
State Tower Bldg., Syracuse, N. Y.	Thompson & Churchill
Public Ledger Bldg., Philadelphia, Pa. (Second and Third Sections)	Horace Trumbauer
Rodin Museum, Philadelphia, Pa.	

Theatre Buildings

Fox Theatre, Brooklyn, N. Y.	C. Howard Crane and Kenneth Franzheim
Fox Theatre, Detroit, Mich.	C. Howard Crane
Midway Theatre, New York, N. Y.	W. W. Ahlschlager
Paramount Brooklyn Theatre, Brooklyn, N. Y.	C. W. & Geo. L. Rapp

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CLEVELAND, OHIO, 809 Bulkley Building
CINCINNATI, OHIO, Union Central Building
DETROIT, MICH., 3104 E. Woodbridge Street
CHICAGO, ILL., 2200 No. Natchez Avenue
ST. LOUIS, MO., 2817 Laclede Avenue
NEW ORLEANS, LA., 207 Queen & Crescent Building
SAN FRANCISCO, CAL., 610 Wells Fargo Building
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For Revere Sheet Copper, Brass and Bronze, Rolls, Strips, Nails, and Pipe, see Manufacturers' Index.

Revere COPPER & BRASS Products

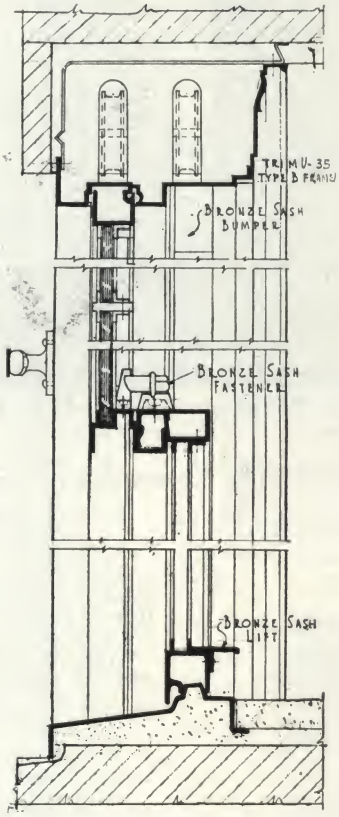
Bronze for Architectural Use

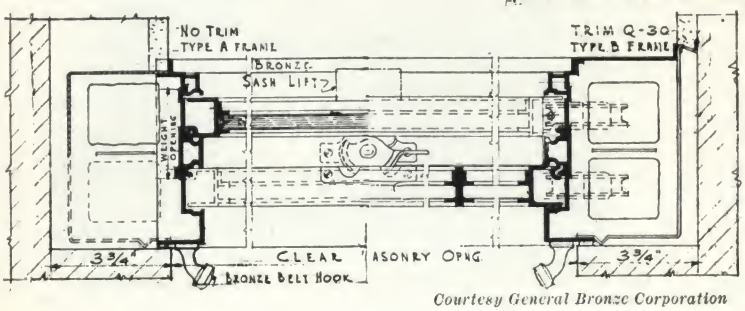
REVERE COPPER AND BRASS INCORPORATED manufacture sheets, extruded and drawn shapes, bars and tubing for a variety of architectural purposes.

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Revere extruded shapes are particularly adapted for the construction of entrances, doorways, store fronts, grilles, and windows.

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The Hangar Club, 34-36 East 63rd Street
City Bank-Farmers' Trust Bldg., William and Beaver Streets
New York County Lawyers' Assn. Bldg., 12-16 Vesey Street
Beaux Arts Buildings, 312-313 East 44th Street

Other Cities

Harvard College, Indoor Athletic Bldg., Cambridge, Mass.
Lee, Higginson & Co.'s Bank and Office Bldg., Boston, Mass.
Buffalo Courier-Express Bldg., Buffalo, N. Y.
Buffalo City Hall, Buffalo, N. Y.
First Stamford National Bank, Stamford, Conn.
Amos Tuck School, Dartmouth College, Hanover, N. H.
Farmers' Trust Bldg., Lancaster, Pa.
First National Bank & Trust Company's Bldg., Greenfield, Mass.
National Savings Bank, Albany, N. Y.

Continued on next page



Exterior Lanterns



Safe Deposit Screen—Finish Half-bright



Check Desk—Finish Half-bright



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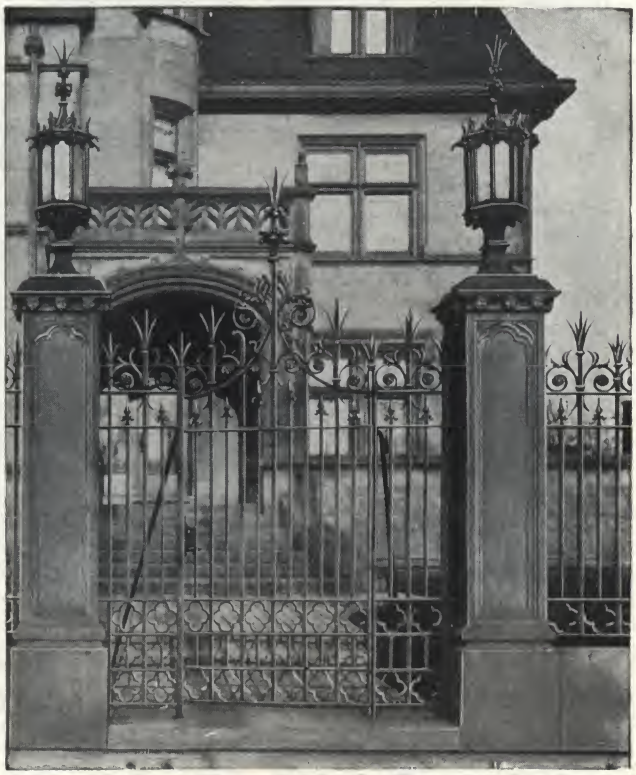
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Entrances: Iron and Bronze
Fences: Iron, Wire, Wire Netting
Fire Escapes
Flagpoles: Steel
Fronts: Store, Building
Gates: Iron, Wire and Folding
Grille Work
Guards: Iron and Wire—Window, Stall, Wheel, Machinery, Skylight
Hangers: Joist, Wall, I-beam
Hitching Posts
Jail Work
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Lamps: Iron
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Canopies and Fire Escape for Gessler Building, Chicago, Ill.



Fence, Gates and Lamps, John R. Thompson Residence, Chicago, Ill.
H. R. WILSON, Architect

Continued on next page

References

Following is a partial list of buildings in which representative installations of our work have been made:

BUILDING, LOCATION AND ARCHITECT

Post & Paddock Club House, Arlington, Ill., B. H. Marshall
Manchester Department Store, Madison, Wis., Law, Law & Potter
Western Theological Seminary, Evanston, Ill., Armstrong, Furst & Tilton
Drake Towers, Chicago, Ill., B. H. Marshall
"1500 Lake Shore Drive," Chicago, Ill., McNally & Quinn
American Bankers' Building, Chicago, Ill., Childs & Smith
American Insurance Union Building, Columbus, Ohio, C. Howard Crane
The Fair (Department Store), Chicago, Ill., Mundie & Jensen
Marks Bros., Granada and Marbro Theaters, Chicago, Ill., Levy & Klein
National Theaters Corp., Paradise Theater, Chicago, Ill., John Eberson
Coronado Theatre, Rockford, Ill., Frederic J. Klein
Shea's Theater, Buffalo, N. Y., C. W. and Geo. L. Rapp
Selwyn-Harris Theater Buildings, Chicago, Ill., C. Howard Crane and Kenneth Franzheim
Keith's Theater, Cleveland, Ohio, C. W. & Geo. L. Rapp
James Theater, Office building, Columbus, O., C. Howard Crane
Chicago National League Ball Park, Chicago, Ill., Davis & Davis.
State & Lake Theater, Chicago, Ill., C. W. & Geo. L. Rapp
Woods Theater and Office Building, Chicago, Ill., Marshall & Fox
Hippodrome Building, Cleveland, Ohio, Knox & Elliott
Shubert Theater, St. Paul, Minn., Marshall & Fox
Illinois Theater, Chicago, Ill., Wilson & Marshall
Blackstone Hotel and Theater, Chicago, Ill., Marshall & Fox
Chicago Athletic Association, Chicago, Ill., Schmidt, Garden & Erickson
Margarita Club, Evanston, Ill., Morrison & Wallace
Crane Co. Building, Chicago, Ill., Graham, Anderson, Probst & White
Chicago Produce Mart, Chicago, Ill., Fugard & Knapp
United Light & Power Building, Davenport, Iowa, Temple & Burrows
Milwaukee Journal Building, Milwaukee, Wis., Frank D. Chase Co.
Mayflower Hotel Building, Washington, D. C., Warren & Wetmore
Blackhawk Hotel, Davenport, Iowa, Temple & Burrows
Severin Hotel, Indianapolis, Ind., Vonnegut & Bohne
Chas. Lange Building, Chicago, Ill., Clarence Hatzfeld
Kahl Building, Davenport, Iowa, Rapp & Rapp
Masonic Temple, Davenport, Iowa, Clausen & Kruse
Popular Mechanics Company Building, Chicago, Ill., Marshall & Fox
Montgomery Ward & Co., Chicago, Ill., Richard E. Schmidt, Garden & Martin
Commonwealth-Edison Co. (6 buildings), Chicago, Ill. Shepley, Rutan & Coolidge and Holabird & Roche.
Chicago Memorial Hospital, Chicago, Ill., Frank D. Chase Co.
Henry Ford Hospital, Detroit, Mich., Albert Wood
Y. M. C. A. College Building, Chicago, Ill., Emery S. Hall
Y. W. C. A. and Y. M. C. A., Nashville, Tenn., Shattuck & Hussey
Iowa State College, Central Building, Ames, Iowa, Proudfoot & Bird
School Buildings—A large number for Board of Education, Chicago, Ill., D. H. Perkins, A. F. Hussander and John C. Christensen
City of Chicago Police Stations, Fire Engine Houses, Chicago, Ill., Chas. W. Kallal
U. S. Naval Training Station (15 buildings), Lake Bluff, Ill., Jarvis Hunt
U. S. Post Office Buildings (over 45)
Seminary Building, Archdiocese of Chicago, Z. T. Davis
Sisters of Providence, College and Music Building, St. Mary's, Ind., D. A. Bohlen & Son
Harper Memorial Building, University of Chicago, Chicago, Ill., Shepley, Rutan & Coolidge
Rand-McNally Co. Building, Chicago, Ill., Holabird & Roche
Cosden Building, Tulsa, Okla., Henry F. Hoit
Stewart Building, Houston, Tex., Jonas & Rue
Overland Stores Building, Kansas City, Mo., Mills, Rhines, Bellman & Nordhoff
Sharpe Building, Kansas City, Mo., H. R. Wilson
Farmers' Security Bank Building, South Bend, Ind., Perkins, Fellows & Hamilton
"Chicago" Building, Chicago, Ill., Holabird & Roche
Monroe Building, Chicago, Ill., Holabird & Roche



Typical First Floor Bronze Elevator Enclosure, Kahl Office and Theater Building, Davenport, Iowa
C. W. and GEO. L. RAPP, Architects



Main Stairs, 3rd to 15th Floors, "Chicago" Building, Chicago, Ill.
HOLABIRD & ROCHE, Architects

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Building and Location	Architect
Delaware River Bridge, Philadelphia, Pa.	Paul P. Cret
Pennsylvania Railroad Station, Philadelphia, Pa.	Graham, Anderson, Probst & White
Bok Tower, Lake Wales, Fla.	Milton B. Medary
John Hancock Building, Boston, Mass.	Parker, Thomas & Rice
Public Ledger Building, Philadelphia, Pa.	Frank C. Roberts
Fidelity Mutual Life Insurance Building, Philadelphia, Pa.	Zantzinger, Borie & Medary
Second Church of Christ, Scientist, Germantown, Pa.	Day & Klauder
Provident Trust Company, Philadelphia, Pa.	Rankin & Kellogg
State Penitentiary, Rockview, Pa.	John T. Windrim



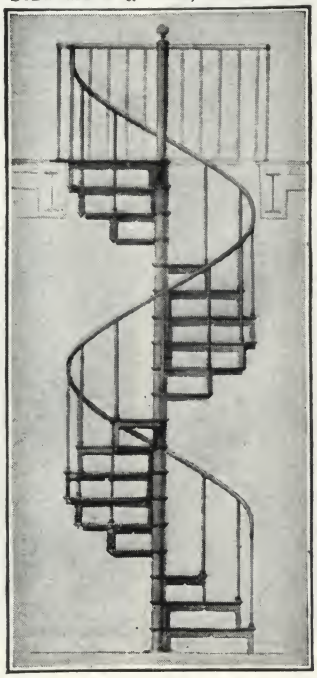
Cast Iron Main Stairs, Bennett Hall, University of Pennsylvania, Philadelphia
Stewardson & Page, Architects



Wrought Iron Organ Screen, Second Church of Christ, Scientist, Philadelphia, Pa.
Day & Klauder, Architects



Cast Iron Main Entrance, Independence Indemnity Insurance Co., Philadelphia, Pa.
Ritter & Shay, Architects



Smyser-Royer No. 300 Stock Spiral Stairs



Cast Iron Main Entrance, Elverson Building, Philadelphia, Pa.
Rankin, Kellogg & Crane, Architects

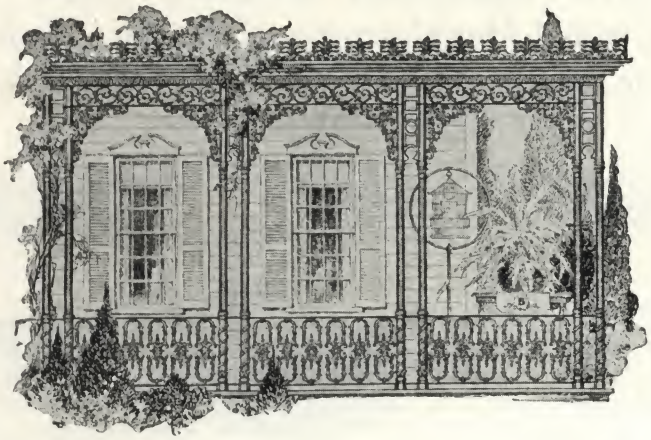


Cast Iron Main Entrance, Elverson Building, Philadelphia, Pa.
Rankin, Kellogg & Crane, Architects

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Booklet

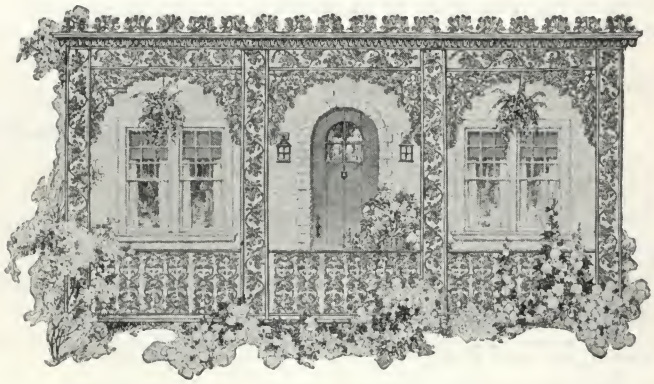
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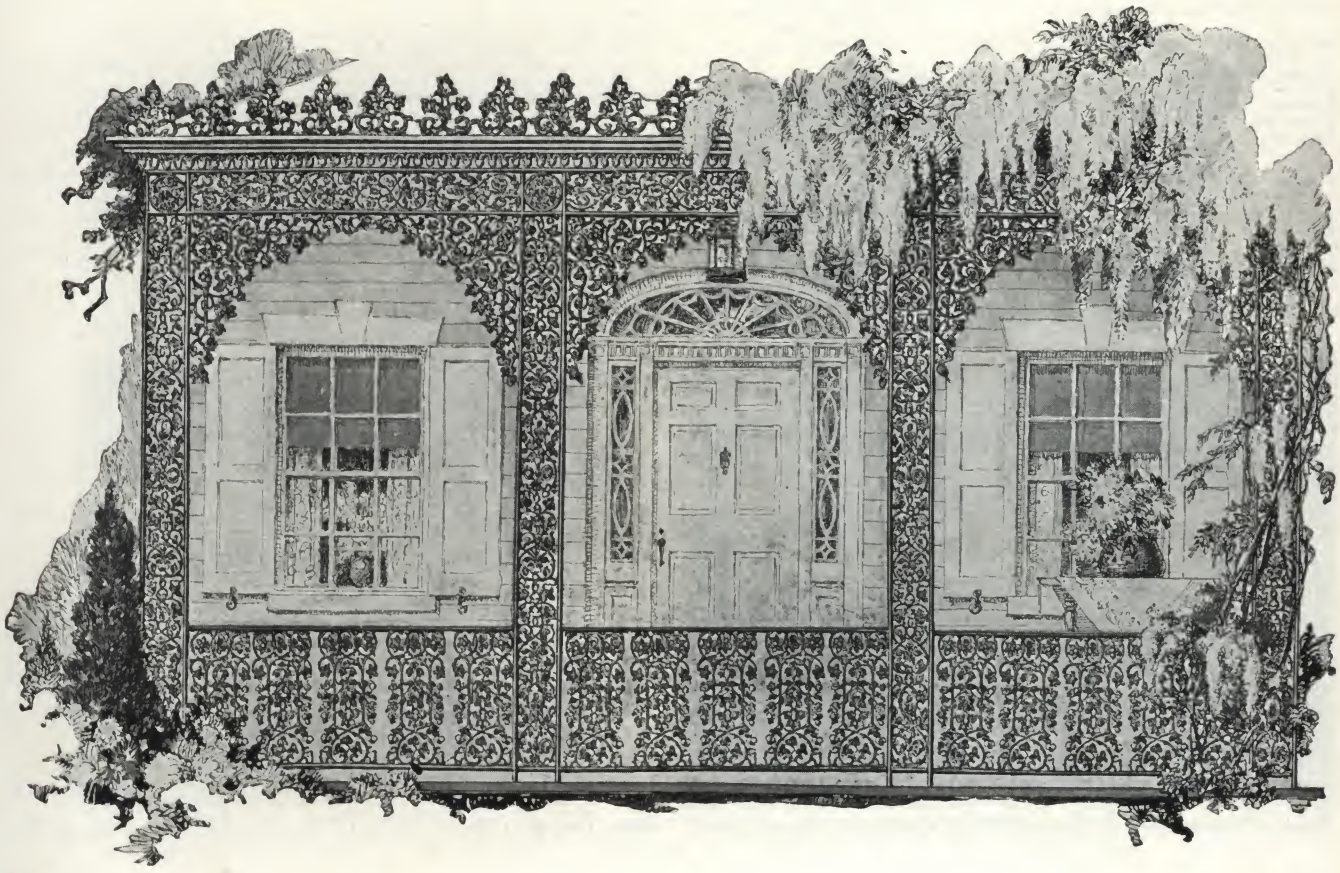


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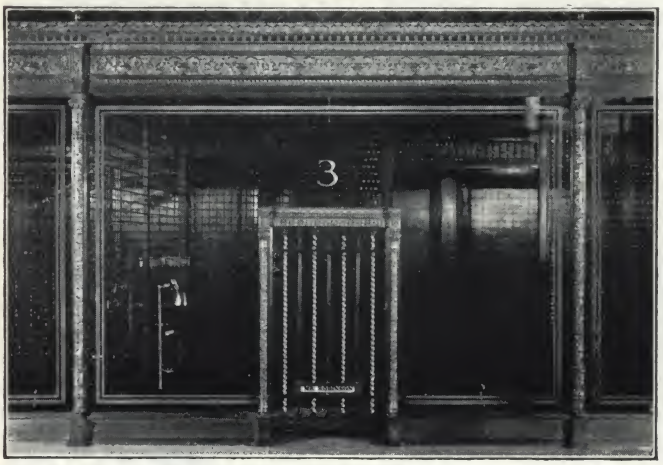
Partial List of Buildings for Which We Executed the Ornamental Bronze Work, with Architects

Bank Buildings

East New York Savings Bank, Eastern Parkway, Brooklyn, N. Y.	Holmes & Winslow
Hackley Union National Bank, Muskegon, Mich.	Weary & Alford Co.
York Trust Company, York, Pa.	J. A. Dempwolf
National City Banks, New York, N. Y.	Walker & Gillette
National Bank of Commerce, 269 Madison Avenue, New York, N. Y.	York & Sawyer
Security Trust Co., Detroit, Mich.	Albert Kahn, Inc.
Clinton Trust Co., Newark, N. J.	Morgan, French & Co.
Second National Bank, Wilkes Barre, Pa.	McCormack & French
Bank of New York & Trust Co., New York, N. Y.	Benj. W. Morris
Broadway National Bank, Fifth Avenue and 29th Street, New York, N. Y.	Louis H. Friedland
Banco Hipotecario de Colombia, Colombia, S. A.	Fred T. Ley & Co.
Federal Trust Co., Newark, N. J.	Dennison & Hirons and Geo. E. Jones
Bank of Manhattan Trust Co., Greenpoint Branch, Brooklyn, N. Y.	Morrell Smith
Berwyn State Bank, Berwyn, Ill.	Emil Liska
Federal Reserve Bank, Baltimore, Md.	Parker, Thomas & Rice
Harrison National Bank, Harrison, N. J.	Thos. M. James, Inc.
Holmesburg Trust Co., Holmesburg, N. J.	Davis, Dunlap & Barney
Bank of Hempstead, Hempstead, L. I., N. Y.	Uffinger, Foster & Bookwalter
Tradesmen's Bank, Vineland, N. J.	E. F. Strassle
First National Bank, Bound Brook, N. J.	Halsey, McCormack & Helmer, Inc.
First National Bank, York, Pa.	Gemmill & Billmeyer
Morsemere Trust Co., Morsemere, N. J.	Wm. Neumann
Federal Reserve Bank, New Orleans, La.	Rathbone De Buys
Glen Cove Trust Co., Glen Cove, N. Y.	Shreve & Lamb
National Savings & Trust Co., Washington, D. C.	A. P. Clark, Jr.
Denver National Bank, Denver, Colo.	W. E. & A. A. Fisher

Public and Private Buildings

Livingstone Memorial Lighthouse, Belle Isle, Detroit, Mich.	Albert Kahn, Inc.
A. E. Kirby Memorial Health Center, Wilkes-Barre, Pa.	T. H. Atherton
Shedd Aquarium, Chicago, Ill.	Graham, Anderson, Probst & White
Drake Towers, Chicago, Ill.	Benj. H. Marshall
A. I. Namm & Son Department Store, Brooklyn, N. Y.	Kohn & Butler
I. Miller Shoe Store, 47 W. 34th Street, New York, N. Y.	Louis H. Friedland
Hotel St. Moritz, New York, N. Y.	Emery Roth
Lehigh Telephone Building, Easton, Pa.	John T. Windrim
1608 Walnut Street, Philadelphia, Pa.	Tilden, Register & Pepper
Masonic Temple, Detroit, Mich.	Geo. D. Mason & Co.
Rockefeller Institute for Medical Research, New York, N. Y.	Coolidge, Shepley, Bulfinch & Abbott
Bonwit Teller Co., Philadelphia, Pa.	Clarence E. Wunder
Union Electric Building, St. Louis, Mo.	Albert B. Groves
W. B. Moses & Sons, Washington, D. C.	A. B. Mullett & Co.
Ward Shoe Store, 555 Fifth Avenue, New York, N. Y.	Richard Haviland Smythe
Gueting Shoe Store, Philadelphia, Pa.	David B. Bassett
Detroit, Institute of Arts, Detroit, Mich.	Paul P. Cret and Zantzinger, Borie & Medary
Holy Redeemer Church, Detroit, Mich.	Donaldson & Meier
Travelers Insurance Co., Hartford, Conn.	Donn Barber and McKenzie, Voorhees & Gmelin
I. Miller Mausoleum, Salem Fields Cemetery, New York, N. Y.	Louis H. Friedland
Morgan Mausoleum, Sabina, Ohio	Presbrey-Leland Co.
Newman Mausoleum, Woodlawn Cemetery, New York, N. Y.	Warren & Wetmore
David A. Brown Mausoleum, Detroit, Mich.	Albert Kahn, Inc.



Bronze Counterscreen, Security Trust Company, Detroit, Mich.
ALBERT KAHN, INC., Architects



Main Entrance Doors, John G. Shedd Aquarium, Chicago, Ill.
GRAHAM, ANDERSON, PROBST & WHITE, Architects

THE TYLER COMPANY

Elevator Cars and Entrances

CLEVELAND, OHIO

BRANCH OFFICES

ATLANTA, GA., 133 Luckie Street
BOSTON, MASS., 20 Providence Street
CHICAGO, ILL., 310 South Michigan Avenue
DETROIT, MICH., 535 Griswold Street
NEW YORK, N. Y., 247 Park Avenue
PHILADELPHIA, PA., 260 South Broad Street

Products

ELEVATOR CARS and ENTRANCES.

Also manufacturers of:

Balcony Railings
Bronze Tablets
Building Entrances
Counter Railings
Counter Screens
Grilles
Lamp Standards
Marquises
Mausoleum Doors
Show Window Backs
Stairs
Store Fronts
Vault Railings

Elevator Cars and Entrances

Fireproof construction throughout. Can be supplied to suit any prevailing hatchway conditions in both new and old buildings.

High Quality and Correct Design

In specifications you will qualify high standards of workmanship and correct design in elevator cars and elevator entrances and in architectural metal work by specifying Tyler. This company has been in the manufacture of quality architectural iron and bronze for more than fifty years.

"Me-Tyl-Wood"

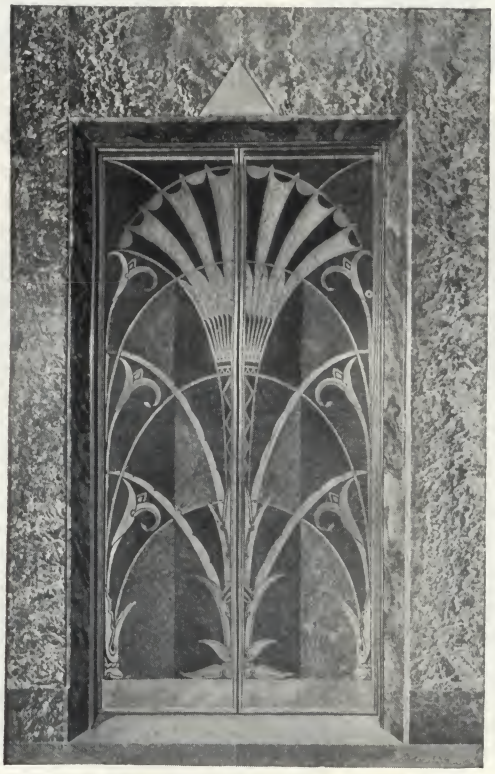
"Me-Tyl-Wood" is a Tyler development and the latest in elevator entrance and car construction. This is a combination of metal, with all its structural qualities, with natural wood finish for exposed surfaces with all the beauty of wood.

Unified Responsibility

All hardware and mechanical parts entering into the construction of elevator entrances and cars are made in our own plant. This insures perfect operation and unified responsibility.

Engineering Service

Architects and owners use our Engineering Service when formulating plans and selecting equipment. They specify Tyler as a standard of high quality. Designs and estimates are submitted when requested.





Showing the Unusual Possibilities and New Opportunities for Architectural Treatment and Design in the Application of Me-Tyl-Wood

JNO. WILLIAMS, INC.

Manufacturers of Bronze, Iron and Wire Work
Bronze Founders

TELEPHONE
CHICKERING 4-1420

542 West Twenty-seventh Street
NEW YORK, N. Y.

Products

ORNAMENTAL BRONZE, IRON and WIRE WORK, including: Bronze and Iron Entrance Doors; Door and Window Grilles; Stair and Tube Railings; Lamp Standards; Bank Fittings, Screens and Enclosures; Wire Mesh Work; Elevator Enclosures; Mausoleum Doors and Fittings; Memorial Tablets; Honor Roll Tablets; Bronze Signs and Letters; Fine Bronze Castings; Statues, Figures and Portraits; Busts and Medallions; Monumental Bronze Work; Fountains and Sundials; Iron Driveway Gates; Fencing and Grille Work.



Designed by Jno. Williams, Inc.



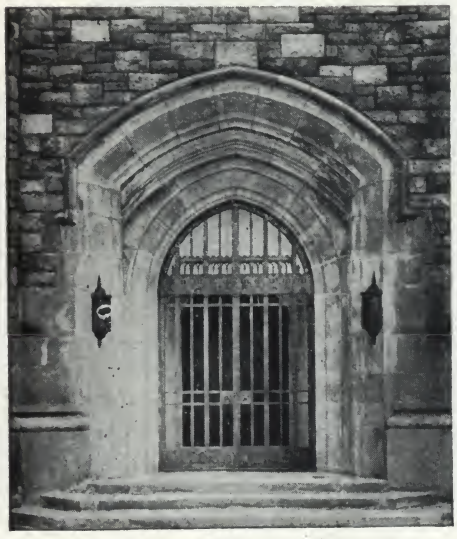
Cast Bronze Lamp Standard,
St. Louis Museum of Art
CASS GILBERT, Architect



Dime Savings Bank, Brooklyn, N. Y.
(19th Avenue and 86th Street Branch)
HALSEY, MCCORMACK & HELMER, Architects



Bronze Door, Gordon
Mausoleum
CROW, LEWIS & WICK,
Architects



Hand-hammered Stainless Steel Door,
Hatfield Residence, New Canaan, Conn.
ALFRED MAUSOLFF, Architect



Bronze Statue "Republic,"
Jackson Park, Chicago, Ill.
D. C. FRENCH, Sculptor



Wrought and Cast Iron Stair Railing,
Kohler Company, New York, N. Y.
CARRERE & HASTINGS, Architects

ESTABLISHED 1897

JOHN E. LINGO & SON, INC.

Flagpoles in Copper Bearing Steel, Bronze and Aluminum

TELEPHONE
CAMDEN 487

28th Street and Buren Avenue
CAMDEN, N. J.

TWO DISTINCT TYPES OF FLAGPOLES

Swaged Sectional Flagpoles

Swaged Sectional Flagpoles are fabricated in sections of copper bearing tubular steel pipe with swaged, telescoped and shrunk joints. They are standardized in three weights for ground setting:

Light Pattern 17 to 100 ft.
Heavy Pattern 20 to 125 ft.
Extra Heavy Pattern 25 to 100 ft. and standardized in two weights for roof setting:
Heavy Type 15 to 100 ft.
Extra Heavy Type 20 to 75 ft.

Swaged Sectional Flagpoles are shipped in knocked down sections up to 22 ft. in length and are assembled at the erection site by means of patented field joints (shown on next page). The flagpole erector merely pushes or telescopes the knocked-down sections together. After the flagpole is erected the field joints are made airtight and watertight by calking metal to metal with an ordinary hammer and calking chisel. Inexperienced men may in a minimum length of time accomplish the erection of these flagpoles. Swaged sectional flagpoles are carried in stock and prompt shipments are assured.

Continuous Tapered Flagpoles

Continuous Tapered Flagpoles are of an entirely different construction from the swaged sectional flagpoles and are more costly. They are produced in copper bearing steel, bronze and aluminum, with a smooth uninterrupted exterior surface throughout, resembling a finished wood flagpole in contour and appearance. These flagpoles may be tapered conically or with entasis as selected by the architect.

Continuous Tapered Flagpoles are especially suitable for memorials, monuments and other buildings of exceptional architectural value, where a prominent flagpole installation is desired to properly harmonize with the architectural design of the project.

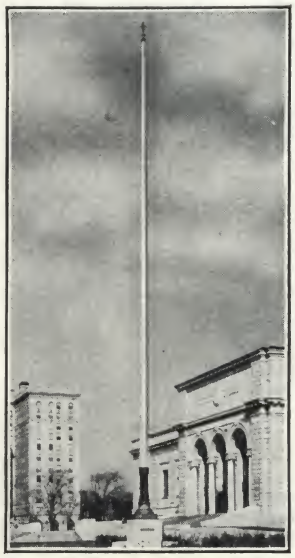
These flagpoles are not carried in stock and are made to order only. They are, however, standardized in two weights for ground setting or roof setting:

Standard 20 to 100 ft.
Sub-standard 20 to 100 ft.

Continuous Tapered Flagpoles are shipped in one piece each, regardless of length, without field joints.



100 Ft. Above Grade by 110 Ft. Over-all, Extra Heavy Pattern Swaged Sectional Flagpole
16-in. butt, 4-in. top.
General Lee's Headquarters, Arlington Cemetery, Arlington, Va.



88 Ft. Over-all, Standard Continuous Tapered Copper Bearing Steel Flagpole
16-in. butt, 5-in. top.
One of two installations at the Institute of Arts, Detroit, Mich.



85 Ft. Over-all, Continuous Tapered Copper Bearing Steel Flagpole
16-in. butt, 9-in. top.
One of ten installations at the Indiana World War Memorial, Indianapolis, Ind.

Continued on next page

New Catalogue

We will welcome the opportunity to send you upon request a copy of our new 60-page catalogue containing full information and complete technical data on Swaged Sectional and Continuous Tapered Flagpoles.

Service

We gladly assist Architects without charge or obligation in handling their flagpole problems in the most satisfactory and economical manner. Your correspondence is solicited and prompt attention is assured.

A Few Recent Installations of "Lingo" Swaged Sectional Flagpoles

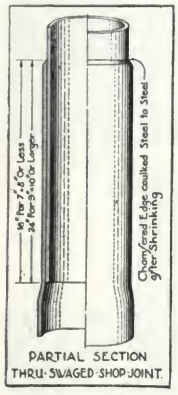
5th Avenue and 58th Street Building, New York, N. Y.
United Office Building, Niagara Falls, N. Y.
Betsy Ross House, Philadelphia, Pa.
Union Station, Cleveland, Ohio
Notre Dame Stadium, South Bend, Ind.
Canal Bank, New Orleans, La.
Arlington Hotel, Hot Springs, Ark.
Graybar Building, Seattle, Wash.

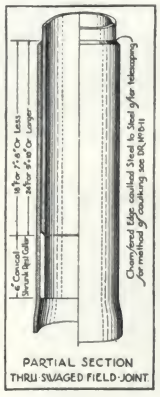
A Few Recent Installations of "Lingo" Continuous Tapered Flagpoles

Building and Location	Number of Installations
Bank of Manhattan Building, New York, N. Y.	1
Hotel New Yorker, New York, N. Y.	8
Lincoln Building, New York, N. Y.	3
Strawbridge & Clothier Dept. Store, Philadelphia, Pa.	4
Delaware County Courthouse, Media, Pa.	2
Duke University Stadium, Durham, N. C.	15
British Embassy Building, Washington, D. C.	1
New Internal Revenue Building, Washington, D. C.	2
Memorial to Gen'l Robert Anderson, Fort Sumter, S. C.	1
U. S. Veterans' Hospital, Augusta, Ga.	1
Boody Building, Toledo, Ohio (bronze)	2
U. S. Veterans' Hospital, Hines, Ill.	1
Milwaukee Gas Light Co. Building, Milwaukee, Wis. (bronze)	2
U. S. Veterans' Hospital, Lincoln, Neb.	1
State Office Building, Albany, N. Y.	3
Jefferson Medical College, Philadelphia, Pa. (bronze)	3

SWAGED SECTIONAL FLAGPOLES

Our swaged sectional flagpoles are fabricated by joining consecutive diminishing diameters of new mill run of full weight standard, open hearth, lap-welded, copper bearing steel tested pipe with joints either of the *shop* type (swaged, telescoped and shrunk) or of the *field* type (swaged and self-aligning). All joints are constructed without the use of bolts, pins, rivets, screw couplings or lead calking. Flagpoles of this type are designed to withstand wind stresses up to 90 miles per hour with a conservative bending resistance. These flagpoles are shipped in one or more knocked down sections and assembled on the ground by means of the field joints. Each section is made to suit car lengths which allows transportation at a minimum rate for less than carload lots and each section may contain two or more pieces to produce the proper reduction. At the erection site the flagpole erector merely pushes or telescopes the sections together and after erection makes the field joints airtight and watertight by calking metal to metal with only an ordinary hammer and calking chisel. Inexperienced men may, in a minimum length of time, accomplish the erection of these flagpoles.





Specification "A"—Swaged Sectional Flagpoles for Ground Setting

Furnish and erect a swaged sectional copper bearing tubular steel flagpole complete with all standard fittings as listed below, made by John E. Lingo & Son, Inc., Camden, N. J., and build concrete foundation in accordance with their standard details. Flagpole to be ground set [Light] [Heavy] [Extra Heavy] pattern with ..... feet exposed height above ground by ..... feet total length with ..... inches butt diameter. After erection, apply over the shop coat of red metal primer two finishing coats of white lead and oil.

Flagpole Construction—Flagpole to be fabricated in sections of standard full weight copper bearing tubular steel pipe of diameters, thicknesses, lengths and joints as detailed by John E. Lingo & Son, Inc., for this type pole. Shop joints to be swaged, shrunk and calked steel to steel. Field joints to be calked steel to steel, airtight and watertight to prevent interior corrosion and deterioration. All joints to be constructed without the use of bolts, pins, rivets, screw couplings or lead calking.

Ball—To be of size recommended by John E. Lingo & Son, Inc., for this type flagpole and to be constructed of 20-oz. copper, covered with Hastings XX gold leaf over three coats of galvanum and one coat of waterproof size. Ball to be mounted on a ¾-in. seamless brass tube and slipped over a ⅝-in. diameter galvanized rod attached to truck.

Truck—To be "Lingo" standard ball bearing revolving truck, cast iron body galvanized, revolving on manganese bronze spindle, with top and bottom ball races with twenty-six ¼-in. diameter bronze balls each. Truck to be fitted with two 2⅜-in. diameter bronze roller bushed sheaves for ⅜-in. diameter bronze pins.

Alternate for Truck—(For extra heavy pattern poles with 4-in. top diameter.) To be "Lingo" extra heavy ball bearing revolving truck, cast iron body galvanized, revolving on manganese bronze spindle, with bottom ball race with thirty ¼-in. diameter manganese bronze balls. Truck to be fitted with two 4-in. diameter bronze sheaves with bronze roller bearings and ½-in. monel metal pins.

Halyards—Provide two sets of ⅜-in. diameter U. S. standard manila bolt rope halyards with bronze swivel snaps at each end for securing to flag.

Cleats—Provide two 9-in. cast iron galvanized cleats to be tapped to pole with ⅝-in. galvanized flat head stove bolts.

Ground Protector—To be copper bearing steel, 18 in. long, extending 12 in. above and 6 in. below the grade and shall be shrunk to the pole, calked on the upper edge and electric-welded on the lower edge to the flagpole.

DIMENSIONS, SWAGED SECTIONAL FLAGPOLES FOR GROUND SETTING

Exposed height, ft.	Foundation depth, ft.	Total length, ft.	Diameter, in. Butt	Top	Ball	Ship. wgt., lb.	Sections Number	Number K. D.
Light Pattern								
17	3	20	3½	2⅜	5	145	3	1
25	3½	28½	4	2⅜	5	242	4	2
33	4	37	4½	2⅜	6	360	5	2
41	4½	45½	5	2⅜	6	502	6	3
49½	4½	54	5 9/16	2⅜	6	653	7	3
57½	5	62½	6⅝	2⅜	8	850	8	4
65½	6	71½	7⅝	2⅜	8	1100	9	4
73	6	79	7⅝	2⅜	8	1310	9	5
80	7	87	8⅝	2⅜	8	1625	10	5
90	8	98	9⅝	2⅜	10	2100	11	6
100	8	108	10¾	2⅜	10	2600	12	6
Heavy Pattern								
20	3	23	4	2⅞	5	218	3	1
25	3½	28½	4½	2⅞	5	314	4	2
30	3½	33½	5	2⅞	6	405	5	2
40	4	44	5 9/16	2⅞	6	593	6	3
50	5	55	6⅝	2⅞	8	800	7	3
60	6	66	7⅝	2⅞	8	1200	8	4
70	7	77	8⅝	2⅞	8	1600	9	4
75	7½	82½	9⅝	2⅞	10	1960	10	5
80	8	88	10¾	2⅞	10	2410	11	5
90	9	99	11¾	2⅞	10	2840	12	6
100	10	110	12¾	2⅞	12	3600	13	6
125	12	137	14	2⅞	14	5414	14	7
Extra Heavy Pattern								
25	3½	28½	5	2⅞	6	380	5	2
30	3½	33½	5 9/16	2⅞	6	498	6	2
35	4	39	6⅝	3½	8	716	6	2
40	5	45	7⅝	3½	8	960	7	3
47	6	53	8⅝	3½	8	1212	8	3
55	6	61	9⅝	3½	8	1661	9	4
62	7	69	10¾	3½	10	1950	10	4
70	7	77	11¾	4	10	2612	10	5
77	8	85	12¾	4	12	3183	11	5
85	8	93	14	4	12	4260	12	6
90	10	100	15	4	14	4932	13	6
100	10	110	16	4	14	5870	14	7

Continued on next page

Specification "B"—Swaged Sectional Flagpoles for Roof Setting, Anchored to Roof with Braces

Furnish and erect a swaged sectional copper bearing tubular steel flagpole complete with all standard fittings as listed below, made by JOHN E. LINGO & SON, INC., Camden, N. J. Flagpole to be roof set [Heavy] [Extra Heavy] type with ..... feet exposed height above roof level with ..... inches butt diameter. After erection apply over the shop coat of red metal primer two finishing coats of white lead and oil.

Flagpole Construction—(See paragraph under Specification "A.")

Ball—(See paragraph under Specification "A.")

Truck—(See paragraph under Specification "A.")

Alternate for Truck—(For extra heavy type poles with 4-in. top diameter.) (See paragraph under Specification "A.")

Halyards—(See paragraph under Specification "A.")

Cleats—(See paragraph under Specification "A.")

Flash Collar—Provide bronze flash collar, place on the flagpole at the height indicated and calk metal to metal after roof flashing has been installed by the Roofing Contractor.

Pole Socket and Plate—Provide cast iron pole socket and steel plate of proper size to suit flagpole and secure with a bolt and bearing plate, fastened to concrete [wood] [steel] construction as indicated on drawing No. B5A of JOHN E. LINGO & SON, INC.

Braces—Provide suitable number of [turnbuckle] [telescope] braces to be of sufficient length and of sizes as detailed on drawing No. B5A of JOHN E. LINGO & SON, INC., and complete with brace collar and suitable brace anchors. Braces to be made of copper bearing tubular steel. Brace collar to be calked to flagpole after erection at the proper height to rigidly support the pole. All the necessary drilling of steel [wood] beams (or placing of anchors in concrete) to be located in accordance with detail drawings to be submitted to the architect for approval by JOHN E. LINGO & SON, INC.

Specification "C"—Swaged Sectional Flagpoles for Roof Setting, Without Braces and Penetrating Roof to Loft Floor

Furnish and erect a swaged sectional copper bearing tubular steel flagpole complete with all standard fittings as listed below, made by JOHN E. LINGO & SON, INC., Camden, N. J. Flagpole to be roof set [Heavy] [Extra Heavy] type with ..... feet above roof plus a distance of ..... feet to loft floor; flagpole butt diameter to be ..... inches. After erection apply over the shop coat of red metal primer two finishing coats of white lead and oil.

Flagpole Construction—(See paragraph under Specification "A.")

Ball—(See paragraph under Specification "A.")

Truck—(See paragraph under Specification "A.")

Alternate for Truck—(For extra heavy type poles with 4-in. top diameter.) (See paragraph under Specification "A.")

Halyards—(See paragraph under Specification "A.")

Cleats—(See paragraph under Specification "A.")

Roof Tube (If Concrete Slab) or Guide Flange (If Steel or Wood Roof)—To be provided of proper size to suit flagpole butt diameter; to be fastened to roof construction and calked steel to steel before roof flashing has been installed by the Roofing Contractor.

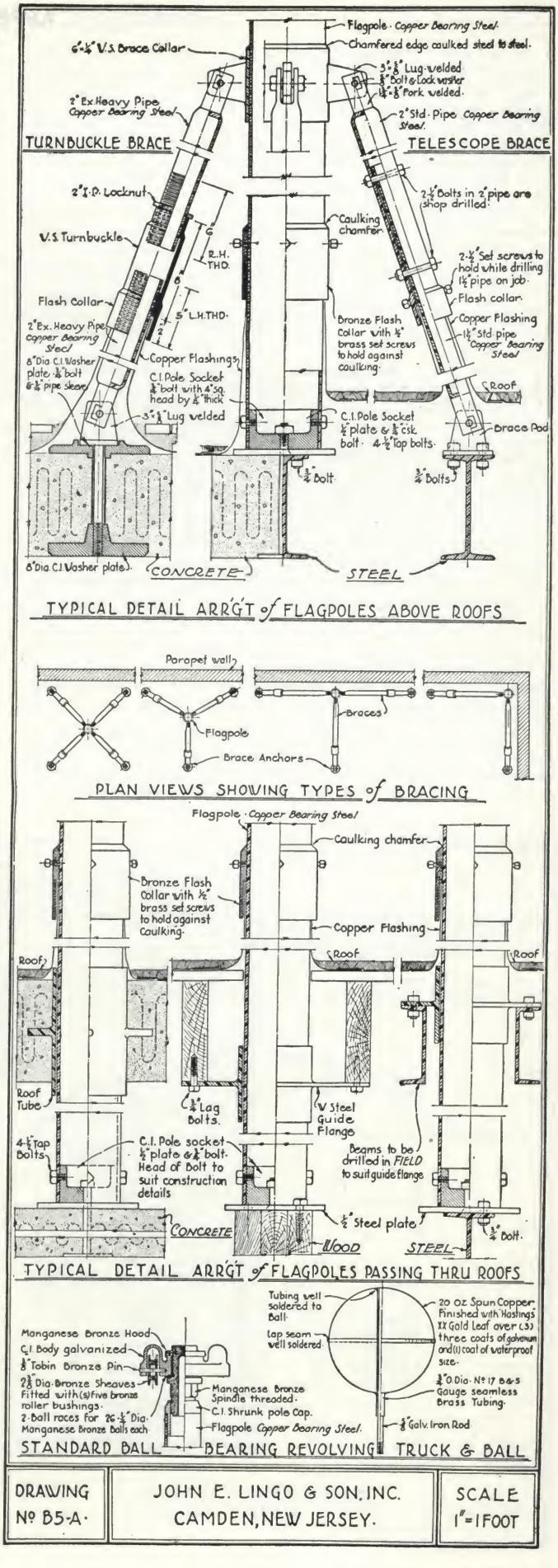
Flash Collar—(See paragraph under Specification "B.")

Pole Socket and Plate—Provide cast iron pole socket and steel plate of proper size to suit flagpole and secure with a bolt and bearing plate, fastened to concrete [steel] [wood] construction as indicated on drawing No. B5A of JOHN E. LINGO & SON, INC. Detail drawings are to be submitted to the architect for approval by JOHN E. LINGO & SON, INC.

IMMENSIONS, SWAGED SECTIONAL FLAGPOLES FOR ROOF SETTING

Exposed height, ft.	Diameter, in.			Shipping weight, lbs.	Sections	
	Butt	Top	Ball*		Number	Number K. D.
Heavy Type						
20	4	2 7/8		159	3	1
25	4 1/2	2 7/8		245	4	2
30	5	2 7/8		325	5	2
40	5 9/16	2 7/8		500	6	3
50	6 5/8	2 7/8		680	7	3
60	7 5/8	2 7/8		990	8	4
70	8 5/8	2 7/8		1375	9	4
75	9 5/8	2 7/8		1620	9	5
80	10 3/4	2 7/8		1750	10	5
90	11 3/4	2 7/8		2500	11	6
100	12 3/4	2 7/8		3000	12	6
Extra Heavy Type						
20	5	2 7/8		244	5	1
25	5 9/16	2 7/8		341	6	2
30	6 5/8	3 1/2		500	6	2
35	7 5/8	3 1/2		668	7	2
43	8 5/8	3 1/2		953	8	3
51	9 5/8	3 1/2		1392	9	4
59	10 3/4	3 1/2		1796	10	4
67	11 3/4	4		2465	10	5
75	12 3/4	4		2970	11	5

*To suit height of building.



TYPICAL DETAIL ARR'GT of FLAGPOLES ABOVE ROOFS

PLAN VIEWS SHOWING TYPES of BRACING

TYPICAL DETAIL ARR'GT of FLAGPOLES PASSING THRU ROOFS

STANDARD BALL BEARING REVOLVING TRUCK & BALL

DRAWING No. B5-A.	JOHN E. LINGO & SON, INC. CAMDEN, NEW JERSEY.	SCALE 1"=1 FOOT

Continued on next page

CONTINUOUS TAPERED FLAGPOLES

Continuous Tapered Flagpoles are produced in copper bearing steel, bronze and aluminum with a smooth uninterrupted exterior surface throughout resembling a finished wood flagpole in contour and appearance. They may be tapered conically or with entasis as selected by the architect. These flagpoles are especially suitable for memorials, monuments, plazas and buildings of exceptional architectural value where a prominent flagpole installation is desired to properly harmonize with the architectural design of the project.

Continuous Tapered Flagpoles are not carried in stock and are made to order only. They are, however, standardized in two weights for ground setting or roof setting, Standard and Sub-standard, as shown in the table of dimensions but may be proportioned to the architect's individual conception if so desired. Approximately one-third of the visible height is cylindrical, the diameter of which corresponds to a standard pipe size and the tapered section is confined to the remaining visible height.

In the past it was impossible to obtain a wall thickness of more than ⅛-in. material at the top with a minimum diameter of 5 in. but now, by use of our patented processes, we are able to taper copper bearing steel, bronze or aluminum tubes to any desired taper or entasis and can produce Continuous Tapered Flagpoles with a wall thickness at the top up to ½ in. with no limit to a minimum top diameter. The wall thickness of the Standard and Sub-standard Continuous Tapered Flagpoles is from ¼ to ⅜ in. depending upon the top diameter of the flagpoles as shown in the table of dimensions.

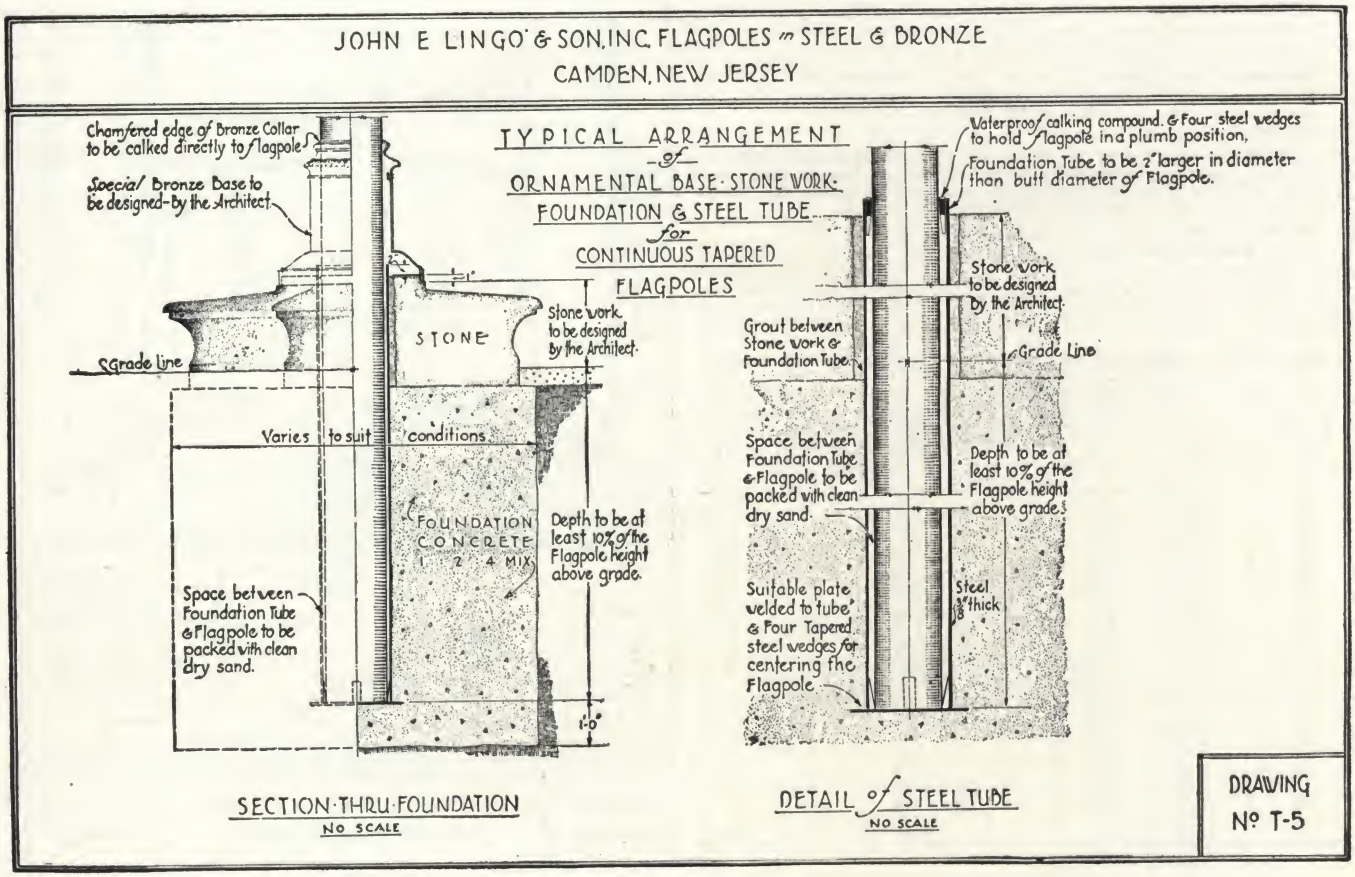
Continuous Tapered Flagpoles, regardless of length, are shipped in one piece each, without field joints, but where handling or shipping will not permit the flagpoles are shipped in two sections each and assembled at the erection site by means of a special field joint. This assembling, however, cannot be accomplished by inexperienced men and we will not ship Continuous Tapered Flagpoles in sections unless the assembling in the field is accomplished by our own men. This tends to enhance the cost but insures the purchaser of a first class installation which might be ruined by the neglect and inexperience of others doing this work.

The dimensions, wall thicknesses, details, etc., shown in the table of dimensions apply to Continuous Tapered Flagpoles produced of copper bearing steel and bronze only, but do not apply to the poles produced of aluminum. Further information regarding Continuous Tapered Aluminum Flagpoles will be furnished on application.

When Continuous Tapered Flagpoles for ground setting are used for monuments or memorials, the architect usually designs a special bronze base with special stone work. Drawing No. T-5, illustrated below, shows a typical arrangement of foundation, stone work, steel tube, ornamental base, etc., which makes an ideal setting. We gladly offer our services to architects, without obligation on their part, by assisting them in properly designing the necessary foundation so that no damage may result from vibration or water.

DIMENSIONS, CONTINUOUS TAPERED FLAGPOLES FOR GROUND SETTING OR ROOF SETTING

Visible height, ft.	Weight, lb.	Weight additional butt, lb.	Wall thickness, in.	Diameter, in.	
				Butt	Top
Standard					
20	240	14.6	¼	5	3
25	350	16.0	¼	6	3
30	540	18.9	5/16	6⅝	3½
35	735	23.5	5/16	7⅝	3½
40	920	28.5	5/16	8⅝	4
45	1216	33.9	5/16	9⅝	4
50	1785	40.4	⅜x5/16	10¾	4
60	2400	45.5	⅜	11¾	4½
65	2545	49.5	⅜	12¾	5
70	3390	54.5	⅜	14	5
75	4180	58.5	⅜	15	5
80	4315	62.5	⅜	16	5
90	5418	70.5	⅜	18	5
100	6670	78.5	⅜	20	5
Sub-standard					
20	180	9.1	¼	4	2
25	272	10.7	¼	4½	2½
30	363	12.5	¼	5	3
35	476	14.6	¼	5⅝	3
40	724	18.9	5/16	6⅝	3½
45	1002	23.5	5/16	7⅝	3½
50	1285	28.5	5/16	8⅝	3½
60	1847	33.9	⅜x¼	9⅝	3½
65	2357	40.4	⅜x5/16	10¾	4
70	2727	45.5	⅜x5/16	11¾	4
75	3338	49.5	⅜x5/16	12¾	4
80	3994	54.5	⅜x5/16	14	4
90	4727	58.6	⅜x5/16	15	4
100	5800	62.6	⅜x5/16	16	4



Continued on next page

Specification "D"—Continuous Tapered Flagpoles for Ground Setting

Furnish and erect a (standard) (sub-standard) continuous tapered (copper bearing steel) (bronze) flagpole complete with all standard fittings as listed below, made by JOHN E. LINGO & SON, INC., Camden, New Jersey. Flagpole to be ground set .... ft. exposed height above (grade) (top of ornamental base) with an overall length of .... ft. with a butt diameter of .... in. tapering with entasis to a top diameter of .... in.

Flagpole Construction—The flagpole shall be constructed of (copper bearing steel) (bronze) of diameters, wall thicknesses and entasis as standardized by JOHN E. LINGO & SON., INC., for this type flagpole. The flagpole shall have a smooth uninterrupted exterior surface throughout, without visible joints or offsets, and shall be shipped from factory in one piece without field joints.

Ball—The ball shall be of size recommended by JOHN E. LINGO & SON, INC. for this type flagpole and shall be constructed of 20-oz. copper, covered with Hastings XX gold leaf over three coats of galvanum and one coat of waterproof size. Ball to be mounted on a ¾-in. seamless brass tube and slipped over a ⅝-in. diameter bronze rod attached to truck.

Truck—(To be used on flagpoles with top diameters up to 3½ in. only.) To be "Lingo" standard ball bearing revolving truck, with bronze body, revolving on manganese bronze spindle, with top and bottom ball races with twenty-six ¼-in. diameter bronze balls each. Truck to be fitted with two 2⅜-in. diameter bronze roller bushed sheaves and ⅜-in. diameter bronze pins.

Alternate for Truck—(To be used on flagpoles with top diameters of 4 in. or over.) To be "Lingo" extra heavy ball bearing revolving truck, with bronze body, revolving on manganese bronze spindle, with bottom ball race with thirty ¼-in. manganese bronze balls. Truck to be fitted with two 4-in. diameter bronze sheaves with bronze roller bearings and ½-in. monel metal pins.

Halyards—Provide two sets of Silver Lake A No. 10 cotton braided halyards with bronze swivel snaps at each end for securing to flag.

Cleats—Provide two 9-in. bronze cleats tapped to flagpole with two $\frac{5}{16}$-in. bronze machine screws.

Painting—(To be included only if flagpole is constructed of copper bearing steel.) After erection of flagpole, apply over shop coat of red metal primer, two finishing coats of white lead and oil.

Note: For typical arrangement of foundation, stone work, ornamental base, etc. for Continuous Tapered Flagpoles for ground setting, see drawing No. T-5 on preceding page.

Specification "E"—Continuous Tapered Flagpoles for Roof Setting, Anchored to Roof with Braces

Furnish and erect a (standard) (sub-standard) continuous tapered (copper bearing steel) (bronze) flagpole complete with all standard fittings as listed below, made by JOHN E. LINGO & SON, INC., Camden, New Jersey. Flagpole to be roof set with .... ft. exposed height above roof level with .... in. butt diameter tapering with entasis to a top diameter of .... in.



72-ft. Overall, Continuous Tapered Copper Bearing Steel Flagpole

One of two installations at Civic Centre, Pasadena, Calif. 12¾-in. butt, 5-in. top.

Flagpole Construction—(See paragraph under Specification "D.")

Ball—(See paragraph under Specification "D.")

Truck—(See paragraph under Specification "D.")

Alternate for Truck—(See paragraph under Specification "D.")

Halyards—(See paragraph under Specification "D.")

Cleats—(See paragraph under Specification "D.")

Flash Collar—Provide bronze flash collar, place on the flagpole at the height indicated and calk metal to metal after roof flashing has been installed by the Roofing Contractor.

Pole Socket and Plate—Provide cast iron pole socket and steel plate of proper size to suit flagpole and secure with a bolt and bearing plate, fastened to (concrete) (wood) (steel) construction as indicated on drawing No. B-5-A of JOHN E. LINGO & SON, INC.

Braces—Provide (tubular turnbuckle) (adjustable telescope) braces of proper number, length and sizes as detailed on drawing No. B-5-A of JOHN E. LINGO & SON, INC., and complete with brace collar and brace anchors. Braces to be made of copper bearing tubular steel. Brace collar to be calked to flagpole after erection at the proper height to rigidly support the flagpole. All the necessary drilling of (steel) (wood) beams (or placing of anchors in concrete) to be located in accordance with detail drawings to be submitted to the Architect for approval by JOHN E. LINGO & SON, INC.

Painting—(To be included only if the flagpole is constructed of copper bearing steel.) After erection of flagpole, apply over shop coat of red metal primer two finishing coats of white lead and oil.

Specification "F"—Continuous Tapered Flagpoles for Roof Setting, Without Braces and Penetrating Roof to Loft Floor

Furnish and erect a (standard) (sub-standard) continuous tapered (copper bearing steel) (bronze) flagpole complete with all standard fittings as listed below, made by JOHN E. LINGO & SON, INC., Camden, New Jersey. Flagpole to be roof set with .... ft. above roof level plus a distance of .... ft. to loft floor; flagpole butt diameter to be .... in. tapering with entasis to a top diameter of .... in.

Flagpole Construction—(See paragraph under Specification "D.")

Ball—(See paragraph under Specification "D.")

Truck—(See paragraph under Specification "D.")

Alternate for Truck—(See paragraph under Specification "D.")

Cleats—(See paragraph under Specification "D.")

Halyards—(See paragraph under Specification "D.")

Flash Collar—(See paragraph under Specification "E.")

Roof Tube—(If Concrete Slab) or Guide Flange—(If Steel or Wood Roof)—to be provided of proper size to suit flagpole butt diameter; to be fastened to roof construction and calked metal to metal before roof flashing has been installed by the Roofing Contractor.

Pole Socket and Plate—(See paragraph under Specification "E.")

Painting—(See paragraph under Specification "E.")

Continued on next page

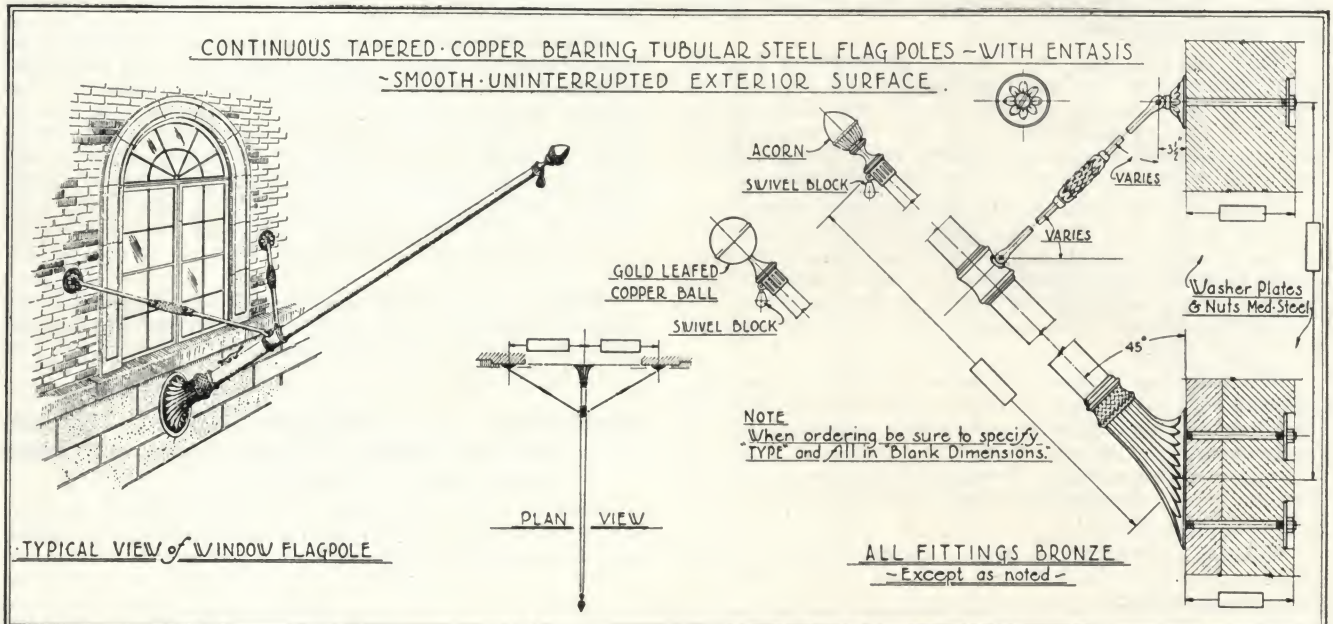
CONTINUOUS TAPERED OUTRIGGER FLAGPOLES

Continuous tapered outrigger or window flagpoles are produced in either *bronze* or copper bearing steel in lengths varying from 16 to 30 ft. and may be projected from the face of the building at a fixed angle of 45 degrees from the vertical (see drawing No. B-12) or projected at any angle desired by use of a hinged arrangement (see drawing No. B-14).

Continuous tapered outrigger or window flagpoles are suitable for bank buildings, office buildings, etc., where it is desirable to fly the flag at lower levels than on a flagpole located on the roof. The poles have a smooth uninterrupted exterior surface throughout without visible joints or offsets and may be tapered conically or with entasis as selected by the architect. The minimum top diameter is 1½ in. with a wall thickness of approximately $\frac{3}{16}$ in. increasing downward to the butt.

Extended from Face of Building at Fixed Angle of 45 Degrees

For beauty and dignity, we recommend the outrigger or window flagpole arrangement shown on drawing No. B-12 below. Continuous tapered flagpoles of this arrangement are produced in either *bronze* or copper bearing steel and complete specifications covering this arrangement are shown below. All bronze fittings are furnished with either the bronze flagpoles or the copper bearing steel flagpoles and the bronze base is so arranged to project the flagpole from the face of the building only at an angle of 45 degrees from the vertical. Flagpoles of this type are also produced of aluminum with aluminum fittings. Further information on application.



TYPE	LIGHT						HEAVY						EXTRA-HEAVY						DRAWING NUMBER
LENGTH in FEET	16	18	20	22	25	30	16	18	20	22	25	30	16	18	20	22	25	30	B-12
DIAMETER at TOP	1½"	1½"	1½"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2½"	
DIAMETER at BUTT	2⅞"	2⅞"	2⅞"	3½"	4"	4½"	3½"	3½"	3½"	4"	4½"	5"	4"	4"	4"	4½"	5"	5 9/16"	

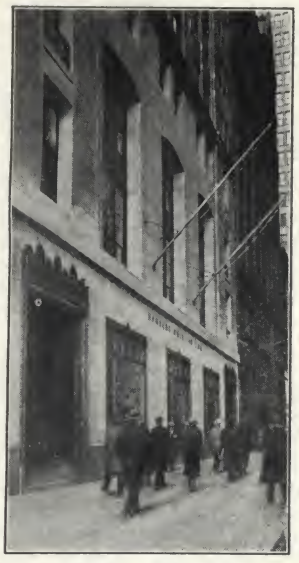


One of Two 28-ft. Continuous Tapered Outrigger Flagpoles
7⅝-in. butt, 4-in. top
Fidelity-Philadelphia Building, Philadelphia, Pa.

Specifications for Continuous Tapered Outrigger Flagpoles Extended from Face of Building at Fixed Angle of 45 Degrees

Furnish and install a continuous tapered [bronze] [copper bearing steel] outrigger flagpole on the face of the building, where shown on plans, projected at an angle of 45 degrees from the vertical, all to be in strict accordance with drawing No. B-12 of JOHN E. LINGO & SON, INC., Camden, N. J. Flagpole to be [Light] [Heavy] [Extra Heavy] type, ... ft. long, with ... in. butt diameter tapering with entasis to ... in. top diameter.

Flagpole shall be of continuous tapered construction, having a smooth uninterrupted exterior surface throughout without visible joints or offsets and shall be shipped from factory in one piece without field joints. All fittings shall be bronze, except the halyards, and shall consist of one bronze acorn top, one bronze pole cap with bronze swivel block, one 9-in. bronze cleat, one set of Silver Lake A No. 10 cotton braided halyards with bronze swivel snaps, one standard bronze base with bronze anchor bolts, washer plates and nuts, one set of bronze braces with bronze ornamental couplers, bronze brace collar, bronze rosettes, etc., all in accordance with drawing No. B-12 of JOHN E. LINGO & SON, INC.

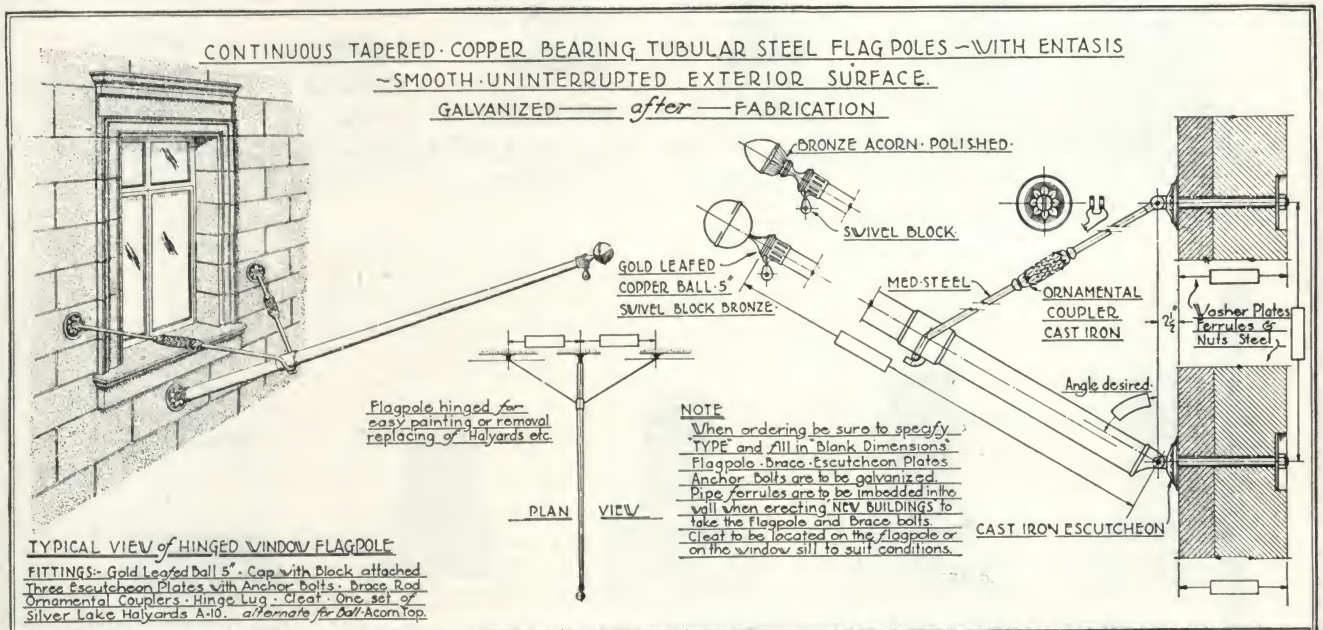


Two 20-ft. Extra Heavy Bronze Continuous Tapered Outrigger Flagpoles
Per drawing No. B-12
4-in. butt, 2-in. top
Harriman Building, New York, N. Y.

Continued on next page

Continuous Tapered Outrigger Flagpoles with Hinged Arrangement to Permit Extension from Face of Building at Any Angle Desired

For economical maintenance and easy accessibility, we recommend the outrigger or window flagpole arrangement shown on drawing No. B-14 below. Continuous tapered flagpoles of this arrangement are produced in either *bronze* or copper bearing steel and complete specifications covering this arrangement are shown below. All bronze fittings are furnished with the bronze flagpoles, whereas bronze, galvanized cast iron and steel fittings in combination are used with the copper bearing steel flagpoles. Flagpoles of this arrangement may be projected from the face of the building at any angle selected by the architect. The hinged arrangement permits righting the flagpoles for repainting or repairs at a minimum cost, eliminates the risky operation with a boatswain's chair from the roof and saves the expense of scaffolding and dismantling.



TYPE	LIGHT						HEAVY						EXTRA·HEAVY						DRAWING NUMBER B-14
LENGTH in FEET	16	18	20	22	25	30	16	18	20	22	25	30	16	18	20	22	25	30	
DIAMETER at TOP	1½"	1½"	1½"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2½"	
DIAMETER at BUTT	2⅞"	2⅞"	2⅞"	3½"	4"	4½"	3½"	3½"	3½"	4"	4½"	5"	4"	4"	4"	4½"	5"	5⅝"	

Specifications for Continuous Tapered Outrigger Flagpoles with Hinged Arrangement to Permit Extension from Face of Building at Any Angle Desired

Furnish and install a continuous tapered [bronze] [copper bearing steel] outrigger flagpole on the face of the building, where shown on plans, projected at an angle of ....degrees from the vertical, all to be in strict accordance with drawing No. B-14 of JOHN E. LINGO & SON, INC., Camden, N. J. Flagpole to be [Light] [Heavy] [Extra Heavy] type, ... feet long, with ... inches butt diameter tapering with entasis to ... inches top diameter.

(If flagpole is bronze include the following): Flagpole shall be of continuous tapered construction, having a smooth uninterrupted exterior surface throughout without visible joints or offsets and shall be shipped from factory in one piece without field joints. The fittings shall consist of one bronze acorn top (Alternate—one 5-in. gold leafed copper ball), one bronze pole cap with bronze swivel block, one 9-in. bronze cleat, one set of Silver Lake A No. 10 cotton braided halyards with bronze swivel snaps, one set of bronze rod braces with bronze ornamental couplers and bronze rosettes, one bronze hinge lug with bronze escutcheon plate, bronze anchor bolts, washer plates, etc., all in accordance with drawing No. B-14 of JOHN E. LINGO & SON, INC.

(If flagpole is copper bearing steel include the following): Flagpole shall be of continuous tapered construction, galvanized after fabrication, having a smooth uninterrupted exterior surface throughout without visible joints or offsets and shall be shipped from factory in one piece without field joints. The fittings shall consist of one bronze acorn top (Alternate—one 5-in. gold leafed copper ball), one bronze pole cap with bronze swivel block, one 9-in. galvanized cleat, one set of Silver Lake A No. 10 cotton braided halyards with bronze swivel snaps, one set of galvanized steel rod braces with galvanized cast iron ornamental couplers and galvanized cast iron rosettes, one galvanized cast iron hinge lug with galvanized cast iron escutcheon plate, galvanized steel anchor bolts, washer plates, etc., all in accordance with drawing No. B-14 of JOHN E. LINGO & SON, INC.

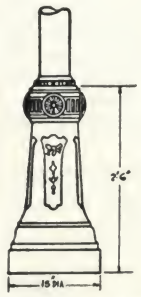


16 Ft. Over All, Continuous Tapered Heavy Type Copper Bearing Steel Outrigger Flagpole
Per drawing No. B-14
New Jersey Bell Telephone Building, Mount Holly, N. J.

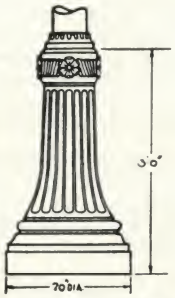


Two 16-ft. Extra Heavy Continuous Tapered Outrigger Flagpoles
4-in. butt, 2-in. top
Collingswood Trust Co., Collingswood, N. J.

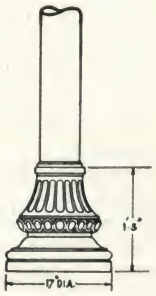
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Design No. 2106
4 to 5 in.



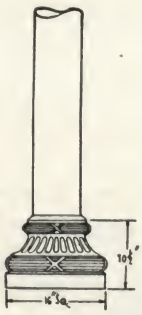
Design No. 2105
4 to 5 in.



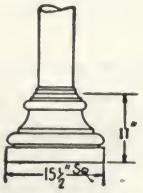
Design No. 2107
5 to 6⅝ in.



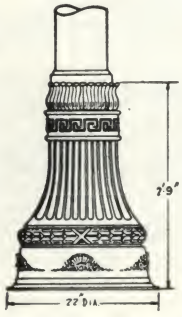
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5 to 6⅝ in.



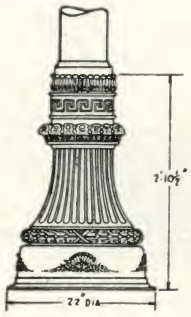
Design No. 2108
5 1/16 to 7⅝ in.



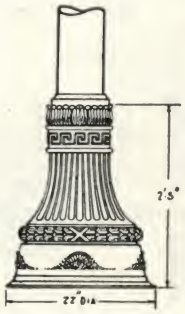
Design No. 1970
5 to 5 1/16 in.



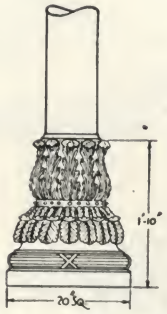
Design No. 2101
6⅝ to 8⅝ in.



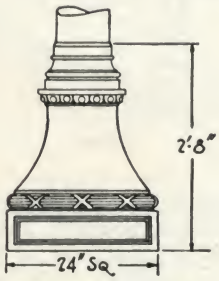
Design No. 2103
5 1/16 to 7⅝ in.



Design No. 2102
5 1/16 to 7⅝ in.

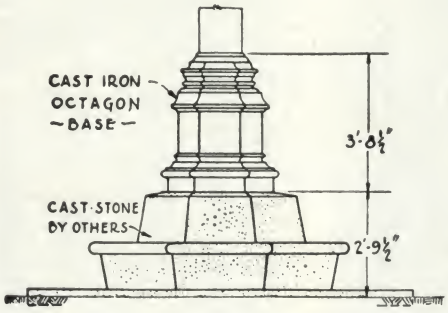


Design No. 2109
6⅝ to 8⅝ in.

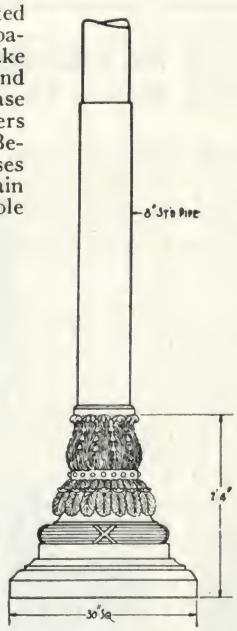


Design No. 1902
7⅝ to 9⅝ in.

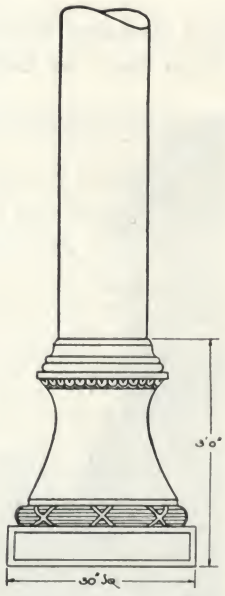
We carry in stock this complete line of ornamental cast iron flagpole bases, painted or galvanized. A ring collar is cast separate and furnished with the base to make a proper "joint" between the flagpole and the collar for hot lead calking. Each base fits certain flagpoles only the butt diameters of which are shown under each base. Before finally specifying one of these bases for a certain flagpole be sure to ascertain whether the butt diameter of the flagpole will fit the base selected.



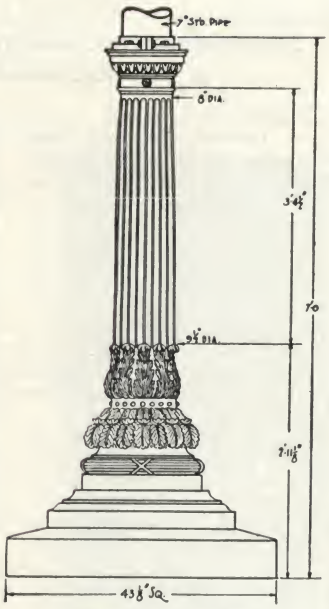
Design No. 1990
12¾ to 18 in.



Design No. 2110
7⅝ to 8⅝ in.



Design No. 1999
10¾ to 16 in.



Design No. 2121
7⅝ in.

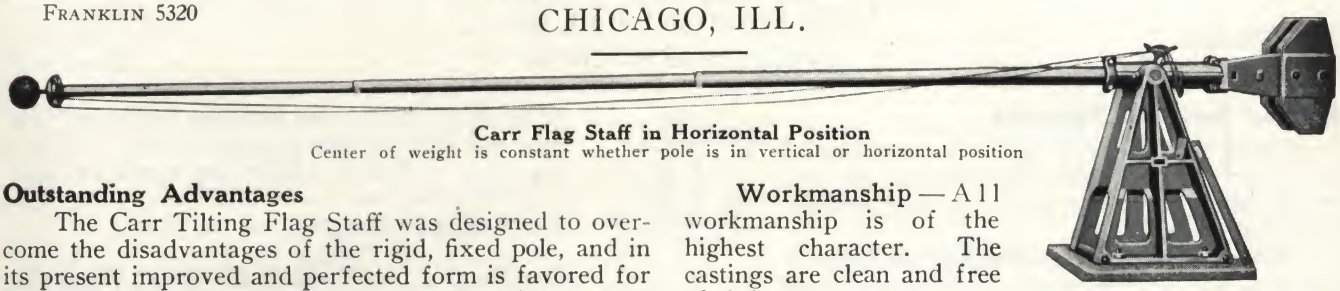
NO SCALE	JOHN E. LINGO & SON, INC. FLAGPOLES IN COPPER BEARING STEEL, BRONZE AND ALUMINUM CAMDEN, N. J.	DRAWING NO. B-6

ELMER E. CARR

Manufacturer of the Carr Tilting Flag Staff

TELEPHONE
FRANKLIN 5320

228 No. La Salle Street
CHICAGO, ILL.



Carr Flag Staff in Horizontal Position
Center of weight is constant whether pole is in vertical or horizontal position

Outstanding Advantages

The Carr Tilting Flag Staff was designed to overcome the disadvantages of the rigid, fixed pole, and in its present improved and perfected form is favored for its simplicity of construction as well as its ease of operation and maintenance.

Counterbalanced—Each unit is provided with adequate counterweight to balance the pole proper, which is secured in a substantial socket provided with steel trunnions to engage in the standard or supporting brackets, the brackets being permanently attached to the roof or foundation. When the pole is lowered or raised the roof load is unchanged.

Repainting, inserting new halyards, etc., are accomplished with the utmost ease and economy. There are no mechanical parts, no gearing or levers to fail. One man can lower the pole by removing the key and locking bar, exerting slight pressure against the counterweight, and bringing the pole (always under control) with little effort to the horizontal. It is returned to the vertical with equal facility.

Simple Pole Support Construction—Due to the low point of gravity, only an ordinary foundation to receive the anchor bolts is necessary and a roof construction adequate to carry the weight of the unit. The supporting castings provide a rigid and sturdy anchorage without the usual "pull and tug" effect of an ordinary pole attached to the roof with structural shapes.

Economy of Erection—Erection is simply and inexpensively accomplished. After the supporting castings are set on the foundation bolts and the pole socket castings in place and shored in a horizontal position, the pole is inserted and bolted in the socket, the counterweights are then bolted in position and the trimmings attached to the top of the pole; the shoring is then removed and the counterweighted pole is easily raised to a vertical position and the locking bar inserted and keyed in place. The parts are raised to the roof with the usual facilities provided for construction work. Once on the roof, the unit, according to size, can be erected complete by two or three men in one and one-half to three hours.

Construction

Base—The supporting structure is of cast iron, which is recognized as better able to withstand the elements than structural shapes.

Socket—The pole socket is of cast iron, with steel trunnions cast in position, and the counterweights also are of cast iron.

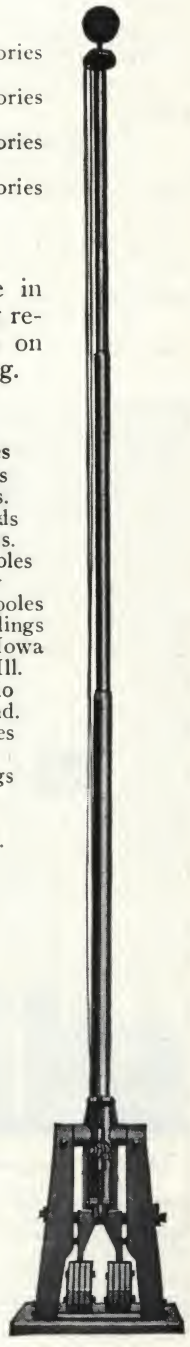
Locking Bar—The locking bar and key are of heavy steel.

Pole—The pole is made up of suitable lengths of steel tubing with lap joints welded.

Pole Trimmings—The pole trimmings consist of a seamless copper ball covered with gold leaf; a truck with two bronze pulleys; a brass nipple for connecting ball to truck; a cleat; and a halyard of good quality with snap hooks.

Workmanship — All workmanship is of the highest character. The castings are clean and free of defects.

Painting—All steel and cast iron are given one shop coat of paint.



Sizes

No. 0—20 ft.—for buildings 1 to 3 stories high.

No. 1—25 ft.—for buildings up to 10 stories high.

No. 2—32½ ft.—for buildings up to 16 stories high.

No. 3—40 ft.—for buildings up to 24 stories and higher.

Service

The manufacturer will co-operate in planning settings to suit various building requirements and will furnish drawings on request. Mention SWEET'S when writing.

Representative Installations

Northwestern Nat. Bank, Minneapolis, 3 poles
Pennsylvania R. R., Philadelphia, 2 buildings
Aluminum Goods Mfg. Co., Manitowoc, Wis.
Michigan Bell Telephone Garage, Grand Rapids
Hardware Mutual Ins. Co., Stevens Point, Wis.
Chicago Civic Opera Bldg., Chicago, Ill., 4 poles
Pickwick Bus Terminal and Hotel, Kansas City
Commonwealth Edison Co., Chicago, Ill., 32 poles
American Telephone & Telegraph Co., 2 buildings
Telegraph Herald Printing Plant, Dubuque, Iowa
Wieboldt Department Store No. 5, Chicago, Ill.
Terminal Railway Post Office, Cleveland, Ohio
Bendix Administration Bldg., South Bend, Ind.
Montgomery Ward & Co., 7 buildings, 11 poles
Warner Brothers Pictures, Inc., Chicago, Ill.
Westinghouse Electric & Mfg. Co., 5 buildings
Civil Courts Bldg., St. Louis, Mo., 8 poles
Alton Telegraph Printing Plant, Alton, Ill.
Asbury Park Press Bldg., Asbury Park, N. J.
Aetna Life Insurance Co., Hartford, Conn.
Des Plaines Post Office, Des Plaines, Ill.
Illinois Bell Telephone Co., 15 buildings
Milwaukee Gas Light Co., Milwaukee, Wis.
Inland Steel Co., Indiana Harbor, Ind.
Congdon & Carpenter, Providence, R. I.
Ohio Bell Telephone Co., 6 buildings
First Nat'l Bank, Hamilton, Ohio
LaSalle-Wacker Bldg., Chicago, Ill.
Canal Nat'l Bank, Portland, Me.
National Biscuit Co., 5 buildings
Marshall Field & Co., 2 buildings
Federal Reserve Bank, 5 buildings
Daily Northwestern, Oshkosh, Wis.
Elburn High School, Elburn, Ill.
Masonic Temple, Ardmore, Okla.
Youngblood Hotel, Enid, Okla.
Wright Field, Dayton, Ohio
Neisner Bros., 2 buildings
Y. M. C. A., Kenosha, Wis.
Borg & Beck, Chicago, Ill.
Crane Co., 9 buildings

AMERICAN MAST & SPAR CORPORATION

Manufacturers and Erectors of Steel, Ambrac, Bronze and Wood Flagpoles, Yacht Masts, Spars, Booms and Derrick Masts

TELEPHONE
LUDLOW 4-1050

149th Street and East River
NEW YORK, N. Y.

CABLE
"MASTSPAR"

Swaged Sectional Flagpoles

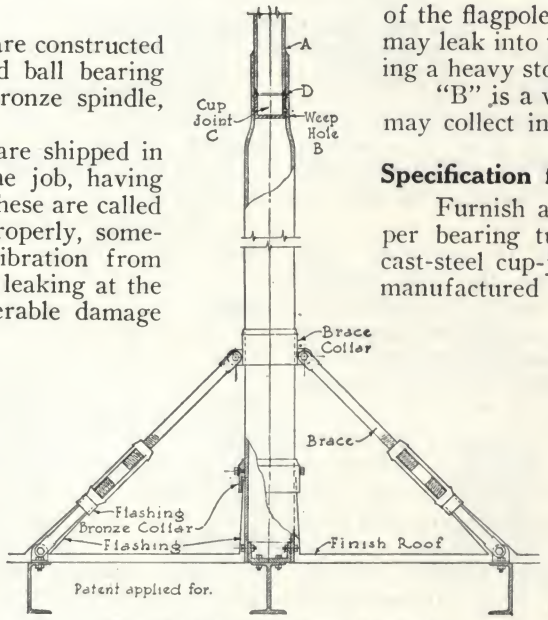
Swaged Sectional Flagpoles are constructed of copper bearing steel, standard ball bearing revolving truck on manganese bronze spindle, cast iron body.

Swaged telescopic flagpoles are shipped in sections and are assembled at the job, having one or two joints to be caulked; these are called field joints and if not caulked properly, sometimes have a tendency, under vibration from heavy storms and winds, to start leaking at the caulked edge "A," doing considerable damage to the interior of the building or foundation upon which it is placed.

To overcome this we have perfected a cup-joint made of cast-steel inserted into the pipe. The pipe is then hydraulically pressed around it and the fins "D" are forced into the pipe, making a tight joint.

The cup-joint acts as a rest collar for the upper section of the flagpole and also prevents any water that may leak into the pole at caulking edge "A" during a heavy storm or wind if improperly caulked.

"B" is a weep hole to allow any water that may collect in the cup joint to drain.



Typical Roof Anchor Type A

Specification for Swaged Sectional Flagpoles

Furnish and erect a swaged sectional copper bearing tubular steel flagpole, fitted with cast-steel cup-joints and all standard fittings as manufactured by the AMERICAN MAST & SPAR CORPORATION. Pole to be .... ft. braced as recommended by them.

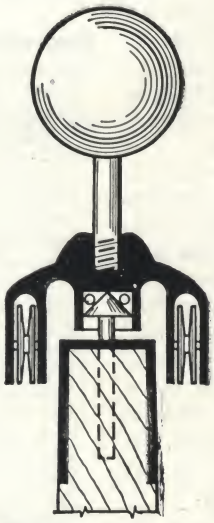
Pole to be fabricated in sections of standard full weight copper bearing steel pipe. Shop joints to be swaged, shrunk, caulked steel to steel. At least one joint of the flagpole to be heated and hydraulically pressed around a steel cup-joint as manufactured by the AMERICAN MAST & SPAR CORPORATION.



Topmast Flagpole with Yardarm

Topmast flagpole with yardarms present a very shipshape appearance and make a striking showing when all penants are flying. Very popular around beach properties and clubs.

Made of copper bearing steel or selected Oregon fir spar timbers, machine turned to true entasis. The Topmast is so made that it can be lowered in stormy seasons and for painting



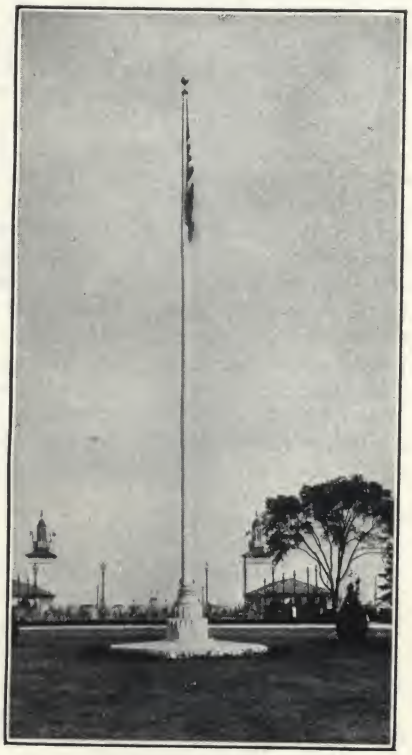
Umbrella Revolving Ball Bearing Truck No. 60

Galvanized cast iron or bronze with bronze roller bearing sheaves for the protection of the top ends of wooden flagpoles of all sizes. Wooden flagpoles will last a lifetime if the top end is protected, by keeping water out of the top. Will also fit steel poles of all sizes. Protect and beautify your flagpoles by specifying an American Mast No. 60 Umbrella Truck

DIMENSIONS

No.	Net length, ft.	Actual length, ft.	Heel diam., in.	Approx. weight, lb.
100	50	55	10	900
101	60	66	12	1500
102	75	82	14	2'00
103	100	110	18	5900
104	125	137	22	8000

Designed and built by spar makers. Prices upon application.



Ground Pole

Made of both wood and copper bearing steel. *Wood* flagpoles are made of selected grade spar timber and *machine turned* to true entasis.

Steel flagpoles are made according to flagpole manufacturers' standard specifications consisting of swaged sectional joints or continuous taper welded.

Prices on application

Continued on next page

American Jr. Complete Unit 20-ft. Flagpole

Including machine turned wood tapered flagpole, 4x6-ft. best bunting flag, finished pole, art stone base, gold leafed ball, lignum-vitae truck, halyard, flag snaps and cleat. Price $35.00 complete delivered within a radius 200 miles of New York, N. Y.

Service Department

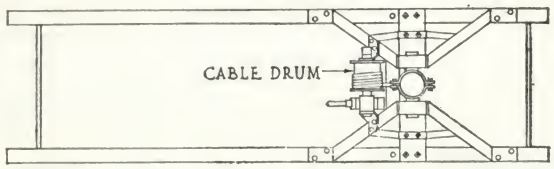
Our Service Department is at your disposal for the solution of flagpole problems.

We would appreciate your consulting us on your individual projects regarding type and height of poles and suitable bracings.

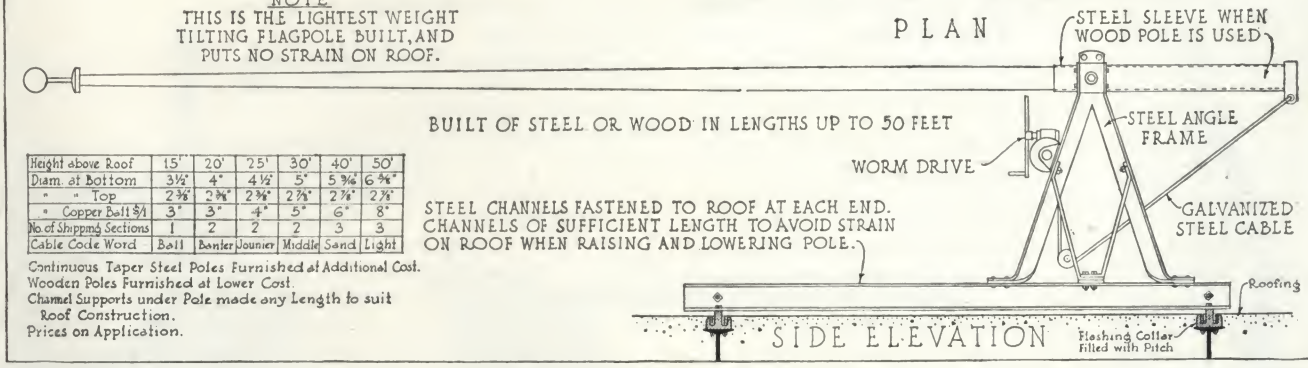
TILTING FLAG POLE UNIT Nº 48

PAT. APPLIED FOR

NOTE
THIS IS THE LIGHTEST WEIGHT TILTING FLAGPOLE BUILT, AND PUTS NO STRAIN ON ROOF.



PLAN

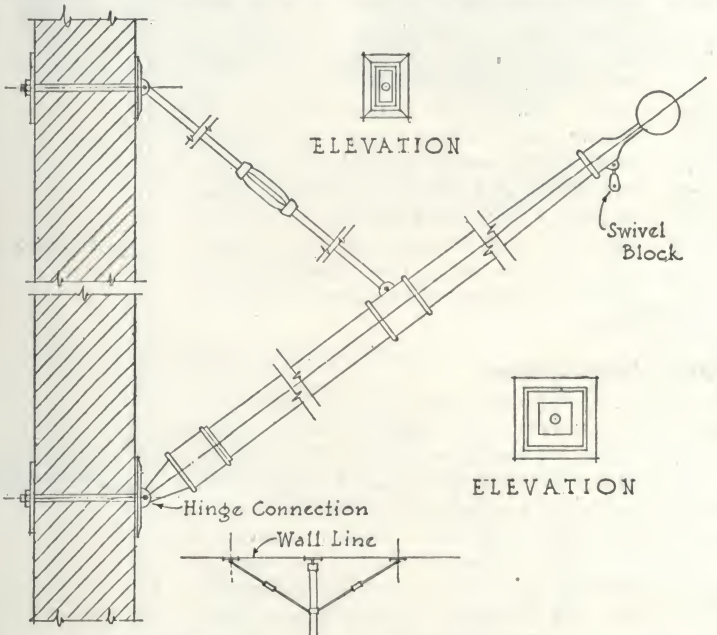


SIDE ELEVATION

Height above Roof	15'	20'	25'	30'	40'	50'
Diam. at Bottom	3½"	4"	4½"	5"	5 9/16"	6 9/16"
" " Top	2 3/8"	2 3/8"	2 3/8"	2 7/8"	2 7/8"	2 7/8"
" Copper Ball $/1	3"	3"	4"	5"	6"	8"
No. of Shipping Sections	1	2	2	2	3	3
Cable Code Word	Ball	Banter	Jounier	Middle	Sand	Light

Continuous Taper Steel Poles Furnished at Additional Cost.
Wooden Poles Furnished at Lower Cost.
Channel Supports under Pole made any Length to suit Roof Construction.
Prices on Application.

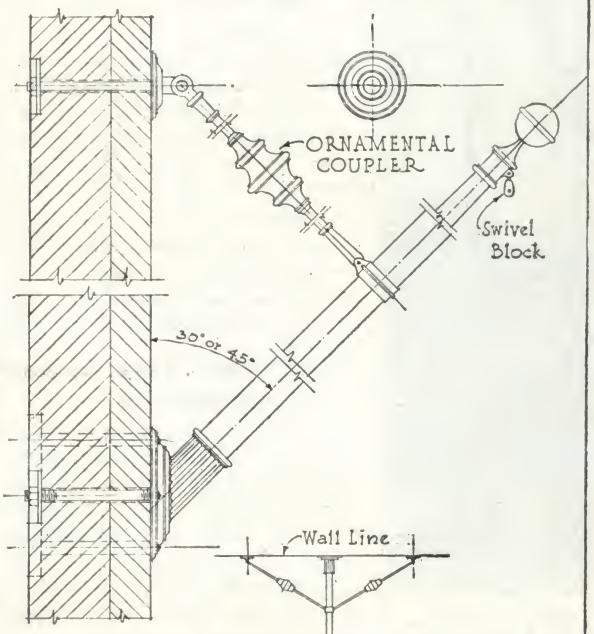
CONTINUOUS TAPERED AND SWAGED COPPER BEARING STEEL FLAG POLES WITH ENTASIS-ALSO AMBRAC ALUMINUM & WOOD POLES



SECTION THRU WALL SHOWING ANCHORING

PLAN SHOWING BRACES

INSTALLATION Nº 60



SECTION THRU WALL SHOWING ANCHORING

PLAN SHOWING BRACES

INSTALLATION Nº 385

NOTES

When ordering be sure to specify type.
Pipe ferrules are to be imbedded in the wall when erecting New Buildings to take the Flagpole and Brace Bolts.
Prices of "Bronze" Flagpoles complete per this arrangement furnished on application.
One set of Silver Lake A-10 Cotton braided halyards (not illustrated) furnished with each complete pole.

TYPE	LIGHT						HEAVY						EXTRA HEAVY					
LENGTH IN FEET	16	18	20	22	25	30	16	18	20	22	25	30	16	18	20	22	25	30
DIAMETER AT TOP	1½"	1½"	1½"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2½"
DIAMETER AT BUTT	2 7/8"	2 7/8"	2 7/8"	3½"	4"	4½"	3½"	3½"	3½"	4"	4½"	5"	4"	4"	4"	4½"	5"	5 9/16"

ESTABLISHED 1909

BABCOCK-DAVIS CORPORATION

Manufacturers of Steel Flagpoles

474 Dorchester Avenue
BOSTON, MASS.

For Mortuary Racks and Stairs, see Manufacturers' Index

BABCOCK-DAVIS EASY ACCESS POLE

Its Construction and Advantages

Patented April 10, 1928, No. 1665535



25-ft. B-D Pole, H. P. Hood Co. Building, Charlestown, Mass.

Principle of the Easy Access Pole Design

It is designed to overcome the expense and difficulty often experienced in replacing fouled and broken halyards as well as making it easy to erect and paint at all times. Every pole should be thoroughly inspected at least once a year. No steeplejack is required to do this with the Easy Access pole as one man can raise or lower the pole in a few minutes. Operating a worm gear by a ratchet wrench raises or lowers the pole or holds it stationary at any angle desired, making it possible to incline pole over a parapet.

Economy

The saving in erection together with a yearly inspection and painting will offset the additional cost over that of the plainest type of pole.

It is readily installed on all types of frame or fireproof roof construction or for grade installations in grounds of schools, public buildings, parks, private estates, etc. For grade installation, a monumental cast iron or bronze base can be supplied to cover the operating mechanism, to which tablets or inscriptions can be attached.

The Patented Easy Access Base Construction

One of the principal features of the base is that the base plate and braces are integral and installed as one. By this method no special requirements for long braces or extra flashings are required. The comparatively small and inconspicuous base is set on an island raised above the roof as shown in the details on the following pages and is built in with the roof construction.

The base also contains the worm which operates the gears of the quadrant on the bottom of pole when worm is turned by removable ratchet wrench supplied with pole.

The heavily galvanized base plate is punched to receive anchor bolts installed according to shop drawings supplied by us. It is set in plastic cement and bolted to roof construction, then roofing material is carried over it and thoroughly flashes the base.

The island type of construction which we use with our poles is the most advanced method of setting flag poles and it is readily seen why there has never been a leaky roof where one of our bases is installed.

We do not furnish the anchor bolts as they can be purchased locally much cheaper than we can furnish them.

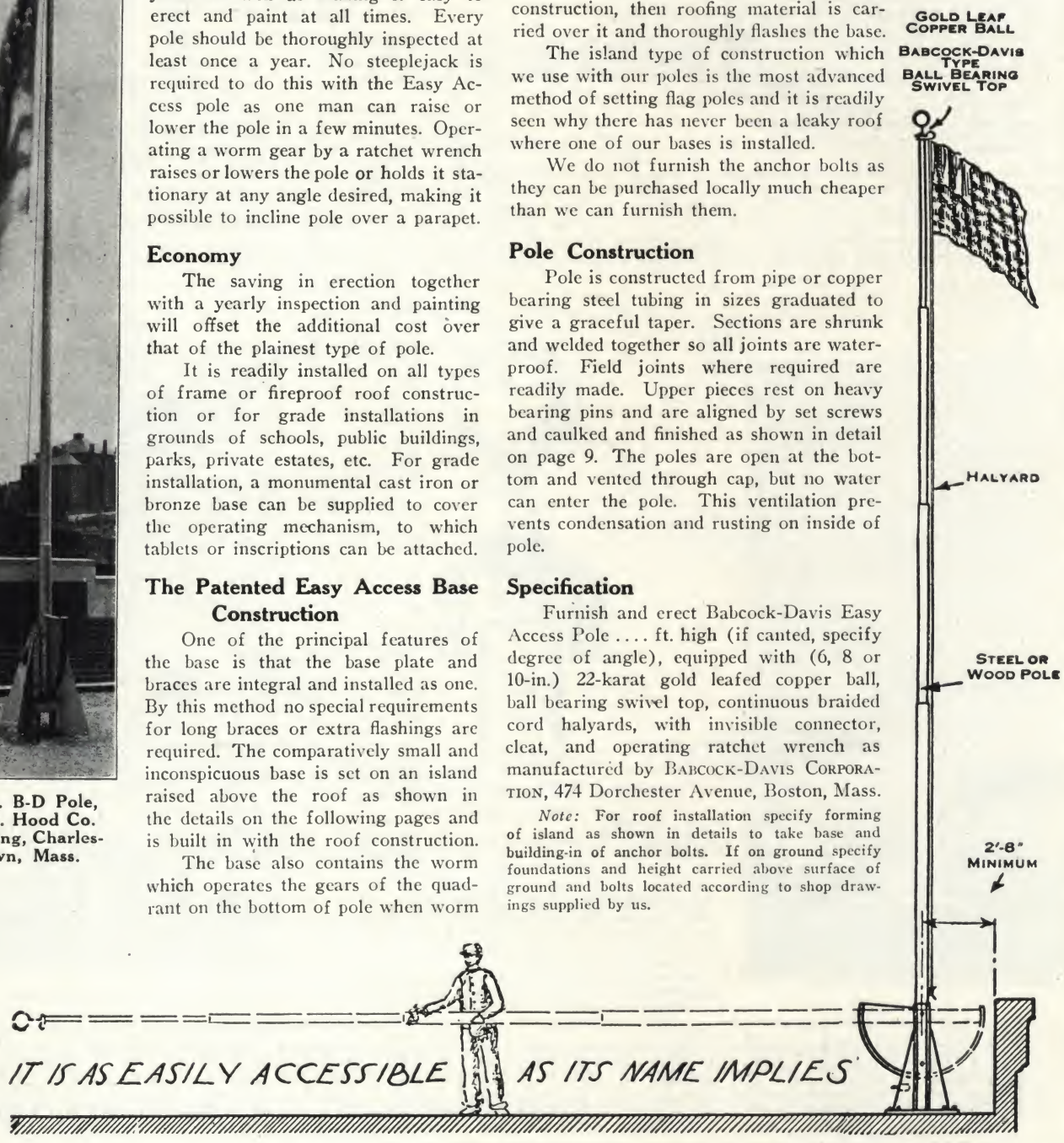
Pole Construction

Pole is constructed from pipe or copper bearing steel tubing in sizes graduated to give a graceful taper. Sections are shrunk and welded together so all joints are waterproof. Field joints where required are readily made. Upper pieces rest on heavy bearing pins and are aligned by set screws and caulked and finished as shown in detail on page 9. The poles are open at the bottom and vented through cap, but no water can enter the pole. This ventilation prevents condensation and rusting on inside of pole.

Specification

Furnish and erect Babcock-Davis Easy Access Pole .... ft. high (if canted, specify degree of angle), equipped with (6, 8 or 10-in.) 22-karat gold leafed copper ball, ball bearing swivel top, continuous braided cord halyards, with invisible connector, cleat, and operating ratchet wrench as manufactured by Babcock-Davis Corporation, 474 Dorchester Avenue, Boston, Mass.

Note: For roof installation specify forming of island as shown in details to take base and building-in of anchor bolts. If on ground specify foundations and height carried above surface of ground and bolts located according to shop drawings supplied by us.



Continued on next page

STANDARD SIZES AND EQUIPMENT OF EASY ACCESS POLES

The standard sizes of the Easy Access Poles are illustrated below. Sizes 20, 25, 30, 35, 40 and 50 ft. are carried in stock, other lengths are made to order and shipped on short notice.

The poles and bases are finished with one coat of red lead and two coats of aluminum paint. The base plate is heavily galvanized, which prevents any chance of rusting after it is flashed in with the roofing. The entire pole can be supplied galvanized at a slight increase in price.

Standard Equipment

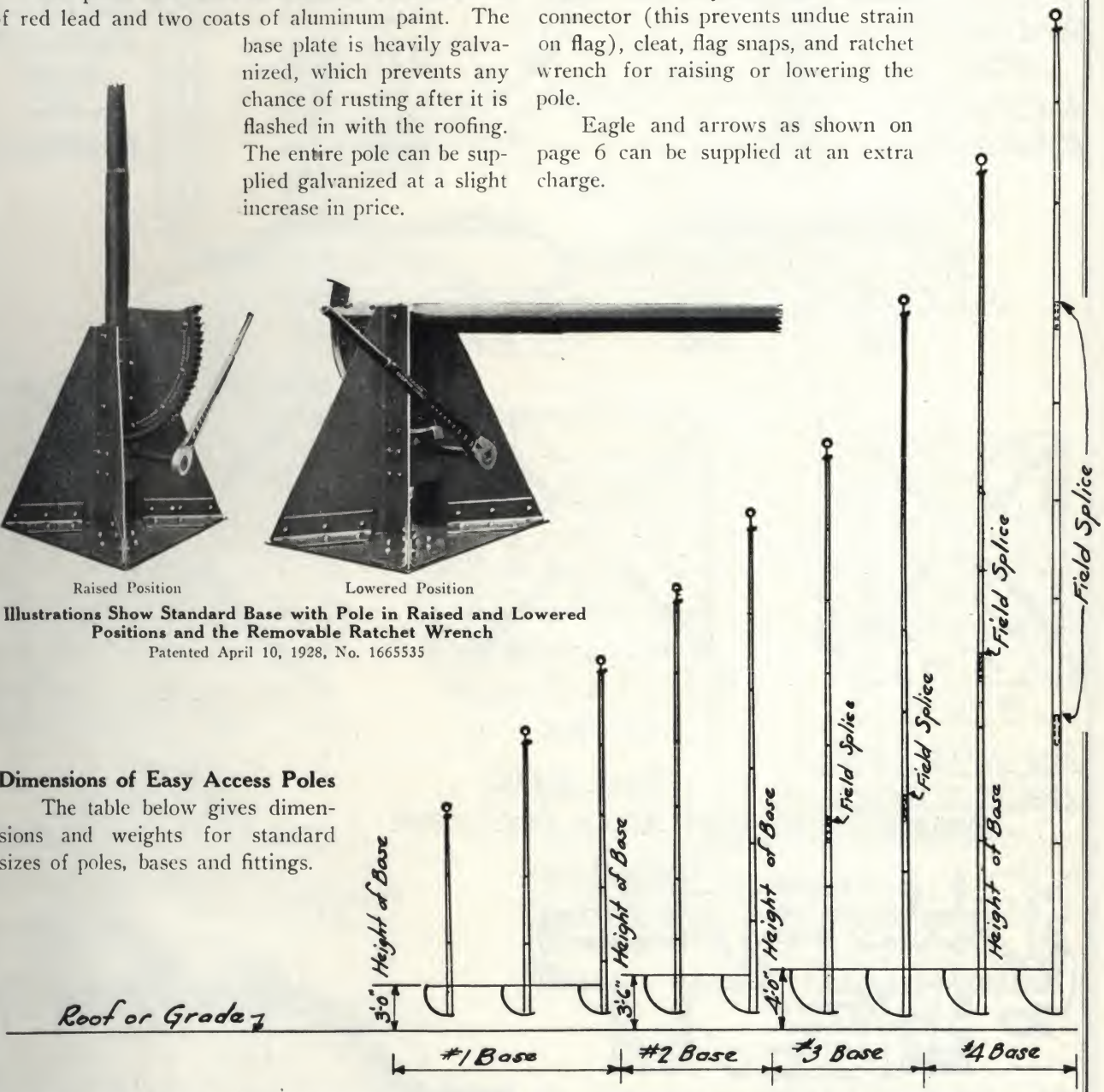
All Easy Access poles are equipped with 22-karat gold leafed copper ball, in 6, 8 or 10-in. size, B-D ball bearing swivel top, continuous braided cord halyards with invisible connector (this prevents undue strain on flag), cleat, flag snaps, and ratchet wrench for raising or lowering the pole.

Eagle and arrows as shown on page 6 can be supplied at an extra charge.

Raised Position Lowered Position

Illustrations Show Standard Base with Pole in Raised and Lowered Positions and the Removable Ratchet Wrench

Patented April 10, 1928, No. 1665535



Dimensions of Easy Access Poles

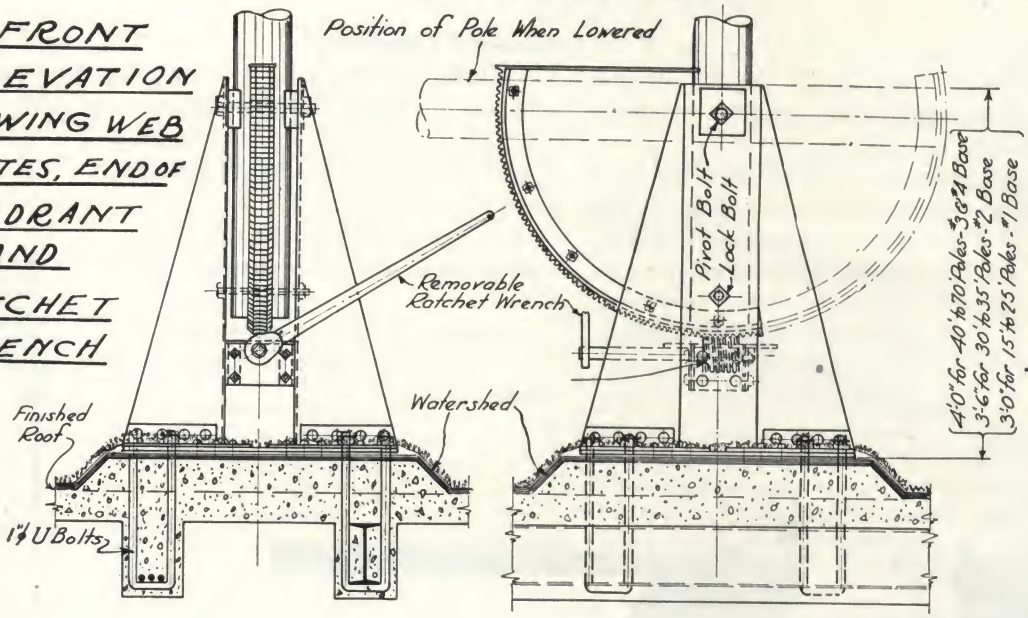
The table below gives dimensions and weights for standard sizes of poles, bases and fittings.

Height Above Roof or Grade	15'	20'	25'	30'	35'	40'	50'	60'	70'
Outside Dia. of Top Section	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 7/8"	2 7/8"	2 7/8"	2 3/8"
Outside Dia. of Bottom Section	3 1/2"	4"	4 1/2"	5"	5"	6 5/8"	6 5/8"	7 5/8"	7 5/8"
Dia. of Gold Leafed Copper Ball	6"	6"	6"	6"	6"	8"	8"	10"	10"
Weight of Pole	100	160	210	305	335	650	775	1225	1425
Weight of Base & Quadrant	350	350	350	475	475	775	775	1250	1250
Total Shipping Weight	450	510	560	780	810	1425	1550	2475	2675
Number of Shipping Sections of Pole	One	One	One	One	One	2	2	2	3

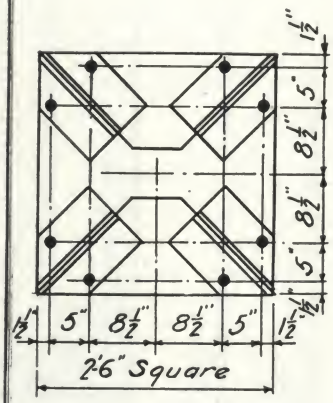
Continued on next page

STANDARD ANCHORAGE FOR ROOF INSTALLATIONS ON CONCRETE SLABS OR STEEL

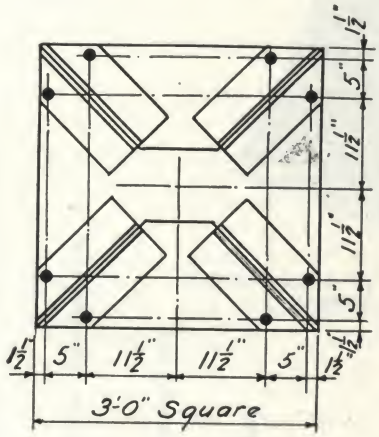
FRONT ELEVATION SHOWING WEB PLATES, END OF QUADRANT AND RATCHET WRENCH



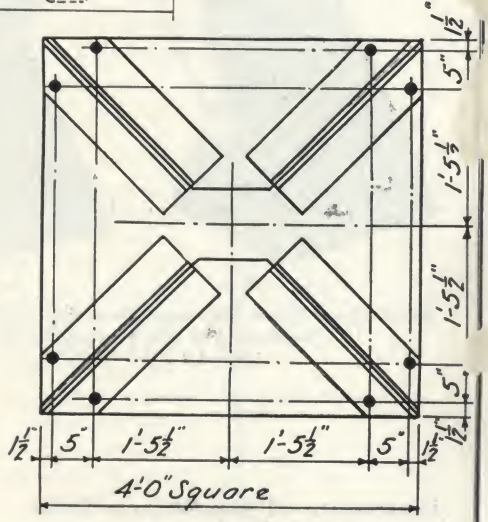
SIDE ELEVATION SHOWING SIDE OF QUADRANT



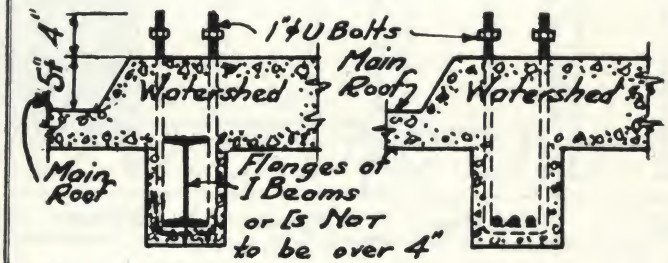
NOS. 1 AND 2 BASE FOR 15 TO 35-FT. POLES

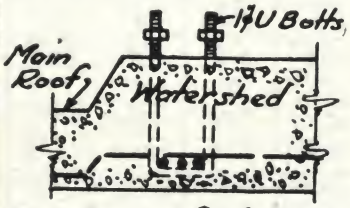


NO. 3 BASE FOR 40 TO 50-FT. POLES

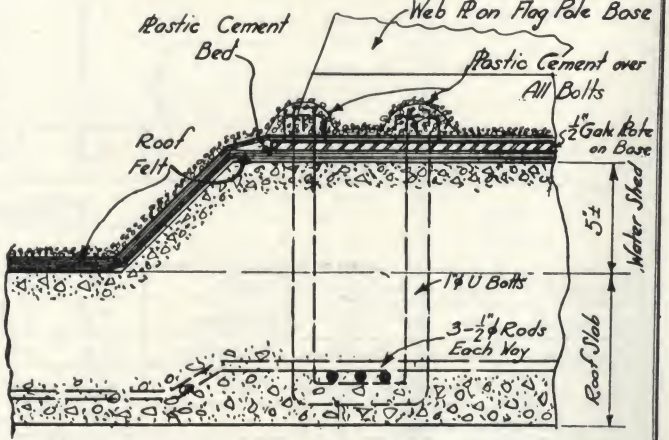


NO. 4 BASE FOR 60 TO 70-FT. POLES





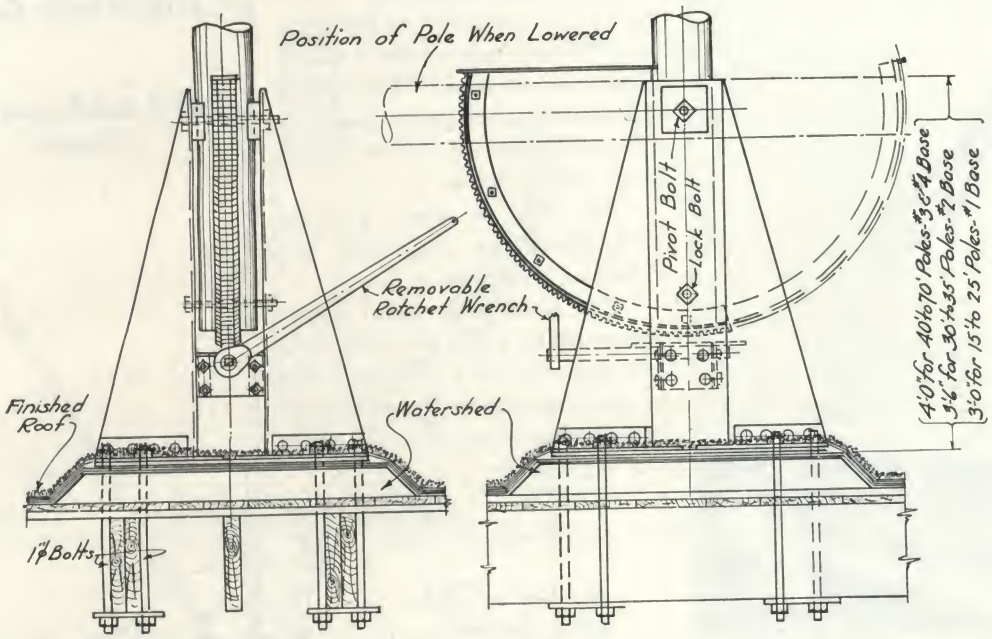
PLANS SHOWING SPACING OF BOLTS FOR BOLTING TO ROOF



1½-IN. SCALE DETAILS SHOWING METHOD OF SECURING ANCHOR BOLTS TO CONCRETE ROOF CONSTRUCTION

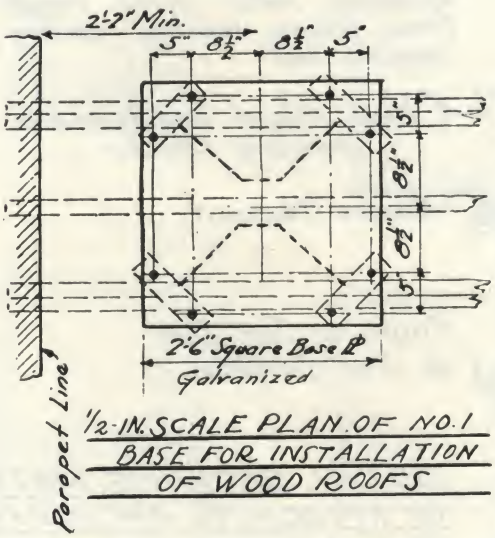
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STANDARD ANCHORAGE FOR ROOF INSTALLATIONS OF B-D EASY ACCESS POLES ON WOOD ROOF CONSTRUCTION

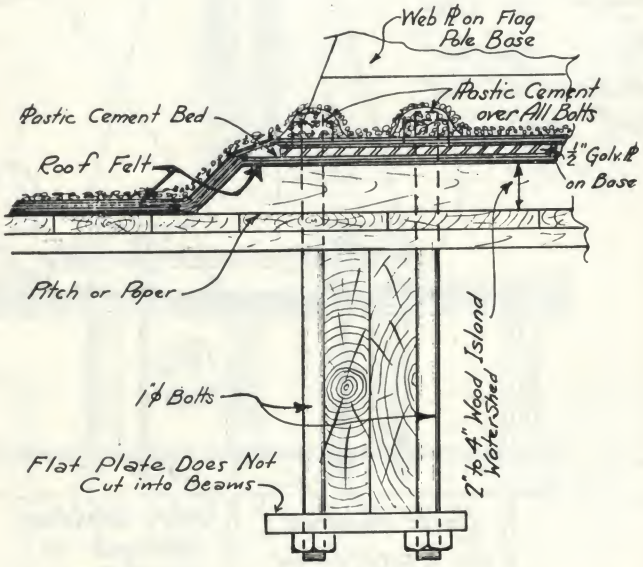


The anchorage and position of bolts for securing the base to wood roof construction is the same as that shown on page 3 for concrete construction. A wooden platform or island should be constructed as shown in detail below and the base plate placed on this. The anchor bolts should be installed at the side of the bearing timbers as shown, using a flat plate under the timbers and using two bolts instead of the U-bolt, as used for concrete. The plate prevents cutting into the timbers. The tops of the bolts are carried above the base plate and covered with plastic cement. In case of shrinkage of the wooden timbers the nuts are easily accessible and can be tightened as required.

The weights of bases and flagpoles are given in the table on page 2.



½-IN. SCALE PLAN OF NO. 1 BASE FOR INSTALLATION OF WOOD ROOFS



1½-IN. SCALE DETAIL SHOWING BOLTING OF BASE PLATE TO WOOD BEAM AND WATERSHED

Continued on next page

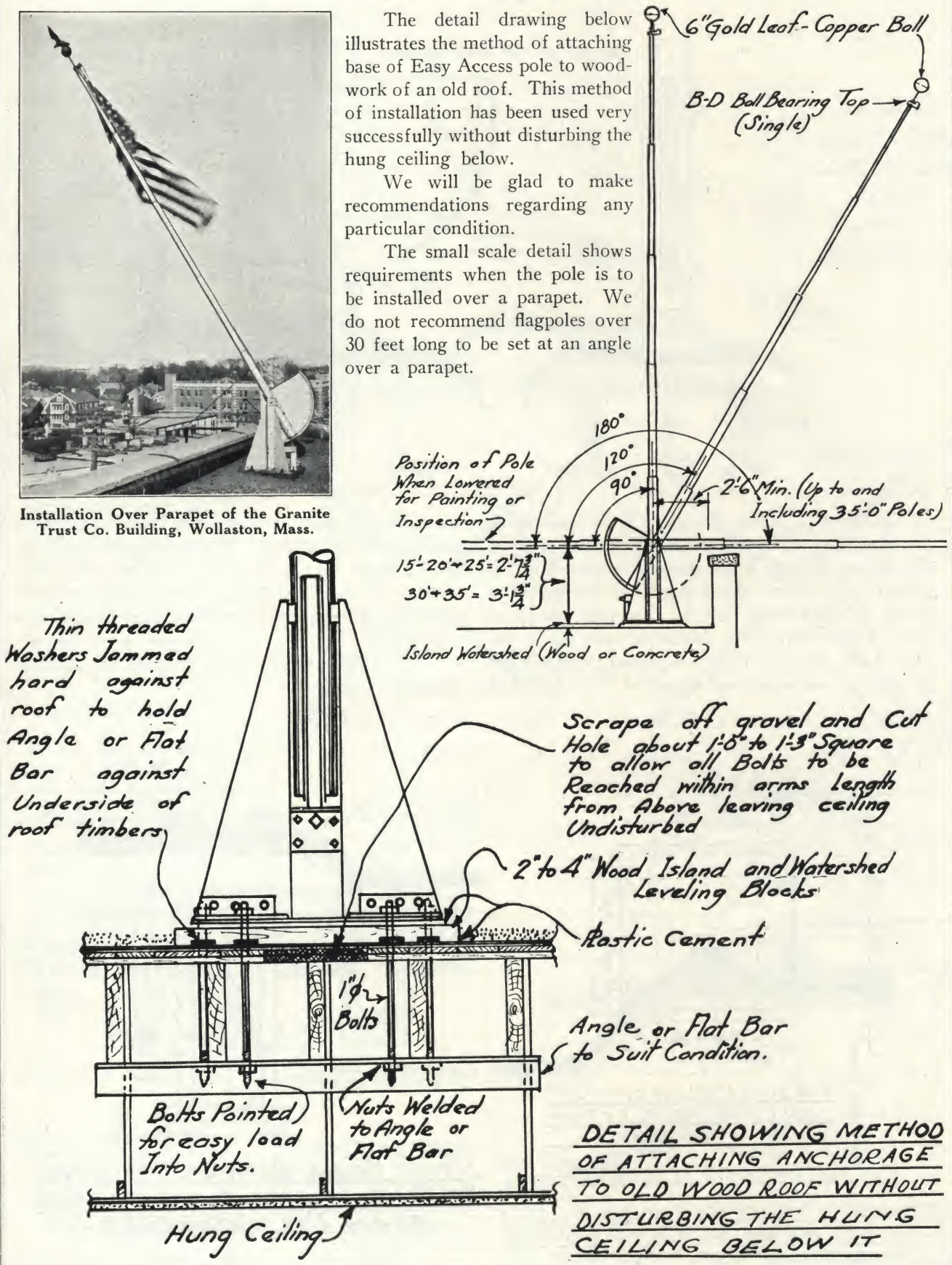
METHOD OF ANCHORING BABCOCK-DAVIS EASY ACCESS POLES TO OLD BUILDINGS WITH WOOD ROOFS

Installation Over Parapet of the Granite Trust Co. Building, Wollaston, Mass.

The detail drawing below illustrates the method of attaching base of Easy Access pole to woodwork of an old roof. This method of installation has been used very successfully without disturbing the hung ceiling below.

We will be glad to make recommendations regarding any particular condition.

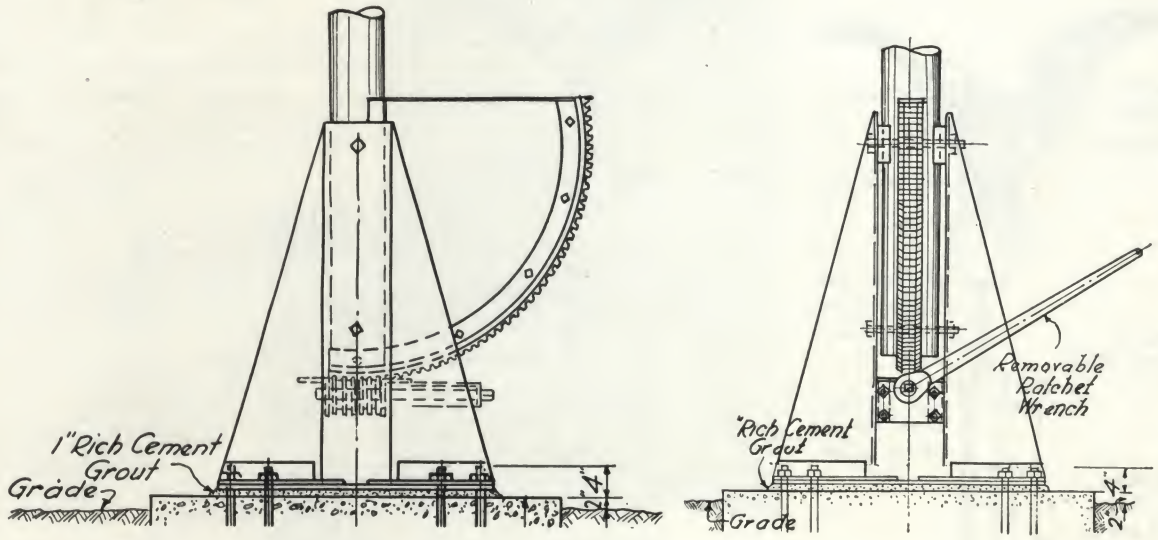
The small scale detail shows requirements when the pole is to be installed over a parapet. We do not recommend flagpoles over 30 feet long to be set at an angle over a parapet.



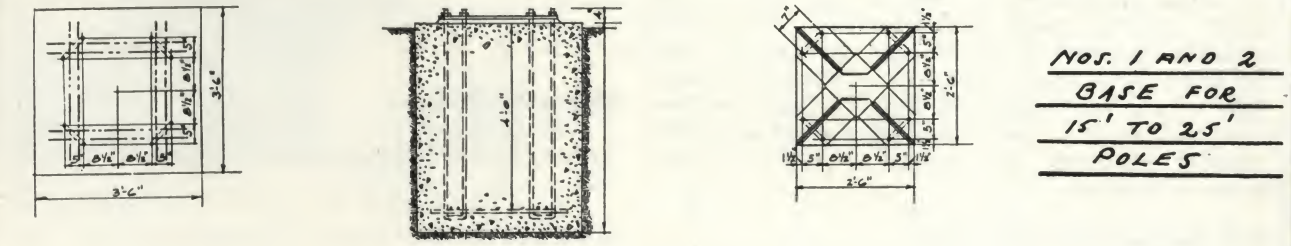
DETAIL SHOWING METHOD OF ATTACHING ANCHORAGE TO OLD WOOD ROOF WITHOUT DISTURBING THE HUNG CEILING BELOW IT

Continued on next page

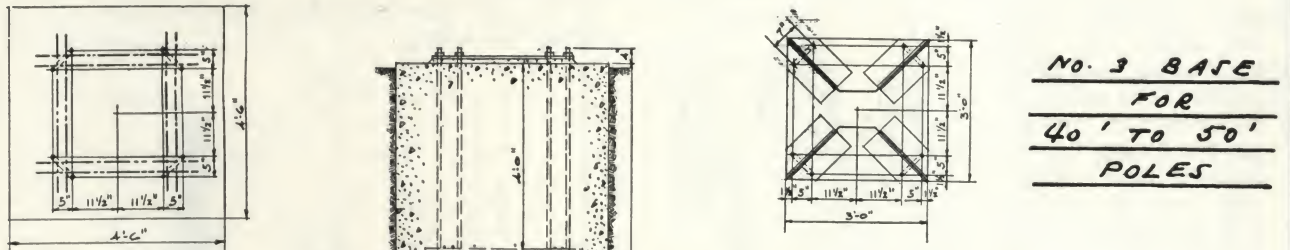
STANDARD FOUNDATIONS FOR GRADE INSTALLATIONS OF EASY ACCESS POLES



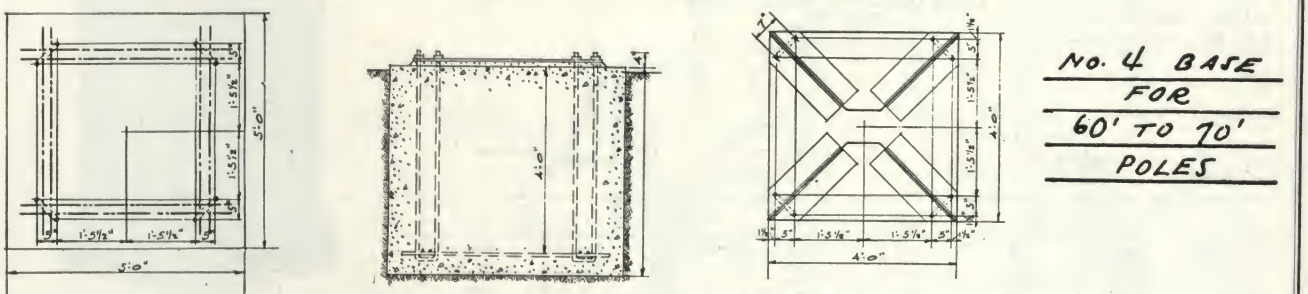
1/4" SCALE ELEVATIONS SHOWING RELATION OF BASE TO GRADE



NOS. 1 AND 2 BASE FOR 15' TO 25' POLES



NO. 3 BASE FOR 40' TO 50' POLES



NO. 4 BASE FOR 60' TO 70' POLES

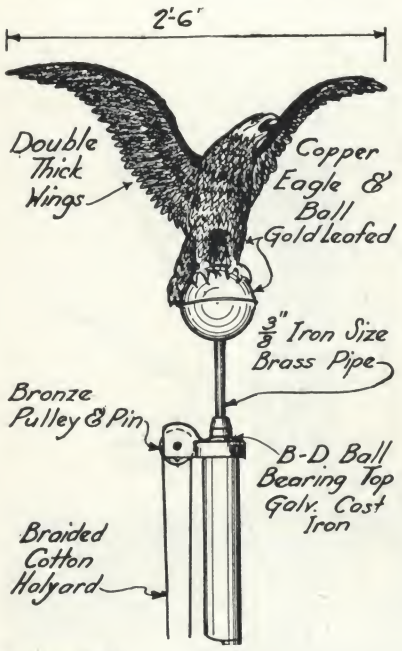
PLAN OF LAYOUT OF REINFORCING RODS

SECTION THROUGH BASE SHOWING POSITION OF ANCHOR BOLTS AND REINFORCING RODS

DETAIL SHOWING PLAN OF PLATE AND BRACE ABOVE GROOVE

Continued on next page

FLAG POLE ACCESSORIES





United States Flags

For use on outside flag staffs. Best quality 2-ply cotton bunting, sewed stars and sewed stripes, made from bunting woven especially for this purpose, constructed along scientific lines, with a view of giving greatest service possible, 13 stripes and 48 stars of mothproof, fast colored material. These flags are made in a superior manner, double stitching throughout, stars stitched on both sides of the union, strong canvas headbands, and large metal grommets for continuous halyards which prevent the flag from ripping. This we believe to be the best flag manufactured for hard wear and cannot be excelled for beauty, quality and durability at any price. Sizes 10x15 ft. and 12x18 ft. have ropes through headbands.

Ornaments

The illustration above is from a photograph of an actual installation of one of our eagles with arrow and the points of the compass. The relief is finely executed in copper and gold leafed with 22 karat gold leaf. Standard equipment consists only of the ball being gold leafed. Eagle weather vane and points of the compass as well as any other type of ornament are supplied on order. Prices given on request.

Stock Sizes of United States Flags

2x3 ft.	6x10 ft.
3x5 ft.	8x12 ft.
4x6 ft.	10x15 ft.
5x8 ft.	12x18 ft.

Monumental Bases

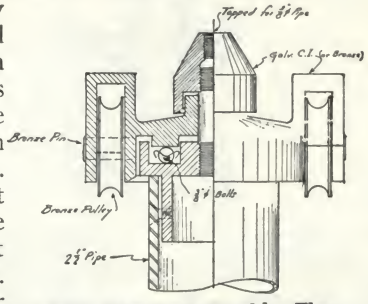
Monumental bases are available for grade installations for schools, public buildings, parks and estates when so desired.

Such installations are bolted to concrete foundations, and the mechanism surrounded with the ornamental base.

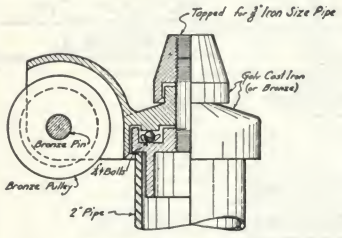
To this base any tablet or inscription can be attached as desired.

Ball Bearing Flag Pole Tops

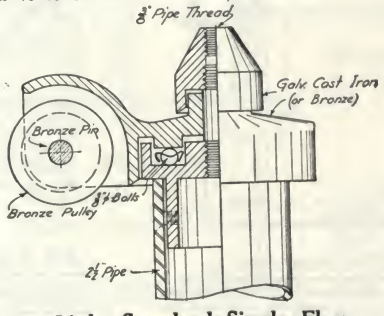
The details of the ball bearing halyard tops show how carefully they are made. The ball bearings are packed in grease. The pulley is of bronze on bronze pin preventing it from freezing in the body. The body is of cast iron galvanized inside and out, and will not rust or deteriorate. They are supplied for either single or double flags as ordered.



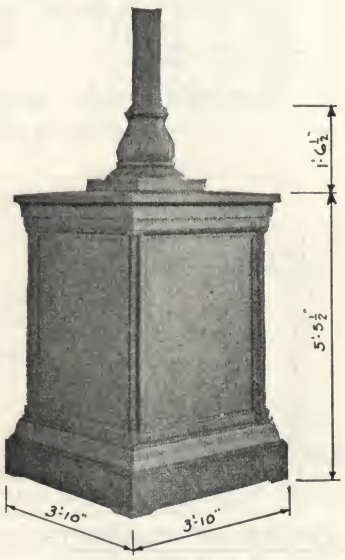
Light Standard Double Flag Pole Top
For poles from 40 to 60 ft.



Standard Flag Pole Top
For poles up to 35 ft.



Light Standard Single Flag Pole Top
For poles from 40 to 60 ft.



Ornamental Base

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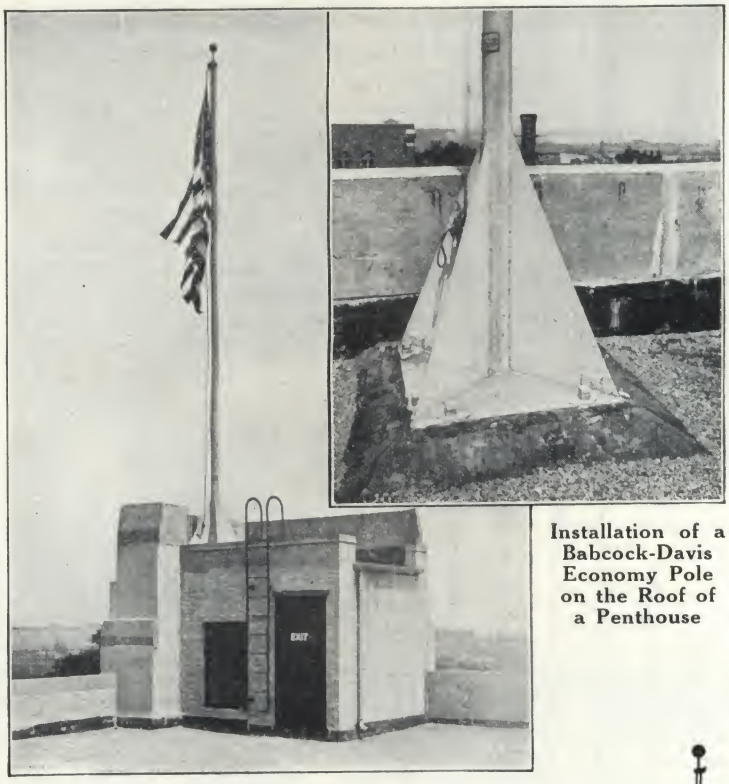
BABCOCK-DAVIS ECONOMY POLES

For Use Where Easy Access Poles Would Not Be Accessible When Lowered

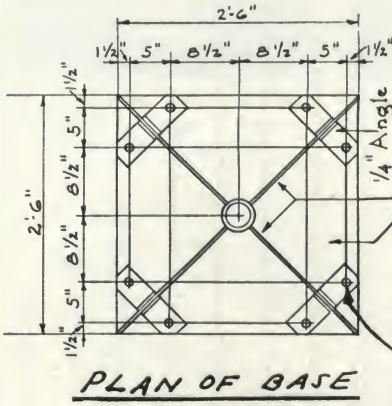
The Economy Pole (patent applied for) has the same principle of advanced, non-leaking base anchorage as the Easy Access Pole but the base plate, braces and bottom of pole are welded in one piece and the pole cannot be lowered. It is designed for terraced or pinnacle buildings, penthouse roofs, etc., where an Easy Access Pole would not be accessible when it was lowered.

It is an inexpensive steel pole for use where cost is one of the first considerations, and is similar in construction and finish to the Easy Access Pole.

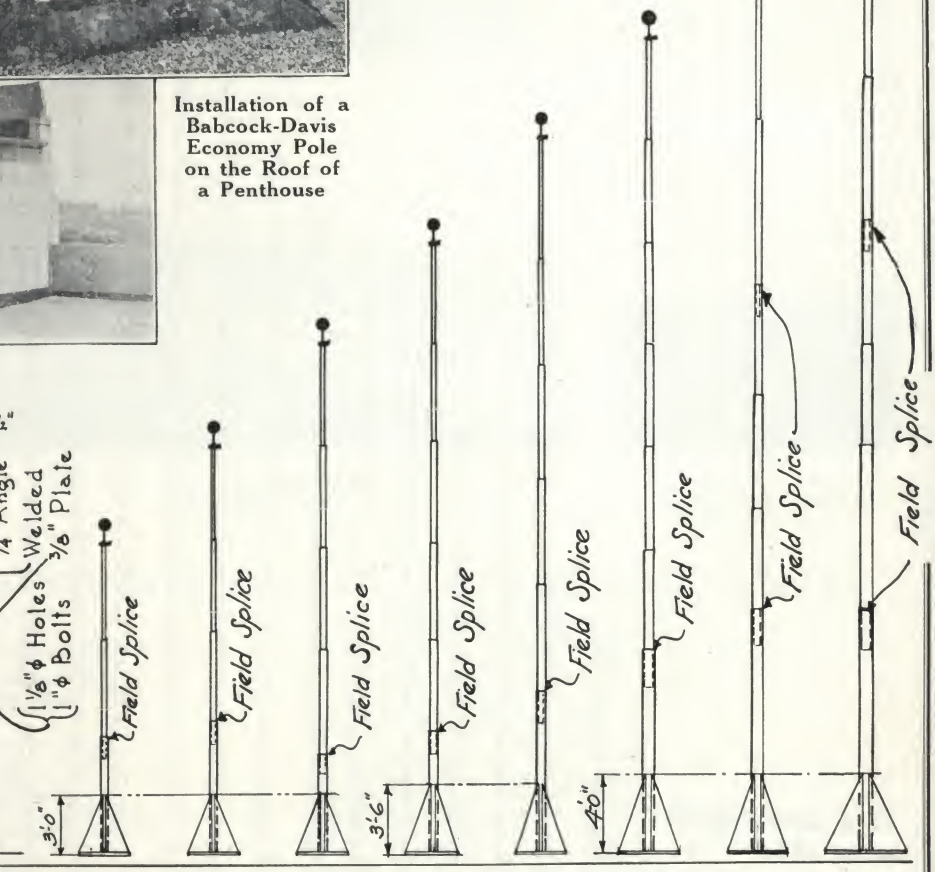
The pole is fully equipped with braided cotton halyards, ball bearing halyard top and a 6, 8, or 10-in., 22-karat gold leafed copper ball. The layout of anchor bolts is the same as that for the Easy Access Pole. (See pages 3 and 4.)



Installation of a Babcock-Davis Economy Pole on the Roof of a Penthouse



PLAN OF BASE



Layout of Anchor Bolts Same as for Easy Access Poles

	#1 Base			#2 Base		#3 Base		#4 Base
Height Above Roof or Grade	15'	20'	25'	30'	35'	40"	50'	60'
Outside Dia. of Top Section	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 3/8"	2 7/8"	2 7/8"	2 7/8"
Outside Dia. of Bottom Section	3 1/2"	4"	4 1/2"	5"	5"	6 5/8"	6 5/8"	7 5/8"
Dia. of Gold Leafed Copper Ball	6"	6"	6"	6"	6"	8"	8"	10"
Weight of Pole & Base	300	360	410	520	550	1020	1140	1965
Number of Shipping Sections	2	2	2	2	2	2	3	3

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BABCOCK-DAVIS GROUND SET POLES

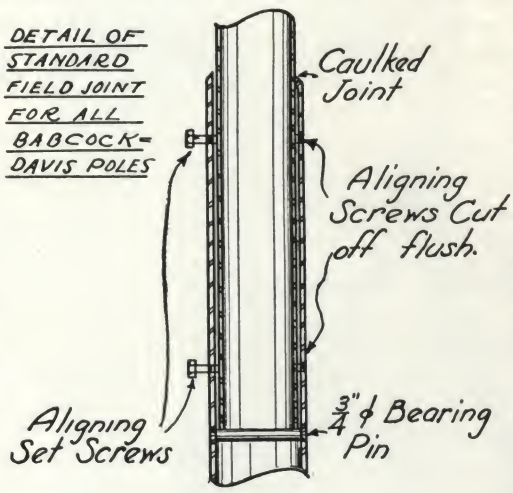
These poles are supplied for use where it is desired to set the pole in concrete without a base such as is used on the Easy Access pole. They do not have the advantage of easy inspection, painting and replacing of halyards as offered by the Easy Access poles. While the first cost is less, the difference is soon made up by increased upkeep cost as they require a steeplejack to make any necessary repairs or to paint them.

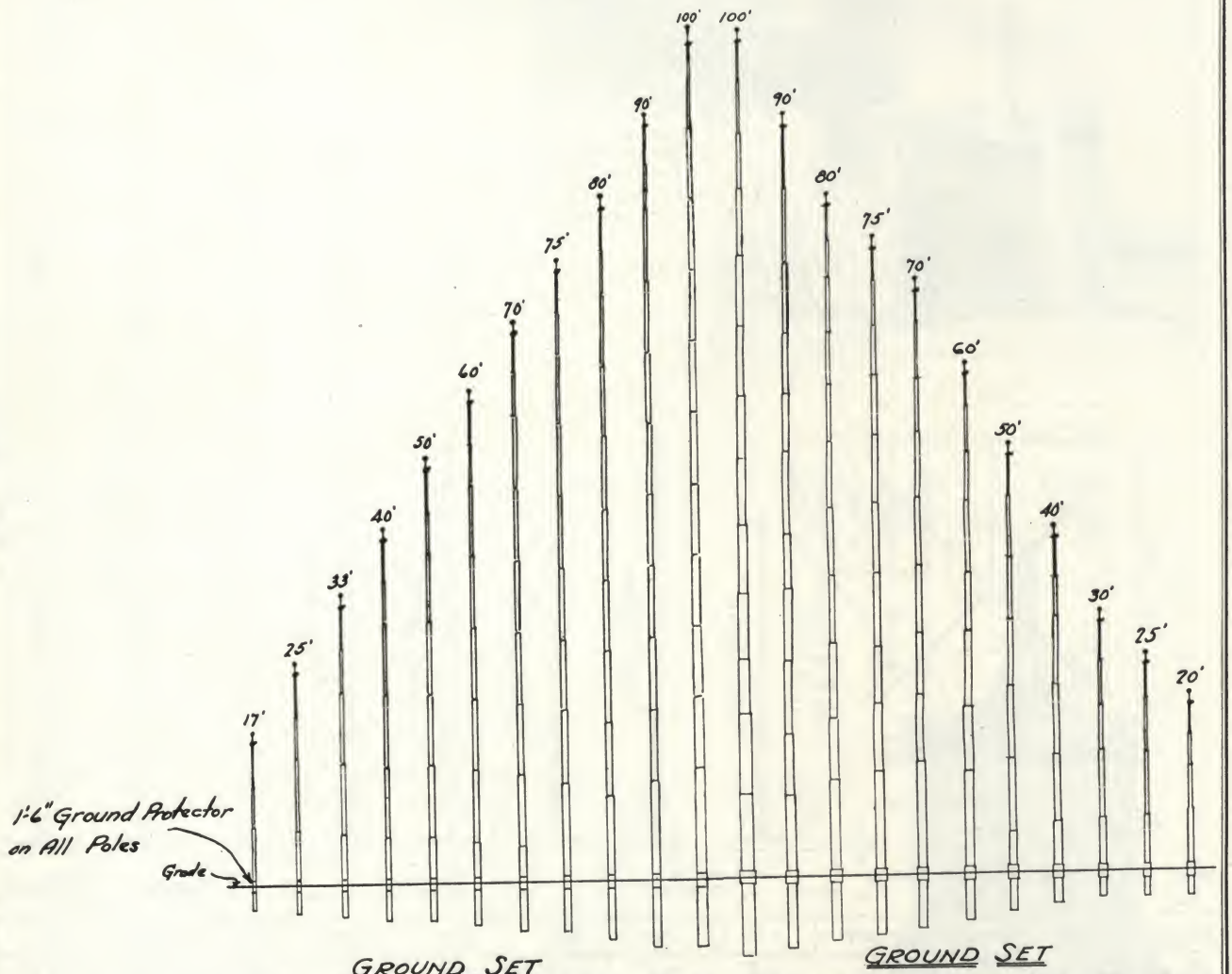
The poles are made of pipe or tubing of graduated sizes with shrunk and welded joints, in two styles—Light Pattern and Heavy Pattern. The heavy pattern is larger in diameter throughout the length.

The difference in size and weight is shown in the table below.

They are also supplied with a ground protector of steel, 1 ft. 6 in. long which is used at the ground level to prevent rusting at this point.

The field joints and construction is the same as for other Babcock-Davis poles. The equipment is the same as for the Economy pole.





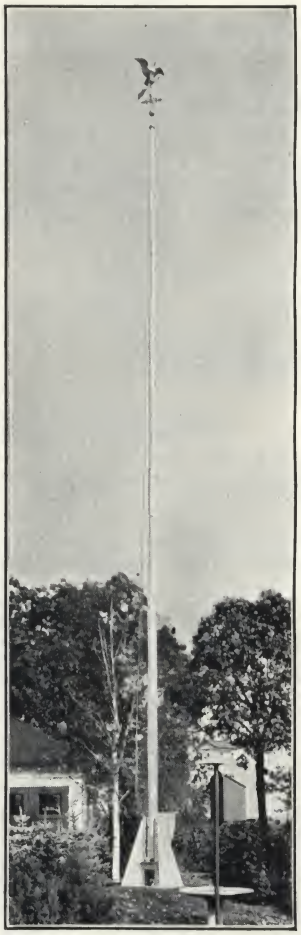
GROUND SET LIGHT PATTERN TUBULAR STEEL FLAG POLES • HEAVY PATTERN TUBULAR STEEL FLAG POLES GROUND SET

Exposed Height above ground (ft.) Total Length	17'×20'	25'×29'	33'×38'	40'×46'	50'×57'	60'×67'	70'×78'	75'×83'	80'×88'	90'×100'	100'×110'	100'×110'	90'×100'	80'×88'	75'×83'	70'×78'	60'×67'	50'×57'	40'×46'	30'×34'	25'×29'	20'×24'
Outside Dia. of Top Section	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 7/8"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"	2 3/4"
Outside Dia. of Butt Section	3 1/2"	4"	4 1/2"	5"	5 5/8"	6 5/8"	7 3/8"	7 5/8"	8 3/8"	9 3/4"	10 1/2"	12 3/4"	11 1/4"	10 1/4"	9 3/8"	8 3/8"	7 3/8"	6 3/8"	5 5/8"	5"	4 1/2"	4"
Dia. of Gold Leaf Copper Ball	6"	6"	6"	6"	8"	8"	8"	8"	8"	10"	10"	10"	10"	8"	8"	8"	8"	8"	6"	6"	6"	6"
Shipping Weight (pounds)	155	260	370	515	715	920	1500	1800	1975	2770	3800	4800	3900	2000	2700	2000	1425	1030	650	420	320	290
Number of Sections Knocked Down	1	1	1	2	2	3	4	4	4	4	4	4	4	4	4	4	3	2	2	1	1	1

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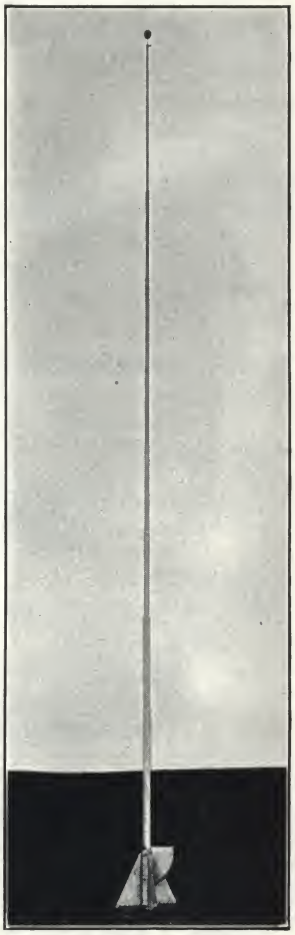
50-ft. Roof Pole on American Bank Building, New Orleans, La.
M. H. Goldstein, Architect



50-ft. Grade Pole at the William Carter Residence, Needham, Mass.



Four 40-ft. Roof Poles on Montgomery Ward Building, Fort Worth, Tex.



70-ft. Grade Pole at Louisville Baseball Grounds, Louisville, Ky.

A FEW INSTALLATIONS OF BABCOCK-DAVIS EASY ACCESS POLES

Cadillac Building, Boston, Mass.
Jewelry Building, Providence, R. I.
Gas & Electric Real Estate Trust Co., Malden, Mass.
High School, Brownsville, Tex.
Hawkins Street Edison Station, Boston, Mass.
A. G. Spalding & Bros., Chicopee, Mass.
Granite Trust Co., Wollaston, Mass.
Montgomery Ward, Fort Worth, Tex.
Malden & Melrose Gas Co., Stoneham, Mass.
Salvation Army Building, Springfield, Mass.
San Angelo Junior College, San Angelo, Tex.
Public Service Building, Boston, Mass.
Buffalo-Ammonia Company, Brooklyn, N. Y.
Board of Water & Light Building, Lansing, Mich.
Brighton Savings Bank, Brighton, Mass.
Toolen High School, Mobile, Ala.
William Carter Residence, Needham, Mass.
S. H. Kress Co., Spartanburg, S. C.
First National Bank, Plainfield, N. J.
John Deere School, East Moline, Ill.
H. P. Hood & Sons, Charlestown, Mass.
Cadillac Garage, Bridgeport, Conn.
Needham National Bank, Needham, Mass.
People's Trust Co., South Norwalk, Conn.
Sunfast Hats Co., East Norwalk, Conn.
S. H. Kress Co., Laredo, Tex.
Star Building, Washington, D. C.
North Station Industrial Building, Boston, Mass.
Flagg Storage Warehouse, Syracuse, N. Y.
State Trade School, Hartford, Conn.
S. H. Kress Co., Wichita, Kan.
Brooks Transfer Co., Richmond, Va.
American Bank Building, New Orleans, La.
Plymouth National Bank, Plymouth, Mass.
First National Bank, Salem, Ohio
First National Bank, Mamaroneck, N. Y.
Montauk Yacht Club, Montauk, N. Y.
Asbury Park Theatre, Asbury Park, N. J.
S. H. Kress Co., Elizabethton, Tenn.
Leland Parker Hotel, Minot, N. D.
Green Acres Farm, North Madison, Conn.
S. H. Kress Co., Tampa, Fla.
Edison Garage, Hyde Park, Mass.
First National Stores, Hartford, Conn.
West Albany School, Albany, N. Y.
S. H. Kress Co., Montgomery, Ala.
St. Patrick's School, Stoneham, Mass.
Sawyer Lumber Co., Worcester, Mass.
Abraham & Strauss Department Store, Brooklyn, N. Y.
Swift & Co., Kansas City, Kan.
State Armory, New Haven, Conn.
Louisville Baseball Grounds, Louisville, Ky.
Beverly Gas & Electric Co., Beverly, Mass.
Municipal Building, Coraopolis, Pa.
Monroe Township School, Continental, Ohio
Schaefer Warehouse, Stamford, Conn.
R. I. Hospital Trust Co., Woonsocket, R. I.
Negro Y. M. C. A., Dallas, Tex.
Dreyfuss & Sons Store, Dallas, Tex.
Savings Bank of Newport, Newport, R. I.
S. H. Kress Co., Colorado Springs, Colo.
Armory, Dover, N. H.
S. H. Kress Co., Pueblo, Colo.
School, St. Augustine's Group, Washington, D. C.
District Court Building, Springfield, Mass.
Scotia Street Edison Station, Boston, Mass.
James Webb Store, Grand Island, Neb.
Everett Savings Bank, Everett, Mass.
Ohio Bell Telephone Co., Dayton, Ohio
First National Bank, Lindenhurst, L. I., N. Y.
Herald Building, Boston, Mass.
Edison Office Building, Boston, Mass.

THE POLE AND TUBE WORKS, INC.

(Incorporated 1918 to Succeed Pole Department of John Simmons Co., Originators of Tubular Flag Poles)

TELEPHONES
WAVERLY 2-3808
2-3889

230 Pacific Street
NEWARK, N. J.

CABLE ADDRESS
POLETUBE

Products

FLAG POLES of copperalloy steel, bronze and white metals. *Swaged Type*—Graduated with swaged telescoped and shrunk joints. *Continuous Taper Type*—Actually tapered with entasis—no visible joints.

CAST IRON or BRONZE PEDESTALS.

WINDOW or OUTRIGGER POLES and SETTINGS.

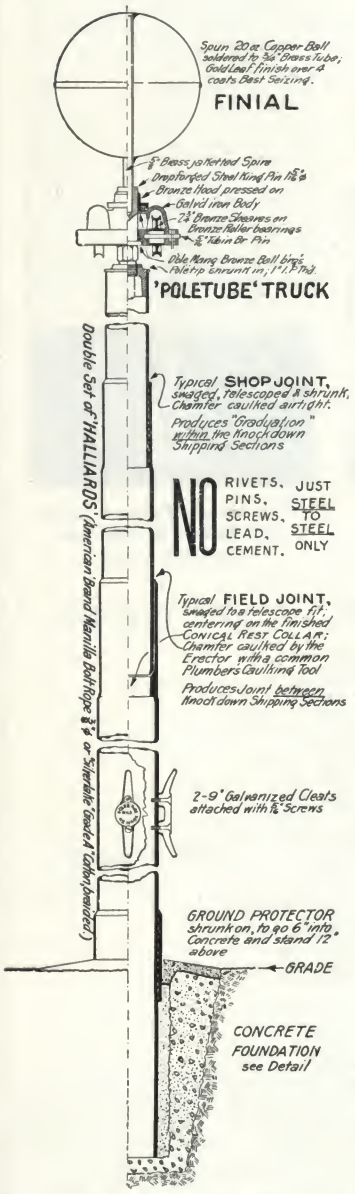
RADIO MASTS and KINDRED PRODUCTS.

Service by 25 Years' Specialization

If you will send us a rough sketch showing requirements, we will gladly submit suggestions and sketches for installation, saving your time and assuring first class work and lowest consistent prices. No obligation involved.

SWAGED POLES FOR GROUND SETTING (COMPLETELY TRIMMED)

Copperalloy Steel, Bronze or White Metals



Essential Features of a Ground Set Swaged Steel Flag Pole

Finial

The ball finial may be changed to an eagle, a vane, or to special designs.

Trucks

"Poletube" Type—For pole tip 3½ in. or smaller; 7-in. diameter; 1-in. pipe thread.

"Simmons" Type—For pole tip 4 to 5½ in.; 9-in. diameter; 1½-in. pipe thread; 4-in. sheaves. Otherwise similar to "Poletube" type.

Giant Type—For pole tip 5¾ to 10 in. Made in bronze only.

Pedestals

For detailed information concerning pedestals see third following page.

Stock Poles

Stock poles are available in three weights:

Standard — Designed to building departments' and general Government specifications.

Light Pattern—Designed for all wind conditions and perfect climbing safety.

Extra Heavy—Designed for appearance more similar to wood poles.

Note: Second hand and mill rejected pipe, cheap inefficient construction by riveting, welding, etc., having been employed in imitating our product, we refuse to sell any of our pole fittings separately. Many such cheaply fabricated poles have failed and our fittings on the wreckage would identify the product as ours.

GROUND SET SWAGED STEEL POLES
(Fully trimmed for erection as illustrated)

Exposed height, ft.	Foundation depth, ft.	Total length, ft.	Diameter, in. Butt	Top	Ball	Shipping weight, lb.
Standard						
20	3	23	4	2 3/8	5	218
25	3½	28½	4½	2 3/8	5	314
30	3½	33½	5	2 3/8	6	405
40	4	44	5 9/16	2 7/8	6	593
50	5	55	6 5/8	2 7/8	8	800
60	6	66	7 5/8	2 7/8	8	1200
70	7	77	8 5/8	2 7/8	8	1600
75	7½	82½	9 5/8	2 7/8	10	1960
80	8	88	10 3/4	2 7/8	10	2410
90	9	99	11 3/4	2 7/8	10	2840
100	10	110	12 3/4	2 7/8	12	3600
125	12	137	14	2 7/8	14	5414
Light Pattern						
17	3	20	3½	2 3/8	5	145
25	3½	28½	4	2 3/8	5	242
33	4	37	4½	2 3/8	6	360
41	4½	45½	5	2 3/8	6	502
49½	4½	54	5 9/16	2 3/8	6	653
57½	5	62½	6 5/8	2 3/8	8	850
65½	6	71½	7 5/8	2 3/8	8	1100
73	6	79	7 5/8	2 3/8	8	1310
80	7	87	8 5/8	2 3/8	8	1625
90	8	98	9 5/8	2 3/8	10	2100
100	8	108	10 3/4	2 3/8	10	2600
Extra Heavy						
25	3½	28½	5	2 7/8	6	380
30	3½	33½	5 9/16	2 7/8	6	498
35	4	39	6 5/8	3½	8	716
40	5	45	7 5/8	3½	8	960
47	6	53	8 5/8	3½	8	1212
55	6	61	9 5/8	3½	8	1661
62	7	69	10 3/4	3½	10	1950
70	7	77	11 3/4	4*	10	2612
77	8	85	12 3/4	4*	12	3183
85	8	93	14	4*	12	4260
90	10	100	15	4*	14	4932
100	10	110	16	4*	14	5870

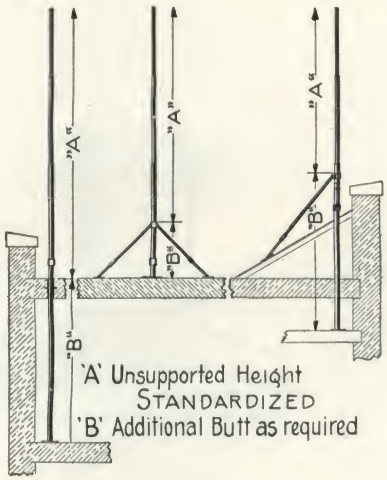
Note: Poles are shipped with least possible *field joints* according to conditions.

*Takes "Simmons" Type Truck.

Continued on next page

SWAGED POLES FOR ROOF SETTING

Copperalloy Steel, Bronze or White Metals



Typical Installations

The several different methods of setting roof poles, braced or penetrating the roof, and the varying types of roof construction, prevent standardization beyond fixing a minimum bending resistance at the uppermost point of support as shown in the accompanying sketch.

For perfect safety we recommend the following diameters (bending resistance) for swaged roof poles at the *uppermost* support:

STANDARD ROOF POLES

Exposed or unsupported height of pole.....ft.	15	20	25	30	40	50	60	70	80	90	100	125	150
Standard diameter at uppermost support.in.	3½	4	4½	5	5 9/16	6 5/8	7 5/8	8 5/8	10 3/4	11 3/4	12 3/4	14	16
Tip diameter.....in.	2 3/4	2 3/4	2 3/4	2 7/8	2 7/8	2 7/8	2 7/8	2 7/8	2 7/8	2 7/8	2 7/8	2 7/8	2 7/8

EXTRA HEAVY ROOF POLES

(Recommended for use where greater similarity to wood pole diameters is desired)

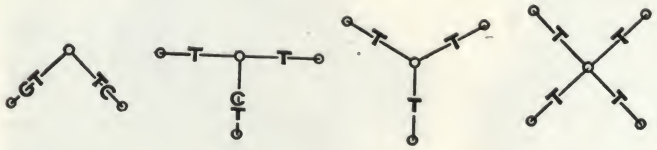
Unsupported or exposed height—not less than.....ft.	20	25	30	35	43	51	59	67	75
Extra heavy pole, diameter...in.	5	5 9/16	6 5/8	7 5/8	8 5/8	9 5/8	10 3/4	11 3/4	12 3/4
*Practical tip, diameter.....in.	2 7/8	2 7/8	3½	3½	3½	3½	3½	4	4

*2⅞ and 3½-in. tips take Poletube truck; 4-in. tips take Simmons truck.

Fittings for Setting Roof Poles

Braces—The following sketch shows whether braces will be in tension (T) or in compression (C) or in both (CT).

Two CT braces are the least possible and preferable because they minimize the number of roof penetrations.

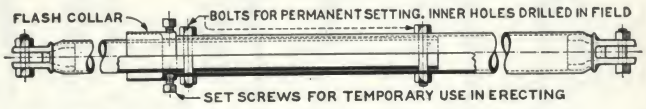


Three Types of Braces—



Standard Brace for Compression and Tension

2-in. extra heavy copperalloy steel pipe. 3-in. adjustment of maximum and minimum length. Turnbuckles are cast bronze



Telescope Brace for Compression and Tension

Particularly suitable where exact length of brace may be difficult to obtain. Made of copperalloy steel pipe as follows:
REGULAR: 2 and 1½ in.
HEAVY: 2½ and 2 in.
EXTRA HEAVY: 3 and 2½ in.
All with bronze flash collars



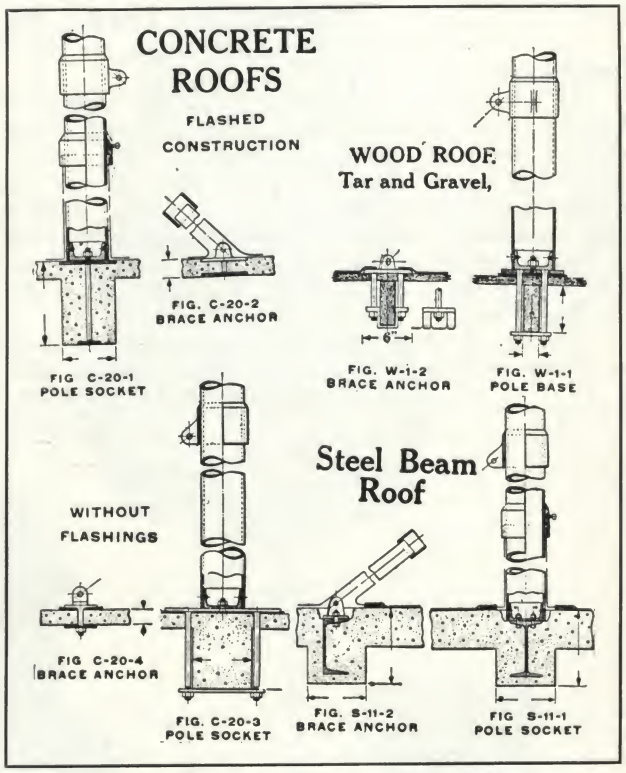
Tension Brace for Tension Only

Also suitable for compression with small poles. Made of high-grade threading steel in the following diameters:
REGULAR: 1 in. round.
HEAVY: 1¼ in. round.

We suggest that our patrons leave the selection of suitable braces to our experience and allow us to serve them with the best type at the least possible cost.

Brace Collar—All our brace collars are made of copperalloy steel pipe, swaged down to fit over the pole; chamfered for caulking and brace lugs welded, thus obviating corrosion at this vital part of the pole. Vastly superior to forged clamped bands.

Brace Anchors—All brace anchors are made to order to suit roof conditions for which detail should be submitted when ordering.

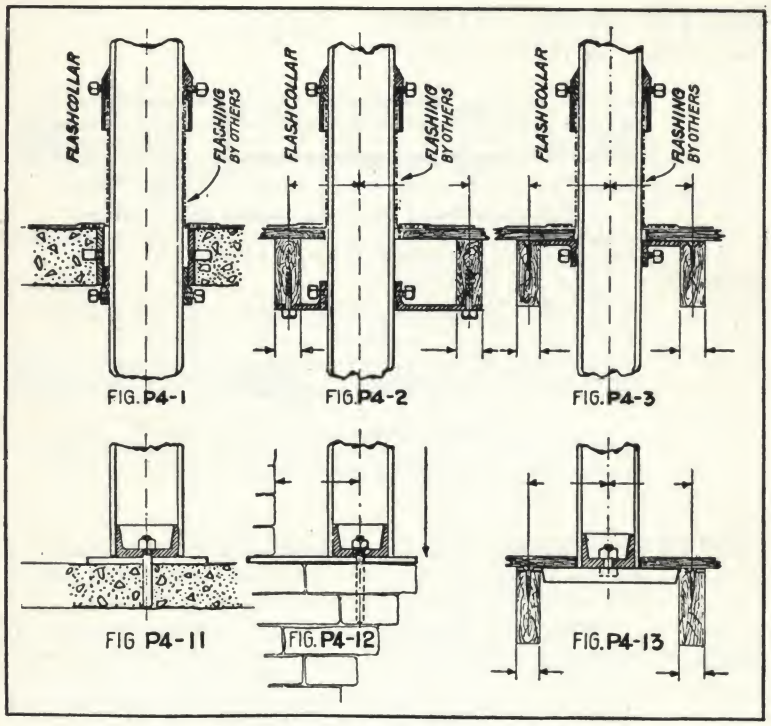


Typical Brace Anchors and Pole Bases

Specification

Furnish and erect where shown on plans, a .... ft. [Copperalloy Steel] [Bronze], [Standard] [Extra Heavy] flag pole as manufactured by THE POLE AND TUBE WORKS, INC., Newark, N. J. and in accordance with manufacturer's practice. Detailed working drawing to be submitted to the architect for approval. Trim pole with [.....] finial; [Poletube] [Simmons] truck; double ⅝-in. bolt rope halyard and cleats; flash collars; braces, etc., complete ready for use. Paint two coats after erection.

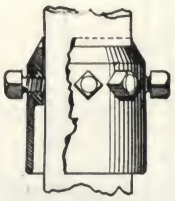
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Roof Tubes, Guide Flanges and Pole Sockets

Fig. P4-1: Roof Tube moulded into the roof slab. May be grouted into existing roof slabs.

Figs. P4-2 and P4-3: Guide Flange. Fig. P4-3 shows Guide Flange inverted to gain greater setting length. This should not be less than 10% of the pole height. Sockets are usually attached to a steel rest plate drilled to suit conditions



Flash Collar

Made in bronze up to 10¾-in. pole butt. In steel if larger.

The top of the collar is chamfered at 30°; this sharp chamfer to be calked back against the pole to which the flash collar is held by the setscrews

CONTINUOUS TAPER POLES

Copperalloy Steel, Bronze or White Metals

Description

In appearance a replica of an entasis tapered wood pole, smooth uninterrupted exterior without visible joints. Usually chosen for monumental effects and architecturally prominent projects. The entasis is individually computed out of the length proportion of the pole to the butt and tip diameters and is applied only to the visible part of the pole. Additional length required for setting (invisible) is added of standard pipe. It is advisable, therefore, to make the butt diameter of the visible taper pole equal to the pipe sizes as follows: 2⅞; 3½; 4; 4½; 5; 5 9/16; 6⅝; 7⅝; 8⅝; 9⅝; 10¾; 11¾; 12¾; 14; 15; 16; 18; 20; 24 in.

We excerpt from architects' designs average heaviest and lightest dimensions of visible portion of continuous taper poles as shown in following tabulation.

CONTINUOUS TAPER POLES

*Height, ft.	Diameters, in.		
	Butt	Tip	†Socket tube
Heavy Type			
20	5	3	5 9/16
25	5 9/16	3	6⅝
30	6⅝	3½	7⅝
35	7⅝	3½	8⅝
40	8⅝	4	9⅝
45	9⅝	4	10¾
50	10¾	4½	11¾
60	11¾	4½	12¾
65	12¾	5	14
70	14	5	15
75	15	5	16
80	16	5	18
90	18	5	20
100	20	5	22
Light Type			
20	4	2	4½
25	4½	2½	5
30	5	3	5 9/16
35	5 9/16	3	6⅝
40	6⅝	3½	7⅝
45	7⅝	3½	8⅝
50	8⅝	3½	9⅝
60	9⅝	3½	10¾
65	10¾	4	11¾
70	11¾	4	12¾
75	12¾	4	14
80	14	4	15
90	15	4	16
100	16	4	18

*Height is the visible, or exposed, portion of the pole.

†See following page "Construction of Flag Pole Monuments."

Note: Provided that the butt diameter be chosen as shown above, we can make Continuous Taper poles to any proportions of length and diameter desired.

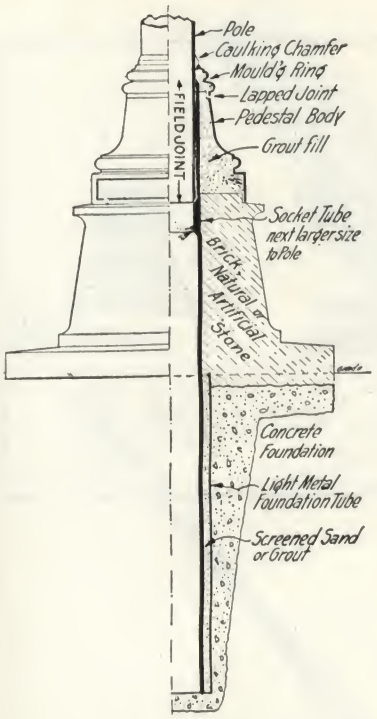


Steel Continuous Taper Pole

CASS GILBERT, Architect

50 ft. above bronze base, 12¾-in. butt

Continued on next page



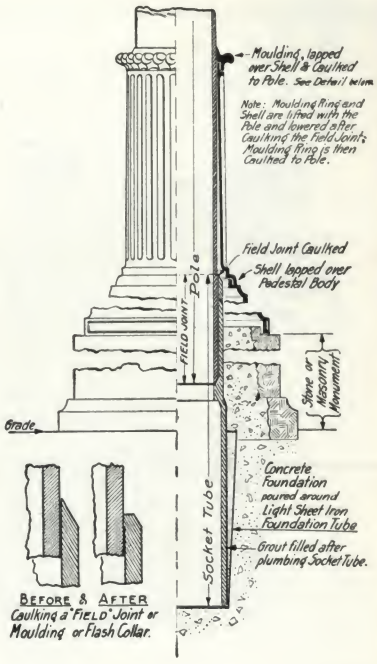
Construction of Flag Pole Monuments

The types of construction illustrated are recommended to architects as they are particularly designed to overcome some difficulties frequently arising during the erection process:

(1) Exposure of stone or masonry joints to possible gyrations of the pole in stormy weather during the setting of the cement.

(2) Necessity of passing the pole through an expensive metal pedestal and monument. The movements of a flag pole dangling from a gin pole or other rigging are difficult to control, especially in stormy weather.

(3) Necessity of hoisting the pedestal together with the pole—a rather risky procedure.



CAST IRON PEDESTALS

Painted or Galvanized



No. 1 (On Plinth)

Height with square base, 36 in., without base, 30 in. For 10¾ to 16-in. butt



No. 2 (On Plinth)

Height with 24-in. square, octagon or round base, 32 in., without base, 26 in. For 5 9/16 to 9⅝-in. butt



No. 3

Octagon only. Height 45 in. For 12¾ to 18-in. butt

Note: All pedestals shown are fitted at the orifice with *calking inserts* to be calked directly to the pole without lead, cement, etc. Joint will remain permanently tight.



No. 70

15½-in. square base only. Height 12 in. For 4½ to 6⅝-in. butt



No. 75

Made in three sizes

No.	Dia. of base, in.	Approx. height, in.	Butt, dia., in.
75-56	14¾	11½	5 9/16 and 6⅝
75-78	18	13	7⅝ and 8⅝

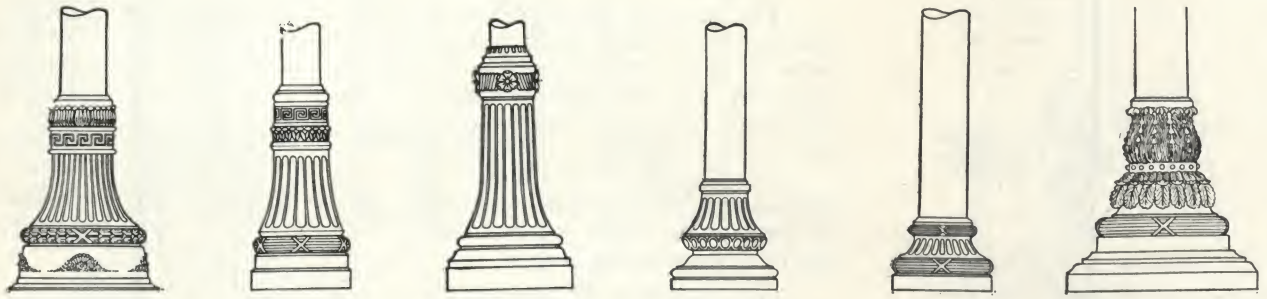


No. 4

Round only. Height 22 in. Diameter 27 in. For 9⅝ to 12¾-in. butt

STOCK PATTERNS

Continued on next page



No. 201
22 in. round
33 in. high
For 8⅝ or 7⅝-in. butt

No. 204
16 in. round
30½ in. high
For 6⅝ or 5 9/16-in. butt

No. 205
20 in. round
36 in. high
For 5 or 4½-in. butt

No. 207
17 in. round
17 in. high
For 6⅝ or 5 9/16-in. butt

No. 208
16 in. square
10½ in. high
For 7⅝ or 6⅝-in. butt

No. 210
30 in. square
28 in. high
For 8⅝ or 7⅞-in. butt

Class 200 Iron Pedestals, Painted or Galvanized

WINDOW OR OUTRIGGER POLES

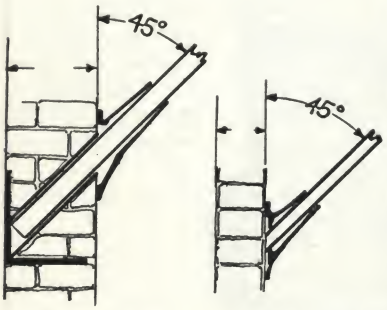
Copperalloy Steel, Bronze or White Metals

General Details

Window or outrigger poles are made in both swaged or continuous taper types and may be set at a permanent 45° angle in a fixed socket, or at any desired angle in a hinged socket.

The hinged construction is advantageous to the owner because repairs or halyard renewals are easily made without expensive rigging or scaffolding and without risk to the repairman and, therefore, at minimum cost.

All window or outrigger poles are furnished complete with bronze pulley block, ball finial, cleat and halyard.



Built-in Wall Socket **Face Mounted Socket for Small Poles**

W. P. 6 Socket—Permanent Angle

Maximum Capacity—4-in. poles in lengths ranging from 10 to 25 ft.

The casting is designed to support poles up to 10 ft. without hanger rods. Poles 4-in. diameter, or less, and up to 20 ft. long, may be mounted in a *built-in* wall socket as shown at the left, and finished with the W. P. 6 socket which in such cases acts ornamentally only. Wall sockets designed to meet individual conditions.

The W. P. 6 socket can also be used with 4-in. poles up to 25 ft. in length if supported by hanger rods with wall escutcheons and turnbuckles to match the design of the socket.

W. P. 5 Socket—Hinged

Maximum Capacity—4-in. pole; 16 ft. long.

A plain, substantial set furnished in three shapes—6-in. round, 6-in. square, and rectangular, 4x6 in. The three shapes are illustrated combined and interchangeable. The hanger rods illustrated are plain ¾ in. but can be furnished in ¾ in. square or twisted and ornamental couplers designed to match the escutcheons can be added.

W. P. 50 Socket—Hinged

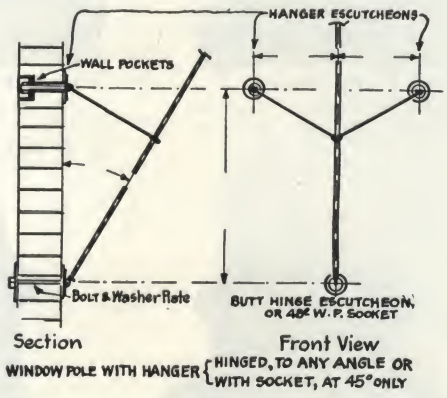
Maximum Capacity—5 9/16-in. pole; 30 ft. long.

Escutcheons are 9 in. round and are furnished in only one design as shown, and act ornamentally only—the stresses being upon steel lugs integral with the wall bolts. The hanger rods, shown with ornamental couplers, are ⅞-in. diameter and can be furnished plain or twisted, with or without ornamental couplers.

W. P. 500 Socket—Hinged

Maximum Capacity—4-in. pole; 22 ft. long.

Furnished exactly as illustrated without alterations.



Information Required for Hinged Poles

For hinged poles we should be supplied with the distances shown on the above sketch as well as the angle of pole desired.

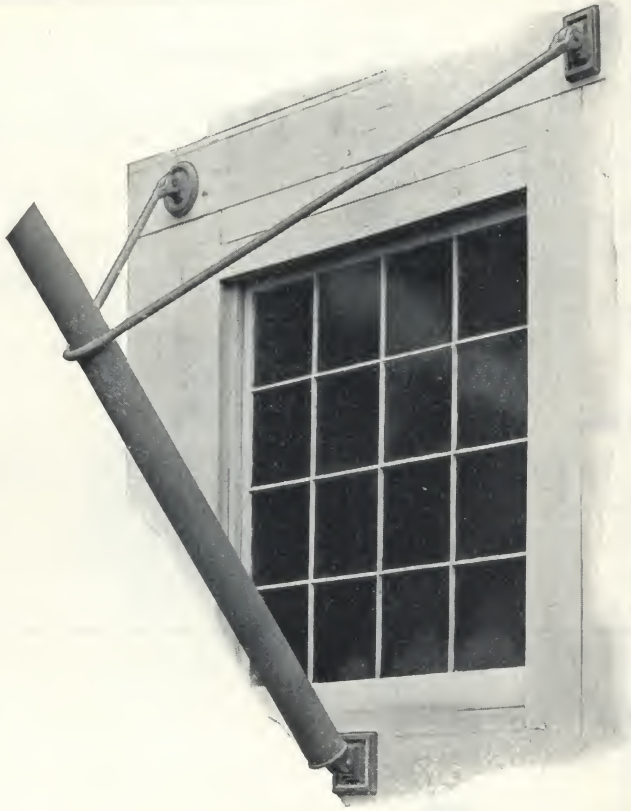
WINDOW OR OUTRIGGER POLES

Continuous Taper type.....	Dimensions, in.	2⅞x1½	3½x2	4 x2	4½x2	5 x2	5 9/16x2½	
	Lengths, ft.	7 to 20	16 to 20	16 to 25	16 to 25	22 to 30	30 to 40	
Swaged type.....	Dimensions, in.	2⅜x1⅞	2⅞x1⅞	3½x2⅜	4 x2⅞	4½x2⅞	5 x2⅞	5⅝x2⅞
	Lengths, ft.	6 to 12	10 to 20	14 to 20	16 to 25	22 to 30	25 to 30	30 to 40

Continued on next page



W. P. 6



W. P. 5



W. P. 50

W. P. 500

WINDOW OR OUTRIGGER POLES AND SETTINGS

In steel, bronze or white metals

Continued on next page

POLE APPURTENANCES AND TRIMMINGS

Vanes

Vanes are made 24, 36, 48, 60 and 72 in. Arrow vanes only are also made 30 in.

All vanes are available in the following finishes:

Regular: Cast iron cardinal points, wrought iron spire painted, other parts brass or copper.

Special: Entirely of brass and copper and practically indestructible by the weather.

Note: Both finishes include gilding with XXXX pure gold leaf over four coats of best English weatherproof sizing.

Eagle Vane—Measured by wing spread of eagle and equal length of arrow.

Arrow Vane—Measured by length of arrow.

Pen Vane—Measured by length of pen.

Finials

Eagle Finials—Measured by wing spread of eagle —24, 30, 36, 48, 60 and 70 in. Gold leaf finish same as vanes.

Ball Finials—For description see our first page. Made in diameters 4, 5, 6, 8, 10, 12, 14, 16, 18, 20 and 24 in.

Poletube Truck

See our first page for description.

Flag Locker

Protects flag, cleats and halyards against tampering and theft. Particularly useful in public parks and schools.

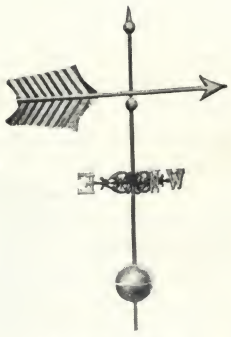
Made of Nos. 14 and 12 gauge iron, galvanized after fabrication and fitted with solid brass hinges and hasp. Furnished complete except padlock.

Cleat Covers

Protect halyards against tampering and theft and are usually ordered paired, one for each cleat; sometimes only one may be attached. Cast in iron, galvanized, and fitted with solid brass hinges. Furnished complete except padlock.



Eagle Vane



Arrow Vane



Pen Vane



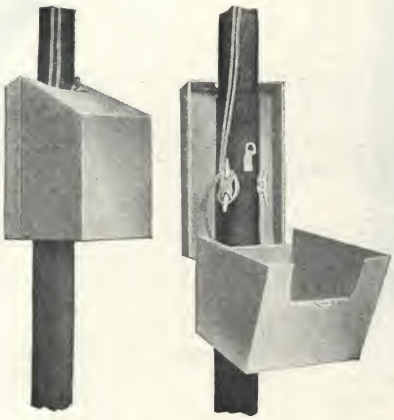
Eagle Finial



Ball Finial



Poletube Truck



Flag Locker



Cleat Cover

Continued on next page



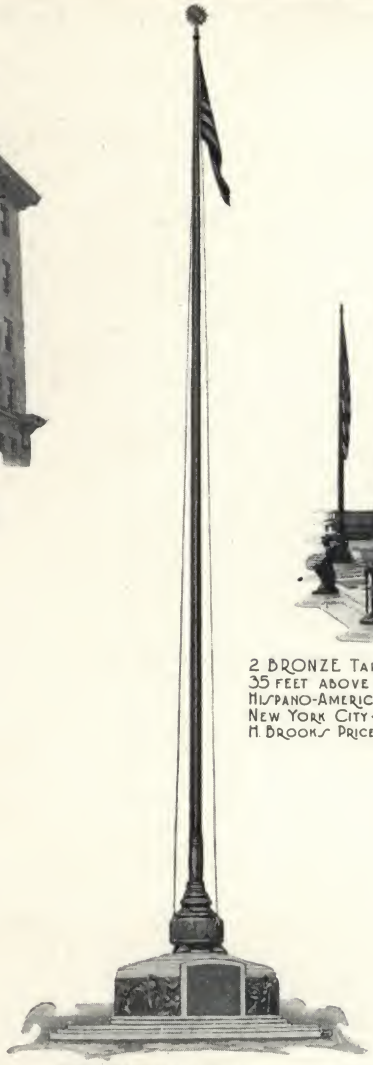
Group of Outrigger Poles
Grace Dodge Hostel (Y.W.C.A)
Washington ——— D.C.



2 Bronze Taper Poles
35 feet above Pedestal
Hispano-American Society
New York City ———
H. Brooks Price-Architect



Steel Taper Pole (War Memorial)
67 feet above Pedestal ———
South Orange ——— New Jersey
Arthur Dillon ——— Architect



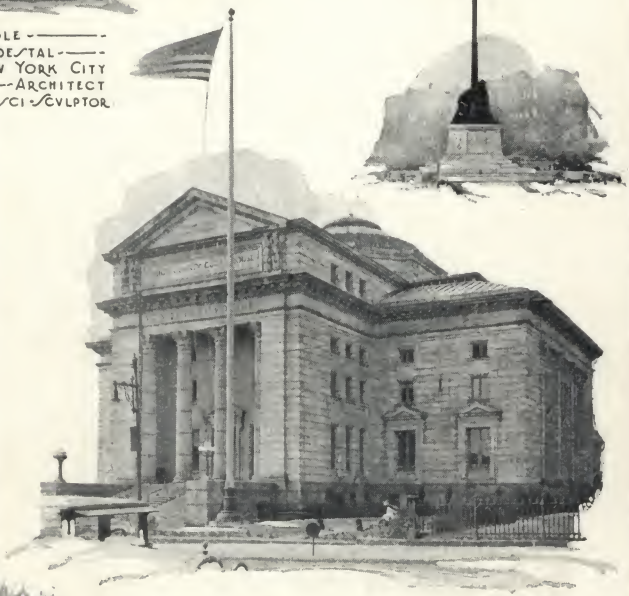
Bronze Taper Pole ———
100 feet Above Pedestal ———
Union Square · New York City
Chas. B. Meyers ——— Architect
Anthony De Francisci Sculptor



Steel Taper Pole (War Memorial)
50 feet above Pedestal ———
Lincoln Park · Newark ——— N.J.
Litchfield & Rogers · Architects
A.H. Niehaus ——— Sculptor



50 foot Steel Tapered Pole
North Ward National Bank —
Newark ——— New Jersey
Gilbert & Betelle · Architects



Steel Taper Pole ———
80 feet above Pedestal ———
Elizabeth · N.J. Court House.



Steel Taper Pole (War Memorial)
80 feet above Pedestal ———
Plainfield ——— New Jersey
Helmle & Corbett ——— Architects

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